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A GUIDEBOOK OF FINANCIAL TOOLS

April 1999 Revision

FOREWORD

The future course of environmental management in America is increasingly being viewed in the context of "sustainable systems." Such systems must exhibit sufficient institutional, technical, managerial and financial capacity to prosper and endure. The question of how to pay for - or how to sustainably finance - the continuing demands for pollution prevention and ecosystem protection is a central theme for the work of the U.S. Environmental Protection Agency's (EPA) Environmental Financial Advisory Board and the Agency's network of university-based Environmental Finance Centers. This *Guidebook* is intended to be a working tool to enable practitioners in the public and private sector to find the appropriate methods to pay for environmental protection efforts.

The genesis of this 1999 *Guidebook* remains the 1992 report of EPA's State Capacity Task Force on Alterative Financing Mechanisms. This report was so well-received that a significant expansion seemed the natural thing to do. In a real sense, this and future *Guidebook* updates will remain as final drafts. The reason is not the lack of information needed to ensure completion: quite the contrary. We found in pulling together this extraordinary amount of material that there is so much going on that by press times we always have more tools to be added. Therefore, we have determined to continue to undertake periodic updates of the *Guidebook*. To this end, we ask *Guidebook* users (via Appendix F) to send us suggestions for new tools and changes and additions to those listed.

The main laboratories for this fascinating environmental financing experimentation are, not surprisingly, found at the regional and local levels. The financing arrangements that will characterize how we will pay for the next generation of pollution prevention and ecosystem prevention are even now being formed in this crucible.

We remain deeply indebted to the members of the Environmental Financial Advisory Board and the Directors and Staff of the Environmental Finance Centers for their contributions to this body of work. Without the efforts on the part of these worthy practitioners in the finance arena, the *Guidebook* would remain an unfulfilled goal. Special thanks are also due to past and present EPA Environmental Finance Program staff -- Victoria Kennedy, William Bivens, and Tim McProuty. Finally, Ms. Diane Doyle of GCI Information Services must be thanked for her efforts to ensure the accuracy of Internet addresses throughout the *Guidebook* and for loading the entire document on the Environmental Finance Program's Web site.

John C. Wise
Executive Director, Environmental Financial Advisory Board

A GUIDEBOOK OF FINANCIAL TOOLS

April 1999 Revision

ABSTRACT

The April 1999 revision of the *A Guidebook of Financial Tools* is a reference work intended to provide an overview of a wide range of ways and means that are useful in paying for sustainable environmental systems. It is divided into 10 sections, presenting outline information on approximately 340 financial tools. The first five sections present comprehensive financing tools that include traditional means of raising revenue, borrowing capital, enhancing credit, creating public-private partnerships, and ways of providing technical assistance. The next five sections present financing tools that are, will, or might soon be, available to address significant environmental priorities, including ways of lowering the costs of compliance, encouraging pollution prevention, paying for community-based environmental protection, financing brownfields redevelopment, and improving access to capital for small businesses and the environmental goods and services industry. Each tool is described along with its actual and potential uses, advantages and limitations, and references for further information. The *Guidebook* is the product of a collaborative effort among members of the United States Environmental Protection Agency's (EPA) Environmental Financial Advisory Board, the Directors and staff of eight university-based Environmental Finance Centers, the staff of EPA's Environmental Finance Program, and numerous other contributors. The *Guidebook* contains forms for users to provide comments and suggestions, and it will continue to be revised and updated as necessary. In this spirit, the *Guidebook* also now provides users and readers with a site in its electronic version (Appendix A.) for exciting new financing tools to be added during the time between hard copy revisions. The *Guidebook's* location on the World Wide Web (Internet address) is: **http://www.epa.gov/efinpage/guidbk98/index.htm**

OVERVIEW OF COMPARATIVE CRITERIA USED IN THE *GUIDEBOOK*

April 1999 Revision

A number of criteria are used throughout this *Guidebook* to compare the current use and potential effectiveness of individual tools relative to one another in each section. The criteria are discussed briefly in the single page narratives of the individual financial tool write-ups, chiefly under the "Advantages" and "Limitations" headings. The comparative criteria also are summarized in matrix form at the end of most sections.

The comparative criteria are meant to describe and compare single financial mechanisms with others within each section, in order to give the reader some sense of the prevalence of use and potential longer-term effectiveness of individual mechanisms. The criteria used in this *Guidebook* are drawn from the general literature on revenue raising and financing mechanisms, and the experience of States, localities and the private sector in using particular tools. Necessarily, some comparisons are somewhat subjective, since data on many tools are not available, for example, data on the incidence of actual use. Other criteria depend on public or private sector viewpoints, for example, whether a tool is considered relatively easy to use, readily accessible, or reasonably priced. Thus, the comparative criteria are meant to provide the reader some perspective on the large of number of tools presented in this *Guidebook*, and some reasons why one or another tool might be utilized.

At the end of each section, the authors' judgements as to how individual tools might be compared to one another are summarized in a Comparison Matrix, with ratings of "High", "Moderate", and "Low" assigned to make these comparisons. On occasion, some numerical value or objective data are presented, such as the number of States using a tool or money raised or spent, and these data are summarized at the bottom of the chart. However, most typically the ratings, while incorporating such data, are for comparison purposes only.

Stars (*) also are used in the list of opening list of tools described in each section, as well as in the matrices, to provide the reader with a summary of which tools have been most highly rated. The stars (*) are meant to provide some measurement, necessarily subjective, of past effectiveness, and a sense of those financial mechanisms which seem the most durable, i.e., able to stand the test of time. Tools which may be short-lived, for example, tools which depend on tax code changes or special assistance program, are not considered durable.

Ten sections in this *Guidebook* use six, and sometimes seven, criteria to compare individual financial tools presented in the individual section. However, Section 2C on "Grants" does not have a comparison matrix.

For the ten sections, the criteria are the same for the most part, with several exceptions as noted below, and some variation in terms of emphasis or nuance in each section, as described in the narratives accompanying each section and each tool. A total of nine comparative criteria are described below.

1. Actual Use: All sections of the *Guidebook* give some indication of current State and local government, and/or private sector, use of a particular funding mechanism. Actual (current) use may give some indication of the stage of development of individual tools, i.e., how long they have been in existence, how widely available or applicable they are on a geographic basis, and their acceptability. Financing mechanisms presented in **Section 1 "Tools for Raising Revenue"**, must be **dedicated** to environmental protection, as opposed to being used for non-environmental purposes, to be counted. The number of States using a particular tool does allow some numerical data to be included in the ratings from "High" to "Low", for example, high use might mean that a tool is used in over twenty-five States, as opposed to low use, for example, under ten States. Actual use cannot measure the potential effectiveness of newly created tools, since by definition they are in their infancy.

2. Revenue Size: This criterion gives an indication of the relative annual sum of money that is raised or invested within States, annually, as a result of using the financial mechanism, or in some instances the potential sum of money. Revenue size is used in all sections, but only rarely is accompanied by dollar amounts since in most cases these data have not been collected nationwide. In those cases where actual use of a tool is low either because it is new or because it is not dedicated to the environment, **potential** revenue size is estimated. For example, tobacco taxes are widely used by States but typically not dedicated to environmental protection. However, since these taxes yield comparatively large revenues, size is rated "High". Revenue size gives some indication of the actual or potential effectiveness of a particular financing tool in terms of environmental benefits, although it is not presented in relationship to total environmental needs. Low revenue size may not mean that a tool is ineffective, because it may be offset by other criteria scoring high, for example, the ability to leverage other financial resources, or the ability to enhance environmental awareness. However, low revenue size may signal problems, for example, it might suggest levying an environmental fee or tax cannot be justified in terms of added administrative costs, time and political difficulties. A proliferation of many small programs may be confusing and burdensome, leading to a decline in public acceptability.

3. Revenue Stability: This criterion is used only for **Section 1 "Raising Revenue"** and for **Section 2B "Loans"**. Here, the relative stability and predictability of annual revenues is compared for each tool to indicate whether the revenue source can be relied upon and readily estimated, audited, and factored into budgetary decisions. Revenue stability can influence the dedication and use of taxes, fees and special changes (e.g., low-to-moderate), but stable revenue receipts would be suitable for funding State operating budget costs such as personnel, and larger, steady revenue streams could be used for capital for infrastructure construction. Many factors can contribute to revenue instability. Examples include consumer product substitution, pollution "havens" in different geographical areas, political decision-making, tax laws and general economic conditions. Revenues from pollution control fines, penalties and cost-recovery are unpredictable and may result only after protracted legal negotiations.

4. Revenue Cost/Savings: Revenue cost/savings is used in six sections. This criterion relates the rough dollar cost of the financial tool to the user with the amount of revenue saved or accessed as a result of using the tool. For example, private bond insurance is relatively costly but it can lower interest costs substantially through improved bond ratings, and may be critical to attracting bond investors. Similarly, private sector use of surety and performance bonds may enable a project to move forward. Privatization can result in lower construction, operations and maintenance costs, which may be translated into lower user fees, compared to the public alternative. Refinancing, while incurring new bond issuance fees and legal costs, can lower annual interest payments considerably.

5. Administrative Ease: Administrative ease is used as a comparative criterion in all sections, addressing practical issues pertaining to both the providers and users (clients) of the financial tool. Such issues include the basic complexity or simplicity of the mechanism, demands on staff time to process paperwork, handle applications and red tape, and the flexibility provided in the administration and use of a financial tool. For **Section 1 "Raising Revenue"**, administrative factors are of special concern to the government imposing the tax, fee or fine, for example, the administrative costs of imposing new fees, particularly establishing collection system, and the costs of legal enforcement proceedings for pollution fines and penalties. For the other sections, administrative ease also can refer to the users of the financial tool, for example, whether the tool is complicated to understand, whether using it is burdensome in terms of staff time and paperwork, whether expensive legal advice is required, whether voter approval must be sought. Tools which provide hands-on technical assistance can be administratively time-consuming for the provider, but on the other hand are easy to use for the client.

6. Equity: Equity also is used in all ten sections, with varying nuances as described in the text. Equity in some sections is used to compare the extent of direct public participation in the choice to use a given tool, or even how to structure the tool. For example, any bond or other local fund-raising device which requires local voter approval is described as highly equitable. Equity also is used extensively to compare the accessibility of the financial tool to small versus large potential users and to compare the costs of the tool for different clients or those who pay. Tools are most equitable if they reflect affordability concerns or special circumstances of the user, for example, in the case of fees and taxes adopting graduated or non-regressive rate structures. Taxes which are paid for by non-residents as well as residents, both of whom may benefit from an environmental improvement, also are highly equitable. Tools are relatively inequitable if all users pay the same price regardless of economic circumstances, if small users pay more since investment is considered more risky, or if certain businesses pay much more than others. Some tools are simply not available to certain small users if they are too costly or complicated, and thus are not particularly equitable.

7. Cost/Benefit Relationship. The cost/benefit relationship applies only to **Section 1 "Raising Revenue"** and **Section 8 "Community-Based Environmental Protection"**. Here, the relationship addresses "who pays" the tax or fee or other costs and "who benefits" from subsequent environmental project investment with the dollars collected. A high or close cost/benefit relationship results when people

who pay can see or directly benefit from specific environmental projects, such a temporary local sales tax add-on to acquire park land. A high cost/benefit relationship may enhance the public acceptability of the financing mechanism. A high cost/benefit relationship also describes situations in which the "polluter pays" principle is applied, although this may result in inequities if costs are economically burdensome. In many sections, a high cost/benefit relationship clearly is present since the users who purchase the financing tool do so for their own benefit, such as a loan or credit enhancement device.

8. Financial Leveraging: This criterion is used in half of the sections to compare the ability of individual financial tools to leverage, free up or attract additional dollars from other sources. For example, State Revolving Funds selling bonds to make loans are highly financially leveraged, since more projects can be initiated in the short-term. Loans are more leveraged than grants, and loans under 100% are further leveraged. Financial outreach, or technical assistance, is a leveraging device since local managerial capacity is heightened which adds to investor willingness to extend credit. Small businesses similarly can make improve their capacity to attract investment by steps such as preparation of business plans and Internet use. Some locally approved tax and voluntary community-based environmental protection fund raising are matched by other public and private sector monetary grants or donations.

9. Environmental Benefits: Environmental benefits can result in a variety of ways, some direct and others less tangible. The most obvious environmental benefit occurs when an environmental project proceeds as a result of using the tool, such as construction of a drinking water treatment plant or brownfields redevelopment. However, other environmental benefits may be more indirect. For example, pollution prevention and recycling, "green" products and marketplace substitutions, conservation easements and development rights purchases, lands placed in trusts, and other measures may forestall or delay impact of pollution, although difficult to measure in the short-term. Paying an environmental tax may result in heightened public awareness of environmental problems and public financing possibilities, as well as change subsequent polluting behavior. Some financial tools call attention to positive as well as negative environmental impacts and provide incentives to increase environmental financing. Other mechanisms enhance the popularity and acceptability of additional pollution control regulations. Hands-on technical assistance and outreach may increase local capacity to pay for and manage critical environmental assets. Involving the private and nonprofit sectors in project funding, operations and maintenance vastly multiples the possibilities for environmental progress. In this *Guidebook*, only those financial tools which have no known environmental impact or are neutral are described as "Low".

1. TOOLS

FOR

RAISING REVENUE

1. TOOLS FOR RAISING REVENUE

This Section describes specific financial mechanisms which States and localities can use to raise revenue to dedicate to funding environmental protection. Four ways of generating monies are presented: taxes, both general and selective; fees; special charges primarily for "polluting" activities; and pollution control fines and penalties. While many of these tools are used by the federal government, the primary focus here is on State and local governments.

Taxes are by far the largest source of revenue for State and local spending, and are imposed on individual and business income and property, and commodity sales. Sales taxes, often termed sales and use taxes, may be general in nature or selective, such as tobacco taxes. In contrast, fees are much less universally used and generate far less revenue. Fees are fixed charges paid for governmental administrative services such as permit issuance, activities such as park fees, and for utility services (user fees). Of these, only user fees raise significant revenue. Special charges are similar to fees but are aimed specifically at "polluting" activities such as effluent and emission discharges and development impact fees. Fines and penalties are monetary or in-kind payments assessed by government on violators of environmental laws and regulations, and in this *Guidebook* include Superfund liability cost-recovery. Both special charges and fines/penalties are used sporadically and selectively by governments.

Raising revenue through taxes, fees and other means is a multi-step governmental process, and all steps are complicated and controversial. Imposition of charges is only the first step in the legal process. Taxes, fees and special charges also must be designed to enable systematic collection and limit possible circumvention. The next step of ensuring environmental dedication is just as critical. Dedication to environmental improvements is by no means a foregone conclusion, even for supposedly earmarked taxes, since all government-funded programs including social services vigorously compete for monies and the popularity of environmental issues rises and falls over time. Dedication can be made directly to a specific project such as a park, or indirectly as a source of bond repayment.

Some revenue generation tools are more suitably dedicated to specific environmental work than others. For example, large and relatively stable revenue sources may be ideal for environmental infrastructure capital and land-related projects such as parks, while smaller mechanisms can fund program operating functions such as personnel, monitoring, and technical assistance. Some taxes, fees and special charges have dual purposes of revenue raising but also as market devices to alter polluting behavior, which may result in lower revenue collection. State and local governments understand that imposing costs is onerous to those who pay, unlike many tools presented in this *Guidebook* which arise from the voluntary action of individuals and businesses.

1.A. TAXES

1.A. TAXES

Description: Most taxes are charged against income, property or sales. Income taxes are charged as a percent of the money earned by an individual or corporation; property taxes are based on a percentage of the value of property owned; and commodity taxes; typically called sales and use taxes, are charged as a percentage of commodity value or a flat rate per transaction. Most States have a general sales and use tax on retail sales of commodities, and local governments often have riders charging an additional surtax to fund local government. In addition to general sales taxes, all States and many localities impose selective taxes on the sales of particular products or services, such as gasoline and tobacco taxes. In all, 23 States earmark a portion of State taxes to the environment, although there is considerable variation among States. In this report, tax "base" refers to the segment of population, products, activities or pollutants on which charges are imposed. Tax "rate" refers to the structural design of tax schedules, i.e., whether flat rates, graduated rates, volume/toxicity based rates, percentages, or other structures are employed.

Advantages: Taxes typically have a broader revenue base than the fees presented in Part B, and therefore can generate high revenues at relatively low rates, although the special charges in Part C also have significant potential. For example, States can levy sales taxes on fertilizer at rates of cents/per pound and generate millions of dollars annually. Dedicating a surcharge on an existing tax to environmental programs, or even a percentage of existing taxes, involves little additional administrative costs. Local governments sometimes can pass a "piggy-back" tax on existing State taxes, generating local revenue, although in some States this may require legislative authorization and voter approval. In most States, income, property and sales data are already reported, thus further reducing administrative costs of new surcharges.

Limitations: Public opposition to new or increased taxes often hinders legislative passage. Unlike fees, many taxes are used for general budgetary support and historically have remained undedicated to particular programs, with clear exceptions such as gasoline taxes. In some States, institutions do not exist for arranging the dedication of taxes to particular programs, or there may be constitutional or statutory limitations on dedication, or "earmarking" as it is often termed. Depending on the market in question, some taxes may be inappropriate financing mechanisms for those pollution control activities that require a predictable amount of revenue every year. Tax bases may shrink due to general economic conditions or behavioral responses to tax imposition, such as conservation of product use or product substitution in the case of some selective sales taxes. Also, unless the tax is targeted to a particular type of property, income or sales, there is only an indirect relationship between the tax base and use of funds, what is termed herein a weak cost/benefit relationship.

Two types of taxes are discussed here: **General taxes** and **selective sales taxes**. The operating principles and dedication opportunities are different in these two cases, so they are evaluated separately in the following pages.

1.A.1. GENERAL TAXES

1.A.1. GENERAL TAXES

Description: A general tax is a tax whose burden falls upon very broad section of the general public, such as wage earners or property owners. State and/or local general taxes are charged against personal and corporate income, property, and commodity sales. Income taxes are levied as a percent of the money earned by an individual wage earners or corporation. Property taxes are based on a percentage of the value of property owned. General commodity taxes, called sales and use taxes, are imposed as a percentage of the commodity value, or as a flat rate per transaction, and are contrasted with selective sales taxes discussed later. General taxes may fund environmental projects through earmarking or specific tax surcharges or add-ons. Historically, States have set the rules for how local governments are organized and conduct their affairs, including raising money. Recently however, localities have appeared more active in seeking and receiving more finance discretion for increasing taxes.

Advantages: General taxes typically have a broader revenue base than other revenue sources and therefore can generate high revenues at relatively low rates. Not only is the tax base large, but income tax rate structures typically are graduated, or proportional, thus increasing equity. Sales and property taxes are more regressive. When local support is high, temporary local tax surcharges may be an effective environmental financing avenue.

Limitations: Imposing or increasing general taxes generally requires legislative action and public opposition often hinders its passage. Since general taxes are not targeted at a particular type of environmentally-related property, income or transaction, there is only an indirect relationship between the tax base and the use of the funds (i.e., a weak cost/benefit relationship). General taxes are a more traditional source of revenue for programs such as education and social services, and thus may be already "tapped out". It may be difficult to safeguard the earmarking of portions of general taxes for environmental purposes over time, since the competition from other programs will persist. A serious concern also pertains to whether earmarking of general tax revenues constitutes sound budgetary and fiscal policy, since earmarking constrains current policy makers' ability to direct funds where they may be most needed, or demanded, at any particular point in time.

Summary: Historically, general taxes have not been the best source for environmental funding compared to revenue sources aimed at more specific products or activities with a more direct relationship to the environment. In particular, State earmarking has been rare. However, in recent years States have granted localities more authority to levy tax surcharges or add-ons which have been dedicated to the environment, especially parks and conservation.

The nine general taxes described here are compared using seven criteria including:

1. Actual Use: Actual (current) use may indicate the developmental stage of individual taxes, i.e., how long they have existed, how widely available or applicable they are on a geographic basis, and their acceptability. Taxes presented in the section must be **dedicated** to environmental protection to be counted. The number of States using a tax allows some numerical data to be included in the ratings from "High" to "Low". For example, high use might mean a tool is used in over 25 States, as opposed to low use meaning under 10 States. Actual use cannot measure the potential effectiveness of new taxes, since by definition they are in their infancy.

2. Revenue Size: This criterion helps indicate the annual sum of money raised or invested, or in some instances the potential sum of money. Revenue size is rarely expressed in dollars since in most cases this data has not been collected nationally. Where a tax's use is low because it is new or not directed to the environment, **potential** revenue size is estimated. Revenue size may give an idea of the actual or potential effectiveness of a tax in terms of environmental benefits, but not in relation to total environmental needs. Low revenue size may not mean that a tax is ineffective, because it may be offset by other criteria scoring high, i.e., the ability to leverage other resources, or enhance environmental awareness. However, it may signal problems, i.e., by suggesting that levying a tax cannot be justified in terms of added administrative costs, time and political difficulties.

3. Revenue Stability: The relative stability and predictability of annual revenues is compared for each tax to indicate whether the revenue source can be relied upon and readily estimated, audited, and factored into budgetary decisions. Revenue stability can influence the dedication and use of taxes. Stable revenue receipts would be suitable for funding State operating budget costs such as personnel, while larger, steady revenue streams could be used for capital infrastructure construction. Many factors contribute to revenue instability, such as product substitution, pollution "havens" in different geographical areas, political decision-making, tax laws and general economic conditions.

4. Administrative Ease: Administrative ease addresses practical issues pertaining to the providers and users of a tax. Such issues include the tax's complexity/simplicity, demands on staff to handle paperwork, applications and red tape, and the flexibility in administration and use. Administrative ease also can refer to users of a tax, i.e., whether it is complicated, whether using it is burdensome in terms of staff time and paperwork, whether expensive legal advice is required, and whether voter approval must be sought. Taxes which provide hands-on technical assistance can be administratively time-consuming for the provider, but on the other hand are easy to use for the client.

5. Equity: Equity can be used to compare the extent of public participation in the choice to use a tax, or even how to structure it. For example, a tax which requires local voter approval is described as highly equitable. Equity also is used extensively to compare the accessibility of the tax to small versus large potential users and to compare the costs of the tax for different clients or those who pay. Taxes are most equitable if they reflect affordability concerns or special circumstances of the user, for example, in the case of taxes adopting graduated or non-regressive rate structures. Taxes which are paid for by non-residents as well as residents, both of whom may benefit from an environmental improvement, also are highly equitable. Taxes are relatively inequitable if all users pay the same price regardless of economic circumstances, if small users pay more since investment is considered more risky, or if certain businesses pay much more than others. Some taxes are simply not available to certain small users if they are too costly or complicated, and thus are not particularly equitable.

6. Cost/Benefit Relationship. This criterion addresses "who pays" and "who benefits" from the environmental investment made with the taxes collected. A high or close cost/benefit relationship results when those who pay can see or directly benefit from specific environmental projects, such a temporary tax add-on to acquire park land. A high cost/benefit relationship may enhance public acceptability of a tax. It also describes situations in which the "polluter pays" principle is applied, although this may result in inequities if costs are economically burdensome.

7. Environmental Benefits: Environmental benefits may be both direct and indirect. The most obvious environmental benefit occurs when a project proceeds as a result of using a tax, such as construction of a water treatment plant or brownfields redevelopment. Other environmental benefits may be indirect, i.e. paying a tax may result in heightened public awareness of environmental problems and public financing possibilities, as well as change polluting behavior. Some taxes may call attention to positive as well as negative environmental impacts and provide incentives to increase environmental financing. In this *Guidebook*, only those financial tools which have no known environmental impact or are neutral are described as "Low".

LIST OF GENERAL TAXES
(In Alphabetical Order)

*1. Corporate Gross Receipts Taxes
2. Corporate Income Taxes
3. Death and Gift Taxes
4. Individual Income Taxes
*5. Local Sales Taxes
6. Personal (Tangible) Property Taxes
*7. Real (Ad Valorem) Property Taxes
*8. State Sales and Use Taxes
9. Value-Added Taxes

* Stars indicate most highly rated mechanisms as described in the Comparison Matrix at the end of the narratives. See Introduction to the *Guidebook* for a description of the criteria used. Ratings of "High", "Moderate", and "Low" are for comparison purposes only, as some ratings are necessarily subjective and data are incomplete.

CORPORATE GROSS RECEIPTS TAXES

Description: These corporate taxes are assessed on the gross receipts of businesses, in some States in lieu of corporate income taxes.

Actual Use: Several States have general taxes on gross receipts of businesses. Portions of these receipt revenues are targeted to specific environmental programs. For example, Delaware dedicates 2.9% of its general gross receipts taxes to a hazardous waste clean-up fund. New Jersey has a general hazardous waste gross receipts tax dedicated to site clean-up.

Potential Use: Gross receipt tax revenues in each State from particular businesses could be dedicated to the environmental program area that the business activities affect. For example, monies from the gross receipts of dry cleaning businesses could be used to fund small source air emission reduction programs.

Advantages: When tax revenues are dedicated, businesses engaged in environmentally-sensitive activities pay for the remediation of problems. Unlike net income taxes, gross receipts taxes are based on the full size of the business and are charged against a broader revenue base. Revenue yield could be quite significant, although it may vary considerably depending on general economic conditions or other factors. Dedicated taxes also mean that the cost/benefit relationship is sustained. Gross receipts taxes may be more simple and equitable, because they employ more reliable administrative and accounting procedures, than other kinds of taxes. For example, for hazardous waste, data on gross receipts are more accurate than data underlying a tax on hazardous waste volume produced or feedstock used.

Limitations: Gross receipts taxes may have a disproportionate impact on smaller businesses and on those with high receipts but also high costs. There is no incentive to improve management practices that contribute to problems, since producers pay the same percent tax regardless of recycling programs or other efforts at reducing solid waste. The lack of environmental incentives could be overcome if the tax were structured to provide rebates for recycling or waste reduction, but this would add to administrative complexities and result in lower revenues.

Reference for Further Information: National Conference of State Legislatures (NCSL), *Earmarking State Taxes,* Denver, Colorado, April 1995.

CORPORATE INCOME TAXES

Description: Corporate income taxes are based upon the net income earned by corporations in a given State. They sometimes are established as, and termed, corporate franchise taxes.

Actual Use: State dedication of corporate income taxes to environmental protection has been rare. Ohio dedicates 1.2% of its corporate income tax revenue to litter control and recycling. Pennsylvania allocates 3.8% of its capital stock and franchise tax to a hazardous waste clean-up fund. Arizona commits 0.2% of its corporate income revenue to environmental programs. The federal government uses an environmental tax surcharge on corporate income, under the Alternative Minimum Tax provisions of the Tax Reform Act of 1986, to fund part of the Superfund Trust Fund. The federal tax is 0.12% of taxable corporate income in excess of $2 million. A few States offer corporate income tax credits for land donations (see **Section 1.A.1.: Individual Income Taxes**).

Potential Use: Corporate income tax revenues could be dedicated to finance environmental programs that stem from the corporate activity itself. For example, if two percent of revenues were generated from mining companies, the State could earmark that portion for erosion control, habitat restoration, and other activities that mitigate the environmental impacts of mining. Similarly, revenues from drink bottle companies could be used to finance state recycling programs.

Advantages: With a relatively broad revenue base, corporate income taxes or surcharges can be charged at relatively low rates and still generate significant revenues. They can spread the costs of the environmental impacts of business activities to out-of-state consumers, adding pollution control to the overall costs of production. For example, a paper company might pass on the cost of a corporate income tax to its customers via a price increase. These revenues could be used to help mitigate environmental impacts of the paper production process, and improve the equity and cost/benefit criteria.

Limitations: Increasing corporate tax rates may be politically difficult, since States attempt to be competitive with other States in order to attract corporations. Net income may not serve as a good measure of the actual size of a corporation, since many corporations have small incomes relative to their gross receipts. This reduces the equity potential of the tax. Of the three main state general taxes (i.e., personal and corporate income, and general sales taxes), the corporate income tax is the least stable. As net corporate income varies tremendously from year to year, the revenue stream will be unpredictable and thus may be unsuitable for some types of environmental program budgets. Corporate headquarters may be located in a different State from production activities, meaning that the revenues from the income tax may not go to the state that experiences environmental damage from a corporation's production activities.

References for Further Information: National Conference of State Legislatures (NCSL), *Earmarking State Taxes,* Denver, CO, April 1995.

DEATH AND GIFT TAXES

Description: Death and gift taxes, or inheritance taxes, are taxes on inherited property or gifts worth more than a set amount. Inheritance taxes can be structured to provide tax relief for property owners making outright land donations or by placing conservation easements on inheritance land, even during a donor's lifetime.

Actual Use: All States now have inheritance tax programs although they vary considerably, Typically, State death and gift taxes have been dedicated to local government, pension funds, and local police and fire protection funds, but not the environment. Most States also structure inheritance taxes to provide tax relief for land donated to State or Local governments or nonprofit land trusts, although not always for conservation easements.

Potential Use: States could earmark a portion of death and gift taxes to general environmental programs. Alternatively, they could structure such taxes to encourage land conservation. Bargain sales of natural land to State and local park services, or anti-development deed restrictions (i.e., conservation easements), could be regarded as non-taxable gifts by the landowner, as is currently done under the federal tax code. While this does not raise revenue per se, it would lower the costs and increase the administrative ease of natural lands acquisition.

Advantages:. Inheritance taxes provide a very broad revenue base. If taxes are structured to provide incentives for land donation, i.e., by offering tax-exempt status for the landowner, this may provide State and local parks with additional natural lands at a much lower cost than outright purchase. In times of tight State or local budgets, this facilitates continuation of open space acquisition programs. The donated land can be purchased and managed initially by State or local land trusts such as The Nature Conservancy, until the appropriate State or local agency can assume responsibility.

Limitations: Using death and gift taxes to provide incentives for land conservation or donations decreases government cash revenues. It may also be difficult to evaluate which gifts are actually valuable natural lands. While most States have natural heritage programs and work closely with non-profit conservation organizations to establish land protection criteria, for example, the presence of rare animal and plant species or natural habitats, potential land donors may not recognize such criteria. For "less valuable" open space, States or localities must then work with non-profit land trusts to sell such property and use the proceeds for other land protection activities.

Reference for Further Information: The Nature Conservancy, *Guidebook for Land Giving and Trusts,* Arlington, VA, 1993; The Trust for Public Land, *Doing Deals: A Guide to Buying Land for Conservation*, San Francisco, CA, 1997.

INDIVIDUAL INCOME TAXES

Description: Individual income taxes are assessed based on a specified percentage of income earned by individuals.

Actual Use: States and counties typically use income taxes for general fund support. Presently, at least 17 States earmark a share of their State individual income tax for local governments, most commonly for education. However, only a few States earmark for environmental purposes. For Example, Arizona earmarks 0.2% for environmental protection, in this case to a water quality revolving fund. The federal government has allowed deductions for donated land for some time. Other States use property tax credits for the same purpose.

Potential Use: A large potential use of State and local income taxes for the environment may come from income tax credits for land donations, conservation easements, and voluntary income tax check-offs (see **Section 8., Contributions of Land**). For example, North Carolina has an individual and corporate income tax credit of 25% of the value of the donated real property. When the initial $5,000.00 annual credit cap was raised to $25,000.00 in 1989, donations grew from $800,000.00 to $17.5 million. Credits can be carried over to succeeding years. California has discussed, but not passed, an ambitious credit of 60-85% of the value of land or water rights donated, which is weighted so that higher taxable incomes receive the lower percentage credit.

Advantages: Earmarking the income tax for environmental funding could provide significant revenues at a very low percentage rate, with a highly stable tax base and revenue stream suitable for dedicating to State or county capital infrastructure construction funds. Tax credits for land donated or easements could provide considerable incentives to landowners to make such donations, particularly in times when tax-averaging would be beneficial.

Limitations: In most States, it is politically difficult to increase and/or dedicate income taxes to specific programs. When income taxes are earmarked for education and other social programs, they may be "tapped out" already. Continued dedication of a portion of income tax revenues to the environment may be difficult to preserve. While individual income taxes are progressive and thus relatively equitable, there is no direct cost/benefit relationship to be attained through using this revenue source for environmental protection. As an alternative, many States are using special individual income tax check-offs for environmental purposes, as opposed to the income tax itself. This practice is discussed subsequently under Section 1.E.: Voluntary Programs.

Reference for Further Information: National Conference of State Legislatures, *Earmarking State Taxes*, Denver, CO, April 1995; The Trust for Public Land, *GreenSense: Financing Parks and Recreation*, Phyllis Myers, Editor, San Francisco, CA, Autumn, 1995 and 1997, Telephone: 800-714-LAND, Internet: **http://www.tpl.org/tpl.**

LOCAL SALES TAXES

Description: Local sales taxes are add-ons to State general sales and use taxes, or may exist where there is no State sales tax. Depending on State constitutions, statutes and home rule traditions, most local governments must seek State approval to levy local sales taxes, as well as local voter approval. State authorization processes vary. States may give approval to all counties or communities, or limit it to a specific localities. Typically, local taxes are limited to a specified time period, or a dollar collection total, and a specific use. The dedicated revenue stream may be used to back local general obligation or revenue bonds or to pay for a specific program directly, such as parks and conservation.

Actual Use: Many States have given localities more leeway to levy taxes, and local residents have approved sales tax increases or new taxes. Revenues often are dedicated to open space acquisition, parks and recreation, historic preservation and other land projects. Missouri has given communities authority to raise taxes up to 0.5% for parks and stormwater improvements, and 29 have done so since 1995. Colorado has been flexible in allowing local taxes, and 17 municipalities and 7 counties use a sales tax increase of 1/10 cent for 12 years for land conservation. Carson City and Douglas County, Nevada, use a 1/4 cent "quality of life" sales tax add-on for open space and parks. Three Georgia counties have a 5-year, 1 cent sales tax for roads, parks, and recreation. Other localities with recent sales tax add-ons from ½ to 1 cent for 5-20 years include Albuquerque, Tulsa, Scottsdale, Suffolk County (New York), and counties in Florida where revenues are dedicated to nature centers, trails, environmental education, and parks. The first across-state tax of 1/8% was passed in four Kansas City counties in 1996, to raise $118 million to restore the historic Union Station.

Potential Use: Local sales tax add-ons are especially useful in high tourism areas and can support a multitude of environmental programs, including brownfields redevelopment, and wetlands, watershed and farmland protection through conservation easements and development rights purchases. Sales tax revenues often are used to capitalize local revolving environmental trust funds as in New Jersey and other States, and may attract State or private matching funds as in Kansas City.

Advantages: Specific approval of dedicated local sales taxes assures revenue use for a particular environmental purpose, and projects funded enjoy public support. Environmental benefits are direct, timely, visible, and heighten public awareness. Revenues can be sizeable and further leveraged.

Limitations: All sales taxes are highly regressive. State and local approval of tax increases may be time-consuming and is not assured. The environmental programs funded must be popular.

Reference for Further Information: U.S. Advisory Commission on Intergovernmental Relations, *State Laws Governing Local Government Structure and Administration*, March 1995; The Trust for Public Land, *Green Sense: Financing Parks and Conservation*, Phyllis Myers, Editor, San Francisco, CA, Telephone: 800-714-LAND, Internet: **http://www.tpl.org/tpl**.

PERSONAL (TANGIBLE) PROPERTY TAXES

Description: These are taxes levied on the estimated or assessed value of items of personal property such as automobiles and boats, but not land. Such taxes are charged on a recurrent basis, frequently annually or biannually, and sometimes are limited to property worth in excess of a specified dollar value, e.g., $2,000.

Actual Use: These taxes are used (not widely) by State and local governments for a variety of purposes, but there is no earmarking for environmental protection at the present time. For example, Virginia charges a flat percentage tax on the blue book value of all motor vehicles, but this is dedicated to highway and road improvements.

Potential Use: State and local governments could establish personal property taxes to mitigate the negative environmental impacts of the use of that property. For example, the revenues generated by a tax on air conditioners could be used for Freon disposal; revenues from a tax on lawnmowers and small engines could be used to fund small source air emissions reduction programs. States could further structure personal property taxes to encourage emissions reduction and/or energy efficiency by discounting tax rates on high-efficiency appliances such as heaters, refrigerators and air conditioners, and low-emission vehicles.

Advantages: Taxes on tangible property could be carefully structured to have a close cost/benefit relationship, depending on the particular purposes to which the tax revenues are dedicated. Also depending on the specific structure of the taxes, they may provide incentives for taxpayers to purchase higher efficiency appliances and vehicles, although this approach is somewhat inequitable as lower income individuals are less able to afford new equipment and cars. Revenue yields generated by personal property taxes tend to be moderate.

Limitations: Few governments have administrative systems in place to track ownership of personal property, aside from automobiles, so that administrative costs could be high and the tax easy to circumvent. The legality of state taxes on high-emission vehicles has been disputed in some states, such as in Maryland. These types of taxes may be highly unpopular with voters and subject to reduction and even elimination.

Reference for Further Information: Virginia Department of Revenue, *Annual Personal Property Tax Estimates,* Richmond, VA, 1993.

REAL (AD VALOREM) PROPERTY TAXES

Description: Real property taxes are charged to property owners as a percentage of the current assessed value of property. They are limited to local governments, and require voter approval.

Actual Use: There are two main ways localities use property taxes to fund environmental projects. The first is to earmark a specific portion of annual revenues, which is rare. The second is to direct a property tax increase or surcharge, temporary or permanent, to a specific purpose. Use of the latter method has been increasing. Dade County, Florida, dedicated over $45 million in one year to funding local natural areas. Colorado's Cherry Creek basin project uses a property tax increase to finance building artificial wetlands, channels and sediment holding ponds to control nonpoint sources. The most publicized use is in New Jersey. By 1997, two counties and 21 municipalities had passed a one or two penny per $100 in value "land preservation tax" to finance open space and farmland trust funds. Los Angeles County, Kings County, Washington, Helena, Montana and Marion, Massachusetts use property tax increases to fund greenways, open space, parks, beaches and shorelines. Several Michigan towns use property tax surcharges to buy development rights on farmland. Spokane, Washington has a "conservation futures tax" of 6 cents per $1000 to buy open space and buffer lands. A third way of using the property tax has occurred in Maryland, which offers a property tax credit to donors who give perpetual easements to the Maryland Environmental Trust.

Potential Use: Any land-based protection or recreation program could be funded through the property tax, as well as any environmental infrastructure popular enough to be approved by residents. Revenues can go to local trust funds, serve as collateral for general obligation or revenue bonds, and leverage State funds. For example, New Jersey's Green Acres Trust Fund makes 25%grants and low-interest loans to localities with dedicated taxes and open space plans.

Advantages: Most local governments have administrative systems in place for assessing real estate values and collecting taxes, which reduces administrative costs. The property tax provides a relatively large and stable revenue base. Voter approval of tax increases to pay for specific environmental projects, and visible results, helps ensure revenue dedication. Additional monies can be leveraged when public commitment is clear, including matching funds.

Limitations: Some localities have statutory limits on property tax levels. Competition for revenues is keen and environmental dedication may be difficult to safeguard. Many proposed tax hikes have been defeated. California uses a landscape and lighting law as an alternative, which enables property owners in developing communities to assess themselves for parks and open space.

Reference for Further Information: The Trust for Public Land, *GreenSense: Financing Parks and Conservation*, Phyllis Myers, Editor, San Francisco, CA; The Trust for Public Land, Mid-Atlantic Regional Office, *On the Land*, Winter/Spring 1998, New York, NY; The Trust for Public Land, *Lands and People*, San Francisco, CA, Spring 1998, Telephone: 800-714-LAND.

STATE SALES AND USE TAXES

Description: State sales and use taxes are based and levied on the value goods sold in retail stores. The scope of coverage of these kinds of taxes could be broadened to also include out-of-State mail order sales to State residents.

Actual Use: Compared to corporate and personal income taxes, State earmarking of general sales tax revenues has become more common in recent years. Currently, at least five States dedicate a percent of their general sales and use taxes to environmental programs. For example, Missouri dedicates 2.9% of its tax revenues to a conservation fund, including non point source control (0.1%); North Carolina dedicates 0. 1% of its revenues to a Wildlife Resources Fund; Idaho dedicates 1.5%, and Washington 0.1%, of revenues to water pollution infrastructure funds; and Florida earmarks 0.2% to a solid waste management fund. Increasingly, States have been allowing counties or cities to charge an additional rider on the State tax, which may also be dedicated to environmental programs (see **Section 1.A.1., Local Sales Taxes**). In Sacramento, California, the county rider on the State sales tax is dedicated to funding the local air quality management district.

Potential Use: States could choose to earmark a specified percentage of their sales and use tax revenues to fund environmental programs. Application of the tax to out-of-state catalog mail order sales, which are typically not taxed unless a retail store exists in the purchaser's state, would broaden the revenue base considerably.

Advantages: The revenue base generated by State sales and use taxes is quite broad and relatively stable, and thus even small percentages of a general sales and use tax can bring in significant revenues.

Limitations: Sales taxes are inherently highly regressive, and thus equity is not attained. The cost/benefit relationship is not immediately obvious unless taxes on specific goods can be related and dedicated to related environmental programs, but this may prove administratively burdensome and too complex. States and localities may have statutory limitations on general sales tax increases and earmarking. Environmental dedication may be difficult to sustain.

Reference for Further Information: National Conference of State Legislatures (NCSL), *Earmarking State Taxes*, Denver, CO, April 1995.

VALUE-ADDED TAXES

Description: Value-added taxes (VATs) tax the addition to the value of consumer goods or services created at each stage of production or distribution. The VAT is an alternative way of collecting a tax on consumption expenditure: it does not tax a base different from other sales taxes. The VAT resembles a sales tax in that each trader adds the tax to sale invoices issued and accounts for the tax so collected. However, traders deduct the tax paid on invoices received for goods and services.

Actual Use: Michigan's single business tax utilizes value-added principles in part, as does a portion of the Louisiana retail sales tax, but, on the whole, the concept remains generally unused throughout the United States.

Potential Use: The VAT is applicable to any State or local sales tax. Implementation of a 10 percent VAT in the three production stages of manufacturing, wholesaling, and retailing is illustrated as follows: A wholesaler buys inputs valued at $500 from manufacturers and sells outputs valued at $900 to retailers. Accordingly, the wholesalers' value-added equals $400. The tax owed by the wholesaler equals $40, $400 times 10 percent. The tax is collected by applying the rate to the transaction price ($900 times 10 percent = $90) and applying a credit for tax paid at earlier stages ($50); the net is the tax on value added ($90 - $50 = $40). The sum of all values added in the process ($500 at manufacturers, $400 at wholesalers, and $300 at retailers) equals the final value of the product ($1200) and the tax generated at each stage ($50, $40, and $30) equals the amount from the same rate sales tax on the final value ($120).

Advantages: VAT is a multistage tax that produces a burden equivalent to that of a single stage retail-sales tax. The tax is a constant proportion of the retail price of the product; it does not vary according to the number of transactions in the production process, as normally occurs under multistage taxes. As a result the tax does not pyramid because it depends on the value added at each stage, not the total transaction price at each stage, and each firm receives credit for taxes paid in prior stages of the product flow. Thus, the tax base for any firm in the production-distribution process will equal its value-added -- the difference between the value of its sales and the value of its purchases -instead of the value of its sales (or gross receipts). The self-enforcing nature of VAT makes it attractive when the tax-compliance climate is not good. VAT induces purchasers to require a documented receipt from vendors for taxes paid, because those receipts will be used to pay part of the taxes vendors will owe when they make sales. Vendors pay the tax because the purchasers of those items demand tax receipts for credit purposes,

Limitations: The European experience with VAT shows that tax evasion still exists and delinquency continues to be a problem, despite the self-enforcing nature of VATS.

Reference for Further Information: Mikesell, John L., *Fiscal Administration: Analysis and Applications for the Public Sector,* Third Edition, Brooks/Cole, Belmont, CA, 1991.

OTHER

Description:

Actual Use:

Potential Use:

Advantages:

Limitations:

Reference for Further Information:

COMPARISON MATRIX FOR GENERAL TAXES

Criteria/ General Taxes	Actual Use	Revenue Size	Revenue / Stability	Administrative Ease	Equity	Cost/ Benefit Ratio	Environmental Benefits
*Corporate Receipts	Low	High	High	High	Mod.	Mod.	High
Corporate Income	Low	High	Mod.	High	Low	Low	Mod.
*Death/ Gift	Low	Mod.	Low	Mod.	High	High	High
Individual Income	Low	High	Mod.	Mod.	Mod.	Low	Mod.
*Local Sales	Low	High	High	High	Low - Mod.	Mod.	Mod.
Personal Property	Low	Low	Mod.	Low	Low	Mod.	Mod.
*Real Property	High	High	High	High	Low	Mod.	High
*State Sales and Use	Low	High	High	High	Low	Low	High
Value Added	Low	Mod.	Mod.	Low	High	Low	Mod.

High - High use (over 25 states/many localities); criteria score high (many advantages); High revenue yield (over $50 million annual state revenue, currently)

Mod - Moderate use (10-25 states/many localities); criteria score in medium range; Moderate revenue yield

Low - Low or rare use; criteria do not rate well (many limitations, and one or more major implementation problems); Low revenue yield

* Star indicates best rated mechanisms

1.A.2. SELECTIVE SALES TAXES

1.A.2. SELECTIVE SALES TAXES

Description: Selective sales taxes are taxes on the sale of particular commodities or services. Selective sales taxes include all other sales and use taxes that are not applied to the general public as a whole. These taxes are sometimes termed excise taxes. They are levied either as a percentage of the sale or price of the item, or as a flat charge per item. Compared to general sales taxes, selective sales taxes have been more widely used by States and localities, although for environmentally-related products (e.g., fertilizer/pesticide taxes as opposed to alcohol taxes) the revenue yield is not yet high.

Some selective sales taxes are collected annually at the point of production, as opposed to the point of sale, to enhance administrative efficiencies in collection. For example, gasoline taxes typically are paid by manufacturers, who then are reimbursed from revenues collected at the gasoline pump. Many green product taxes can be most efficiently collected directly from producers or distributors, who typically will pass on costs to consumers. Selective taxes which do not involve sales, such as effluent fees, are discussed under **Section 1.C.: Special Charges**.

Advantages: Selective sales taxes are more easily dedicated to a particular environmental program compared to general sales taxes, since there often is a more direct relationship between the particular type of product in the tax base and the use of the funds for environmental purposes. For example, the gasoline tax can be dedicated to oil pollution control, the real estate transfer tax to bond related acquisitions, and certain green product taxes to water quality. Such taxes may have inherent environmental incentives, i.e., avoiding the tax may lead to behavioral shifts resulting from conservation of use or purchase of "safer" products, although this reduces revenue yield. Some taxes such as the real estate transfer tax, have been used to make interest payments on environmental bonds.

Limitations: The tax base for selective sales taxes is much narrower than for general taxes. Therefore, a higher rate must be charged to generate the same amount of revenue, which may cause inequities. Sales taxes typically are highly regressive, since it is difficult to use graduated rate structures depending on the economic circumstances of the purchaser. However, more "toxic" products could bear higher tax rates than less toxic products, if this could be appropriately measured. Pollution "havens" may arise between States and localities when taxes are not uniform local sales taxes typically must have State approval.

Summary: State use of selective sales taxes is widespread, and for environmentally-related products and services is increasing. However, revenue yield remains modest and there is little uniformity among States. Some high revenue-producing taxes used in virtually all 50 States, such as alcohol and tobacco taxes, rarely are dedicated to environmental programs.

LIST OF SELECTIVE SALES TAXES
(In Alphabetical Order)

1. Alcoholic Beverage Taxes
2. Amusement Taxes
3. Energy Taxes
4. Fertilizer/Pesticide Taxes (Agricultural Chemicals)
*5. Green Product Taxes
*6. Hard-to-Dispose Taxes
*7. Hotel and Resort Taxes
8. Insurance Premium Taxes
9. Litter Control Taxes
10. Marine and Aviation Taxes
11. Miscellaneous Selective Sales Taxes
*12. Motor Fuel Taxes
13. Motor Vehicles Sales and Registration Taxes
14. Petroleum Products Taxes
*15. Real Estate Transfer Taxes
16. Rental Car Taxes
*17. Tobacco Taxes
18. Watercraft Sales Taxes

* Stars indicate most highly rated mechanisms as described in the Comparison Matrix at the end of the narratives. See Introduction to the *Guidebook* for a description of the criteria used. Ratings of "High", "Moderate", and "Low" are used for comparison purposes only, as some ratings are necessarily subjective and data are incomplete.

ALCOHOLIC BEVERAGE TAXES

Description: Alcoholic beverage taxes are based on volume or value, and include liquor, wine and beer. Along with tobacco and lottery/gambling taxes, alcohol taxes are often termed "sin" taxes. Wine coolers and similar beverages could be included.

Actual Use: All 50 States, many localities, and the federal government, levy rather steep taxes on over-the-counter purchase of all alcoholic beverages. Half of the States currently earmark alcohol tax receipts, typically for local revenue-sharing and State alcoholism prevention and rehabilitation programs. However, no States have dedicated alcohol tax revenues to environmental protection as yet, although this is proposed from time to time.

Potential Use: Since alcohol is distilled from agricultural products, State or local governments could dedicate a surcharge on the alcohol tax to agricultural runoff control or other land-based programs. Alternatively, since breweries require a large volume of very clean water and discharge wastewater from distilling processes, revenues could be dedicated to drinking water treatment and point source water pollution control programs. Breweries might also be taxed directly. Tax surcharges could be extended to currently non-taxed consumption, such as at military commissaries. Imports would have to be accounted for.

Advantages: Since administrative records of alcohol sales already exist, a tax surcharge would be administratively simple to collect and track. Consumption is widespread, and thus revenues could be significant with an additional tax, for example, of 1%. The demand for alcohol is relatively unresponsive to price changes, and thus a tax increase may not cause a decrease in sales sufficient to full offset revenues.

Limitations: All consumption taxes are highly regressive and, therefore, may be considered in this context as inequitable. Since alcohol taxes already are extremely steep, additional costs may impose undue hardship. The cost/benefit relationship is questionable. Depending on the State, alcoholic beverage taxes would face strong opposition from the alcohol industry. Lack of uniformity among State taxes and surcharges already has given rise to pollution "havens" between States, with consumers crossing State lines to make purchases, thus reducing tax yield for some States. It might be difficult to retain the dedication of alcohol surcharges for environmental programs, since total revenue yield is large and commonly "tapped out" for other State and local programs.

Reference for Further Information: National Conference of State Legislatures (NCSL), *Earmarking State Taxes*, Denver, CO, April 1995; U.S. Advisory Committee on Intergovernmental Relations, *Significant Features of Fiscal Federalism*, 1991.

AMUSEMENT TAXES

Description: Taxes on ticket sales to sports or entertainment events, or on gross receipts from events. Parimutuel taxes are charged on amounts wagered at race tracks. Gambling casinos could be included as well. Use of lottery ticket purchases is discussed subsequently in **Section 8., Environmental Lotteries**.

Actual Use: Amusement taxes are used by both State and local governments for a variety of purposes, including stadium construction and renovation. However, dedication to environmental programs is rare. Illinois dedicates a share of proceeds from its parimutuel tax to local park districts, and Oregon earmarks a small portion for youth conservation programs.

Potential Use: Revenues from amusement and gambling taxes could be used to offset the impact of large numbers of visitors to a particular site or area. For example, a county with a sports arena and/or a theme park could use the tax funds generated to cover additional water and solid waste disposal costs created by visitors. States could dedicate amusement taxes to recycling, litter control, or greenways beautification programs.

Advantages: Amusement taxes spread the costs of providing government services to benefitting visitors. Ticket sales are relatively easy to track, although government collection systems must be established. Taxes are highly equitable in that non-local and out-of State residents can help subsidize the cost of governmental services.

Limitations: Demand for tickets to sporting and other entertainment venues can be relatively sensitive to price increases, and therefore taxes could reduce the number of tickets bought and thereby lower revenues. Revenue yield may not be high.

Reference for Further Information: National Conference of State Legislatures (NCSL), *Earmarking State Taxes*, Denver, CO, April 1995.

ENERGY TAXES

Description: Energy taxes are surcharges on regular customer utility bills, such as electricity, heating oil or gas, and even telephone charges. Energy taxes could also be charged directly to utility companies, which then probably would pass costs on to consumers.

Actual Use: Many localities, and a few States, have energy surcharges-taxes to fund environmental programs among other uses. Maryland has a special electric energy tax which is reflected on regular electric bills to all customers, and California has a small utility sales tax based on kilowatt generating capacity. Massachusetts also has established a sales tax on all utility bills. Overland, Missouri has a 3.5% utility surcharge dedicated to open space and greenways. A Federal "BTU Tax" was proposed and widely discussed in 1993, and the concept of energy taxes in general is often debated.
Potential Use: Any utility bill could be a vehicle for such surcharges, the receipts of which could be dedicated to the corresponding program, such as heating fuels to spill prevention and recovery projects, and electricity surcharges to air pollution control and acid rain programs. The concept could be extended to cable television services, as well as telephone services although these are already subject to federal, State and local taxes.

Advantages: Energy consumption is readily estimated and tracked on a national, State and local basis. Tax surcharges would be easy to collect through regular billings, which the utility company then would rebate to the relevant governmental unit. A very close cost/benefit relationship might be attained depending on subsequent program dedication, since energy production has such strong environmental impacts. Even low-level increases to annual residential costs for total energy consumption, such as $5.00 per year, is estimated to yield $10 billion nationwide. The yield would be relatively stable, and any resulting energy conservation could yield important environmental benefits. State and local governments could structure surcharges to reflect local economic conditions and existing tax burden, and provide special subsidies, e.g., for lower income households.

Limitations: Compared to water and sewer utility charges, heating fuel and electricity costs are already steep, although smaller than the relative costs of cable television. Thus, the impact on some residential customers could be high within an already highly regressive cost structure. Graduated tax structures might enhance equities but would be administratively complex since, other than heating fuel for the elderly in some localities, utility bills are rarely subsidized. If based on the cost of providing energy, revenue yield could fluctuate dramatically with the price of oil.

Reference for Further Information: National Conference of State Legislatures (NCSL), *Earmarking State Taxes*, Denver, CO, April 1995; Warren, Richard E., "Funding Environmental Values," presented at the Public Works and the Human Environment International Symposium, Seattle, Washington, April 1995.

FERTILIZER/PESTICIDE TAXES
(Agricultural Chemicals)

Description: Agricultural chemical taxes are imposed on fertilizers, pesticides, agricultural additives and minerals, and some herbicides, either as a retail sales tax or as a sales production tax, i.e., a tax placed directly on the producer, manufacturer or distributor but based on a percentage of the item value to be sold. They represent a type of green product sales tax.

Actual Use: At least four States, Wisconsin, Iowa, Minnesota and Oregon, assess a surcharges on fertilizer/pesticide sales or charge producers/distributors directly. Typically, these and other States also charge fertilizer/pesticide product inspection, registration and/or licensing fees (discussed subsequently under Part B: Fees). Wisconsin charges $2,000 for each manufacturer of the active (toxic) ingredients in a pesticide, and $100-$300 for pesticide distributors; Iowa assesses a dedicated tax on nitrogen-based fertilizers at $.75 a ton; Minnesota levies a sales surcharge on all agricultural chemicals collecting $2.5 million annually; and Oregon levies a $.20 -.60 per ton tax on producers.

Potential Use: This tax could fund remediation of agricultural nonpoint source and groundwater pollution. It could also be used to fund research and technical assistance for sustainable farming techniques that have reduced environmental impact.

Advantages: The tax could generate significant revenues due to the relatively large volume of fertilizers and pesticides used. States could employ graduated rate structures which vary according to the toxicity of the ingredients in each item, thus improving equity considerations. Such taxes are relatively easy to collect if imposed on producers directly, and may discourage excessive use of harmful products (leading to declining revenues). They could include residential garden use.

Limitations: Although there is a direct cost/benefit relationship between agricultural chemical use and pollution, it would be difficult to apply all revenue receipts to nonpoint source projects because such projects are generally lower cost compared to point source projects. The tax is highly regressive and inequitable in terms of the cost to small farmers versus large agricultural businesses, and impacts vegetable and fruit producers especially hard. Taxes would be strongly opposed by the agricultural lobby because of the importance of fertilizers/pesticides to reliable crop production. Pollution "havens" between States might be created if the taxes were not uniform across States. As a sales tax, fertilizer/pesticides taxes might be as efficiently and equitably administered at the federal as opposed to State level, although then would fall most heavily on crop producing States.

References for Further Information: National Conference of States Legislatures (NCSL), *Financing Clean Water,* Non Point Source Pamphlet, June 1991; U.S. EPA Report to Congress, *Alternative Funding Study: Water Quality Fees and Debt Financing Issues*, Syracuse University, June 1996; Congressional Research Service, *Funding Water Quality Programs,* 1992.

GREEN PRODUCT TAXES

Description: Green product taxes are sales tax surcharges, which might be levied on a large range of household and commercial products which negatively impact water or air quality. The use of the term "green" here implies that the product is potentially harmful, not "safe". Taxes may be imposed as a percentage of value, or a flat fee per item (**see Section 7, Deposit Refund Systems**).

Actual Use: States increasingly use green product taxes, although they still are most prevalent as hard-to-dispose products taxes, pesticide/fertilizer taxes, and petroleum product taxes, described separately. The majority of States now have recycling program charges (e.g., aluminum cans and some plastics). Examples of newer green product sales tax programs include Florida's taxes on toilet paper and dry cleaning solvents, Wisconsin's taxes on de-icing salts, and Washington's wood stove sales tax. Illinois and Washington also have sales tax surcharges on various toxic products. The federal government has established a tax on ozone-depleting chlorofluorocarbon yielding almost $1 billion annually. Green product taxes are used extensively in Western Europe.

Potential Use: The list of potential products in a tax base is very long, and includes: personal cleaning products (soaps, shampoos, mouthwash, etc.); household paper products; cleaning products and solvents; chlorides; detergents; cooking oils; plumbing fixtures, chemicals, and copper pipe; paint products; photo processing chemicals; and synthetic dyes and inks.

Advantages: These taxes could generate significant revenues, if a wide array of products were included in the tax base and rates were at 3% or more of sales price. When collected directly from producers/manufacturers as opposed to over-the-counter, they are relatively easy to collect. They can heighten awareness of the negative environmental impacts of such products, and lead to behavioral shifts such as conservation and the development of new, "safe" products.

Limitations: These taxes are regressive, impacting both small producers and consumers adversely. It is difficult to define and limit the tax base, as the list of harmful products is so large, and data on adverse environmental impacts small. The lack of quantitative toxicity data makes it difficult to employ a more equitable, graduated rate system for different products. Administrative complexities impact the stability and predictability of the revenue stream, as new products and producers will appear or disappear over time, and be imported. These taxes create pollution havens if the tax base and rates are not uniform across States, which is hard to achieve. Industry and consumer resistance may be high. For many products, green taxes may be best run as a federal and not State program.

References of Further Information: U.S. EPA Report to Congress, *Alternative Funding Study: Water Quality Fees and Debt Financing Issues*, Syracuse University, June 1966; Natural Resources Defense Council; Reprint of "Life and Taxes", *The Amicus Journal*, 1995; Association of Metropolitan Sewerage Agencies, "A Federal Green Fee for Clean Water", July 1996.

HARD-TO-DISPOSE TAXES

Description: Taxes on hard-to-dispose items that contribute heavily to solid waste disposal problems, such as new or used tires and lead acid batteries, paint and solvent containers, and used oil. They can be assessed at a flat rate per item, or as a percentage of the value of the item. When collected at the time of purchase, they represent a type of green product tax . If collected at the time of disposal, they are like solid waste disposal fees (see **Section 7, Deposit Refund Systems**).

Actual Use: These taxes now are used extensively by States and, for some items, as part of local government recycling and disposal programs. For example, Arkansas charges $1.50 for each tire sold at retail and $10.00 for each car battery purchased if customer does not bring the old battery in exchange. Florida charges $1 for each new tire or battery purchased, while North Carolina assesses 1% of the value of each tire purchased. Other States imposing taxes for new tires include Kansas, Nebraska, Oklahoma, Oregon and Wisconsin. Montana charges a junk vehicle fee. The Federal Highway Trust Fund has a graduated tire tax ranging from $.15/lb. to $10.50/lb. Used oil taxes are imposed in Florida and a number of other States.

Potential Use: The tax base could be broadened by imposing charges on any items contributing to landfill problems, such as fast food packaging materials, cars, mattresses and household appliances, or on goods that have no recyclable content, such as disposable diapers. Some taxes might be refundable analogous to deposits on recyclable or reusable material like glass bottles. Florida's Advance Disposal Fee exempts any item, such as aluminum and steel cans, 50% of which is recycled Statewide. Sales taxes also could be imposed on surrogates for landfill use, such as plastic garbage bags, garbage and trash cans, and recycling bins.

Advantages: Hard-to-dispose taxes are easily understood by the public and provide a direct cost/benefit relationship when proceeds are used for local landfill, incinerator or recycling costs. As in Arkansas and Florida, taxes could be structured to encourage recycling of reusable commodities and encourage recycling markets, although this leads to an unpredictable and diminished revenues.

Limitations: It may be administratively difficult to separate out specific commodities for taxation. Double taxation, if such products are also taxed as green products, may be hard to avoid and would heighten inequities. If taxes are collected at the point of disposal and not sale, collection may be administratively expensive, and illegal dumping may result. This may also be the case if local and/or State fees are not uniform. Revenue generation and the environmental goal of encouraging conservation/recycling are very much in conflict for these taxes.

References for Further Information: Natural Resources Defense Council Reprint, "Life and Taxes", *The Amicus Journal*, 1995; New York State Department of Environmental Conservation, *Survey of State Funding for Solid Waste Management*, June 1991.

HOTEL AND RESORT TAXES

Description: Hotel and Resort taxes are taxes on room accommodations, or occupancy, charged either per night or as a percentage of the room rate.

Actual Use: Both State and local governments have used hotel and resort taxes for various purposes, including alleviating the burden placed by tourism on the local culture. For example, Dade County, North Carolina used occupancy tax proceeds to finance a new wastewater treatment facility made necessary by the influx of seasonal tourists. Delaware dedicates 12.5% of its public accommodation tax to beach preservation. Flagstaff, Arizona has a 0.2%, 10-year "BBB" tax on hotels, bars and restaurant charges dedicated to beautification, greenways and trails, as well as marketing and economic development. Montana allows resort communities to charge up to a 3% tax on goods and services sold to tourists, such as hotels, campsites, restaurants and skiing. Designated Colorado communities have a similar tax.

Potential Use: Occupancy taxes could be used to finance operating costs for State and local parks and natural areas that attract tourists. Revenues could also finance operating and capital costs for local services. For example, occupancy tax revenues could finance capital costs for the expansion of a solid waste facility to accommodate the influx of tourists to a particular area.

Advantages: Occupancy taxes spread the costs of maintaining State and local natural areas and government services to those who benefit from them. Because non-local and out-of-State residents must pay such taxes, they are equitable and maintain a good cost/benefit relationship.

Limitations: Since the demand for hotel space is relatively elastic, a price increase could reduce occupancy rates, and ultimately tax revenues, particularly if a city or county unilaterally imposes an occupancy tax higher than in surrounding areas. If no occupancy tax currently exists, collecting occupancy information for hotels, motels, and rental units each month could involve high administrative costs. Revenue yield might be low, unpredictable, and lack stability.

Reference for Further Information: The Trust for Public Land, *Greensense: Financing Parks and Recreation,* Phyllis Myers, Editor, San Francisco, CA, Telephone: 800-714-LAND, Internet: **http://www.tpl.org/tpl**.

INSURANCE PREMIUM TAXES

Description: These are taxes that are levied on insurance premiums, or on the gross receipts of insurance businesses.

Actual Use: Insurance taxes are used by State governments, and they are frequently dedicated to pension funds.

Potential Use: The proceeds from premium taxes could be dedicated based on the type of insurance. For example, proceeds from taxes on auto insurance could fund air pollution control and proceeds from taxes on homeowner's insurance could fund operating costs of water and wastewater facilities. The concept could be expanded to include liability insurance required in some States for projects falling under Superfund laws, and revenues collected could be used to provide funds for abandoned facilities or very small facilities for which liability insurance is very costly.

Advantages: Taxes on insurance have a large tax base and thus could yield a significant and predictable revenue stream at a modest cost. For mandatory types of insurance, such as auto liability and residential fire insurance, and flood plain insurance in some States, revenues will be extremely dependable.

Limitations: Insurance premiums are not a good proxy for assessing the environmental risk of an individual. For example, an air pollution control tax based on auto insurance premiums would capture less revenue from older cars that have lower premiums, but generally higher emissions levels, than from newer cars. Thus, inequity may result and lower the cost/benefit relationship. Collection by governments may prove difficult, and administrative tracking will be costly.

Reference for Further Information: Apogee Research, Inc., *Preliminary Review of Alternative Superfund Financing Schemes* (unpublished report), July 1991.

LITTER CONTROL TAXES

Description: Litter taxes are taxes on the sale of virgin newsprint and paper products, such as newspapers and magazines, that contribute significantly to solid waste volume. When assessed as sales taxes, litter taxes represent a type of green product sales tax.

Actual Use: The imposition of litter control taxes is generally limited to State governments. At least three States use them extensively, dedicating tax receipts to solid waste programs. For example, Nebraska's litter tax funds solid waste facilities. The tax can also be structured to encourage conservation. To encourage newspapers to use recycled newsprint, North Carolina taxes virgin newsprint and dedicates the proceeds to a solid waste management trust fund. Washington spends its litter control tax revenues on recycling and waste reduction programs.

Potential Use: These taxes could be used to finance any solid waste disposal costs, including facility operation and maintenance, and State recycling facility and program costs. The concept could be extended to cover sales catalogs which would broaden the tax base and capture revenue from out-of-State businesses.

Advantages: Litter control taxes might encourage consumers to buy less of the taxed commodity, reducing the total amount of solid waste but also lowering revenue yield. The cost/benefit ratio can be strong depending on program dedication. If taxes are collected directly from producers, they can be relatively easy to collect and administer. However, equity is reduced if the tax is then passed on to the consumer.

Limitations: Virgin newsprint and other paper taxes would face political opposition from the paper industry or other affected industries.

Reference for Further Information: National Conference of State Legislatures (NCSL), *Earmarking State Taxes,* Denver, CO, April 1995.

MARINE AND AVIATION TAXES

Description: These are taxes on fuel used by commercial or recreational boats and inland barges, and aviation fuel, tickets and airport service charges. Marine and aviation fuel taxes could be implemented either by removing the exemptions from highway fuel (gasoline) taxes which exists in many States, or by instituting fuel tax surcharges at different rates.

Actual Use: Marine fuel taxes are generally limited to State governments. In Alaska, the tax funds water and harbor facilities. In Iowa, marine fuel revenues are dedicated to Department of Natural Resources programs. California, Maryland, Oregon and Washington also use these tax receipts to fund coastal and estuary programs. Aviation fuel and airline ticket taxes (almost 8.5% of ticket value) are assessed by the federal government, and many localities impose airport service fees to all passengers of $1-$3.00, which are initially collected by commercial airlines and were authorized under the 1990 Federal Aviation Safety and Expansion Act, as well as aircraft landing fees. The federal government also imposes a port tax (about .04% of cargo value) and an inland barge fuel tax (slightly over 10 cents/gallon).

Potential Use: Marine tax revenues could be used to fund research on water pollution, particularly on near coastal and estuarine water quality, and marine fuel spill prevention and response. Sewage pump-out stations for recreational boaters also is a likely area for funding. Taxes on the use of public docking and pump-out facilities could be used as a surrogate tax and, if flat tax rates were employed, might be easier to collect. State or localities could assess surcharges on federal air ticket, port, and inland barge fuel taxes, although these charges already are quite steep. Aviation-related taxes, often used for aircraft safety and airport renovation, could be used to support air pollution and noise abatement programs as well, or safe disposal of de-icing fluids.

Advantages: Implementing marine fuel taxes assures equity among all gasoline and diesel fuel users, although current marine fuel rates generally are lower than highway gasoline taxes. Having boat and barge users pay some of the costs of pollution control associated with their activities creates a solid cost/benefit relationship, as well as heightening awareness of potential water quality problems. Aviation-related taxes can be a particularly good source of local revenue and, similar to rental car taxes, help ensure equity by including out-of-State travelers..

Limitations: If a State does not already tax marine and aviation fuel, it could be costly to set up a collection and accounting system. The same is true for local mooring and port taxes. The revenue stream probably will fluctuate depending on a number of factors, including weather and travel conditions, and the current cost of air travel.

Reference for Further Information: Governor's Panel Financing *Alternatives for Maryland's Tributaries Strategies,* Maryland University Sea Grant College, August 1995.

MISCELLANEOUS SELECTIVE SALES TAXES

Description: Any product or specific activity could be subject to a State or local sales and use tax, provided authority is granted by the State to a locality and voter approval is gained. Local sales tax may exist in States where no general sales and use tax exist. The taxes described are termed miscellaneous because they exist sporadically, and are designed to leverage or replace other monies.

Actual Use: In recent years States and localities have been active and extremely creative in imposing taxes on individual products or uses. Most taxes are relatively small and limited by a specific time period, or to raise a specific dollar amount, and then are ended. Sales taxes are designed to meet unique sales characteristics of individual communities, and may or may not be environmentally-or green product-related, although the relationship may attract more public support. Examples of local sales taxes are the BBB (bed, board and booze") tax in Flagstaff, Arizona which raises $2 million a year for open space and trails and is leveraged by Arizona's lottery and federal transportation funds. Virginia Beach uses a tax (sales and service) on cellular phones to make regular payments on farmland development rights, with Treasury bond proceeds guaranteeing the end balloon payments. Texas taxes sales of sporting goods (the only State to do so), imposed to replace declining cigarette tax revenues supporting parks and recreation initiatives. Minnesota has a $2 per ton birdseed manufacturing tax, and Florida places a penny per pound assessment on Everglades-grown sugar dedicated to the Everglades Trust Fund which leverages additional government dollars.

Potential Use: Any locality may seek to establish a selective sales tax for a special, and widely supported environmental purpose, such as parks, recreation, open space, nature centers and trails, environmental education, and the like. Fees could be designed in concert with federal, State and private sector programs to leverage additional monies. They could be particularly useful in States where there is no general sales and use tax.

Advantages: The advantages of selective sales tax pertain to their specificity and short-term nature, thus yielding direct environmental benefits and heightened public environmental awareness without becoming too burdensome. The leveraging potential, which may be spelled out at the outset, adds to revenues and increases popularity. Selective sales taxes may be less regressive than general sales taxes since in most cases a "higher end" product or activity is taxed, and non-resident's pay as well.
Limitations: There may be voter revolt against special taxes, particularly if the project is not properly presented, widely supported, or completed on a timely basis. Voter approval is not assured. Revenue raising potential may be small, unstable or unpredictable if there are ways to avoid the tax..
Reference for Further Information: The Trust for Public Land, *Green Sense: Financing Parks and Conservation*, Phyllis Myers, Editor, San Francisco, CA, Telephone: 800-714-LAND, **http://www.tpl.org/tpl**.

MOTOR FUEL TAXES

Description: Motor fuel taxes, commonly termed gasoline taxes, are imposed on fuel used in all vehicles, except off-road vehicles. Fuel includes both gasoline and diesel fuel. Off-road vehicles typically are exempted because taxes normally are used to fund highway improvements.

Actual Use: All 50 States have gasoline taxes, typically dedicated to highway construction and maintenance and sometimes to local streets and roads. Three States, Illinois, Massachusetts and Nevada currently earmark between .3% and 1.7% to environmental programs. California earmarks $10 million annually for open space acquisition by the State Land Trust Funds. At least four States, New Mexico, Oklahoma, Vermont and Washington, add a surcharge to existing taxes for environmental spending. Total gasoline rates generally range from 8 cents to 25 cents per gallon, with surcharges being considerably less, typically under one cent per gallon. The Federal Leaking Underground Storage Tank Trust Fund is financed by a 0.1 cent per gallon federal excise tax on motor fuels. The Federal Highway Trust Fund is supported in large part by federal gasoline taxes, which have averaged 5 cents/gallon less than similar State taxes.

Potential Use: Because of the impact of auto emissions on air quality, revenues from the tax could be used to fund air pollution research or control. State motor fuel taxes could also be used to finance underground storage tank clean-up, such as done in Illinois.

Advantages: Because of the broad tax base, high tax rates, and somewhat inelastic demand, gasoline tax receipts have the potential to raise considerable revenues, although surcharges would raise less and may be less predictable and stable. Gasoline taxes exhibit a strong cost benefit relationship when dedicated to environmental programs. Since all States already have motor fuel taxes, collecting surcharges would involve few additional administrative costs.

Limitations: Many States have historically dedicated motor fuel taxes to highway funds, and in some States, revenues from these taxes may be constitutionally or statutorily dedicated to these uses. Since the tax also increasingly is used to raise general revenues at the State level, and is the largest source of earmarked road money, it is one of the slowest growing taxes levied by States because gasoline consumption per mile has declined and most States use flat per gallon rates. Thus, it may be difficult to legislate new earmarking and surcharges, and safeguard dedication to environmental programs. Gasoline taxes are notoriously regressive and, thus, inequitable.

Reference for Further Information: National Conference of State Legislatures (NCSL), *Earmarking State Taxes*, Denver, CO, April 1995.

MOTOR VEHICLE SALES AND REGISTRATION TAXES

Description: Motor vehicle taxes are placed on the sale of new and used vehicles by States. They may include recurrent (annual or biennial) registration of existing vehicles, or registration fees may be used as a surrogate for a sales tax. Some States incorporate emission-based fees, including for inspection, into this tax.

Actual Use: All 50 States charge substantial taxes for the purchase of motor vehicles, as well as ongoing registration and licensing taxes. Generally, the funds raised go to pay for highway-related State programs. At least three States, including Washington, now dedicate a small portion of these types of taxes to air pollution control programs. Washington also charges a tax surcharge on campers and trailers. Illinois raised $5 million in 1997 from the title transfer tax to fund State and local trails and bike paths.

Potential Use: Earmarking a portion of these taxes or tax surcharge receipts to air pollution control is an obvious choice. Revenues could be dedicated to solid waste programs as well. The sale or transfer of recreational vehicles and heavy trucks could be taxed at higher rates.

Advantages: These taxes clearly demonstrate the relationship between motor vehicles and air pollution. They could be graduated depending on the air pollution control devices on the vehicles, e.g., older cars with less efficient catalytic converters could be assessed more, as well as on the specific use of the vehicle.

Disadvantages: Many States have statutory or constitutional limits on the earmarking of these funds, such as with motor fuel taxes. These taxes are probably not a large revenue source because of this fact and the limited tax base. Collectability may be made more difficult if special surcharges are added, and auto individual dealers may be able to avoid new charges.

Reference for Further Information: National Conference of State Legislatures (NCSL), *Earmarking States Taxes*, Denver, CO, April 1995.

PETROLEUM PRODUCTS TAXES

Description: Petroleum products taxes could cover a wide range of products derived from the refining of crude oil. Excluding motor vehicle gasoline, diesel and aviation fuel, special petroleum products might include plant condensate, lubrication oils, crankcase motor oil, kerosene, benzol, residual fuel, petroleum coke, asphalt base, and liquefied or liquefiable gases such as butane, ethane and propane. Derivatives such as petroleum jellies, cleaning solvents and asphalt paving might also be included. Petroleum product taxes present a type of specialized green product fee, and could be imposed as a percent of production, wholesale or retail value. Fuel oils and gas for residential and commercial heating represent an energy tax, discussed earlier along with electric energy surcharges.

Actual Use: These taxes increasingly are used by States, and dedicated to underground storage tank projects and oil spill or conservation funds. Tennessee earmarks 28.6% of its special petroleum product tax to an underground storage tank fund, Oklahoma dedicates its excise taxes on petroleum and gas to oil conservation and well plugging. Washington and Maine dedicate all tax receipts to oil spill response and insurance. Nebraska taxes petroleum wholesalers directly. Hawaii earmarks a petroleum product barrel import tax for groundwater protection. New Hampshire taxes all stored oil. The Federal Superfund Trust Fund was supported in part by a tax of about 10 cents per barrel of domestic and imported crude oil, and by petroleum chemical feedstock and other taxes. The Federal Highway Trust Fund is supported by taxes on the sale of ethanol/methanol from petroleum.

Potential Use: Petroleum product taxes could be used by any State to fund oil leakage or spill projects. Because of existing federal taxes, equity would be enhanced by avoiding federally-taxed products. The list could be expanded to certain plastics and synthetic rubbers.

Advantages: The cost/benefit relationship between the pollution source and cleanup or prevention is attractive and easily understood, especially with oil production and storage. Demand is inelastic.
Limitations: Administration and collection could become complicated. It might be difficult to single out products for taxation in the first place, as the potential list is long, especially if expanded to plastics. There is potential overlap with other taxes, particularly federal excise taxes supporting the above-mentioned federal trust funds, and there are many possible collection points. Foreign imports would have to be accounted for in some fashion, or substantial substitution might occur. It might prove easier to charge certain petroleum producers directly. The petroleum and chemical industries are already heavily taxed, resulting in increased inequity of impacts.
References for Further Information: U.S. Department of Transportation, Federal Highway Administration, *Financing Federal-Aid Highways*, May 1992; Congressional Research Service Report, *Summaries of Environmental Laws Administered by the Environmental Protection Agency*, January 1993.

REAL ESTATE TRANSFER TAXES

Description: Real estate transfer taxes are charged to the buyer and/or seller of real property at the time of sale, based on a percentage of sale value of the property, a flat deed registration tax, or a combination. A similar tax is called a documentary stamp tax.

Actual Use: Real estate transfer taxes are widely, and increasingly, used by both State and local governments. At the State level the tax has funded trust funds for environmental infrastructure and open space/natural lands acquisition, park rangers salaries park maintenance, watershed and wetlands protection, and conservation easements, and has been a dedicated source of payment for revenue bonds for these projects. For example, Florida and Tennessee finance land acquisition and habitat and wetlands restoration with taxes of 7.5 cents/$100 and 28 cents/$1000, respectively. Montana finances State park programs, and Washington uses tax revenues to fund wastewater and drinking water capital facility construction. Illinois raised $13 million in 1997 to fund a grant program for local open space acquisition. New York raised $120 million in the same year dedicated to pay a portion of the interest on its 1996 mega-environmental bond act, particularly for watershed protection projects, and North Carolina and Vermont similarly fund their environmental bonds. Maryland's 0.5% tax funds Chesapeake Bay protection. At the county and city level, Cape Cod voters approved (and subsequently eliminated) a 1% tax to finance a land bank for open space and trails, but not before ten other Massachusetts town asked the State to approve similar local real estate transfer taxes. Colorado communities use the tax for open space and conservation initiatives.

Potential Use: Real estate transfer taxes could be dedicated to any environmental, land-oriented program, or mitigation of the impacts of rapid land development such as agricultural and urban runoff. The tax could be extended to new construction.

Advantages: Real estate transfer taxes based on property values generate a large amount of revenue at relatively low rates. Most governments already have system in place for recording sales which ease collection, Tax rates can be graduated to increase equitability and a close cost/benefit relationship. The tax leverages additional monies when it is used as a source of bond repayment. Dedication of revenues to popular land protection programs enhances the acceptability of the tax.

Limitations: Revenues depend on the level of real estate market activity, which is subject to wide and frequent fluctuations based on economic conditions/interest rates, weather and other factors. Application of the tax may have inequitable distribution effects, and increased housing costs in some areas. Localities must seek State legislative approval to impose the tax, which has not been easy.
Reference for Further Information: The Trust for Public Land, *GreenSense: Financing Parks and Conservation*, Phyllis Myers, Editor, Spring and Fall 1997, San Francisco, CA, Telephone: 800-714-LAND, Internet: **http://www.tpl.org/tpl**.

RENTAL CAR TAXES

Description: These types of taxes are levied on rental cars, or on the gross receipts of rental car businesses.

Actual Use: Like hotel taxes, many States and counties use the revenues raised from rental car taxes for beatification and tourism promotion purposes.

Potential Use: Because of the impact of rental care use on air quality, a share of rental car taxes could be dedicated by State and local governments to fund the operating costs of air pollution control programs. Alternatively, these taxes could be used to finance water quality activities in lake and seaside area frequented by tourists, or to mitigate any environmental problem exacerbated by increased tourism.

Advantages: Rental car taxes could help spread the costs of maintaining air and water quality to those who benefit from it, including out-of-county and out-of-State visitors, which would enhance equity considerations. These taxes might also serve as an incentive for the visitors to use public transportation, reducing mobile source air emissions but producing a corresponding drop in revenues.

Limitations: At the local level, imposing a new tax or increasing an existing tax could cause a city or county to lose rental car business to other, lower-tax jurisdictions. Similarly, State business as a whole could be affected negatively, particularly in areas bordering other States. The revenue yields from rental car taxes may be small and unpredictable.

Reference for Further Information: Virginia Department of Revenue, Richmond VA, has information on Virginia's rental car tax.

TOBACCO TAXES

Description: These taxes are levied on tobacco, based on either volume or as a percentage of value.

Actual Use: All 50 States have tobacco taxes on cigarettes, pipe and chewing tobacco, and cigars. However, tax receipts typically are used for general revenue purposes. At least three States, Idaho, Minnesota and Washington, dedicate a portion of tobacco taxes to water quality, including wastewater treatment facility construction, generating $3 million, $16 million, and $31 million, respectively. California dedicates tobacco taxes to health programs including indoor air protection.

Potential Use: Tobacco taxes could be used to finance programs for agricultural non-point source control, such as offering economic incentives to encourage tobacco farmers to use best management practices. In States without tobacco farming, the tax could be dedicated to indoor air pollution or solid waste programs.

Advantages: Since demand for tobacco still is not too elastic, small earmarks or tax increases in the form of an environmental surcharge might yield significant revenues. However, larger tax increases might produce a behavioral response of declining smoking having personal as well as environmental benefits. Some States, such as Texas have experienced a large decline in revenues from cigarette sales. Texas now uses a sporting goods sales tax to compensate for lost revenues, generating $32 million annually.

Limitations: Tobacco taxes are highly regressive, and the failure of states to dedicate tax revenues to the environment results in a weak cost/benefit ratio. The tobacco industry is in turmoil due to litigation and recent congressional debate, and a further decline in smoking may ensue. A dedication of revenues to the environment may not send the right signal for anti-smoking campaigns.

Reference for Further Information: U.S. EPA, Report to Congress, *Alternative Funding Study: Water Quality Fees and Debt Financing Issues*, Syracuse University, June 1996. The Trust for Public Land, *Green Sense: Financing Parks and Conservation*, Phyllis Myers, editor, Spring 1995, San Francisco, CA, Telephone: 800-714-LAND, Internet: **http://www.tpl.org/tpl**.

WATERCRAFT SALES TAXES

Description: Watercraft taxes may be imposed on boat sales and/or boat title registration and transfer.

Actual Use: Although State use of these taxes is widespread, tax receipts generally are not dedicated to the environment. Currently, Maryland, Virginia, North Carolina and Washington earmark the tax to marine estuarine programs.

Potential Use: A tax or a percentage of a tax on boat sales could be specifically dedicated to water pollution control or marine fuel spill cleanup because of the impact of recreational boating on water.

Advantages: Boat owners would pay some of the costs of maintaining water quality, which creates a strong cost/benefit ratio.

Limitations: Revenue yield is modest and unstable, as general economic conditions and other factors influence boat sales. Even in Virginia and Maryland, with strong estuary protection programs, boat sales taxes are actually several percentage points lower than the standard sales and use tax due to the strength of the boat-building and fishing lobbies.

Reference for Further Information: Governor's Panel, *Financing Alternatives for Maryland's Tributary Strategies*, Maryland University Sea Grant College, August 1995; Virginia Department of Taxation, *1990 Virginia Sales and Use Tax Expenditure Study*, Richmond, VA, 1992.

OTHER

Description:

Actual Use:

Potential Use:

Advantages:

Limitations:

Reference for Further Information:

COMPARISON MATRIX FOR SELECTIVE SALES TAXES

Criteria/ Selective Sales Tax	Actual Use	Revenue Size	Revenue Stability	Administrative Ease	Equity	Cost/ Benefit Ratio	Environmental Benefit
Alcoholic Beverage	Low	High	Mod.	High	Low	Low	Mod..
Amusement	Low	Low	Low	Mod.	Mod.	Mod.	Low
Energy	Low	High	Mod. High	Mod.	Low	Mod.	Mod
Fertilizer/ Pesticide	Low	Mod.	Mod.	Mod.	Mod	Mod.	High
***Green Product**	Mod.	Mod.- High	Mod.	Mod.	Low	Mod.	High
***Hard-to-Dispose**	High	Low	Low	Mod.	Low	High	High
***Hotel and Resort**	High	Mod.	Mod.	Mod.	Mod.	Mod.	Mod.
Insurance Premium	Low	Low-Mod.	Mod.	Low	Low	Low	Low
Litter Control	Low	Low-Mod.	Mod.	Mod.	Low-Mod.	Mod.	High
Marine & Aviation	Mod.	Mod.	Low	Low	Mod.	High	Mod.
Misc. Select. Sales	Low	Low	Low	Mod.	Mod.	Low	Low

COMPARISON MATRIX continued

Criteria/ Selective Sales Tax	Actual Use	Revenue Size	Revenue Stability	Admini-strative Ease	Equity	Cost/ Benefit Ratio	Environ-mental Benefit
***Motor Fuel**	Mod.	High	Mod.	High	Low	High	High
Motor Vehicles Sales & Registrtion	Low	Low	Low	Mod.	Mod.	Low	Low
Petroleum Products	Low.	Low-Mod.	Mod.	Mod.	Mod.	Mod.	Mod.
***Real Estate Transfer**	High	Mod.-High	Mod.	High	Mod.	Mod.	High
Rental Car	Low	Low	Low	Low	Mod.	Mod.	Low
***Tobacco**	Low	High	Mod.	High	Low	Mod.-High	High
Watercraft Sales	Low	Low	Low	Mod.	Mod.	High	High

High - High use (over 25 States/many localities); criteria score high (many advantages); High revenue yield (over $25 million annual State yield currently)

Mod.- Moderate Use (10-25 States/many localities); criteria score in medium range; Moderate revenue yield

Low - Low or rare usage; many limitations and one or more major implementation problems exist; Low revenue yield

* Star indicates best rated mechanisms

1.B. FEES

1.B. FEES

Description: A fee is a financial charge for services rendered, or activity undertaken. Fees can be based on the service provided or benefit received, including potential negative environmental impacts. Fees establish direct links between the demand for services and the cost of providing them. For example, local utilities require customers to pay for the cost of providing water and wastewater services. State permitting fees are used to finance the cost of processing permit applications, e.g., NPDES permit fees. Inspection/monitoring fees cover the inspection and certification of equipment, facilities, or employees for environmental compliance. Park and recreation fees finance oversight of the general public's environmentally-sensitive activities.

Most of the fees described in this section are dedicated to State or local program budgets, i.e., to cover personnel and other operating costs, as opposed to be capital-generating fees for environmental facility construction. Fees that provide environmentally-related services, e.g., laboratory testing fees, are termed **administrative service fees**. Fees that allow a certain activity to be undertaken that may impact the environment negatively, e.g., septage disposal, are called **activity fees**. User fees that pay for utility services are called **utility fees**. Utility fees often are applied to capital cost recovery.

Revenue yield from administrative service and activity fees is typically modest, although the utility fee revenue stream may be significant. Another characteristic of administrative service and activity fees is that many are one-time charges, i.e., imposed only once, or imposed periodically at the time of demand. In contrast, most utility user fees are recurrent charges imposed at regular intervals.

Advantages: Well-structured fees can be an equitable means of matching program costs to program beneficiaries. In many cases, instituting a fee essentially eliminates a subsidy for a government service, freeing up general revenues that could be used to fund other environmental programs. Thus by definition, many fees have a very close cost/benefit relationship and, if graduated rate structures are used, are highly equitable. Because they are imposed at the time of service, or through regular billing, they may be relatively easy to collect. Behavioral shifts do not reduce revenue potential as much as with sales taxes. In many States, service and activity fees can be set administratively, meaning that no legislative action is required to impose them. Utility fees, in contrast, typically require public approval or, in the case of privately-owned facilities, are subject to State regulation.

Limitations: Since they are targeted to a specific service or group, fees have a narrower revenue base than most taxes. In many States, administrative service fees cannot exceed the costs of providing a service, although there is often wide latitude in defining what constitutes service. Thus while equitable, revenue potential is sharply curtailed. Some States have expressed increasing concern over a growing resistance to both administrative and activity fees among industry groups, as well as the general public. Likewise,

voters frequently defeat passage of even modest utility user fee increases.

Summary: Increased use of administrative service and activity fees by States and localities is a well-established trend in environmental program funding, encouraged by the federal government. Most administrative service and activity fees are used solely to offset government operating costs, and, although equitable and directly related to costs and benefits, they provide only a modest revenue yield. In an effort to raise more revenue and cover more budgetary costs, the number of State fees has proliferated in recent years, and may have led to some public backlash.

Utility user fees have been in existence for a long time, particularly for public water supply, and employ increasingly sophisticated rate structures and billing mechanisms. In recent years, the policy goal of "full-cost pricing" appears to be more widely recognized and may provide capital cost-recovery in addition to ongoing operating costs. However, utility charges may be fashioned to accommodate other policy goals such as economic development, suburban growth, and privatization

LIST OF FEES
(In Alphabetical Order)

1. Access Rights
2. Bond Issuance Fees
*3. Connection Fees
4. Construction Fees
5. Franchise Fees
*6. Inspection/Monitoring/Testing Fees
*7. Licensing and Recreational Fees
*8. Local Aquifer Protection Fees
*9. Local Water/Wastewater Utility User Fees
*10. Permitting Fees
11. Product Registration Fees
12. Professional Certification Fees
13. Septic System Impact Fees
*14. Solid Waste Disposal Fees (Tipping Fees, Septage/Sludge Fees)
*15. State Public Water Supply Withdrawal Fees
*16. Tolls
17. Transporter Fees
18. Water Rights Application Fees
19. Well Permit/Pumping Fees

* Stars indicate most highly rated mechanisms as described in the Comparison Matrix at the end of the narratives. See Introduction to the *Guidebook* for a description of the criteria used. Ratings of "High", "Moderate", and "Low" are for comparison purposes only, as some ratings are necessarily subjective and data are incomplete

ACCESS RIGHTS

Description: Access rights or capacity credits are local fees, imposed on a one-time basis, on new users requesting access, and old users requiring increases in capacity, to water and sewer facilities. In exchange for payment, applicants are guaranteed future access to a contracted amount of system capacity that has been reserved for their use.

Actual Use: Many local communities sell water and sewer access rights to finance expansion or upgrades of water and sewer systems. Water and sewer access rights programs are structured in many different ways. The basic principle is that for a set, one-time charge, the purchaser of a water and/or sewer access right is guaranteed the right to connect to the system in the future. This is important since possible sewer moratoriums at a later date would prohibit new residential or commercial development.

Potential Use: The principle of capacity rights to a new facility could be broadly applied. For example, developers, industry and households could be required to purchase access rights to solid waste management removal or treatment services, and revenues from the sale of the rights could be used to finance construction of future solid waste management facilities.

Advantages: New users of government services pay for the expansion, which helps facilitate governmental planning and provides needed capital in advance of construction. The cost/benefit relationship thus is very direct.

Limitations: It may be difficult to sell credits in advance, particularly if a community is not experiencing a high demand for new housing and commercial activity, or seeks to attract economic development. It is difficult to measure what the needed capacity might be for some new users, which reduces the likelihood of equity. Revenue may be neither large nor stable.

Reference for Further Information: U.S. EPA, *Alternative Financing Mechanisms,* August 1992

BOND ISSUANCE FEES

Description: These are fees that might be imposed by States or localities on environmentally-related bonds in addition to normal bond "cost of issuance" fees. Fees are assessed as a percentage of total bond value, including general obligation bonds, special obligation bonds, appropriation-backed bonds, revenue and private-activity bonds, and other bond instruments. Any environmental infrastructure construction bond could be included.

Actual Use: New York State collects a bond issuance fee on all State bonds. Rates move on a sliding scale, i.e., 7 basis points (.07% of value) for bonds under $1 million, 14 basis points/$1-5 million, 21% basis points/$5-10 million, 28 basis points/$10-20 million, and 35 basis points for bonds over $20 million. Revenues in New York are collected by the bond issuance agency or authority but rebated to the State budget general fund.

Potential Use: Bond issuance fees could be used by any level of government or special authority issuing bonds, and dedicated to its general infrastructure capital account. Fee proceeds might also be used to lower specific debt reserve fund requirements, pay for bond insurance or legal fees, make hardship, no-interest loans. For the State Revolving Fund (SRF) program, these fees cannot be used to cover SRF loan administrative cost due to recent EPA restrictions on using more than 4% of SRF capitalization grants for administrative purposes but fees from other bonds could also be used.

Advantages: Such fees could provide a significant revenue stream when bond issuing amounts are high. If graduated fee schedules are established, fees are equitable and provide a good cost/benefit ratio depending on subsequent environmental dedication.

Limitations: The revenue stream is unpredictable since it depends on the local demand for financing, which is influenced by environmental compliance issues, local debt capacity, and readiness to proceed with construction. State private-activity revenue bond issuance fees may result in a lack of State competitiveness with local industrial development authorities, which already may have lower bond issuance costs. Fees add to the carrying costs of local agencies undertaking infrastructure work, and thus may seem counter-productive. The administrative costs of collecting fees on very small bonds may be prohibitive. In New York, bond issuance fees were implemented to support the State budget, not to fund environmental projects.

Reference for Further Information: New York State, *Public Authorities Law*, Chapter 166 Section 240, "Cost Recovery on the Issuance of Certain Bonds", effective August 1, 1991.

CONNECTION FEES

Description: Connection fees are charged to property owners at the time they hook up to or connect with an existing municipal utility.

Actual Use: Connection fees generally are limited to local governments. Hook-up fees and new connection fees are frequently charged by localities in residential developments for water supply services and wastewater collection systems, as well as for some industry and businesses. At least three States use drinking water connection fees at present, including Massachusetts, New Jersey and Nevada, with fees averaging several hundred dollars for each residential hook-up.

Potential Use: Many local governments charge low or no connection fees, particularly for businesses, essentially subsidizing the cost from general revenues. Charging connection fees would allow these general revenues to be used for other purposes.

Advantages: Beneficiaries pay for the extension of local government services to them, rather than having current users subsidize new customers, which increases equity. Connection fees could be a strong revenue source with a very direct cost/benefit relationship.

Limitations: In contrast to access rights, connection fees provide capital only after, not in advance of the need created by new residents. Thus, local governments will need some alternative means of raising capital before new residents actually move in, or necessary expansion may not be completed in time. It is difficult to provide high equity with connection fees, since water and sewer use may be the same regardless of the economic status of the household hooking up to the central system. Connection fees may provide some disincentive for suburban or rural households to join the central systems, thus possibly exacerbating environmental problems.

Reference for Further Information: Raftelis Environmental Consulting Group (now Raftelis Financial Consulting, PA), *1998 National Water and Wastewater Rate Survey,* Charlotte, NC, 1998, Telephone: 704-373-1199; Raftelis, George, *Comprehensive Guide to Water and Wastewater Finance and Pricing,* second edition, CRC Press/Lewis Publishers, 1993; National Conference of State Legislatures, *States as Water Quality Financiers*, Denver, CO, May 1991.

CONSTRUCTION FEES

Description: Construction fees are charged by States and localities on a one-time basis for the right to construct an environmental facility, most notably for drinking water and underground storage tanks. While they may be used to cover the costs of reviewing construction plans, environmental impact reviews or permit issuance, such fees are meant in part to serve as a measure of future environmental impact.

Actual Use: At least seven States charge drinking water facility construction fees, including Arkansas, Florida, Illinois, Missouri, New Jersey, Ohio, and Pennsylvania, in most cases in connection with a construction permit. Florida's fees range from $50 to $1000; New Jersey's vary between $100 and $12,000; Illinois structures its fee rate on the depth of the water main extensions; Pennsylvania uses a flat fee structure of $750 per project. New Jersey and Florida also use flat-rate underground storage tank construction permit fees of $50-$100 per tank which, given the large number of tanks, generates close to $2 million annually in each State.

Potential Use: Fees could be used to cover expenses related to any future environmental problem, especially those related to private sector activity. For example, some small, privately-owned drinking water facilities provided by developers in new residential areas, often result in problems as developers abandon or turn facilities over to the public. Private underground storage tanks, landfills, and mines similarly may be abandoned or improperly maintained. Annual operating fees also could be charged by States. Currently, New Jersey and Oklahoma levy annual operating fees on investor-owned drinking water systems.

Advantages: Construction fees ensure that States or localities can recover some costs relating to future environmental compliance, resulting from poor management or other problems, such as closing landfills or fixing underground leaks in accordance with new regulations.

Limitations: Fees may be difficult to collect up-front from the private sector. Revenue yields may be modest and sporadic.

Reference for Further Information: U.S. EPA, *An Overview of Existing State Alternative Financing Programs: Financing Drinking Water System Capital Needs in the 1990's*, Office of Water, May 1992; National Conference of State Legislators (NCSL), *States as Water Quality Financiers*, Denver, CO, May 1991.

FRANCHISE FEES

Description: Franchise fees can impose on any private activity that must purchase a franchise to operate a commercial business. Typically, the new private business purchases a franchise to market a parent company's goods or services, using its name, in a particular territory. In this instance, fee would be imposed by a State or local government on the new business, and could be dedicated to an environment program.

Actual Use: Several States, as well as the federal government, are experimenting with franchise fees on the private sector, primarily in parks and other public lands. States and localities are using franchise fees for private businesses selling products in publicly-owned parks, for example, T-shirts, hats, toys, or food products bearing the name of the park, or food and beverage concession fees. Private parking lots in parks have been subject to franchise fees. Fee for such businesses are onetime, but the public entity also may collect a portion of annual profits. New York City's Central Park charged a $1 million fee for Disney's production of "Pocahontas" in the Park. Market-driven "profit centers" operating on leased parklands which pay State and local franchise fees include fees on selling Olympic-type corporate sponsorships, building and operating sports and entertainment centers piers and bumper boat rides, restaurants and the like. Franchise fees may be imposed directly on selected private businesses, for example, Florida uses a franchise fee on electric companies, dedicating revenues to parks and recreation.

Potential Use: While franchises in parks are becoming more commonplace and innovative, franchise fees on any new businesses unrelated to parks could be expanded.

Advantages: The benefits of franchise fees are not only financial, but for parks they can enhance land uses which pay for themselves. The market linking of public and private sector goals leverages revenues, such as additional private contributions, and enhances future funding opportunities.

Limitations: A major concern for non-park business franchising is that it may discourage new development and commercial concerns. Equity and the cost/benefit relationship is questionable if fees are placed on non-environmentally related businesses and if dedication of revenues is not sustained.

Reference for Further Information: Garvin, Alexander, *The American City: What Works, What Doesn't*, McGraw, New York, 1995; Souder, Jon and Fairfax, Sally, *State Trust Lands: History Management, and Sustainable Use*, University of Kansas Press, 1996; The Trust for Public Land, *GreenSense: Financing Parks and Conservation*, Phyllis Myers, editor, San Francisco, CA, Autumn, 1996, ("Nouveau Park Capitalism"), Telephone: 800-714-LAND, Internet: **http://www.tpl.org/tpl**.

INSPECTION/MONITORING/TESTING FEES

Description: These fees pertain to the ongoing inspection and monitoring of operators or outputs of facilities which have an impact on the environment, to confirm that equipment or discharges meet applicable standards. This may be part of ongoing permit enforcement, but not actual facility permitting. Outputs, or discharges, of facilities must be laboratory tested according to regulatory requirements.

Actual Use: Most State and local governments charge regular inspection/monitoring/testing fees. In a single year, New York collected almost $3 million in private company reimbursements for State monitoring. Examples of State programs charging fees include:

- Emissions inspection fees (widespread use);
- Laboratory inspection fees (widespread use);
- Drinking water monitoring fees (New Jersey and Iowa charge for monitoring, but this is still relatively rare);
- Septic tank inspection fees (Wisconsin, Maine and Massachusetts);
- Laboratory testing fees (widespread use); and
- Underground storage tank inspection fees (Wisconsin).

Potential Use: Many States have privatized water supply, solid waste disposal, and vehicle emissions inspection facilities. Governmental monitoring of these and other privatized facilities could be financed by facility inspection/monitoring fees. Septic tank inspection fees could finance the creation of septic tank management districts to monitor and prevent spillage. Laboratory fee revenues could pay for oversight of privatized environmental monitoring facilities, such as private air emissions inspection contractors.

Advantages: In addition to revenues, inspection/monitoring/testing fees provide a way of tracking which facilities are engaged in environmentally-sensitive activities. They may provide environmental incentives to stay in compliance, as this might reduce the need for inspection. Septic tank fees capture revenues from households not connected to municipal sewers, but impacting on water quality due to septic tank leakage.

Limitations: Fee revenue may be modest in most cases. If set too high, fees may discourage private companies from owning and operating environmental facilities. It may be difficult to identify and track owners of some facilities, especially residential septic tanks.

Reference for Further Information: U.S. EPA, Report to Congress, *Alternative Funding Study: Water Quality Fees and Debt Financing Issues*, Syracuse University, June 1996.

LICENSING AND RECREATIONAL FEES

Description: These are fees charged to individuals for the privilege of engaging in activities, and can be distinguished from professional certification fees by the lack of training required. Examples include the privilege of mooring boats on State waters, using State parks and campgrounds, or for hunting, boating or fishing licenses. Vanity licensing plate purchases are discussed in **Section 8: Tools To Pay For Community-Based Environmental Protection**.

Actual Use: Both State and local governments use these fees for a variety of purposes. Some local governments charge mooring fees at municipal marinas run by port authorities, where the income pays for port operations. Delaware charges a $1.50/square foot for private docks on State waters to fund its boat safety program. North Carolina supports marine research with salt water fishing license fees. State and local governments charge fees for park use. Arizona's park user fees produce over $1 million/year for park operating costs. Fees for fishing and boating licenses also are charged by most States. The federal government uses park and recreational fees extensively for its facilities.

Potential Use: License revenues could cover the costs of environmental programs associated with the activity. For example, a share of boat license fee or mooring fee revenues could be used to finance pump-out facilities for boat toilets. Park fees can be levied wherever State or local governments incur costs for the provision of recreation services. Camping fees can be used to fund improved access to and maintain camping sites.

Advantages: These fees can cover expenses for public use of environmentally sensitive areas, and still represent an untapped revenue source in many States. Charging fees would allow State general revenues to be used for other purposes. Most license fees have built in enforcement mechanism, since the licensing government can revoke the privilege granted with the license if fees are not paid, and provide a direct cost/benefit relationship. Equity is enhanced because out-of-State tourists must pay for the environmental impacts of increased tourism in an area.

Limitations: It may be difficult to institute recreational fees if use of State waters and parks has historically been free. Such fees may have a disproportionate impact on lower-income segments of the population who may have few other low cost recreational opportunities. Since they generally apply only to a limited population, most license fees have a small revenue base, and it may be difficult to raise significant revenues if fees are set at low levels.

Reference for Further Information: National Conference of State Legislators (NCSL), *States as Water Quality Financiers*, Denver, CO, May 1991.

LOCAL AQUIFER PROTECTION FEES

Description: Local aquifer protection fees are similar to the concept underlying State water supply withdrawal fees and State direct water use fees in that they are special charges on local water utility fees and private well users. By labeling them as "aquifer" or "water conservation" fees, localities are attempting to highlight the effects on aquifer health of groundwater withdrawals (see also later in this section, **State Public Water Supply Fees** and **Well Permit/Pumping Fees**, and in **Section 1C, State Direct Water Use Fees**).

Actual Use: Local use of special aquifer fees is recent, and sporadic. For example, in Spokane, Washington all residents are charged a $15 annual "aquifer protection fee". In Dade County, Florida water utility users pay a 3% surcharge on all water bills. In Providence, Rhode Island all water customers pay a surcharge of 1 cent/100 gallons of regular water bills. The property tax has been dedicated to open space, watershed and wetlands protection.

Potential Use: Similar to "quality of life" or "conservation taxes" added on to local general sales taxes or property taxes, aquifer fees are designed to heighten public awareness of environmental consequences, as well as raise revenue. Revenues could also be used for a range of drinking water treatment needs, infrastructure, septic and well rehabilitation, purchase of development rights and other land protection projects.

Advantages: Advantages in terms of environmental benefits and public awareness are clear. If revenues are dedicated to specific projects, the cost/benefit relationship is strong. Revenues could be designed to leverage additional dollars. Water conservation may or may not result, depending on fee structure.

Limitations: Fees are regressive when imposed as flat fees. They require voter approval, which means that the dedicated uses of fees must be popular, and fees must be affordable. While revenue yield may be predictable, unless structured to influence water conservation, it most likely is relatively small. There may be a public backlash against fee surcharges.

Reference for Further Information: The Trust for Public Land, *Protecting the Source: Land Conservation and the Future of America's Drinking Water*, Richard Stapleton, author, San Francisco, CA, Telephone: 800-714-LAND, Internet: **http://www.tpl.org/tpl**.

LOCAL WATER/WASTEWATER UTILITY USER FEES

Description: User fees are charged regularly to all customers, industrial, commercial and residential, for the receipt of utility services such as public drinking water, wastewater treatment, and stormwater drainage. Customers receiving services are connected to central publicly or privately-owned facilities.
Traditionally, utility user fees have been levied for water and sewer. Water meters and pollutant tracking have led to sophisticated billing procedures and rate structures based on volume and toxicity. Utilities can assess rates to cover their full costs including capital cost recovery ("full cost pricing"), or subsidize the costs of service with general revenues. Rates are usually measured in cents per 1,000 gallons of water withdrawn (drinking water) or discharged (wastewater) into the treatment system.

Actual Use: User fees are limited to localities. (State utility fees will be discussed later). Most localities issue water and sewer bills once or twice a year. Average annual water/wastewaster rates per household range from $170 to $230, based on a family of 2.64 persons using 104 - 140 gallons of water per day, at $.14/1000 gallons. Costs of smaller communities may be two to three times more due to lack of economies of scale. Costs for stormwater drainage pipes and discharge are less universal and more often subsidized.

Potential Use: A basic issue in rate-setting is the link between capital and operating budgets, and the rate base and structure. Medium-to-large communities review user fees regularly in relation to budget needs, and make decisions about using full-cost pricing procedures to cover more than current operating costs. They also make policy decisions to subsidize classes of users (e.g., the elderly or disadvantaged, urban residents), and on using ascending block rates for conservation and other purposes, or descending block rates to promote economic development. Industrial waste stream toxicity is also accounted for. Another issue is if non-users of the facilities should pay for the environmental benefit to surrounding clean lakes and streams.

Advantages: Utility user fees provide services that most residents require. Thus, the fee base is large enough to provide a strong and reliable revenue stream at relatively low, equitable rates. Graduated rate structures would improve equity. Small rate increases can raise significant revenues while imposing a fairly small increased burden on households. The cost/benefit relationship is clear and rational rate-setting increases public awareness of the true cost and environmental benefits of water-related services.

Limitations: Many localities are accustomed to subsidized rates. This makes rate increases difficult. In small or economically disadvantaged communities, reliance on user fees for operations and maintenance as well as capital financing may be unaffordable, based on fiscal indicators such as median household income and community debt capacity. Smaller communities may not have the management and other tools needed to reevaluate their rate structures with many complex policy choice issues.

Reference for Further Information: Raftelis Environmental Consulting Group (now Raftelis Financial Consulting, PA), *1998 National Water and Wastewater Rate Survey,* Charlotte, NC, 1998, Telephone: 704-373-1199; Raftelis, George, *Comprehensive Guide to Water and Wastewater Finance and Pricing*, second edition, CRC Press/Lewis Publishers, 1993; Association of Metropolitan Sewerage Agencies, *Wastewater User Fee Survey,* Washington, DC, 1994.

PERMITTING FEES

Description: Permitting fees are charged for processing costs associated with the initial permitting, and periodic permit renewal, of municipal and industrial facilities, or a location such as a wetland. Such fees typically are dedicated to operating budgets. Fees may be graduated depending on whether a facility is classified as major and minor, and depending on the toxicity of the waste stream.

Actual Use: Both State and local governments increasingly have used permitting fees to cover the administrative costs associated with permit writing and issuance. This has been supported by the federal government, and is required for air emissions under Title V of the 1990 Clean Air Act and in several Clean Water bills. Wetlands fees are one of the major sources of funding for State wetlands programs. Local industrial pretreatment permit fees are a source of revenue for local governments. Examples of administrative fees and rates include: **State NPDES Permit Fees** (over 30 States); **State Drinking Water Permit Fees** (over 35 States); **State Air Emissions Source Permit Fees** (all States); **State Hazardous and Solid Waste Permit Fees** (at least 20 States); **State Wetlands Permit Application Fees** (at least 20 States); **State Groundwater Certification Fees** (used by a growing number of States); **State Underground Storage Tank Fees** (at least 10 States); and **Local Industrial Pretreatment Permit Fees** (many localities, but only where program is delegated).

Potential Use: State and local governments could institute permit application fees, as well as periodic permit renewal fees, for any environmentally-related facility or location. Wetlands permits could be expanded to all areas classified as valuable natural habitat. Permit fees could be more widely used for solid waste, sludge disposal, underground storage tanks and stormwater discharge.

Advantages: Permit fees may cover some or all of the start-up costs related to the permit application process. Graduated fee rates based on toxicity, such as used for effluent-based permits in Louisiana, New Jersey and Louisiana, and hazardous waste permit fees in New York, could produce a significant revenue stream for State capital-generation for environmental infrastructure. Graduated rates may encourage pollution reduction, and wetland permits promote conservation and give State governments advance information on wetland building plans. Fee collection is relatively straightforward.

Limitations: Revenue yield in most States is modest, and somewhat unpredictable. Flat rates may be inequitable, particularly for minor facilities which constitute the majority of permittees, and facility owners may not see a close cost/benefit relationship. Tracking ownership and development of wetlands and underground storage tanks can be administratively complex and expensive.

Reference for Further Information: National Conference of State Legislatures (NCSL), *Summary of State Wastewater Discharge Permit Fees*, Denver, CO, December 1993; NCSL, *Alternative Funding Mechanisms for State Drinking Water Programs*, Denver, CO, July 1993; U.S. EPA, Report to Congress, *Alternative Funding Study: Water Quality Fees and Debt Financing Issues*, Syracuse University, June 1996.

PRODUCT REGISTRATION FEES

Description: Such fees are charged for the registration of particular products that have some environmental impact, most notably fertilizers and pesticides.

Actual Use: These fees generally are limited to States, as well as the federal government. A number of States have fertilizer registration programs, some of which finance nonpoint source pollution control. In Kansas, for example, a State $1.70/ton fertilizer fee is charged, with $0.30/ton dedicated to the fertilizer program and $1.40/ton dedicated to the State Water Plan which funds conservation, water quality and water use projects throughout the State. Other States with dedicated pesticide registration fees include Iowa, Minnesota (which raises $3 million annually), New York and Wisconsin.

Potential Use: Any (especially new ones), environmentally-sensitive product, with complex, non-organic components, could be required to be registered and pay a fee, for example, water treatment compounds, carpet treating chemicals, and the like.

Advantages: If set high enough, and proportional to anticipated product production, such fees may increase the awareness of harmful products on the part of consumers and influence the conservation of use or product substitution. Fee revenues dedicated to research and data collection on new, environmentally-degrading products would result in a good cost/benefit relationship. These fees also may enable the placement of limits or regulations on the sale of such products, and at least provide advance notice of new products coming on the market.

Limitations: Product registration fees will face opposition from the producers, who may already have gone through complicated and expensive federal approval processes, such as the Food and Drug Administration certification.

Reference for Further Information: The Fertilizer Institute, *Summary of State Fertilizer Laws*, 1988; National Council of States Legislators (NCSL), *States as Water Quality Financiers*, Denver, CO, May 1991; U.S. EPA, *Prevention, Pesticides and Toxic Substances: Pesticides Industry Sales and Usage: 1992 and 1993 Market Estimates*, June 1994.

PROFESSIONAL CERTIFICATION FEES

Description: Certification fees are charged to companies or individuals for the privilege of engaging in an activity, at one time only or on a periodic renewal basis. Fees can fund training for professionals in environmentally sensitive industries and confirm that environmental officials are certified.
Actual Use: Both State and local governments use license fees to finance administrative costs associated with related government agencies. Examples include:

-Pesticide Dealer and Applicators' License Fees;

-Business License Fees, including for engineering/construction/testing;

-Laboratory Certification Fees; and
-Occupational License Fees, e.g.,:

-Solid and Hazardous Waste Facility Operator and Transporter Certification

-Water and Wastewater Operator, and Training Program, Certification
-Underground Storage Tank Installer Certification Fees; and
-Septic Tank Installer Certification Fees.

Potential Use: Professional certification revenues could cover the costs of environmental programs associated with the industry or activity. In addition to plan review and processing costs, fees could be used to pay for public notification required under regulations. Fees for the professional engineering and construction industry could be used to mitigate the urban runoff problems associated with construction.
Advantages: Like licensing fees, most professional certification fees have a built-in enforcement mechanism, in that a privilege granted through certification can be revoked if fees are not paid. Construction certification fees give States advance warning of construction and the funds to analyze the extent of the potential impact. Laboratory, operator, and testing certification fees for businesses allow the State to maintain some oversight of particularly privately-owned and/or operated environmental facilities.
Limitations: Certification fees may have a disproportionate impact on small businesses, who may not be able to afford operator or construction certification. Since these fees generally apply only to a limited population, most professional certification fees have small revenue base in most cases, and it may be difficult to raise significant revenues. Fees dedicated to potential future impacts do not have a high cost/benefit relationship.
Reference for Further Information: U.S. EPA, Office of Underground Storage Tanks, *Funding Options for State and Local Governments,* August, 1988; National Governor's Association, *Funding Environmental Programs: An Examination of Alternatives*, Washington, D.C., 1989.

SEPTIC SYSTEM IMPACT FEES

Description: Septic system impact fees are levied on the construction of new septic fields, including residential septic systems. They are designed as a type of impact fee, which measures the future negative impact of poorly maintained septic systems.

Actual Use: At least five States impose septic system fees on all new development, including Maryland, Oregon, North Dakota, Virginia and Wisconsin.

Potential Use: Since individual septic fields and tanks are largely unregulated at the State and local level, the impact fee could be used as a surrogate for permit issuance. Fee rates could be graduated to reflect the possible negative damage to water quality resulting from improper maintenance by owners, for example, fee rates could be higher if septic system were located near lakes or groundwater sources of community drinking water. Fees could heighten awareness of the importance of preventative maintenance.

Limitations: Fees could be difficult to collect from individual property owners, and administratively complex and expensive to track. Revenue yield is modest and unpredictable. The cost/benefit relationship may not be apparent for individual homeowners.

Reference for Further Information: National Conference of State Legislatures (NCSL), *Financing Clean Water,* Groundwater Pamphlet, Denver, CO, June 1991.

SOLID WASTE DISPOSAL FEES
(Tipping Fees, Septage/Sludge Fees)

Description: State and local disposal fees are levied for the volume and sometimes toxicity of solid waste (e.g., garbage and trash) disposed of at local management and/or treatment facilities, such as landfills and incinerators. This type of fee also may be used for septage, pumped from septic tanks and treated at local wastewater treatment plants, and municipal water and wastewater treatment sludge which is sub-surface disposed and land applied.

Actual Use: Most localities use "tipping fees" to cover solid waste disposal and treatment costs at municipal (or private) landfills and incinerators. Tipping fees range from $50 to $200 or more per ton depending on waste content and local demand for service, as well as the availability and location of management/treatment facilities. While tipping fees represent one type of service unit cost for solid waste, they are not strictly user fees, and extraneous factors such as geography and public/private competition influence the level of charges. Many localities also charge fees per bin or bag of garbage and recycling. Connecticut, New Jersey, and Vermont, levy an added fee per ton of solid waste disposed, ranging from 1-4 dollars. Septage/sludge disposal fees used by several States are used to finance sludge management programs. Colorado, Indiana, Oklahoma, and Wisconsin, charge for industrial sludge disposal.

Potential Use: Local tipping fees could be adjusted to reflect more precisely the true cost of service, as opposed to demand/supply issues. Disposal fees could be more broadly applied, especially for septage, for revenue purposes but also as an incentive mechanism to encourage conservation and beneficial use. States could become more active in assessing solid waste fees.

Advantages: Fees could be set to encourage waste reduction. Currently, solid waste disposers do not bear the full costs of disposal, which encourages the option of disposal as opposed to recycling. Tipping fees should remove this disincentive if set at appropriate levels. There is a clear cost/benefit ratio, and revenue yield could be significant and predictable. Fees from local garbage and trash haulers should be relatively easy to collect.

Limitations: Fees are not necessarily equitable if not directly related to the true cost of service. However, competition between the public and private sectors, and lack of available landfill space has undercut efforts at fair pricing. Fees based solely on volume may not adequately capture revenue from the most toxic and least degradable waste, which is difficult to measure. Very high fees could encourage illegal dumping of wastes. If significant waste reduction occurs in response to fees, revenues will similarly decline. Also, since many wastewater treatment plants subsidize the cost of beneficial sludge uses, e.g., land spreading, fees may be counter-productive.

Reference for Further Information: New York State Department of Environmental Conservation, *Survey of State Funding for Solid Waste Management Programs,* June 1991.

STATE PUBLIC WATER SUPPLY WITHDRAWAL FEES

Description: In addition to local user fees, these State fees are assessed on public and private utilities, or their industrial, commercial and residential customers, that supply or are supplied consumptive water via central facilities. They may be levied as a percentage of local water utility sales to local customers, or volume of water treated or produced. They may also be levied as a surcharge or add-on to local water bills. Imposed as a flat rate and assessed in cents/per 1,000 gallons of water sold or withdrawn, they can be collected by States directly or, in the case of customer surcharges, by local utilities which rebate the surcharge to the States. They differ from the **Direct Water Use Charges** used by States discussed in **Section 1.C.: Special Charges**.

Actual Use: State public water supply withdrawal fees increasingly have been used by States primarily to cover program costs as opposed to infrastructure capital-generation. Presently, at least 11 States have imposed such fees in the form of drinking water production, sales or service fees, ranging from $.03 - $.07 per 1,000 gallons, including Arizona, California, Delaware, New Jersey, New Mexico, Montana, Oklahoma, Rhode Island, Texas, Vermont and Virginia. A similar fee was defeated recently in New York and is being considered in Pennsylvania and Florida.

Potential Use: An increase of $.07/1000 gallons to water customer bills yields $1 billion annually nationwide, based on 1990 consumption rates. Thus, there is significant potential for States to use this fee to generate revenue for capital infrastructure funds for water and wastewater, such as SRFs.

Advantages: This type of broad-based, low level fee can yield high revenue. The regressiveness of flat fees can be avoided by using graduated fee rate structures or percentages. The cost/benefit relationship is strong, and such fees may increase awareness of the true cost of water services. The demand for public water, particularly by industry, is relatively inelastic, resulting in stable and predictable revenues.

Disadvantages: The revenue base of the public water supply withdrawal fee is severely limited, however, because water supplied by utilities resents only a very slim portion (about 12%) of all water use in this country. The majority of water use results from direct withdrawals from ground and surface water sources by industry, mining, hydroelectricity and agriculture, and private wells. Legislation would be required, and local utilities may resist rebating fees to the State level. New fees would be unpopular with water utilities, both public and private, which oppose incremental increases in user fees because of lack of community support particularly when fees are redistributed to other localities. New State administrative procedures would be required to collect fees from utilities.

Reference for Further Information: U.S. EPA, Report to Congress, *Alternative Funding Study: Water Quality Fees and Debt Financing Issues*, Syracuse University, June 1996, discusses the fee in-depth; Clean Water Council, *America's Environmental Infrastructure: A Water and Wastewater Investment Study*, Washington, D. C., December 1990; U.S. EPA, Environmental Finance Advisory Board (EFAB), *Public Sector Options to Finance Environmental Facilities*, March 1992.

TOLLS

Description: Tolls are fees charged for auto and truck passage on thruways, highways, roads and bridges to offset the expenses of new construction, operation and maintenance. Tolls are also imposed on boats (e.g., docking fees) and airplanes (e.g., landing fees). Tolls may be used to pay for environmental mitigation resulting from negative construction impacts (see **Section 8, Mitigation Lands and Banking**).

Actual Use: Tolls have been used in all States for transportation budgets, and may constitute the State matching share to federal construction grants. Localities use tolls as well. Traditionally, highway construction has included some environmental component, for example, preventing nonpoint construction sites. Recently, some States and localities have gained approval to establish new tolls specifically to pay for environmental mitigation of problems caused by construction and use. A good example is Alligator Alley (Interstate 75) bisecting the sensitive Florida Everglades ecosystem, and the construction of which has been a major contributor to altered water flows. An estimated $4.5 million annually of Alligator Alley toll revenues is being used for environmental mitigation projects, including land purchases in the Everglades and Florida Bay. Toll dedication was agreed to by both the federal and State Government, and is part of a $685 million, 20-year initiative.

Potential Use: The potential uses of a toll revenues for environmental projects is large. After meeting federal and state requirements for operation, maintenance and new construction needs, dedication of a portion of toll receipts can pay for both on-and-off site environmental mitigation. Highway tolls could be to correct problems caused by use of de-icing salts. Harbor-related tolls could be used to correct water degradation. Airport landing fees could be used to collect and treat propylene glycol contaminated runoff from aircraft deicing operation.

Advantages: Considerable environmental benefits can be achieved, and public awareness of environmental degradation from highway construction and use may heightened. Toll collection systems already exist, and non-residents can help bear some of the cost of environmental mitigation. Revenues could be substantial.

Limitations: Tolls already are fairly steep, and regressive. It may be difficult to increase tolls, and ensure environmental dedication over time, particularly given competing demands from highly popular transportation projects.

Reference for Further Information: The Trust for Public Land, *GreenSense: Financing Parks and Conservation*, Phyllis Myers, editor, San Francisco, CA, Spring 1996, Telephone: 800-714-LAND, Internet: **http://www.tpl.org/tpl**. See the Transportation Equity Act for the 21st Century (TEA-21), June 1998, for a description of what tolls may be applied to a State's matching share to federal grants.

TRANSPORTER FEES

Description: These are fees charged to a company or individual, most notably for hauling and transporting solid or hazardous wastes, septage, petroleum products, and radioactive waste. Fees can be charged on volume of waste transferred, or as a flat charge per hauler.

Actual Use: Hazardous waste transporter fees are used to pay the cost of hazardous waste monitoring and spill response in many States, including Arkansas, California, Connecticut, Indiana, Massachusetts, New Jersey, Ohio, Oklahoma, Pennsylvania, Washington, and Wisconsin, often generating several million dollars per year. A few other States assess septage hauling fees, such as Michigan, Texas and Wisconsin. Washington levies a flat fee of over $1,000 for petroleum transporters, which must be renewed periodically. Maine charges significant fees for hauling radioactive waste.

Potential Use: Revenues could be used to make road improvements on routes traveled by hazardous waste transporters with safety considerations in mind. Graduated rate structures based on the anticipated distance of transporting could be imposed. Revenues also could finance the operating costs of State monitoring programs for hazardous waste transport.

Advantages: The fees could capture revenue from transporters who are responsible for some waste spillage. Graduated fee structures based on distance might provide incentives for disposal at nearby sites. Charging septage haulers may be the only way to include private septic systems in fee systems.

Limitations: The revenue base is very small and thus the revenue yield is low. Depending on the structure of the fee, it may have a disproportionate impact on small businesses, particularly in the septage hauling business. The fee might encourage polluters to dump wastes illegally to avoid the costs of transportation to a legal site.

Reference for Further Information: National Conference of State Legislators (NCSL), *States as Water Quality Financiers*, Denver, CO, May 1991.

WATER RIGHTS APPLICATION FEES

Description: State water rights application fees are imposed on municipal, agricultural and industrial users seeking to establish legal boundaries for diversion of water for direct use. Fees could be charged at one time for new permits, or on a recurrent basis.

Actual Use: Most western water rights States use these fees. Rates in California, Montana and Nevada are quite steep and recurrent.

Potential Use: This fee concept could be extended to include dam registration fees (Maine) and stream encroachment fees (New Jersey), or any other water diversions. Also, some western localities have sold water rights "futures" such as Escondido, California. California has considered using income tax credits to encourage donations of water rights.

Advantages: Water rights application fees could be used to cover the administrative costs of processing State permits, but also could be designed as an activity impact fee, in recognition of potential negative impacts on surface or groundwater. If a State does not use direct water use fees (discussed subsequently), water rights application fees provide some equity in the imposition of all water withdrawal and use fees.

Demand for water in the west may still be relatively inelastic, but such fees might heighten awareness of the importance of water as a vital and potentially nonrenewable natural resource. Collecting fees for water rights permits may be relatively straightforward in the first instance, but there may be strong opposition to recurrent fees in western States which traditionally have regarded water as free.

Limitations: Unless fee rates are steep or levied on a recurrent basis, revenue yield is small and unpredictable. The cost/benefit relationship is not immediately obvious to permittees. Water rights fees may not be applicable to many eastern riparian rights States.

Reference for Further Information: University of Florida College of Law, *Nationwide Survey of State Water User Fee Legislation,* February 1992.

WELL PERMIT/PUMPING FEES

Description: Like septic field/tank installation and septage disposal, private wells represent a largely unregulated area. Licenses for private well drilling and pumping are imposed in a number of States and localities as a "surrogate" fee for actual water use/withdrawal which may negatively impact the water table. Such fees are also discussed earlier in this section under **Local Aquifer Protection Fees**.

Actual Use: At least seven States levy well drilling license, permit and/or pump fees, including Alabama, Arizona (including industrial well users), Montana, New Jersey, South Dakota, Virginia, and Wisconsin (which labels its fee a "compensation" fee for well water use).

Potential Use: Well fees could be used much more widely.

Advantages: Well fees could heighten awareness of the value of water and the potential negative impacts on the underground water table. Well fees provide equity for all water withdrawal and user fees, since private wells are currently a loophole in the system of regulation and user fees.

Disadvantages: It may be extremely difficult to administer such fees, particularly at the State level. There exist few notification mechanisms for individual drilling activity, especially for private homeowners. States such as New York have attempted to institute such fees, but found them too difficult to collect. Revenue yield would be very small and unpredictable. As with all "surrogate" impact-related fees, the benefit is not immediately evident to fee payers.

Reference for Reference for Further Information: U.S. EPA, Report to Congress, *Alternative Funding Study: Water Quality Fees and Debt Financing Issues,* Syracuse University, June 1996.

OTHER

Description:

Actual Use:

Potential Use:

Advantages:

Limitations:

Reference for Further Information:

COMPARISON MATRIX FOR FEES

Criteria/ Fee	Actual Use	Revenue Size	Revenue Stability	Administrative Ease	Equity	Cost/ Benefit Ratio	Environmental Benefits
Access Rights	Mod.	Low-Mod.	Mod.	Mod.	High	High	High
Bond Issuance	Low	Mod.	Mod.	High	High	Mod.	Low
***Connection**	High	Mod.	Mod.	High	Mod.	High	High
Construction	Mod.	Low	Low	Mod.	Mod.	Mod.	Low
Franchise	High	Mod.-High	Mod.-High	High	High	Mod.	High
***Inspection/ Monitor/ Testing**	High	Low	High	High	Mod.	High	Mod.
***Licensing & Recreational**	High	Mod.	Mod.	High	High	High	Mod.
Local Aquifer Protection	Low	Low	Mod.	Mod.	High	High	High
***Local Water /Wastewater Utility User**	High	High	High	High	Low-Mod.	High	Mod.
***Permitting**	High	Low-Mod.	High	High	Mod.	High	High
Product Registration	Low	Low	Low	High	Mod.	Mod.	Mod.

COMPARISON MATRIX (continued)

Criteria/ Fee	Actual Use	Revenue Size	Revenue Stability	Administrative Ease	Equity	Cost/ Benefit Ratio	Environmental Benefits
Professional Certification	High	Low	Low	Mod.	Mod.	Low	Mod.
Septic System Impact	Low	Low	Low	Low	High	Mod.	High
***Solid Waste Disposal**	High	High	High	High	Low	High	High
***State Public Water Supply Withdrawal**	Mod.	High	High	Mod.	Mod.	Mod.	Low
Tolls	Mod.	High	Mod.	High	Mod.	High	High
Transporter	Low	Low	Mod.	Low	Mod.	Mod.	Mod.
Water Rights	High	Low	Low-Mod.	Mod.	High	Low	Low
Well Permit/ Pumping	Low	Low	Low	Low	High	Mod.	Mod.

High - High use (over 25 States/many localities); criteria score high (many advantages); High revenue yield

Mod.- Moderate Use (10-25 States/many localities); criteria score in medium range; Moderate Revenue yield

Low - Low or rare usage; many limitations; low revenue

* Star indicates best rated mechanisms

1.C. SPECIAL CHARGES

1.C. SPECIAL CHARGES

Description: Special charges are charges not placed on the general population or upon the sale of a particular good or service, such as many taxes, and they are not fees for administrative services. Rather, special charges apply to specific types of transactions or activities which impose unique environmental or development costs. A special charge may be similar in some features to either a fee or a tax and, in fact, hitherto have been termed fees or taxes somewhat interchangeably. For example, effluent charges are sometimes called effluent fees or effluent taxes, and mineral severance charges are sometimes referred to as fees and sometimes as taxes.

As discussed here, special charges are a way of assigning clean-up costs to whomever or whatever caused, or may cause, pollution, hence the term "polluter pays". In this sense, special charges may most closely resemble activity impact fees. However, special charges have the characteristic of being recurrent or ongoing, instead of being attached to a permit application, renewal, licensing or certification. Unlike activity fees, special charges typically are quite steep or costly.

Nine special charges are examined in this section, including effluent and emission fees, feedstock and waste-end special industry fees, direct water use fees, other severance fees (e.g., coal, gas, oil, timber), special assessments and exactions, and development impact fees. Unlike many other fees and taxes, which could be used by many different levels of government or even simultaneously by more than one level, special charges often are limited to one particular level of government depending on the characteristics of the charge imposed or other revenue and environmental goals. For example, the federal government may not have the authority or ability to implement direct water use fees (i.e., self-supplied surface and groundwater withdrawal) on cultural and constitutional grounds. Exaction and impact fees typically are local in nature. Multi-governmental effluent, emission, feedstock and waste-end fees would result in double counting, or double taxation, and would be prohibitive from an economic cost and equity standpoint.

Advantages: Special charges can be designed to generate revenues for any environmental and development-related activity or impact. As described in this report, special charges could have a very significant and highly predictable revenue potential, which in recent years is beginning to be tapped and dedicated to the environment. The potentially large size of the revenue stream means that such charges could be highly suitable for dedication to State and local environmental infrastructure capital construction funds, as opposed to general operating budgets. Some, such as effluent or emission charges and hazardous waste production charges, can be highly equitable when rate structures are based on volume and toxicity of the waste stream. The "polluter pays" principle helps to ensure that some cost/benefit relationship is achieved. Most special charges create strong environmental incentives, i.e., tax avoidance may cause a reduction in pollution behavior. Thus, some charges are frequently discussed in the current literature as

market-oriented incentives.

Limitations: The polluter pays principle is not widely accepted for many special charges, such as effluent fees which typically would be opposed by municipal and industrial dischargers. Some long-standing fees remain largely undedicated to environmental programs, such as severance taxes, which typically are dedicated to State general budgets. Since many charges are novel, and extremely complex to design and administer (e.g., effluent and feedstock fees), policy makers should exercise special care in designing new systems. Collection may cause difficulties, as there may be no existing, related collection bureaucracy and procedures on which to build. Thus, brand new systems may have to be established. Administrative complexities in establishing graduated rate structures, and lack of uniformity across States, means that some charges (e.g., emissions fees) may be best suited to the federal as opposed to State government.

Many States and local governments may not have enabling legislation to levy special charges. Both enabling legislation and specific legislation may be very difficult to achieve, which has been the case with the federal government and many States up until now.

Summary: Special charges, with which State and local government continue to experiment, are increasing in importance. The potential for yielding revenue streams significant enough for environmental infrastructure capital-generation is high. However, except for the more traditional charges such as exactions and severance taxes, the use of special charges by all levels of government is still low. This is in part due to strong industry opposition and because of the very large legal and administrative complexities involved in instituting equitable programs and rate structures, e.g., for effluent, emissions, and feedstock taxes. Special charges offer significant opportunity for States and localities to explore in the future.

LIST OF SPECIAL CHARGES
(In Alphabetical Order)

*1. Direct Water Use Charges
2. Effluent Charges
3. Emission Charges
*4. Exactions
5. Feedstock Charges
*6. Impact Fees
*7. Severance Taxes
*8. Special Assessments
9. Waste-End Charges (Special Industry Fees)

* Stars indicate most highly rated mechanisms as described in the Comparison Matrix at the end of the narratives. See Introduction to the *Guidebook* for a description of the criteria used. Ratings of "High", "Moderate", and "Low" are for comparison purposes only, as some ratings are necessarily subjective and data are incomplete.

DIRECT WATER USE CHARGES

Description: Water drawn directly from the surface or ground, by industry, mining, hydroelectric firms, agriculture and households using private wells represents 88% of all water use. Water supplied and treated by public or privately-owned utilities constitutes the other 12%. Direct water use charges are fees placed on self-supplied water, typically measured in terms of cents/per 1000 gallons of water or acreage, by States and sub-State water districts.

Actual Use: At least 10 State and large sub-State water districts impose a recurrent direct water use fee on users that "self-supply" their own water. These include Arizona, Arkansas, Connecticut, Kansas, New Mexico, New Jersey, North and South Dakota, and several sub-State districts in Texas. New York proposed direct charges, but they were defeated in the legislature. Florida and Pennsylvania are considering such legislation. Two States exempt agricultural uses, and in two States the hydroelectric industry has challenged the fees based on temporary non-depletive use. Most States exempt withdrawals below a certain amount, so private wells are typically excluded.

Potential Use: Direct water use fees could be implemented by any State, or they could be implemented on a sub-State or even municipal basis. Inclusion of private wells would be difficult to administer, which is why well drilling fees often are used as surrogate fees.

Advantages: Direct water use charges create equity for all users, i.e., most withdrawals from public and private utilities are charged regular user fees, but this is the clear minority of all water use. These charges can raise significant revenue. One study estimates that $1 billion could be raised yearly if all States charged an industrial use fee of about 2 cents/per 1000 gallons. Revenues would be stable, since demand for water especially among non-residential users is relatively inelastic. Fees would have little economic impact on small users, who typically are exempted. The cost/benefit ratio is fair in that some revenues would be dedicated to both point and nonpoint source projects.

Limitations: Self-supplied water is hard to estimate on a State-by-State basis because water allocation and regulation (or lack thereof) differs by State. The amount of water returned to the water table, and the degree it is polluted, also vary widely, and are hard to measure. For example, agricultural returns may be contaminated (fertilizer/pesticides), but hydroelectric uses may be relatively clean. This decreases the equity of direct charges substantially. Many water users, especially agricultural, object vigorously to the imposition of these charges.

Reference for Further Information: U.S. EPA Report to Congress, *Alternative Funding Study: Water Quality Fees and Debt Financing Issues*, Syracuse University, June 1996; U.S. Department of Interior, *Estimated Use of Water in the United States in 1990*, Solely, Pierce and Perlman, 1993; University of Florida College of Law, "Nationwide Survey of State Water User Fee Legislation", February 1992; Congressional Research Service (CRS), *Funding Water Quality Programs: Revenues for a National Water Investment Corporation*, July 1992.

EFFLUENT CHARGES

Description: Effluent charges are those placed on the volume and toxicity of pollutants discharged into the water by industry and/or municipal wastewater treatment plants.

Actual Use: While effluent fees have been considered by the federal government and a number of States, only three States, New Jersey, Louisiana, and Washington, have true effluent fee programs. A true effluent fee program exists when fees are based on measuring the pollutants discharged into water from point sources, including both quantity and quality, and not just what is allowed under NPDES limits. Annual fees in the three States are upwards of $100,000 for each "major" industrial permit, yielding from $10 to over $20 million. While these States use the fees mainly to subsidize State operating budgets, they are used widely in Europe for capital-generation.

Potential Use: Effluent fees could be used by States or the federal government, but probably not by localities. Revenue could be dedicated to infrastructure funds such as State Revolving Funds. These fees could be imposed mainly for revenue purposes but also as incentives to reduce pollution.

Advantages: Effluent fees could generate significant and reliable revenue on an annual basis. The cost/benefit ratio is satisfactory since the "polluter pays" principle exists. Fees could provide strong environmental incentives to reduce the discharge of harmful pollutants. If tied to NPDES permit issuance and renewal, fees could be collected by permit writers.

Limitations: Effluent fees are hard to design and administer due to data limitations and policy concerns. Although self-reported Toxic Release Inventory (TRI) data are used to estimate volume and toxicity, the TRI only covers major industrial toxic discharges and no standardized toxicity measures exist. Thus, it is difficult to institute graduated rate structures which characterize true effluent fee systems, and even more complex to relate discharges to receiving water quality, because waste streams vary in dilution and receiving water quality varies considerably. The inability to relate fees to specific environmental damage reduces their equity and the directness of the cost/benefit ratio. Flat-rate fees are simpler and less easily circumvented via dilution or media transfers. However, even this approach seems to impact heavily, and disproportionately, on the chemical and allied product industry and, secondarily, on the pulp and paper industry. Effluent fees are unpopular with industry and municipalities, and there is no observable trend nationwide for their increased use.

Reference for Further Information: U.S. EPA Report to Congress, *Alternative Funding Study: Water Quality Fees and Debt Financing Issues,* Syracuse University, June 1996; Congressional Research Service, *Funding Water Quality Programs: Revenues for a National Water Investment Corporation,* July 1992; Research Triangle Institute, *Effluent Discharge Fees and Water Quality,* February 1993; American Petroleum Institute (API), *Effluent Fees: Present Practice and Future Potential*, Discussion Paper #075, December 1993.

EMISSION CHARGES

Description: Emission charges are levied on the volume and toxicity of pollutants emitted into the atmosphere by industry, and also municipal facilities such as power plants.

Actual Use: States already use a type of emission-based permit fee under Title V of the Clean Air Act, which requires them to charge permitted sources the equivalent of $25 per ton of regulated pollutants emitted. Since the purpose of this requirement is to help States recover the full cost of permit issuance, such fees resemble permit fees. A number of States have emission-based motor vehicle fees which are reflected in motor vehicle sales taxes and/or recurrent registration fees. In contrast, "true" emission fee systems cover a large list of toxic pollutants and sources, using graduated rate structures based on toxicity and volume, and assessing fairly steep rates. The best example is the non-vehicle acid deposition fees used in California and Wisconsin. California's Acid Deposition Program is funded by low-level fees assessed against sources that emit 1,000 tons or more of sulfur or nitrogen oxides per year, which are capped at $5 per ton of pollutant emitted, which produce almost $2 million annually.

Potential Use: Since these fees already exist in States, continued State use as opposed to a new federal system might seem desirable. However, since atmospheric pollutants cross State boundaries, as shown by acid rain issues, inter-State issues must be evaluated. States could expand the idea of emission fees to small sources that are generally exempt from Clean Air Act permits, such as dry cleaners. Because of overall volume, small sources represent a large share of total emissions. The idea could be extended to volatile compounds, ozone-depleting emissions, and indoor air emissions.

Advantages: If emission fees were raised above $25/ton, annual revenue might be enough to pay for State programs such as pollution prevention, monitoring and research, improving the link between costs and benefits. The broader the coverage, e.g., including small sources, the more equity is achieved. Environmental incentives often discussed in terms of market-based air emission trading and emission reduction, would come into play at the higher rates, although reducing fee revenues.

Limitations: States have had problems with these fees. Administrative costs have been high, and fee avoidance exists. Although sources can be required to monitor emissions, compliance and enforcement can be costly. Depending on the fee structure, it may be hard to show a polluter's contribution to atmospheric damage, e.g., differing toxicity of sulphur dioxide versus carbon dioxide. Receiving air quality also varies and critical measurements are national/international in scope. State variations may cause pollution havens. The national emission trading program has had mixed success.

Reference for Further Information: U.S. EPA, The Clear Air Act Advisory Committee, *The Clean Air Act of 1990: An Introductory Guide to Smart Implementation,* Washington, D.C., 1992; U.S. EPA, Office of Air and Radiation, State Air Emission Fee Programs, 1994; National Governor's Association (NGA), *Funding Environmental Programs: An Examination of Alternatives*, Washington, D.C., 1989.

EXACTIONS

Description: Exactions, or proffers as they are often called, may be broadly defined as money, land, construction materials, infrastructure facilities, or in-kind services provided by a private developer to a public jurisdiction. Traditional exactions typically are on-site, and have included mandatory land dedication for rights of ways, the provision of road and parking facilities, other infrastructure, and open space and parks, and cash payments in lieu of these. Exactions sometimes are termed development fees, or impact fees (but are different from the impact fees discussed subsequently).

Actual Use: Exactions are by nature limited to local governments. They have been in existence for a long time, and may be offered voluntarily or negotiated with each developer. Most localities use exactions in some form. Some localities offer competitive exactions programs that assign building permits partially based on the level of exactions offered by different developers (Napa, California).

Potential Use: Traditional use of exactions for roads and parking could be extended to cover all necessary government services required by new developments, including water, sewer and solid waste services, and stormwater drainage. Agreement as to the operation and maintenance of such facilities could be made at the same time. While not raising new revenue, the money saved by localities could then be devoted to other environmental infrastructure projects. Another application is the "in lieu of taxes" concept, whereby a municipality offers tax savings to a developer in exchange for an environmental service or facility offered or constructed by the same developer in another location.

Advantages: Developers pay the true cost of community expansion out of their direct benefit from that expansion. Thus, some equity and cost/benefit relationship is achieved, but the way some exactions are privately negotiated may leave equity issues in doubt. When exactions take the form of construction materials or facilities, having the developer do the construction may be cheaper and faster than having it done by the governmental jurisdiction. Since they can be individually negotiated, exactions allow more flexibility than fixed impact fees discussed later. The revenue collected by monetary contributions, or represented by cost-savings on facilities built, could be significant.

Limitations: Since they are individually negotiated, exactions are not considered as predictable or equitable as impact fees. Fairness may be decreased if politics enter into private negotiations. The revenue source is only as predictable as the economic conditions affecting the construction industry.

Reference for Further Information: National League of Cities (NLC), *Research Report on America's Cities: City Fiscal Conditions* in 1994, Washington D.C. July 1994.

FEEDSTOCK CHARGES

Description: Feedstock charges typically are taxes levied on the primary chemicals that produce hazardous products and, ultimately, hazardous wastes.

Actual Use: A federal tax on petrochemical feedstocks finances the Superfund Trust Fund. New Jersey has a tax on petroleum and chemical feedstocks that is used to fund hazardous waste clean-up. Florida has a tax on perchloroethylene (dry cleaning solvent). However, State use of feedstock charges has been rare. Such charges probably are not suitable for localities.

Potential Use: The use of feedstock charges has yet to be fully tested by States. For example, obvious candidates include chlorine used for disinfection processes, and chlorinated solvents, acids, and photochemicals used by industry, in addition to the federal petrochemical excise taxes.

Advantages: Because the tax base is potentially so broad, significant revenues could be raised by the imposition of charges at relatively low rates. Some of the complexities in the design of equitable rate structures based on receiving water or air quality for effluent and emission charges could be avoided because "receiving" environmental quality is not at issue here, rather simply the toxicity of the original chemical. Some cost/benefit relationship is sustained if revenues are dedicated to site remediation or other environmental projects. Environmental incentives for reduction of feedstock use or substitution of other chemicals, i.e., pollution prevention, may be achieved.

Limitations: Disadvantages are several. Sometimes product substitution is not an option, or governmental regulations require on-site remediation, e.g., chlorine used for disinfection and permit requirements for de-chlorination. Double counting, or double taxation, may be an issue when products are already taxed as green product sales, under federal law, or the industry is already charged a waste-end, effluent or emission fee. Standard toxicity measurements likewise do not exist. Information on feedstock use is not recorded on an industry-by-industry, so costly new administrative reporting and collection systems may need to be devised, which may be easily evaded. Imports must be accounted for. These factors raise administrative costs, and reduce the equity, of tax imposition. Pollution prevention goals are extremely worthwhile, and feedstock taxes may be best implemented with behavioral change as a primary goal, when product substitutes are known and product costs are similar. However, caution must be exercised to avoid the complex pitfalls of feedstock charges implemented with revenue generation in mind.

Reference for Further Information: U.S. EPA Report to Congress, *Alternative Funding Study: Water Quality Fees and Debt Financing Issues*, Syracuse University, June 1996.

IMPACT FEES

Description: Impact or development fees are one-time charges to new users of government services, to pay for the expansion of the services that they require. Some are similar to waste and sewer connection fees, but differ from developer exactions in that they are paid by a broader segment of the population. Impact fees typically are assessed when building permits or certificates of occupancy are issued.

Actual Use: Impact fees are limited to local government, and are not considered "taxes". Many localities have wide-ranging impact fee programs requiring new residents and businesses to pay set charges for police, fire, water, natural resources, and wastewater services, such as the service cost-recovery fee system in Loveland, Colorado. Parks and recreation facilities are increasingly financed by these fees. More than twenty States have impact fee laws governing local use as a revenue source, and fees are an increasingly important response to local budget problems.

Potential Use: Impact fees could be used to finance any environmental service or additions to services that increased or transient population makes necessary. For example, local governments could use impact fees to finance landfills, stormwater and flood control in addition to more traditional services. In Florida, impact fees were used as partial security for bonds issued to finance sewer improvements. Communities attracting high tourism could also expand the use of these fees to such temporary facilities. Higher fees could be assessed on development in sensitive areas, such as development in flood plains, tidelands, agricultural lands, or open space. Fees can be graduated depending on the kind of development and affordability, such as in Olathe, Kansas.

Advantages: The beneficiaries of services pay specifically for the extension of local government facilities to them, rather than being subsidized by current users. This results in enhanced equity and a close cost/benefit relationship. Impact fees cover non-subdivision projects such as condominiums and commercial developments. From a developer's perspective, impact fees may replace more unpredictable, negotiated exactions. Impact fees may help local governments to plan for growth.

Limitations: Impact fees do not provide capital much in advance of development, unless impact "rights" are sold up-front. It may be hard for localities to ascertain capital needs and thus size fees. Impact fees are criticized for deterring development and increasing new housing costs, and resulting in interjurisdictional competition. Also, communities may change their policy preferences depending on economic conditions, for example, finding a need to subsidize new development rather than the reverse. Developers may well pass on impact fees to residents.

Reference for Further Information: National League of Cities (NLC), Research Report on America's Cities, July 1994. National Conference of State Legislatures (NCSL), *The Fiscal Letter: "Impact Fees Can Alleviate Local Growing Pains"*, Denver, CO, July/August 1991.

SEVERANCE TAXES

Description: A severance tax is a charge on natural resources extracted from the land or waters of a State. Direct water withdrawal fees, discussed earlier, are a type of severance program. Other types of severance taxes include fuel/mineral taxes (based on the volume of coal, gas, oil, uranium and other minerals withdrawn), timber taxes (based on the volume of timber logged), and oyster/shellfish taxes (based on the volume or value of shellfish harvested).

Actual Use: Severance taxes on coal and gas are used by mining States generating considerable revenues. For example, Montana collects $66 million annually from its coal severance tax, and Wyoming collects $20 million annually. However, these States apply most revenues to general State budgets, dedicating only the interest on the funds to environmental protection. Other States with mineral severance taxes include Louisiana (oil), Nebraska (uranium), New Mexico (all minerals and fuels, dedicated to the protection of natural areas and endangered species), and Pennsylvania (coal). Timber taxes used in Alabama, North Carolina, Washington, and Wisconsin generally are dedicated to State forestry replenishment programs. Maryland and Georgia use revenues from shell fish taxes to fund shellfish replenishment programs and State fisheries administrative costs.

Potential Use: These taxes could be used by any State, and dedicated to activities that mitigate the environmental impacts of natural resources extraction, such as habitat restoration. Salt mining and wetland drainage could be included. Revenues could provide insurance for extraction companies.

Advantages: Severance taxes can yield significant revenues, which could be sufficient to dedicate to environmental infrastructure capital-generation. Charges are highly equitable especially when based on the current market value, not volume, of material mined or harvested. When dedicated promptly to activities that mitigate impacts, particularly near the same site, these taxes have a high cost/benefit ratio. For sensitive activities such as timber cutting, and wetland alteration, the State will be given advance notice of impending activity.

Limitations: Severance tax revenues depend on the level of extraction activity, or price of the material extracted. If the tax base or commodity price fluctuates (e.g., shellfish harvest varies yearly as do oil and gas prices), revenues may not be suitable for funding environmental costs that require stability. Some States have defeated passage of severance taxes and resisted dedication. No amount of revenue can mitigate the effects of some extraction activities, such as in the Alaskan tundra.

Reference for Further Information: U.S. EPA Report to Congress, *Alternative Funding Study: Water Quality Fees and Debt Financing Issues*, Syracuse University, 6/96; Report from the Governor's Panel, *Financing Alternatives for Maryland's Tributary Strategies*, University of Maryland Sea Grant College, 8/95; Montana Department of Natural Resources and Conservation, *Flow of Funds for the Coal Tax: FY 96-97.*

SPECIAL ASSESSMENTS

Description: Special assessments are recurrent charges levied by local jurisdictions on a sub-group of population. The sub-group receives benefits from an environmental service or improvement not enjoyed by others in the area. For example, if a community wants to finance treatment plant improvements that contribute to lake clean-up, residents with waterfront property, or residents not hooked up to the central sewerage facility but enjoying recreational benefits from clean water, could be assessed a special surcharge. When benefits accrue to residents outside the improvements area, the benefits typically must be shown through some measure, such as higher property values, increased business activity, or frequent use of recreational sites. Special assessment/ improvement districts could be used to define the geographical boundary of any environmental improvement, e.g., a sewer or stormwater management district.Where the benefit clearly is shown via higher property values, "Tax Increment Financing" (TIF) can be used. TIF generates revenue from the incremental change in property values caused by the improvement financed. After creating a special district, two sets of tax records are maintained -- one reflecting the property's value up to the time of enhancement, and a second reflecting growing assessed value after the enhancement. In some cases, governments issue tax increment bonds for revitalization projects, with the bonds being backed, in part, by the anticipated increase in property values resulting from the investment (i.e., value capture).

Actual Use: Special assessments are generally limited to local government and often barred by constitution as a State tool. While not used as much for environmental purposes as for urban redevelopment and sports facilities, water, stormwater, and wastewater treatment have become more common recently. Fast growing States like Florida and Arizona use special assessments and tax increment financing for many such projects.

Potential Use: Special assessments could be used more widely for park and other open spaces, lake and stream rehabilitation, estuary and bay protection, and even for solid waste management such as recycling and resource recovery centers. Assessments usually are recurrent charges, but the concept could cover one-time charges too. Charges could be graduated depending on ability to pay and other benefits to be obtained.

Advantages: The advantages of this tool relate to the potential revenue yield, which could be stable, and to increased equity and an improved cost/benefit relationship. Extending revenue requirements to suburban residents, who may have lower infrastructure costs and greater ability to pay, can relieve the burden on inner city residents. Asking inner city residents to pay for suburban developments may prove inequitable. Incentives recognizing the true costs of environmental services is important.

Limitations: Assessments require the ability to pass local ordinances and create special financing districts, which may require State approval, which is often difficult. They require administrative systems that may be costly to manage over time. It is not possible to achieve total equity, as there may be no ability to collect, for example, from downstream users benefitting from upstream water quality improvement. Assessments based on predictions of property value increases, and documentation of results, requires strict record-keeping and periodic reassessments which may require special management tools unavailable to communities.

Reference for Further Information: Report from The Governor's Panel, *Financing Alternatives for Maryland's Tributary Strategies*, University of Maryland Sea Grant College, August 1995.

WASTE-END CHARGES
(Special Industry Fees)

Description: These charges are applied most notably to the hazardous waste industry, and are intended to capture revenues from the potential negative impacts of that industry. Structuring the charges is complicated, and often the most simple method is followed. For example, special industry fees for hazardous waste may be assessed against waste generators, storers, treaters, or disposal facilities. Fees may be flat charges on the volume of waste produced, stored or disposed, or be based on the waste or disposal method. The number of methods used by States reflects the complexity of measuring hazardous waste, and differences in their accounting and tracking systems. For hazardous waste, waste-end charges are similar to effluent and emission charges for water and air dischargers.

Actual Use: Numerous States use these taxes to finance hazardous waste programs, including Connecticut, Indiana, Minnesota, New Jersey, and Washington. The first three assess the charge on generators, while Washington uses three separate taxes; a hazardous substance fee, a generators' fee, and a tax on the volume/toxicity of substances produced. Other kinds of industry waste-end charges are a resource recovery facility charge in Connecticut, and a petroleum wholesalers tax in Nebraska.

Potential Use: Waste-end charges might be placed on industrial solid waste as a whole, where the revenue potential is huge., e.g., a $5 per ton tax would raise over $1 billion annually nationwide. However, there is little documentation for solid waste collected and disposed of on behalf of industry. The waste-end idea could also be extended on an industry-by-industry basis. Revenues could go to special insurance funds, resource recovery projects, and brownfields redevelopment.

Advantages: Specific waste-end industry taxes have the advantage of collecting revenue from selected industries considered especially dangerous to the environment, without the legal and administrative steps of collecting from a broader range of industry, or solid waste in general.

Limitations: Charges are not necessarily equitable, since they are so industry specific, and the cost/benefit relationship is not clear because revenues may be applied to any clean-up site. Tax assessment methods are extremely complicated, contributing to revenue instability. Taxes may be easy to circumvent and illegal dumping may result. Pollution "havens" between States may be created when charges are dissimilar. Hazardous waste disposers may have multi-State disposal options, which increase transportation costs and risks, but these options are limited and may be prohibited by some State laws. The hazardous waste industry already is highly regulated.

Reference for Further Information: National Conference of State Legislatures (NCSL), *Earmarking State Taxes,* Denver, CO, April 1995; Natural Resources Defense Council (NRDC) Reprint, "Life and Taxes", *The Amicus Journal,* 1995; U. S. EPA, Environmental Finance Advisory Board, *Public Sector Options to Finance Environmental Facilities,* March 1992.

OTHER

Description:

Actual Use:

Potential Use:

Advantages:

Limitations:

Reference for Further Information:

COMPARISON MATRIX FOR SPECIAL CHARGES

Criteria/ Special Charges	Actual Use	Revenue Size	Revenue Stability	Adminis-trative Ease	Equity	Cost/ Benefit Ratio	Environ-mental Benefits
***Direct Water Use**	Mod.	Mod.	Mod.	Mod.	High	Mod.	High
Effluent	Low	Mod-High	Mod.	Mod.	Low-Mod.	Mod.	High
Emission	Low	Mod.-High	Mod.	Mod.	Low-Mod.	Mod.	High
***Exactions**	High	High	Low	High	Low-Mod.	Mod.-High	High
Feedstock	Low	Mod.-High	Low	Low	Mod.	Mod.	High
***Impact Fees**	High	Mod.-High	Mod.	Mod.	High	High	High
***Severance Taxes**	Mod.	High	Mod.-High	Mod.	Mod.	Mod.-High	Mod.
***Special Assess-ments**	High	High	Mod.	Mod.	High	High	High
Waste-End Charges	Low	Mod.-High	Mod.	Low-Mod.	Low-Mod.	Low-Mod.	Mod.

High - High use (over 25 States/many localities); criteria score high (many advantages); High revenue yield (over $20 million annually in State revenue currently).

Mod.- Moderate Use (10-25 States/many localities); criteria score in medium range; Moderate revenue yield

Low - Low or rare use; criteria do not rate well (many limitations, one or more major implementation problems).

* Star indicates best rated mechanism

1.D. FINES AND PENALTIES

1.D. FINES AND PENALTIES

Description: Violators of federal and/or State environmental laws and regulations are frequently subject to the payment of monetary fines and penalties. Many of these violators also are subject to court adjudication. The amount of fines or penalties generally is outlined in federal and State statutes, but the actual sum imposed typically results from specific administrative or judicial decisions, and may only occur after repeated violation on the part of offenders. Both municipalities and the private sector are covered by fines and penalties, although historically prosecution of private sector cases has been more vigorous.

Cases may be either civil or criminal, depending on the degree of negligence. For example, civil cases may involve a fine measured in thousands of dollars for failure to file documents such as discharge monitoring reports for wastewater and laboratory testing results for drinking water. Criminal penalties resulting from intentional polluting behavior are rare, but the resulting penalty may be measured in millions of dollars. Each federal environmental statute outlines different types of fines, penalties, and administrative and judicial procedures, including review provisions. Lawsuits may be filed against an offender by government, or as a result of citizen suits which are provided for in all federal environmental statutes. Foundations such as the National Resources Defense Council, Environmental Defense Fund, and Atlantic States Foundation, have all been successful in achieving financial settlements as a result of citizen suits.

In addition to monetary payment of fines and penalties, responsible party reimbursements to government occur as a result of contingent liability laws under the federal Superfund statutes are evaluated in this section. Although not fines or penalties *per se*, reimbursements on the part of industry, municipalities or individuals for past contamination of waste sites subsequently categorized as hazardous may be paid to the federal government, or in some cases to States.

Where appropriate, enforcement settlement agreements may include commitments for direct funding of "environmental benefit" projects, or "supplemental environmental projects" as they are called currently. Such projects, which may be on- or off-site of the location where the violation occurred, are made in lieu of dollar penalties, as determined by the courts or in out-of-court settlements. Such projects may entail contributions in the form of land, wetlands restoration, environmental education or in-kind services, and similar types of projects.

Advantages: The revenue benefits from fines and penalties, as well as from environmental benefit projects implemented in lieu of direct payment by offenders, could be considerable. Of large significance, however, are the environmental improvements to be achieved when compliance is attained through the avoidance of such fines and penalties. The deterrence value of fines and penalties may large, depending on the viewpoint of a particular municipality or business, and the trade-off between prompt compliance and paying the fine or penalty must be carefully evaluated. Fines are considered equitable by much of the public, because they emphasize the "polluter pays" principle. Large fine and penalty revenues are best suited to fund State endowments or trust funds
for future capital expenses, and smaller fines can contribute monies to specific remediation or restoration projects. Both have been used to cover unanticipated budgetary shortfalls in a number of States. Non-revenue contributions can also be important, and create environmental incentives and attract additional resources.

Limitations: The revenue stream resulting from fines and penalties is highly unpredictable, both because it is unclear when and if a violation may occur, and also because court actions and appeals may occur over a long time period with the final outcome highly uncertain. Thus, these monies are not suited to fund environmental program operating costs on a regular basis. Moreover, since most fines and penalties by law are deposited initially in State treasuries, or the U.S. Treasury in the case violations of federal law, States must take specific legal steps to dedicate funds to environmental purposes instead of general budgetary support. The total amount of revenue generated often depends on the number of staff available to inspect and monitor activities to uncover violations.

The potential for a conflict of interest between collecting fines and penalties, and gaining compliance without the necessity of payments, is an ongoing and extremely delicate issue. Fines and penalties may also result in inequities and have a weak cost/benefit relationship, since small offenders or offenses may cost considerable sums of money while larger offenders, both municipal and industrial, may be let off the hook. It is often difficult to assess fines against small communities and industries in financial difficulty.

Summary: Fines and penalties can be a source of funds for environmental programs, as well as environmental benefit projects in lieu of direct payment by violators, but should be considered as a last resort to encourage municipalities, industries or businesses to comply with State regulations or to submit to a compliance schedule. Monetary payments will not generate a steady, dependable stream of income.

Three sources of environmental funding from fines and penalties are discussed following: environmental benefit projects in lieu of financial payments, monetary payments of fines and penalties, and reimbursements to Superfund site cleanup.

LIST OF FINES AND PENALTIES
(In Alphabetical Order)

*1. Environmental Benefit Projects (Supplemental Environmental Projects)
*2. Monetary Payments
*3. Reimbursements (Superfund Liability Cost Recoveries)

* Stars indicate most highly rated mechanisms as described in the Comparison Matrix at the end of the narratives. See Introduction to the *Guidebook* for a description of the criteria used. Ratings of "High", "Moderate", and "Low" are for comparison purposes only, as some ratings are necessarily subjective and data are incomplete.

ENVIRONMENTAL BENEFIT PROJECTS
(Supplemental Environmental Projects)

Description: Environmental benefit projects, or supplemental environmental projects as they are currently labeled, are special environmental improvement projects undertaken at the expense of the violator of an environmental regulation or specific permit requirement. They may be in lieu of or in addition to direct monetary payment by the offender, and may be arranged by adjudicatory authorities or in out-of-court settlements.

Actual Use: Many States have instituted environmental benefit programs in the last five years. Such projects may result either from government action or citizen suits. First preference is given to remediation of an environmental hazard in the same geographical area, i.e., the particular plant, city, or water body, but funds cannot used by the offender to comply with violations which resulted in the fine or penalty in the initial instance. Examples of environmental benefit projects include purchases or donations of land for open space or recreational uses, park and nature facilities, improved lake access for boating and hiking, aquariums, construction of recycling facilities, environmental monitoring and testing, hands-on environmental education projects, and even reduction in pollutant loading by the same company in another geographical area. Use of environmental benefit support for research and planning generally is not considered the best use.

Potential Use: The environmental projects that might be included are many, in all environmental media, and Federal policy has been somewhat flexible. Commingling of supplemental environmental benefit project funds in single governmental trust accounts might permit funding of larger projects on an ongoing basis, although this undercuts the geographical proximity criterion.

Advantages: Special environmental projects undertaken in this fashion may be those which otherwise would not be pursued due to budgetary constraints, and thus can be very important in creating environmental incentives and generating broad interest. The potential exists for leveraging other governmental funds, once seed money is provided. Such projects also enable the original offender to undertake a "greening" action, thus saving face. If the project result from a citizen suit, citizens may have a large input and community-based environmental values will be enhanced.

Limitations: Environmental benefit projects may not be equitable, nor support a strong cost/benefit relationship, because they may not compensate for the environmental damage caused by the violation, and it may be very difficult to put a monetary number on the damage. Moreover, because such projects may have to be specially designed, they may be very small and developed piecemeal with no assurance of continued support. Critics complain that they may have limited utility.

Reference for Further Information: New York State Department of Environmental Conservation, *The Conservationist*, June, 1996.

MONETARY PAYMENTS

Description: Fines and penalties for environmental violations range from the very small in the case of administrative citations or civil penalties, to huge monetary penalties for criminal violations yielding millions of dollars in a single suit. In general, federally-prosecuted cases require monetary penalties be deposited in the U.S. Treasury, although they then may be dedicated to States. Most cases settled under State law or pursued by State officials accrue to the State. However, States must have specific delegated program authority, such as federal delegation of the NPDES permit program under the Clean Water Act, or drinking water primacy, to have enforcement authority under federal programs. The major local governmental legal authority occurs for delegated industrial pretreatment programs. Fines and penalties resulting from citizen suits must be deposited in government accounts. Oil spill cases are pursued by the Coast Guard, not the Environmental Protection Agency.

Actual Use: Most States collect fines and penalties, and dedicate them to environmental programs. Many have set up trust funds to receive the payments and then spend monies for environmental purposes (includes Florida, Indiana, Massachusetts, Missouri, Montana, Ohio, Pennsylvania, New Jersey, New York, Virginia, Washington and Wisconsin). Most of these States collect several millions in fines and penalties annually, with New Jersey heading the list with almost $500 million in one year. For example, New York collected a $3 million criminal penalty in 1994 from one company, which also had to build a $20 million industrial pretreatment facility. The Virginia Environmental Endowment is a sizable trust fund begun 20 years ago with contributions of almost $10 million from two companies, which supports research and special projects. Some fines are dedicated to local projects, such as the Massachusetts Bay Trust Fund and Massachusetts Bay Credit Project, that fund Boston Harbor clean-up, beach and salt marsh restoration, and estuary programs.

Potential Use: Fines and penalties could be used by States and localities for any environmental purpose. States also can pursue out-of court monetary settlements, thus reducing costs.

Advantages: The potential to generate considerable revenues from fines and penalties exists. When commingled in State trust fund accounts, revenues will continue to grow and be sufficient to use for infrastructure construction. Interest income is also generated.

Limitations: Revenue streams are unpredictability and delicate. "Bounty hunting" often has been raised when the seeking of fines or penalties appears more important than gaining compliance on the part of the offender. Citizen suits have this potential, since nonprofits may recover expenses and legal fees. The costs of documenting enforcement cases and collecting fines are very high, and must be weighed against the likelihood and importance of gaining compliance without fines.

Reference for Further Information: Discussion with nonprofit legal foundations: Atlantic States Foundation, Natural Resources Defense Council (NRDC).

REIMBURSEMENTS
(Superfund Liability Cost Recoveries)

Description: These fine or penalty-type reimbursements arise because of the "joint and several liability" laws under federal Superfund statutes (both CERCLA and SARA), as well as State hazardous waste laws. Under these contingent liability provisions, all past and present users of sites designated as federal Superfund sites, and many State-designated sites, are liable for damage cost recovery, including abandoned sites. Users, called responsible parties, include waste generators, transporters who select the disposal site, and disposal facility owners and operators. Responsible parties are liable for both clean-up costs and related damage to natural resources.

Actual Use: Currently, 70 percent of site cleanups are funded by private parties found responsible for waste at Superfund National Priority List sites. Cost-recovery is primarily for the federal government, but States also have cost-recovery programs. However, reimbursements under Superfund statute clauses on the "replacement and acquisition of natural resources" have been rare.

Potential Use: The potential for cost-recovery is, theoretically, huge. However, the legal difficulties in collecting reimbursements mean that negotiations have been protracted and expensive, particularly for abandoned sites and non-industrial parties. Interest on Superfund settlement accounts also can be large, and amendments to existing law might create the ability to use such funds for State purposes off-site, such as credit enhancement for SRF activities, liability insurance funds for small facilities, and brownfields redevelopment. The Superfund natural resources damage laws might be more widely used if ecological damage could be more readily valuated.

Advantages: The benefit of vigorously pursuing Superfund liability cost-recovery is not only in the potential cost-savings, but also in creating environmental incentives for pollution prevention, including illegal dumping, in the first place. Equity and the cost/benefit relationship is strongly upheld if more responsible parties contribute to clean-up, although cost-recovery must be based to some extent on ability to pay which is not acknowledged in Superfund statutes. Many financial leveraging possibilities exist.

Limitations: The revenue potential is highly unpredictable, and administrative and legal costs of pursuing offenders may be prohibitive. Moreover, all negotiations are protracted, and may delay site clean-up activities. The joint and several liability clauses of current Superfund statutes are the subject of large debate, and many "softening" Congressional amendments add to uncertainties.

Reference for Further Information: The Congressional Research Service (CRS), Report for Congress, *Summaries of Environmental Laws Administered by the Environmental Protection Agency,* Washington, D.C., January 1993; U.S. EPA, Environmental Finance Advisory Board, "Preliminary Analysis of Using the Superfund Program as Cross-Collateralization", June 1995.

OTHER

Description:

Actual Use:

Potential Use:

Advantages:

Limitations:

Reference for Further Information:

COMPARISON MATRIX FOR FINES AND PENALTIES

Criteria/ Fine or Penalty	Actual Use	Revenue Size	Revenue Stability	Administrative Ease	Equity	Cost/ Benefit Ratio	Environmental Benefits
***Environmental Benefit Projects**	High	Low	Low	High	Mod.	Mod.	High
***Monetary Payments**	High	Low - Mod.	Low	Low	Mod.	High	High
***Reimbursements (Superfund Liability Cost Recoveries)**	High	Mod.	Low	Mod.	Mod.	Mod.	High

High - High use (over 25 States/many localities); criteria score high (many advantages); High revenue yield

Mod.- Moderate use (10-25 States/many localities); criteria score in medium range; Moderate revenue yield

Low - Low or rare use; criteria do not rate well (many limitations)

* Star indicates best-rated mechanisms

2. TOOLS

FOR

ACQUIRING CAPITAL

2. TOOLS FOR ACQUIRING CAPITAL

INTRODUCTION

In contrast to raising revenue through taxes and fees which are subsequently dedicated to environmental projects, this section presents the three major ways in which governments and the private sector acquire capital to invest in pollution prevention, environmental protection, and environmental improvements: **bonds**; **loans**; and **grants**. Bonds and loans entail repayments of principal and interest, although interest rates may be governmentally subsidized. In contrast, grants represent sums of money awarded by the federal government, States, and even the private sector for specifically designated purposes for which no repayment is required.

Each form of acquiring capital, bonds, loans and grants, serves distinct purposes and have certain limitations. Grants are regarded as highly desirable by recipients, and are often crucially important in start-up situations. However, since grants are designed by the awarding agency to meet ceratin, often specific, goals, they may carry additional mandates, require matching monies, involve difficult application procedures, and be piecemeal and small in size for individual recipients. Grants, moreover, are hardly free in the sense that the ultimate sources of funds are tax dollars. The redistribution of tax revenues to some communities and not others can be a very sensitive issue. Historically, many grant programs have been somewhat unstable since they must be approved annually by legislative bodies whose memberships are ever changing. The total amount of grant monies, moreover, is strictly limited by appropriation and competition for grants is very keen.

Government loan programs have similar limitations as do government grant programs, although interest rates on the loans may be subsidized particularly for small communities. In contrast, commercial loans are more flexible, but typically more expensive for public and private borrowers. Commercial loans represent the greatest source of investment capital for private businesses, compared to grants and bonds.

At present, the tax-exempt municipal bond market remains the dominant source of governmental environmental financing in this country, even compared to grants and loans. The federal wastewater treatment construction grants program has virtually ended, and even the Clean Water State Revolving Fund (SRF) loan program which has replaced it and the newer Drinking Water SRF, operate through the bond market. Over half of the Clean Water SRFs issue bonds to leverage their wastewater loans. By the end of 1997, these SRFs had issued almost $10 billion in revenue bonds out of a total loan pool of $24 billion. Drinking Water SRFs also are beginning to issue bonds to leverage their monies. Furthermore, local debt obligations, both general obligation and revenue bonds, account for the greatest source of local capital for environmental improvements ranging from pollution control to parks and open space. Although the 1986

Tax Reform Act made it more difficult for the private sector to finance environmental infrastructure through State and local tax-exempt private activity bonds, these bonds are still widely used as are the more costly taxable bonds.

Although bonds represent the largest source of ready and expandable capital, they are the most complex and expensive way to borrow, with the exception of SRF bond-backed loans for which interest rates are subsidized. The high expense results from the legal and other fees, administrative time, and in some cases the voter approval process required for issuing bonds. Since small borrowers incur the same costs as large borrowers, loans may be more advantageous for small borrowers than bonds. While grants are the cheapest source of funds, comparisons of government grant/loan equivalency ratios demonstrate that additional governmental mandates required under grants may substantially raise the costs and time of construction (lowering the effective value of the grant aid).

Bonds, loans and grants are presented separately in the following sections, with emphasis on recent bond innovations and the State Revolving Fund (SRF) programs. While government loan programs are fewer in number, grant programs, particularly federal ones, are more numerous. The grant narratives give some indication of the size and durability of these programs, but are not summarized in a comparison matrix. Additionally, noted throughout this Section are government grants and loans made to and by the private sector, although these are presented in more depth in **Section 8.: Tools to Pay for Community-Based Environmental Protection** and **Section 10. : Tools to Access Financing for Small Businesses and the Environmental Goods and Services Industry**.

2.A. BONDS

2.A. BONDS

Description: A bond is a written promise to repay borrowed money on a definite schedule and usually at a fixed rate of interest for the life of the bond. Bonds can stretch out payments for new projects over a period of fifteen to thirty years. State and local governments repay this debt with taxes, fees, or other sources of governmental revenue. As discussed in this section, it is the source of pledged security or repayment for bonds, or the type of collateral used, that defines the type of bond, for example, general obligation bonds, a myriad of revenue bonds, or hybrids.

Since most government bonds are tax-exempt, bondholders are generally willing to accept a lower rate of return on their investment than they would expect on a comparable commercial bond. Bond financing, therefore, can often provide State and local governments with low-interest capital.

Some State and local governments are required by statute to seek voter approval for certain types of bond issues. For example, most State and local governments cannot issue general obligation bonds without voter approval. If achieving this type of approval is difficult or time-consuming, State and local governments may want to consider issuing bonds that do not require voter approval, or exploring other options for capital financing, even if interest costs may be higher.

The Tax Reform Act of 1986 altered the tax-exempt status of some government-issued bonds. The Act reclassified bonds into two categories, governmental purpose bonds and private activity bonds. Governmental purpose bonds are automatically tax-exempt, but private activity bonds must meet certain criteria in order to be classified as tax-exempt. To qualify as a governmental purpose bond, at least 90 percent of the bond proceeds must be used by a State or local government, and no more than 10 percent of the debt service on the bond may be derived from or secured by a trade or business. If a bond does not meet these criteria, it is classified as a private activity bond. Private activity bonds that are issued for specific public-purpose projects-- such as water supply facilities, sewage treatment plants, solid waste disposal facilities, and some hazardous waste plants--can be tax-exempt. However, each State is limited to issuing private activity bonds in the amount of $50 per capita or $150 million each year, whichever is greater.

Advantages: Bonds provide financing for immediate capital needs. If the project qualifies, tax-exempt bonds can be a low-interest way of acquiring capital.

Limitations: Certain types of bonds require voter approval. Bonds only spread out costs of a project; an ultimate revenue source still needs to be identified. There may be some competition for debt capacity at the State or local level. Some State and local governments may also have statutory limitations on the dollar amount and/or number of bonds that can be issued. Issuing bonds is an expensive and time-consuming process, and requires sound legal and financial advice.

LIST OF BONDS
(In Alphabetical Order)

1. Advance Refunding Bonds
*2. Anticipation Notes
3. Appropriation-Backed Bonds
4. Asset-Backed Revenue Bonds
5. Capital Appreciation and Zero Coupon Bonds
*6. Certificates of Participation
7. Derivatives
*8. Double-Barrel Bonds
*9. General Obligation Bonds
10. Mandate Bonds (Environmental)
11. Mini/Baby Bonds
*12. Moral Obligation Bonds
*13. Mortgage Lease-Back Revenue
*14. Private Activity Bonds
*15. Revenue Bonds
*16. Short-Term Municipal Bonds
*17. Special Assessment Bonds
*18. Special Tax Bonds
*19. State Revolving Fund (SRF) Revenue Bonds
20. Structured Municipal Bonds
21. Tax Increment Bonds

[**Special Note:** We received writeups for two innovative new bond tools after this section was completed. Please see the write-ups for **Better American Bonds** and the **EPA: Environmental Bond Guarantee Program** in Appendix A, on pages A-2 and A-3, respectively.]

* Stars indicate most highly rated mechanisms as described in the Comparison Matrix at the end of the narratives. See Introduction to the *Guidebook* for a description of the criteria used. Ratings of "High", "Moderate", and "Low" are for comparison purposes only, as some ratings are necessarily subjective and data are incomplete.

ADVANCE REFUNDING BONDS

Description: Advance refunding is the refunding of an outstanding issue of bonds by the issuance of a new bonds prior to the date (defined as more than 90 days before) on which the earlier bond can be redeemed or paid. Advance refunding is undertaken for a variety of reasons, but primarily to take advantage of lower interest rates when general economic conditions permit, and/or to alter debt reserve requirements, such as to lower coverage requirements. For a period of time both the bond being refunded, or refinanced, and the new bond may be outstanding, although typically the indenture securing the earlier bond may be defeated by deposit of the new issue proceeds into an escrow fund for the earlier bond (see also **Section 6., Refinancing Loans**).

Actual Use: Prior to the Tax Reform Act of 1986, advance refunding in the municipal market was a major source of bond activity, accounting for up to 40% of all new bond issues, and any bond issue could be advance refunded numerous times to adjust outstanding debt to current interest rates. Actual use now is sharply curtailed as a result of the new tax code, which limits each governmental activity bond issue to one advance refunding if the original issue was issued after December 31, 1985. Thus, bond leveraged State Revolving Funds (SRFs), are extremely limited in their use of advance refunding. Advance refunding now is prohibited entirely for qualified tax-exempt private activity bonds, e.g., bonds financing private wastewater facilities, except for non-profit 501 (c)(3) issues.

Potential Use: Local government bonds issued before 1985 may still advance refund these earlier bonds more than once, and SRFs often have given advice to communities on how and when to proceed with refunding.

Advantages: Significant savings in interest costs to lenders may be achieved as a result of advance refunding. However, SRF issuers will have to carefully examine the interest rate trends to assure that the one-chance refunding nets the issuer the greatest benefit possible. Advance refunding may reduce significantly the size of debt reserve funds (coverage) or other restrictive covenants.

Limitations: Other restrictions are outlined in the 1986 Tax Reform Act, including complex technical specifications and requirements that apply to the temporary periods for refunded redemptions, reserve funds and yield restrictions. These restrictions have made it exceedingly difficult for SRF's using the over funded reserve fund method of leveraging, to advance refund their bonds at all. These SRFs need to seek the advice of their investment bankers on the handling of reserve funds and Guaranteed Investment Contracts (GICs) before considering advance refunding.

Reference for Further Information: Council of Infrastructure Financing Authorities (CIFA), *State Revolving Funds Under Tax Reform,* CIFA Monograph No. 2, William Graham, Paul Shinn and John Petersen, Washington, D.C., June 1989.

ANTICIPATION NOTES

Description: Anticipation notes are short-term bond instruments repaid with anticipated revenues from various sources. They can be used to acquire immediate capital when other funding sources are delayed or unidentified. For example, if a city anticipated a future federal grant for a project, the government might issue a Revenue Anticipation Note to meet interim construction costs.

There are four primary types of anticipation notes: *Tax Anticipation Notes* (TANs) are issued in anticipation of tax receipts and paid from those receipts; *Revenue Anticipation Notes (RANs)* are issued in anticipation of other sources of future revenues, often federal or State aid; *Bond Anticipation Notes (BANs)* are supposed to provide financing until a future bond offering is made; *General Obligation (GO) notes* are not backed by any particular revenue source, but by the full faith and credit of the issuing government.

Actual Use: Both State and local governments widely use anticipation notes to meet short-term capital needs while awaiting other sources of revenue.

Potential Use: Anticipation notes can be used to meet short-term gaps in project finance, when the ultimate revenue source (grants, bonds etc.) has been delayed, or when suitable revenue sources have not been identified.

Advantages: Tax anticipation notes provide immediate funds for capital projects and other financing needs.

Limitations: Interest rates for anticipation notes are typically higher than on longer-term securities. They represent only a temporary funding source. Ultimately, the final source of funding still needs to be identified.

Reference for Further Information: *Moody's on Municipals: An Introduction to Issuing Debt*, Moody's Investor Service, Moody's Public Finance Department, Inc., 1989 and subsequent additions, 99 Church St., New York, NY 10007; (212) 553-1658. Lamb, Robert, and Rappaport, Stephen, *Municipal Bonds*, McGraw-Hill Book Company, New York, NY, 1987. Contain good basic introduction to anticipation notes.

APPROPRIATION-BACKED BONDS

Description: Appropriation-backed bonds are State special obligation bonds using a pledge of future State direct appropriations, typically annual appropriations, as the form of pay back to the bondholders. Such bonds may be either tax-exempt or taxable, depending on what is being financed or how monies are managed, and constitute a specific type of State revenue bond. State bond issuance is authorized by State legislatures, and the issuing authority may enter into a service contract or lease arrangement with the State or State agency undertaking the activity being financed.

Actual Use: Many States use appropriation-backed bonds for special State projects which do not fall readily under any specific environmental program category, or when there is an anticipated need for funds for subsequent outlay. For example, the New York State Environmental Facilities Corporation, which houses the SRF program, has used appropriation-backed bonds for projects undertaken on behalf of the State, such as the construction of State park facilities, a State hospital wastewater treatment plant, and State Thruway Authority hazardous waste clean-up. Some States have used appropriation-backed bonds to raise the 20% State match required under the SRF program, in which case taxable bonds may be issued to avoid expensive arbitrage rebate accounting. However, in recent years appropriation-backed bonds have been challenged legally in a number of States, on the grounds that legislative appropriation of funds does not constitute adequate assurance for the bondholders and ties the hands of future elected officials. Hence, current use of appropriation-backed bonds is less common.

Potential Use: Appropriation-backed bonds could be used to provide money for the State match required for the drinking water revolving fund program recently authorized by the Safe Drinking Water Act of 1996, because the 20% State match payments could be deferred until 1998. Other potential uses are many, including open space acquisition and solid waste programs, and government air pollution control facilities.

Advantages: These bonds can be useful as a prompt and efficient financing device to cover special needs as they arise, and which may fall outside of the normal budgeting cycle of State legislatures. In theory, they constitute a special obligation of the State.

Limitations: The legal uncertainty surrounding appropriation-backed bonds has made States cautious about using them when other financing means are available. In some States, use of such bonds is prohibited by the State constitution.

Reference for Further Information: The Bond Market Association (BMA), *Fundamentals of Municipal Bonds*, Fourth Edition, New York, NY, 1990. The BMA updates this book periodically, but a fifth edition is not expected until 2000. For information, call (212) 809-7000.

ASSET-BACKED REVENUE BONDS

Description: An asset-backed bond is a revenue bond backed by a pledge of collateral in the form of a very specific asset, usually a physical asset such as a building, facility or land, and income flow attached to these. More recently, assets have been interpreted to include a specific revenue stream or portion of a larger revenue stream, such user fees. Asset-backed bonds are somewhat similar to certificates of participation, except they are bonds not notes. Bondholders do not have claim on all the assets of the bond issuer, but only the asset described in the legal bond covenants. Typically, asset-backed bonds arise from local units of government and the private sector.

Actual Use: Asset-backed bonds are increasingly common, particularly for defined and limited funding purposes, and may be issued in smaller denominations and for shorter time periods (under ten years) compared to other revenue bonds.

Potential Use: Asset-backed bonds could be used to finance a wide range of environmental purposes, including land acquisition for parks and conservation, brownfields redevelopment, and air pollution control equipment as well as for water and wastewater projects.

Advantages: Using asset-backed bonds allows municipalities or private entities to structure bonds in a way which does not expose their full range of assets, or credit, to the market, but still borrow capital funds for a defined purpose. They may enable businesses to proceed with specific environmental projects when their overall financial condition may not permit the issuance of larger bonds without extremely high interest charges or the or the use of costly bond insurance.

Limitations: Because these bonds are not backed by the full faith and credit of the issuer or all of the issuer's revenue stream, they may be considered more risky and thus be more costly to the issuer in terms of increased interest costs and bond issuance costs including higher coverage for debt reserve funds. The collateral pledged may bear little relationship to the project to be funded. In some cases, certificates of participation may be preferable because bond issuance costs are avoided.

Reference for Further Information: Heide, Susan C., Klein, Robert A., and Lederman, Jess, editors, *The Handbook of Municipal Bonds*, Probus Publishing, 1994.

CAPITAL APPRECIATION AND ZERO COUPON BONDS

Description: Capital appreciation bonds (CABs) and zero coupon bonds (zeros) are used in the issuance of State and local general obligation and revenue-backed debt. They both provide investors a guaranteed reinvestment rate, so they are most attractive to investors when interest rates are expected to fall. CABs, also called compound interest bonds, accumulators or municipal multiplier bonds, are sold at face value (par) but the issuer makes no periodic interest payments. Instead, the interest component is held by the issuer and compounded at a stated rate so the investor receives a lump sum multiple of the principal and interest. CABs result in more bond proceeds for the same use of debt capacity (total par value) than do zeros, which are the most extreme version of original issue discount bonds. Zero coupon securities also make no periodic interest payments. Instead, they are sold at deep discount from their face value. At maturity date, the security is redeemed at face value. The investor receives the rate of return based on the appreciation from the discounted price to the full face value. Zero coupon bonds are also issued by corporations and may be created by a brokerage firm when it "strips" the coupons off a bond and sells the corpus and the coupons separately. This latter technique often is used with Treasury bonds. The Internal Revenue Service maintains that the holder of a taxable zero owes income tax on the interest that accrues, but not paid, each year, so such bonds tend to be bought for Individual Retirement Accounts and Keogh Accounts, where they are tax-sheltered. Buying a tax-exempt zero frees the purchaser of paying taxes on imputed interest income. Zeros are among the most volatile of fixed-income securities, falling more dramatically when interest rates rise and rising more rapidly when interest rates decline.

Actual Use: Both taxable and tax-exempt CABs and zeros have been used extensively.

Potential Use: These types of bonds can be used to finance virtually any type of physical project for environmental purposes.

Advantages: CABs and zeros tend to be attractive to investors who are interested in investing for a future need, such as retirement, or want the convenience of not having to deal with how to reinvest periodic interest payments. Governments are able to delay interest payments until the final maturity.

Limitations: The issuer must have substantial funds available at maturity for what is effectively a balloon maturity.

Reference for Further Information: Government Finance Officers Association, 180 North Michigan Ave., Suite 800, Chicago, IL 60601, Phone: 312-977-9700, Internet: **www.gfoa.org**; *Internet Debt Reference Guide*: **www.window.texas.gov/localinf/debtguide/**. *Moody's on Municipals: An Introduction to Issuing Debt*, Moody's Investors Service, Public Finance Department, 99 Church St., New York, NY 10007, Phone: 212-553-1658.

CERTIFICATES OF PARTICIPATION

Description: Certificates of participation (COPs) are financial instruments used to finance capital projects, which are backed by the leasing of real property, physical assets, such as wastewater plants or equipment. The assets are held by a trustee, and the certificate issuer pays yearly lease payments to the certificate holders until the debt is repaid. If the certificate issuer should default on the lease payments, the trustee is responsible for selling the physical assets and using the proceeds to reimburse the certificate holders. Certificates of participation are similar to mortgage bonds and asset-backed bonds, but are not legally classified as such, meaning that State and local governments can issue them without voter approval and without affecting their overall bonding capacity.

Actual Use: COPs are used primarily by local governments, but sometimes a State, to finance purchase of property or physical assets, such as mass transit buses, sports facilities, or parks. COPs have been widely used in California where bond financing through the ballot box is not always a viable option. For example, San Diego recently issued COPs to help pay for renovation of Balboa and Mission Bay Parks, and the COPs were guaranteed by city golf course fees and hotel tax revenues. Washington State issued COP for park redevelopment backed by park fees. COPs were used in Olathe, Kansas to purchase on historic site and in Arlington, Texas for a municipal golf course. COPs also may be repaid by annual legislative appropriation.

Potential Use: A wastewater treatment or solid waste management facility might be financed through certificates of participation. A certificate of participation can also provide an excellent opportunity to structure a public-private partnership (see **Section 4: Tools for Building Public-Private Partnerships**).

Advantages: Certificates of participation do not require voter approval, and do not count against debt capacity limits, but allow governments to pay back year-by-year. In some States, special districts cannot issue bonds but may issue certificates backed by equipment. COP payments to private investors are tax-exempt, an attractive feature.

Limitations: These certificates can only be issued to finance capital projects where a real asset exists that is suitable as collateral, and only in jurisdictions in which local authorities are allowed to negotiate long-term leases. COPs cost 20-35 basis points more than conventional or bond financing.

Reference for Further Information: The Trust for Public Land, *Green Sense: Financing Parks and Conservation*, Spring and Autumn, 1996, Spring 1997, Phyllis Myers, Editor, San Francisco, CA, Telephone: 800-714-LAND, Internet: **http://www.tpl.org/tpl**.

DERIVATIVES

Description: A derivative product is a financial instrument whereby the value of the instrument is "derived" from the value of a specific, underlying market or index. For example, a bond paying an interest rate based on changes in the stock market, may be referred to as a derivative because the value of the bond changes in response to a market, which may be measured by an index such as the Standard and Poor's 500. In this particular case, the "underlying"is the Standard and Poor's 500.
A wide range of financial instruments have been classified in a generic sense as derivative products. These instruments include swaps, caps, options, puts, calls, and collars. The common theme of all of these products share is that their value is derived from the performance of specific indices or cash markets. From an accounting perspective, a derivative is defined as having two characteristics: 1.) the holder has the right to participate in some or all of the price change experienced by the underlying; and 2.) the instrument's value at maturity can be settled in cash as opposed to taking ownership of the underlying.

Actual Use: Many States and medium to large municipalities have used derivatives as a way of reducing financial risk, either interest rate risk or other related risks. The most common type of derivative used is the interest rate swap which provides savings to municipal issuers by permitting them to exchange floating or fixed-rate payments or vice versa. Standard and Poor's recommends that municipal issuers should generally minimize risk by limiting swaps based on markets other than municipals, since many of these other markets can be highly volatile.

Potential Use: Derivatives can be a useful tool to help States and larger, financially healthy, municipalities (with financially sophisticated managers) reduce their interest rate risks and to a lesser extent, maximize financial results. In general, SRFs have avoided use of derivatives as unnecessarily complicated for their programs, including for arbitrage considerations.

Advantages: Derivatives can be an excellent way to manage interest rate risks.

Limitations: Derivatives are a sophisticated tool for the sophisticated investor. Some can be quite volatile and financially risky. They should not be undertaken lightly or without professional financial advice, which may be quite costly. There are other financial tools that should be examined/used before considering derivatives.

Reference for Further Information: Standard and Poor's *Structured Municipal Finance Criteria*, McGraw Hill, 1993. Standard and Poor's Corporation, Municipal Finance Department, 25 Broadway, NY, NY 10004. Goldman Sachs & Co., 85 Broad Street, New York, New York 10004.

DOUBLE-BARREL BONDS

Description: A double-barrel bond is a revenue bond secured by a pledge of two (or more) sources of payments, typically a user fee and, secondarily, by the credit of the issuing government through *ad valorem* taxes (See writeup on "General Obligation Bonds" later in this section). Occasionally, a general obligation bond may also be backed by a specific revenue.

Actual Use: Both State and local governments increasingly have used double-barrel bonds to finance environmental improvements, including renovation of wastewater treatment plants and start-up capital for stormwater districts. The revenue stream pledge may be in the form of multiple taxes, such as the real estate transfer tax or special assessment taxes.

Potential Use: Double-barrel bonds can provide cheaper capital than conventional revenue bonds for projects that generate revenues, such as solid waste landfills, wastewater treatment plants, drinking water utilities, or stormwater management districts.

Advantages: Double-barrel bonds are a good way for States or localities, particularly those with low credit ratings or low debt capacity, to obtain lower interest rates on bond issues compared to conventional revenue bonds. The pledge of a special tax or fee to a visible environmental project may enhance the acceptability of the tax or fee, and increase leveraging potential. Double-barrel bonds are also useful in situations where the public benefit, for example, from improved water quality achieved by increased wastewater treatment is broader than the population base paying the user fee.

Limitations: Some State or local governments may have statutory limitations on the issuance of double-barrel bonds, or they may subject these bonds to the same statutory limitations as General Obligation bonds.

Reference for Further Information: Lamb, Robert, and Rappaport, Stephen, *Municipal Bonds*, McGraw-Hill Book Company, New York, 1987. Contains a good basic introduction to double barrel bonds.

GENERAL OBLIGATION BONDS

Description: General Obligation (GO) bonds are bonds backed with the guarantee that the issuing government will use its taxing power to repay the bond. For State GO bonds, the income and sales taxes secure the debt, while for localities it typically is the property tax. There are two primary types of GO bonds: unlimited *ad valorem* tax debt and limited *ad valorem* tax debt. Unlimited *ad valorem* tax debt occurs when the government pledges its full faith and credit with no limitations on possible property tax rates. Limited *ad valorem* tax debt occurs when the government pledges its full faith and credit, but with a cap or restriction on possible property tax rates to repay the bond. This is regarded as less secure than an unlimited bond if the tax limits could conceivably be reached within the term of the bond, or if other tax revenues are not available for debt service.

Actual Use: Both State and local governments have used GO bonds to finance capital projects related to environmental programs and activities, including natural lands purchase. State referendum environmental bonds, which often are very large, are GO bonds paid for by a variety of sources of revenue including appropriations.

Potential Use: GO bonds are suitable for financing any project that requires large amounts of capital up-front.

Advantages: GO bonds backed by full taxing power are regarded as safer than bonds backed by a single revenue source, and generally command lower interest rates and lower reserve fund requirements. GO bonds also have structural flexibility since the issuing government can repay the bond with a variety of revenue sources.

Limitations: Voter approval is frequently required for GO bonds. Many States and cities also place statutory limits on total GO debt, or on GO debt as a percent of property valuation. The private bond rating agencies consider the amount of a government's GO debt, or its debt ceiling, in rating bonds, even though water and sewer are theoretically not included, the rating agencies generally make note of water and sewer GO debt in establishing bond ratings.

Reference for Further Information: Lamb, Robert, and Rappaport, Stephen, *Municipal Bonds*, McGraw-Hill Book Company, New York, 1987. Contains good basic introduction to GO bonds.

MANDATE BONDS (Environmental)

Description: The Government Finance Officers Association (GFOA) several years ago proposed the creation of a new category of tax-exempt bonds called "Mandated Infrastructure Facility Bonds" (MIFs) for which many of the federal restrictions on tax-exempt financing would be eased. The proposal suggests that private activity bonds used to finance facilities built, acquired, renovated, or rehabilitated due to a requirement in a federal statute or regulation should receive the same or more favorable tax treatment as governmental bonds. Specifically, an MIF bond would ease the following restrictions contained in the 1986 tax act:

- The private business use and payment test would be 25 rather than 10 percent;
- The 5 percent private business or disproportionate use test would not apply;
- Arbitrage rebate requirements would not apply, except that yield restrictions would govern investments, and arbitrage earnings would be used for the project;
- Interest earned on the bonds would not be subject to either individual or corporate minimum alternative taxes; and
- Financial institutions would be allowed to deduct 80 percent of the cost of purchasing and carrying the bonds without regard to issuance limitations.

By targeting the proposal to mandated infrastructure and requiring that property be governmentally owned, the GFOA hopes to allay fears that creation of this new bond is a return to pre-1986 bonds.

Actual Use: Mandate bonds are still only proposed. There have been other similar proposals from environmental interest groups and various Congressional Representatives.

Potential Use: Mandate bonds could be used by State and local governments to finance federally-mandated construction, renovation, expansion, and upgrade of environmental facilities.

Advantages: Mandate bonds would allow State and local governments to retain tax-exempt status for bonds used to finance capital projects that involve greater private participation than is currently allowed for tax-exempt governmental bonds.

Limitations: Creating mandate bonds would require federal legislative action.

Reference for Further Information: GFOA, Chicago, Illinois, Internet: www.gfoa.org.

MINI/BABY BONDS

Description: Mini Bonds, also called baby bonds for their smaller-than-normal face or par values (generally less than $1000, usually $100 to $500, or even $25), are characterized by direct marketing from issuers to investors. Modeled after federal savings bonds, they bring segments of the bond market within reach of small investors and open a source of funds to issuers who lack entree to the large institutional market. Other than their small denominations and direct marketing, baby bonds have diverse characteristics designed for investors with different objectives. For example, some are structured as capital appreciation bonds so investors do not have to worry about reinvesting periodic interest earnings (see also earlier in this section, the writeups on **Capital Appreciation Bonds** and **Zero Coupon Bonds**).

Actual Use: In 1997, the Lower Colorado River Authority issued both capital appreciation bonds and current interest bonds in $500 increments to a maximum of $10,000 per owner, with varying maturities of 3, 5, 11 and 12 years. The City of Tacoma, Washington Solid Waste Utility sold $2 million in $1000 par value, 3 and 5-year bonds as part of a $71 million debt refinancing rated A by both Moody's and Standard and Poor's. Baby bonds have experienced widespread use at state and local levels since the late 1970's.

Potential Use: Mini/baby bonds could be used to finance relatively small, targeted environmental investments, such as non point source pollution control measures.

Advantages: Lower costs of issuance and flexibility are the chief advantages.

Limitations: Mini bonds generally entail higher administrative costs for distribution and processing, relative to total money raised, and they lack a large and active market that ensures liquid for bond holders.

Reference for Further Information: Petersen, John and Hough, Wesley, *Creative Capital Financing for State and Local Governments*, Government Finance Research Center , 1983; Internet *Debt Reference Guide*: **www.window.texas.gov/localinf/debtguide/**.

MORAL OBLIGATION BONDS

Description: A moral obligation bond is a bond secured from revenues from a financed project, as well as a non-binding pledge that any deficiency in pledged revenues will be reported to the State legislature, which may appropriate State monies to make up the shortfall. Under most State laws, if a draw down of the bond's debt reserve occurs, the bond trustee must report the amount used to the governor and the State legislature. The State legislature is then authorized to appropriate the requested amount to repay the bondholders, although there is no legally enforceable obligation to do so.

Actual Use: Since 1960, over 20 States have issued moral obligation bonds. The first State to issue this type of bond was New York, which issued moral obligation bonds to finance a housing authority. In most cases, moral obligation bonds have been self-supporting, and no State financial assistance has been required. In all recorded instances to date in which the moral pledge was actually called upon, the respective State legislatures responded by appropriating the necessary amounts of monies.

Potential Use: Moral obligation bonds can be used to acquire project capital at lower rates than revenue bonds. Since they generally do not count against debt issuance limitations, they are particularly useful for governments that are approaching debt limits.

Advantages: Typically, moral obligation bonds do not count against debt limitations. Moral obligation bonds can obtain interest rates almost as low as general obligation bonds because they are backed by the pledge of repayment.

Limitations: The process required to issue moral obligation bonds may involve legislative action in some States. Because the pledge of repayment is not legally enforceable, debt holders may expect (demand) slightly higher rates of return on moral obligation bonds as compared to general obligation bonds.

Reference for Further Information: Raftelis, George A., *Comprehensive Guide to Water and Wastewater Finance and Pricing*, second edition, CRC Press/Lewis Publishers, Chelsea, Michigan, 1989. Contains a basic introduction to bonds, including a description of moral obligation bonds.

MORTGAGE LEASE-BACK REVENUE BONDS

Description: Mortgage lease-back bonds are revenue bonds issued by a State or local authority where the revenue stream underlying the bonds are lease payments by another public entity, for example, a municipal unit of government. Such bonds typically are used for land or other real property transactions. Lease or mortgage payments to retire bond investor debt are made through annual budget appropriations, which may be supplemented by fees generated by the use of the leased property. At the end of the lease or mortgage terms, the governmental entity assumes ownership. Bonds typically are tax-exempt.

Actual Use: Conventional mortgage-backed bonds have been used extensively by the housing industry, such as Fanny Mae and State housing authorities, as well as for school and hospital construction. For environmental purposes, mortgage lease-back revenue bonds have been used in instances where the public agency, usually a local government, lacks the capital funds or debt capacity to make an outright purchase of land or real property, and thus leases the item from the capital provider which typically is a nonprofit entity, such as a 501(c)3 foundation, set up by the local government. For example, a park foundation may purchase land and then lease it to local government, typically a special park district, such as was the case in Johnson County, Kansas.

Potential Use: Mortgage lease-back bonds could e used more widely for land purchases, such as for brownfields, land on which an environmental facility is to be constructed, open space, historic sites and buildings, trails and bikeways, and other lands. Similarly, nonprofit foundations and land trusts could make land acquisitions through the use of these bonds, as long as the governmental entity promises to make timely lease or mortgage payments through appropriations or specific revenue dedication. Some redevelopment costs could be financed through the bond.

Advantages: Benefits pertain mainly to be the ability of local governments to proceed with land acquisitions or project construction when they do not wish to use condemnation powers or general obligation bonds, but have insufficient funds to make such purchases in a timely manner, particularly when land is threatened by potential development. The revenue bonds are less often subject to voter approval than general obligation bond.

Limitations: Using a bond is always more complicated and expensive that an outright purchase. Local support must exist to help ensure lease payments.

Reference for Further Information: The Trust for Public Land, *Greensense: Financing Parks and Recreation*, Spring 1997, Phyllis Myers, editor, San Francisco CA, Telephone: 800-714-LAND, Internet: **http://www.tpl.org/tpl.**

PRIVATE ACTIVITY BONDS

Description: "Private activity" or "Exempt" is a term now used to describe industrial development and similar bonds which meet one of a number of test under federal tax law measuring private involvement in a bond financing. The most commonly used definition includes bonds which meet both the private business use test and the private payment definition. The private business use test is met when no more than ten percent of bond proceeds are used by entity other than a State or local government unit. The private payment test is satisfied when no more than ten percent of debt service on the bonds is directly or indirectly paid or secured by a private entity. Most of these restrictions flow from the 1986 Tax Reform Act.

Actual Use: State and local bonds meeting the definition of private activity bonds may be issued on a tax-exempt basis if issued for specifically identified purpose and a myriad of specific rules are satisfied. Tax-exempt private activity bonds (qualified or exempt bonds) may be issued for the following purposes: airports; docks, and wharves; water and sewerage, certain solid waste disposal, and qualified hazardous waste facilities; certain public housing; facilities for the furnishing of local electric energy or gas, local district heating and cooling facilities; mass commuting and high-speed intercity rail facilities; certain improvements to hydroelectric generating facilities; student loans, certain redevelopment and industrial development activities; facilities for use by 501(c)(3) charitable organizations; and enterprise zone facilities. In addition, small-issue IDBs may be issued to finance, manufacturing facilities and farming property.

Potential Use: Private activity bonds also could be used for financing brownfields activities.

Advantages: Qualified private activity bonds provide funding at tax-exempt rates of interest which should be lower than most alternative financing mechanisms. Although interest on such bonds is exempt from the regular income tax, interest on the bonds (other than for bonds issued for 501(c)(3) charitable organizations) is an item of "tax preference" for purposes of the alternative minimum tax.

Limitations: Bonds meeting the definition of private activity bonds may only be issued on a tax-exempt basis if, among other requirements, room is available under the particular State's volume cap. Federal law imposes a limit on qualified private activity bond issuance for each State of $50 per capita or $150 million, whichever is greater. Private activity bonds issued for airports, docks, wharfs, municipally-owned solid waste disposal facilities, and facilities used by 501(c)(3) charitable organizations do not require a volume cap allocation.

Reference for Further Information: Heide, Susan C., Klein, Robert A., and Lederman, Jess, editors, *The Handbook of Municipal Bonds*, Probus Publishing, 1994.

REVENUE BONDS

Description: Revenue bond is a broad term used to describe bonds on which the debt service typically is payable mainly from revenue generated from the operation of the project being financed, or from other non-property tax sources. They may be issued by States or local governments, or by an authority, commission, special district or other unit created for the purpose of issuing bonds for facility construction, and typically are tax-exempt. State Revolving Fund (SRF) bonds and private-activity industrial development bonds are types of revenue bonds, as are others which derive their basic characteristics from revenue bonds, such as mortgage lease-backed bonds.

Actual Use: Revenue bonds now account for the clear majority of municipal bonds used to finance infrastructure in this country, including for water, sewer, and solid waste. Issued by all levels of government, revenue bonds may be preceded by the creation of a special district defining the geographical boundaries, as well as a public authority issuing and responsible for the bonds. Because the bond payment is secured mainly by the revenue pledge, additional covenants and mortgages may be used and feasibility studies required. Bond interest rates may be slightly higher for revenue compared to general obligation bonds, and even higher for taxable revenue bonds.

Potential Use: These bonds may finance construction of any environmental facility which generates future payments from its use, such as user fees, tolls, concession fees, and rental or lease-back payments.

Advantages: Revenue bonds have grown in popularity primarily because they are free from the requirements of general obligation bonds, which must be approved by voters, are subject to debt ceiling limitations, and may carry other restrictions covering principal and interest repayments. In contrast, revenue bonds are issued by special authorities and districts, created by local legislative bodies, and do not count against debt ceilings, although the national rating agencies take this into account in financial capability analyses. Revenue bonds can be issued in a timely manner, and debt can be specifically structured to meet project needs. Level annual debt payments ensure that future as well as present users of the new facilities will pay, thus enhancing equity.

Limitations: For some jurisdictions, the issuance of revenue bonds is more complicated. In New York, special revenue authorities must be created by the State legislature, and the State comptroller approves revenue bonds over a set amount. Public authorities remove direct control over spending (including approval of user fees) from local legislative bodies. Thus, political control is exercised indirectly via the appointment of board and authority members. Some localities strongly resist the creation of revenue authorities and special districts.

Reference for Further Information: The Bond Market Association, *Fundamentals of Municipal Bonds*, Fourth Edition, 40 Broad Street, New York, New York, 10004, 1990.

SHORT-TERM MUNICIPAL BONDS

Description: Historically, the phrase "short-term municipals" referred to short-term municipal bonds and to short-term securities known as notes. There are two main types of notes, anticipation notes and general obligation notes. Both types of notes are often used for the same purposes. All of these instruments generally have maturities ranging from a few months to a few years, have fixed interest rates, and are issued in anticipation of a bond issue, grant proceeds, or tax collections.

In the 1980s a new, broader class of "short-term municipals" were developed to address high interest rates and interest rate volatility -- and the resulting investor worries about fluctuations in the value of portfolios and issuer concerns about the increasing costs of borrowing capital. These new "short-term municipals" are known as demand obligations or variable rate demand obligations. They are based on a simple idea. Governments issue long-term bonds, but they have yields determined as if they are short-term notes. The bond holders can demand purchase of their bonds at par (the principal due at maturity) , plus accrued interest at regular predetermined intervals. Bond demand periods can be daily, weekly, monthly, quarterly, semiannually, or annually. In addition, the interest rate varies at predetermined intervals. Tax-exempt commercial paper represents another new type of short-term instrument. This is simply a short-term promissory note issued for up to 270 days. It is often used instead of anticipation notes because of greater flexibility in determining and setting both maturities and rates.

Actual Use: State and local governments issue billions of dollars a year in "short-term municipals" of all types, traditional and new, to meet short-term capital needs for design and initial construction while waiting for long term funding revenues. These short-term instruments are issued to fund many different activities. Examples include housing and urban renewal, water and wastewater project start-ups, transportation projects, school district operations, and temporary agency operating deficits caused by seasonal variations in tax collections.

Potential Use: Short-term municipals can be used to meet short-term gaps in project finance and operations when they occur, and until the final sources of funds become available.

Advantages: Short-term municipals bonds provide issuers with immediate funds for capital and operating needs.

Limitations: Short-term municipals have higher interest rates and funding is temporary.

Reference for Further Information: *Fundamentals of Municipal Bonds*, Fourth Edition, issued by The Bond Market Association, 40 Broad Street, New York, NY 10004-2373.

SPECIAL ASSESSMENT BONDS

Description: Special assessment bonds are bonds issued by local governments and/or special authorities that are secured by some type of special taxes, charges, or fees. The bonds are sold to finance specific public infrastructure improvements that directly benefit the property owners in limited, identifiable areas. Assessments are levied on properties in the areas in direct relation to the benefits received from the projects. The assessments are based on property measurement systems related to the benefits such as street front-footage or square footage owned. The system for collecting assessments is usually tied to the collection of *ad valorem* property taxes. Most special assessment bonds have maturities of 15 years or less (see the next tool, **Special Tax Bonds**).

Actual Use: Examples of projects commonly funded by special assessment bonds include the construction maintenance, and/or repair of water and sewer lines, storm drains, sidewalks, roadways, and lighting improvements. However, special assessment bonds have also been sold by communities and/or authorities to finance public improvement ranging from parks to bicycle paths to major landscaping work to parking lots.

Potential Use: Special assessment bonds could be used more widely to finance local or even regional public-purpose projects that benefit specific areas. They could be an excellent tool to fund projects that provide improved environmental services and benefits, especially ones that are community- and ecosystem-based.

Advantages: The great attraction of special assessment financing is that it is very equitable. Only those individuals, private firms, and other groups who directly benefit from the specific public improvements through improved services, quality of life, and/or increased property values are responsible for paying for them.

Limitations: Special assessment bonds are normally used only for the construction of a project and not for maintenance, which can prove to be quite expensive in its own right over the long-term. These bonds have speculative elements which can be mitigated through backup measures such as limited tax increase authority, utility revenue pledges, and cash flows. Because only those who benefit from the projects must pay, these bonds may require high assessments which small and economically disadvantaged communities may not be able to afford.

Reference for Further Information: *Standard and Poor's Municipal Finance Criteria,* Standard and Poor's Corporation, 25 Broadway, New York, NY 10004. Telephone Number: 212-208-1146.

SPECIAL TAX BONDS

Description: A special tax bond combines some of the characteristics of both revenue bonds and general obligation bonds. Such bonds, usually issued by local governments to finance a particular type of facility, are backed by the pledge of proceeds from a specific tax source. However, they differ from "Special Assessment Bonds" described previously since tax rates are a flat percentage or rates as opposed to being proportional to the benefit being received from the new project by individuals paying the tax.

Actual Use: Special tax bonds have long been issued by highways authorities to finance highways, roads and bridges and are paid for out of highway taxes. For environmental purposes, particularly the financing of parks and open space, localities recently have used special tax bonds financed out of local sales tax surcharges, or even property tax surcharges. Such surcharges may be approved for a limited time period or to collect a specified amount of money.

Potential Use: The potential for environmental financing from special tax bonds is growing, particularly when used for local parks, nature facilities, greenways and trails, natural lands acquisition, and similar land-based projects. This growth is primarily because of the increased local popularity of such environmental projects.

Advantages: The advantages of special tax bonds are that they may have strong local support, in fact they have to be popular for a municipality to go through the steps of seeking State approval and local voter agreement to the special tax to begin with. Community-based environmental protection is greatly enhanced by the use of these bonds. Bond proceeds sometimes have been dedicated to local land trust to purchase natural lands on a revolving basis and have been further leveraged through State and private sector matching grants. When the local sales tax is used, local residents benefit from non-residents paying the tax as well. When taxes are temporary, to collect a fixed sum of money, the cost/benefit relationship is close.

Limitations: Gaining State and local agreement to tax add-ons is anything but a foregone conclusion, and often has proven impossible. The taxes usually are highly regressive.

Reference for Further Information: See **Section 1.A.1.:** *Local Sales Taxes, Personal (Tangible) Property Taxes, and Real (Ad Valorem) Property Taxes.* See also **Section 8.:** *Tools To Pay For Community-Based Environmental Protection.* Special sales taxes are described in the Bond Markets

Association's *Fundamentals of Municipal Bonds*, Forth Edition, New York, 1990.

STATE REVOLVING FUND (SRF) REVENUE BONDS

Description: SRF revenue bonds are issued to expand, or leverage, loan funding sources for local projects which meet the eligible project criteria under the Clean Water and Drinking Water SRFs (CWSRF and DWSRF). SRF tax-exempt revenue bonds, issued under the bond leveraging approach are secured first by local GO or revenue bond pledges as collateral and loan recipient repayments, and by SRF debt reserve funds underlying the revenue bond. The two basic leveraging approaches used by SRFs are described in **Section 3: Enhancing Credit**, "SRF"Bond Leveraging". SRF revenue bonds also may be issued to provide for the required 20% State match to federal capitalization grants, and sometimes are issued on a taxable basis to avoid complicated arbitrage rebate requirements.

Actual Use: To date, over half of the CWSRFs have bond leveraged their funds with SRF revenue bonds. Typically this has occurred through bond pools, and over five CWSRFs have received AAA bonds rating. Single issue revenue bonds may be issued to very large municipalities, such as New York City. The bond leveraging approach has resulted in 2-3 times more loans being made in the near term compared to the direct loan approach, and has enable many CWSRFs to meet municipal wastewater treatment demands and thus fund other projects such as stormwater, solid waste landfills, and source water protection as well as estuary and agricultural non-point source improvements. Several States already have leveraged their DWSRFs. The SRF model has been adopted by Congress in the National Highway System Designation Act of 1995, which establishes a State infrastructure bank program for transportation projects, and has been discussed in Congress for school construction.

Advantages: Revenue bond leveraging allows for more projects to be funded in the near term compared to the direct loan approach. Although SRF revenue bonds are issued at market rates, local borrowers receive loans at below market interest rates, subsidies provided in part by investments of the large bond debt reserve funds. Because of their high asset to liability ratio, SRF revenue bonds are high quality credits and provide market access to borrowers regardless of their individual credit ratings.

Limitations: SRF borrowers must comply with national SRF program requirements, such as Davis Bacon and a limit of 20 years for loan repayments, unlike other revenue bonds which may extend to 30 years. Bond leveraging over the long run does not result in loan repayment interest earnings to the SRF fund, unlike direct loans.

Reference for Further Information: Merrill, Lynch & Co., *Guide to State Revolving Fund Revenue Bonds*, by Christopher Mauro, December 1995.

STRUCTURED MUNICIPAL BONDS

Description: All municipal (State and local government) debt issues have a particular structure. However, the structuring of bonds has come to refer to new financing techniques and credit substitutions where the financing objectives of the issuer and the investment requirements of the purchaser can be achieved simultaneously. In this context, structured municipal bonds can provide the issuer cash-flow oriented debt financing. This approach uses loan pooling, cash flow allocation and credit enhancement to create multi-class municipal bonds with differing characteristics designed to attract investors with different needs. Although federal tax and securities laws limit the nature of the application of structured financing techniques in the design of municipal bonds, the principles are clear. Securitization of diverse municipal cash flows from various user fees, tax levies, and other payments is similar to residential mortgage-backed securities. Structured municipal bonds rely on multiple tranches (pieces of an asset) for structuring principle and interest payments into different classes. They also may have credit enhancements provided by letters of credit (LOC). An example of structured municipals is a collateralized bond obligation (CBO), which is an asset-backed security with a portfolio of bonds as collateral. The sponsor transfers the collateral into a special purpose vehicle, such as a trust or corporation, which has no other assets. A typical CBO has more than one tier or tranche and the senior tranche has first claim on the collateral's cash flows to cover it's payments. The junior tranche, which has more risk of default, has second claim. The equity tranche claims the residual that is left over after satisfying all other claims against the underlying cash flow.

Actual Use: The structuring of pools of previously issued tax-exempt bonds has been practiced for some time now. More recently, pools of municipal property tax liens have been securitized and sold with relatively high ratings.

Potential Use: Securitization of State Revolving Loan fund portfolios for sale to private investors increases the availability and lowers the cost of capital. With securitization, loan repayments are sold to a trust that finances the purchase by selling securities to investors. Returns to investors in these securities could be structured by maturity, risk, and flow of funds priorities.

Advantages: Structured municipal bonds offer opportunities for more efficient means of raising capital for environmental projects.

Limitations: Structured debt transactions tend to be complex, reflecting the challenge of mitigating risk to investors while still providing financial benefits to the issuer.

Reference for Further Information: Government Finance Officers Association, 180 N. Michigan Ave., Suite 800, Chicago, IL 60601; Phone: 312-977-9700; Fax: 312-977-4806; Standard and Poor's Public Finance, Structured Finance Group, 25 Broadway, NY, NY 10004; Phone: 212-208-8000; Fax: 212-412-0475. *Getting Secure* by Jane Katz at www.bos.frb.org/economic/nerr/katz97_3.htm.

TAX INCREMENT BONDS

Description: Tax increment bonds, which differ slightly from special assessment bonds, are local tax-exempt bonds issued for special assessment or improvement districts where the benefit from the project being financed is specifically manifested through higher property values. The tax increment financing, termed TIF, generates revenue for bond repayment from the incremental change in property values caused by the financed improvement. After creating a special district, two set of tax records are maintained - one that reflects the property's value before the enhancement, and a second that reflects growing assessed values (and payments) after the enhancement and serves as the source of bond repayment.

Actual Use: TIF has been most frequently for local urban redevelopment and sporting facilities, but water, stormwater and wastewater treatment have become more common uses in recent years. For example, tax increment bonds for environmental improvements have been used frequently in rapidly growing States such as Florida and Arizona. These bonds have not been used by States and, indeed, often are prohibited for State use by State constitutions.

Potential Use: Tax increment financing could be used more widely for the acquisition of for park and open spaces, lake and estuarine protection, for recycling facilities and brownfields clean-up and redevelopment.

Advantages: TIF has the advantage of being able to define specifically the geographical boundaries and benefits of an environmental improvement. It ensures that those individuals or businesses actually benefitting from the improvement will help pay for it, thus increasing equity. TIF bonds for revitalization projects bonds may be backed by revenue pledges in addition to anticipated increases in property value, called "value capture", which makes them highly leveraged.

Limitations: TIF requires the ability to pass local ordinances and create special financing districts, which often has proven difficult. Tax increment bonds require effective administrative systems for property value tax accounting that may be costly and complicated to manage over time. Property tax assessments are somewhat subjective since they are based on predictions, and assessments must be fully documented, subject to strict record-keeping, and periodically reassessed.

Reference for Further Information: Report from The Governor's Panel, *Financing Alternatives for Maryland's Tributary Strategies*, University of Maryland Sea Grant College, University of Maryland Environmental Finance Center, August 1995.

OTHER

Description:

Actual Use:

Potential Use:

Advantages:

Limitations:

Reference for Further Information:

COMPARISON MATRIX FOR BONDS

Criteria/ Bond	Actual Use	Revenue Size	Revenue Cost/ Savings	Administrative Ease	Equity	Financial Leveraging	Environmental Benefits
Advance Refunding	High	High	High	Low	Low	Mod.	Low
***Anticipation Notes**	High	High	High	High	Mod.	High	High
Appropriation-Backed	Low	Low-Mod.	Low	Mod.	Low	Mod.-High	High
Asset-Backed Revenue	Mod.	Mod.	Mod.	Mod.	Mod.	Mod.	High
Capital Appreciation/Zero Coupon	High	High	High	Mod.	Low	Mod.	Mod.
***Certificates of Participation**	High	Mod.	Mod.	Mod.-High	High	High	Mod.-High
Derivatives	Mod-	High	High	Low	Low	Mod.-	Low
***Double-Barrel**	Mod.	High	High	Mod.	Mod.	High	High
***General Obligation**	High	High	High	Low	Mod.	Low	High
Mandate	N.A.	N.A.	High	Mod.	High	Low	High
Mini/ Baby	Low	Low	High	Low	High	Mod.	High

COMPARISON MATRIX continued

Criteria/ Bond	Actual Use	Revenue Size	Revenue Cost/ Savings	Administrative Ease	Equity	Financial Leveraging	Environmental Benefits
***Moral Obligation**	Mod.	High	Mod.	Mod.	Mod.	Mod.	High
***Mortgage Lease-Back Revenue**	Mod.	Mod.	Mod.	Mod.	Mod.	High	High
***Private Activity**	High	Mod. - High	High	Mod.	Mod.	Mod.	High
***Revenue**	High	High	Mod.	Mod.	Mod.	Mod.	High
***Short-Term Muni**	High	High	High	Mod.	Mod.	High	High
***Special Assessment**	High	High	Mod.	Mod.	High	Mod.	High
***Special Tax**	Mod.	Low-Mod.	Mod.	Low	Mod.-High	High	High
***SRF Revenue**	High	High	High	Mod.	High	High	High
Structured Municipal	Low	Mod.	Mod.	Low	Mod.	Mod.	Low
Tax Increment	Low	Low	Mod.	Low	High	Mod.	High

High - High Use (over 25 States, many localities or private sector); revenue over $2 billion annually nationwide; criteria score well (low interest rates, straight forward, flexible, specific)

Mod. - Moderate use (10-25 States, many localities/private); criteria score in medium range

Low - Low or rare usage; criteria score poorly

* Star indicates best rated mechanisms

2.B. LOANS

2 B. LOANS

Description: A loan is the temporary provision of a specific amount of funds up-front for an expenditure, that must be repaid in a set amount time, typically with interest. The rate of interest is established prior to the loan or, in the case of commercial loans, determined through negotiations.
Private loans, typically made by banks and other financial institutions, provide capital for a wide variety of environmental projects within a range of market interest rates. Typically, larger and more financially secure customers receive the best interest rates, compared to smaller borrowers. However, environmentally risky projects, such as those involving hazardous waste, also carry higher interest costs. At present, commercial loans account for the largest portion of private sector capital financing and, depending on economic conditions, are a highly expandable source of funding.

Government loan programs provide capital funds to a select number of governments, non-profit organizations, and private businesses. Like grants, government loans are made with very specific goals in mind, often are accompanied by specific mandates, may be less than 100% of total project costs, and are limited by legislatively appropriate dollar amounts. Unlike commercial loans, government loans often are made available at subsidized (lower than market) interest rates for projects that meet eligibility criteria, or may be interest-free, e.g., some State Revolving Fund (SRF) loans. Many government loan programs are targeted to small, economically distressed, and/or rural areas, which need the most assistance in acquiring project capital. In general, small, disadvantaged borrowers receive the lowest interest rates, compared to the reverse for commercial loans.

The SRF program is clearly the largest government environmental infrastructure loan program available today, far surpassing and sometimes eclipsing other State loan programs. While the SRF program is capitalized by a federal capitalization grant (like a block grant), it is presented in here as a State loan program. With the exception of the federal Department of Agriculture and Small Business Administration (discussed in Section 10) loan programs, direct federal loan programs are few in number.

Advantages: Government loan programs frequently provide loans at lower interest rates than those that are available for commercial loan and bond financing. Loans involves fewer and lower transaction costs than bonds, and may be acquired without voter approval. Smaller, disadvantaged communities may fund government loans an easier and less costly route than bonds or commercial loans. Moreover, loans from different sources may be co-mingled, including with grant funds. Loans requiring matching funds are highly leveraged. Both SRF and commercial loans are especially flexible as to application deadlines and cost overruns.

Limitations: Government loans are subject to the availability of approved funds, and competition between borrowers can be keen. Such loans may carry onerous governmental mandates, such as SRF loans for which borrowers must comply with federal "cross-cutters" such as Davis Bacon. Most federal loans have complicated application procedures and deadlines. Small, disadvantaged communities may be unable to borrow even at zero interest. Other than SRF loans, government refinancing and short-term loans are rare, and recipients may not be able to finance pre-construction costs on their own. Commercial loans, while widely available and much more flexible, generally will have higher interest costs than tax-exempt bonds.

Summary: Government loans, particularly SRF loans, are a large source of infrastructure capital, and monies appropriated for that purpose, and may carry specific government requirements and limitations. Small, disadvantaged communities receive the most favorable interest rate treatment, and primarily by the private sector are a large source of both construction and operating capital, and loan terms can be highly flexible and tailored to meet specific needs, including short-term needs. However, commercial loans are expensive particularly for small projects.

LIST OF LOANS
(In Alphabetical Order)

1. Agriculture: Rural Business-Cooperative Service – Economic Development Loans
2. Agriculture: Rural Housing Service (RHS) – Community Facilities Loans
3. Agriculture: RHS – Housing Site & Self-Help Housing Land Development Loans
4. Agriculture: Rural Utilities Service -- Water and Waste Disposal Systems Loans

*5. CoBank (National Bank for Cooperatives Loan Program)
*6. Co-Funding
*7. Commercial Loans

8. Direct Source (Equipment) Financing

*9. EPA: State Revolving Funds - Clean Water
*10. EPA: State Revolving Funds - Drinking Water

11. Federal Financing Bank
12. Federal Loan Programs

*13. North American Development Bank
*14. Private Investment

15. State Loan Programs

*16. State Revolving Fund (SRF) Pre-Financing and Short-Term Loans
*17. SRF Private Beneficiary Loans - Clean Water

* Stars indicate most highly rated mechanisms as described in the Comparison Matrix at the end of the narratives. See Introduction to the *Guidebook* for a description of the criteria used. Ratings of "High", "Moderate", and "Low" are for comparison purposes only, as some ratings are necessarily subjective and data are incomplete.

DEPARTMENT OF AGRICULTURE
RURAL BUSINESS-COOPERATIVE SERVICE
ECONOMIC DEVELOPMENT LOANS

Description: These zero interest loans are used to promote rural economic development and job creation projects. Loans may fund project feasibility studies, start-up costs, incubator projects, and other related reasonable expenses. Eligible applicants include electric and telephone utilities with current rural electrification or rural telephone bank loans or guarantees outstanding.

Actual Use: Examples of projects funded include the establishment or expansion of factories or businesses, medical facilities, water and sewer industrial development parks, business incubators for rural economic development activities, and other jobs projects. Most of the environmental projects funded involve water or wastewater systems.

More than $12,275,000 in loans were obligated in Fiscal Year (FY) 1997 with assistance ranging from $10,000 to $750,000 and averaging $375,000. Projected loan obligations for FY 1998 and 1999 are approximately $25 million and $15 million respectively. Between May 1989 and September 30, 19976, 474 economic development loans totaling $83.2 million were made.

Potential Use: These loans could be used to help finance directly and leverage other capital for additional wastewater and drinking water utilities, and to fund non-point source improvements. Depending on interpretation of authorizing legislation and regulations, they might also fund solid waste and waste-to-energy facilities, as well as brownfields cleanup and redevelopment.

Advantages: The loans are inherently equitable since they fund projects that would not otherwise be funded for an often needy segment of society. Federal funding for this program has been relatively stable and loan application procedures are not difficult.

Limitations: The maximum loan amount is $750,000. The maximum loan term is ten years at a zero interest rate. Loan recipients must provide supplemental funds totaling 20 percent of the assistance received. Environmental projects compete with many other types of projects for loans.

Reference for Further Information: U.S. Department of Agriculture, Rural Business - Cooperative Service, 14th & Independence Avenues, SW, Rm. 5405-South Building, Washington, D.C. 20250, Internet web site at **http://www.rurdev.usda.gov/rbs/index.html**. Information on this loan program can also be found in the *Catalog of Federal Domestic Assistance* and its World Wide Web site at **http://aspe.os.dhhs.gov/cfda/ideptagr.htm**.

DEPARTMENT OF AGRICULTURE
RURAL HOUSING SERVICE
COMMUNITY FACILITIES LOANS

Description: The Department of Agriculture's Rural Housing Service provides loans to help finance community facilities that provide essential services to rural residents. Eligible applicants include city, county, and State agencies; political and quasi-political subdivisions of States, associations and corporations; Tribes; and private nonprofit corporations.

Actual Use: These loans are used to build, enlarge, extend, or otherwise improve community facilities providing safety, transportation, community, social, cultural, and health benefits; industrial parks; access ways; and utility extensions. They have been used to buy fire fighting equipment, renovate hospitals, and build rural health clinics, municipal buildings, and schools.
In Fiscal Year 1997, 468 direct loans and 80 guaranteed loans were made totaling approximately $130 million and $64 million, respectively. Direct loan amounts ranged from $50,000 to $2,500,000 and averaged $447,521. Guaranteed loans ranged from $100,000 to $2,500,000 and averaged $905,594. Rural Housing Service estimates for Fiscal Years 1998 and 1999 are for direct loans of about $206 million and $200 million and for guaranteed loans of $153 million and $210 million.

Potential Use: Depending on interpretation of applicable legislation and regulations, these loans could be used to finance brownfields cleanup and reuse costs relating to the redevelopment of contaminated community facilities. They might also be used to pay for encapsulating and/or removing asbestos during the renovation of community facilities. Water and wastewater line extensions could potentially be funded using these loans.

Advantages: These loans are at zero interest and targeted to areas that are often economically disadvantaged. Equity and leveraging potentials are high, since State revolving funds, as well as HUD and EDA grants or loans, could be combined with these loans.

Limitations: Even with a zero interest rate, these loans must be repaid. Assistance is limited to community facilities in rural areas. The loans can be used to fund all development costs related to the community facilities, not just environmental costs. The competition for funding from the many different types of non-environmental projects is great.
Reference for Further Information: U.S. Department of Agriculture, Rural Housing Service (RHS), 1400 Independence Avenue, SW, Washington, DC 20250, Telephone: 202-690-1727, RHS home page is on the World Wide Web at **http://www.rurdev.usda.gov/agency/rhs/rhs.html**. Information on this loan program is also available in the *Catalog of Federal Domestic Assistance* and its World Wide Web site at **http://aspe.os.dhhs.gov/cfda/ideptagr.htm**

DEPARTMENT OF AGRICULTURE
RURAL HOUSING SERVICE
HOUSING SITE & SELF HELP HOUSING LAND DEVELOPMENT LOANS

Description: The Department of Agriculture's Rural Housing Service provides this assistance to public or private non-profit organizations that provide developed housing sites to qualified borrowers in open country and towns with less than 10,000 people (or under certain conditions in areas up to 25,000 people). The housing sites must be sold on a cost development basis to low income families, cooperatives, nonprofit organizations, and public agencies.

Actual Use: Loans are used to purchase and develop adequate housing sites in rural communities, including any needed equipment which becomes a permanent part of the development. Loan funds may be used to pay for water and sewer facilities, if unavailable; needed engineering, legal fees, and closing costs; and landscaping and related facilities such as walks, parking areas, and driveways. Three loans were made in Fiscal Year 1997 and loan obligations totaled $1,192,334.

Potential Use: The U.S. Department of Agriculture projects that this loan program will grow dramatically. The Department estimates that loan obligations for Fiscal Years 1998 and 1999 will be $1,187,000 and $10,000,000 respectively.

Advantages: These loans could be more aggressively used to ensure that adequate water and wastewater (sewer) services are provided when housing is developed in lower population areas for use by low-income residents.

Limitations: Loans can be used to fund all development costs related to housing, not just for environmental facilities. Land purchase costs eat up a significant portion of funds and there is competition for funds use for other non-environmental purposes. All housing developed with these loans must be used by low and very low income families in generally rural areas. Finally, the program is a relatively small one.

Reference for Further Information: U.S. Department of Agriculture, Rural Housing Service (RHS), 1400 Independence Avenue, SW, Washington, DC 20250, Telephone: 202-690-1727, RHS home page on the World Wide Web is at **http://www.rurdev.usda.gov/agency/rhs/rhs.html**. Information on this loan program can also be accessed in the *Catalog of Federal Domestic Assistance* and its World Wide Web site at **http://aspe.os.dhhs.gov/cfda/ideptagr.htm**.

DEPARTMENT OF AGRICULTURE
RURAL UTILITIES SERVICE
WATER AND WASTE DISPOSAL SYSTEMS LOANS

Description: These loans provide assistance for meeting rural water and waste disposal needs. Funds may be used to install, repair, improve, or expand water and waste disposal facilities. Eligible applicants include political subdivisions of a State (municipalities, counties, districts and authorities), associations, cooperatives, nonprofit corporations, and federally recognized Tribes.

Actual Use: Projects have included construction of water systems involving lines, wells, pumping stations, storage tanks and treatment plants; improvements to water systems such as new lines, wastewater facilities and booster pumps; renovation of water systems including distribution lines, wells and pressure tanks; construction of wastewater collection and treatment systems; replacement of wastewater plants and upgrade of collection lines; repair of wastewater lines and construction of lift stations; and purchase of landfill sites and trucks/equipment for solid waste disposal. Loan obligations in Fiscal Year (FY)1997 totaled $480,000. FYs 1998 and 1999 loan obligations are projected at $0 with program funds being limited to grant awards (see **Section 2.C., Department of Agriculture -- Rural Utilities Service Water and Waste Disposal Systems Grants**).

Potential Use: Loans could be used to acquire capital to finance additional wastewater, drinking water, and solid waste facilities. Depending on interpretation of legislation and regulations, the grants might finance waste-to-energy and recycling facilities, and non-point source programs.

Advantages: Equity and leveraging possibilities are high, since State revolving funds, as well as HUD and EDA grants or loans, can be combined with these loans. State revolving funds can pre-finance these loans (and/or grants), thus covering up-front design and initial construction costs.

Limitations: Loans are paid out only after construction is completed. Projects cannot service areas in towns of over 10,000 people. Grants, as opposed to loans, are made only if needed to reduce user charges to a reasonable level, and only after loan funds are expended. For a grant of up to 70 % of eligible costs, service area median household income must be below the poverty level or below 80% of the State non-metropolitan median household income (whichever is higher).

Reference for Further Information: U.S. Department of Agriculture, Rural Utilities Service (RUS), Stop 1548, 1400 Independence Ave., SW, Washington, DC 20250-1548, RUS home page is located on the World Wide Web at **http://www2.hqnet.usda.gov/rus/water/programs.htm**. Information on the loans is also available in the *Catalog of Federal Domestic Assistance*, and at the Catalog's Web site, **http://aspe.os.dhhs.gov/cfda/ideptagr.htm**.

COBANK
(NATIONAL BANK FOR COOPERATIVES LOAN PROGRAM)

Description: CoBank is a federally-chartered and regulated private financial institution that serves the approximately 2,400 local, regional and national agricultural cooperatives and rural utilities systems across the country. CoBank operates as a financial cooperative and is part of the Farm Credit System, a government-sponsored enterprise to assist agriculture and other business in rural areas. CoBank's customers capitalize the bank by providing equity capital based on borrowings. Earnings of the bank are distributed in the form of patronage refunds based on loan usage.

Actual Use: CoBank offers a broad range of flexible loan programs and specially tailored financial services. For environmental projects, it provides long-term, interim, and refinancing loans at competitive rates to credit-worthy water and wastewater systems in unincorporated areas or communities with less than 20,000 people. Loans issued by CoBank have terms extending up to 20 years, with fixed or variable interest rates. In cooperation with CoBank also provides a cash investment service. In cooperation with the National Association of Water Companies, CoBank operates a Small Loan Program that provides loans of $50,000 to $500,000 through a streamlined application process.

Potential Use: Loans are available for interim construction or long-term financing of plant and equipment of water and waste disposal systems.

Advantages: CoBank is a national cooperative(s) bank with very competitive interest rates and flexible terms.

Limitations: Loan applicants must meet eligibility requirements (population of 20,000 or less) and a test of acceptable credit quality. CoBank provides funding for many types of projects, not just environmental ones.

Reference for Further Information: The U.S. EPA Environmental Financial Advisory Board (EFAB) advisory: *Small Community Financing Strategies for Environmental Facilities*, August 9, 1991 contains a description of the CoBank loan program. EFAB can be reached via USEPA's Environmental Finance Program at 401 M Street, SW, Washington, DC 20460, Mail Code: 2731R. Contact: Alecia Crichlow at crichlow.alecia@epa.gov. For direct information on CoBank and applications for its loan programs, contact: CoBank National Bank for Cooperatives, P.O. Box 5110, Denver, CO 80217, Phone: 303-740-4051 or 1-800-542-8072.

CO-FUNDING

Description: Localities may combine federal and State loans in the same project, including grant funded projects. Project financing may be arranged by the locality or the State. Co-funding opportunities are particularly applicable and advantageous to small communities, for wastewater, drinking water, nonpoint sources and other environmental projects.

Actual Use: All States and many localities co-mingle sources of funds, both loans and grants. One of the most prevalent uses is SRF-arranged wastewater project co-financing for small, disadvantaged communities. This approach takes advantage of the SRFs' flexibility to pre-finance loans prior to construction, which federal agencies cannot, as well as act as a financial coordinator. For example, Waverly, New York, facing a $2.7 million wastewater treatment plant and collection sewer project, qualified for a $900,000 SRF interest-free loan and received commitments from the federal Rural Utilities Service for a $1.3 million grant and $50,000 loan, and from HUD for a $400,000 grant. With these commitments, the town obtained a short-term, interest free, $2.7 million SRF loan, which will be paid off by long-term SRF, RUS and HUD financing. Other federal dollars that could be combined in similar projects include economic development assistance grants, and State monies may be available from environmental bonds and legislative appropriations such as for solid waste.

Potential Use: The potential use of co-funding for environmental projects is large, especially, if an agency is willing to take the lead in organizing and harmonizing different funding sources, cycles and procedures. This may require regular inter-agency meetings as done in New York. It may be possible to pre-qualify applicants (which solves problems caused by different agencies' application time periods), and to consolidate or simplify individual grant/loan applications. It is expected that the Drinking Water SRF program also will use the co-funding approach for small localities.

Advantages: Co-funding can make project implementation possible, and increases access and equity for clients, particularly smaller communities. The total number of communities that can be served is also increased. Co-funding overcomes specific restrictions which apply to individual programs, for example, federal agencies rarely provided money up-front, and have funding restrictions (e.g., RUS rarely award grants over $1 million and loan interest rates do not vary with affordability factors; HUD grants are capped annually at $400,000). Co-funding helps overcome uncertainties in individual agency annual budget fluctuations.

Limitations: Co-funding may be beyond the ability of a single community to arrange, since financing procedures differ so radically and the application process is tedious. Thus, without a lead agency at the State level to take charge, funding windows may close.

Reference for Further Information: Localities should consult State Self-Help programs, and Rural Community Assistance Programs, for more information.

COMMERCIAL LOANS

Description: Most commercial banks and/or financial institutions in the United States have public finance departments that operate to provide State, local and other governments with loans to finance a wide variety of capital projects and purchases.

Actual Use: States and local governments tend to use commercial loans where lower-interest financing is unavailable and/or to fill short-term financing needs in anticipation of revenues from other sources (i.e., so-called bridge loans). Commercial loans are usually provided at set costs keyed within a range of market-based interest rates.

Commercial lenders such as banks are very low-risk lenders and usually seek to protect themselves and their loans by securing collateral in one or more of three ways: primary collateral in the form of assets (preferably liquid), secondary collateral such as guarantees, and cash flow. For governments, some portion of future revenues or taxes often represents the ultimate security for commercial loans.

Potential Use: Commercial loans could also be used to finance privatized public-purpose environmental facilities and equipment that are ineligible for governmental bond financing, or for governments whose bonding capacity has been exhausted.

Advantages: The application process for commercial loans can be much faster than for government loan programs. Commercial lenders usually have no set eligibility criteria in the way that government loan programs do and may have no predetermined limits on the total amount of loan capital available.

Limitations: Generally, commercial loans have higher interest rates and less favorable payback terms than government-funded loan programs.

Reference for Further Information: Most commercial banks have public finance departments that will assist with inquiries on loan programs. Those that do not, can either handle inquiries from their general finance/loan operation or refer inquiries to bank that have public finance departments.

DIRECT SOURCE (EQUIPMENT) FINANCING

Description: With direct source financing the tax-exempt borrower receives equipment financing directly from the investor. This approach tends to streamline the borrowing process, simplifying documentation and minimizing intermediary involvement. In particular, it is not subject to the municipal securities disclosure requirements of Securities and Exchange Commission (SEC) Rule 15c2-12. Certain large institutional investors have public finance arms which work with tax-exempt borrowers to design financing programs to meet specific equipment needs at tax-exempt interest rates with flexible payment terms. Generally, reserve funds are not required and prepayment options are available throughout the term of the loan, rather than only on set call dates. Public bond offerings generally involve a more time consuming documentation process as well as the obligation to provide both continual notices of material events regarding the securities and annual financial information.

Actual Use: Equipment purchases are often accomplished with direct source financing, which is also called equipment financing. However, leasing has proven to be a very competitive alternative financing technique (see **Section 4.A., Tax-Exempt Lease**). Direct lenders often securitize equipment loans.

Potential Use: Direct source financing could be used to acquire equipment needed for environmental protection or production of environmentally friendly goods.

Advantages: Because it eliminates underwriter and rating agency fees, printing costs, and time-consuming documentation and disclosure processes, direct source financing can reduce front-end and total costs.

Limitations: Direct source financing is not practical for major facility projects, which require longer term funding due to the amounts needed.

Reference for Further Information: Government Finance Officers Association (GFOA), 180 North Michigan Avenue, Suite 800, Chicago, IL 60601, Phone: 312-977-9700; Fax: 312-977-4806, Internet: **www.gfoa.org**. General Electric Capital Public Finance, 8400 Normandale Lake Boulevard, Suite 470, Minneapolis, MN 55437; Phone: 800-346-3164; E-mail: gecapinfo@corporate.ge.com; Internet address: **www.ge.com/ capital/public/pf2.htm**

ENVIRONMENTAL PROTECTION AGENCY (EPA) STATE REVOLVING FUNDS - CLEAN WATER

Description: Under Title 6 of the 1987 Clean Water Act, States receive federal monies to capitalize clean water revolving loan fund (CWSRF) programs. States must provide a 20 percent match to the federal funds. CWSRFs are authorized to make loans to localities to finance wastewater treatment facilities, nonpoint source pollution control activities and estuary program activities. Loans are made at low interest rates (0 percent to market rate) for up to 20 years. States can use loan funds to refinance previously executed debt obligations, guarantee local debt obligations, buy bond insurance for local debt obligations, or guarantee bonds issued by municipal and inter-municipal revolving funds. States may use up to 4 percent of the federal funds for administrative costs. States may set the criteria for determining which municipalities can access the loans and other fund uses each year.

Actual Use: All States have CWSRFs, and they increasingly are making loans for non-traditional wastewater projects. By mid-1997, fifteen States were funding nonpoint source pollution projects (including direct loans to farmers), six were funding stormwater projects, nine were funding landfill projects, five were funding septic system rehabilitation and replacement, six were funding estuary wetlands, stream restoration, and wellhead protection, many were funding sludge projects, and over half were funding combined sewer overflow projects. Some States have already used their own funds to finance revolving funds to assist localities with various capital projects. At least two States have made loans to acquire land or conservation easements to protect source water.

Potential Use: States are starting to apply the revolving loan fund concept to other media such as hazardous waste remediation, Superfund cleanups, brownfields redevelopment, biosolids reuse, highway and airport cleanups, and solid waste finance. USEPA has indicated the potential eligibility of wetlands acquisition, watershed protection, habitat restoration, and other new types of projects.

Advantages: The CWSRFs are able to provide localities with extremely low-interest loans at favorable terms. They can be considerably more flexible than commercial banks, as States can adjust interest rates and other loan terms to suit localities' ability-to-pay.

Limitations: The competition among applicants for access to revolving loan funds is intense in some States. Federal "cross-cutting" requirements that apply in using CWSRF monies can increase project costs. Some small communities may not be able to afford any loan. Loan terms are limited to 20 years, although there have been proposals to extend them to 30 years.

Reference for Further Information: U.S. General Accounting Office: *Water Pollution: States' Progress in Developing State Revolving Loan Fund Programs*, March 1991. Ohio Water Development Authority, *1995 Annual SRF Survey.* U.S. EPA, Office of Water, *Annual U.S. Clean Water SRF Assistance for Wastewater Treatment*, 1997.

ENVIRONMENTAL PROTECTION AGENCY (EPA) STATE REVOLVING FUNDS - DRINKING WATER

Description: The 1996 Safe Drinking Water Act Amendments authorize the funding of Drinking Water State Revolving Loan Funds (DWSRFs) to assist drinking water systems in financing the infrastructure costs of complying with the Act and to protect public health. The DWSRFs provide low cost loans to publicly and privately owned water systems, as well as nonprofit non-community ones, for up to 20 years (30 years for small, disadvantageds). States provide a 20 % match, and may use 4% of federal funds for administration. Refinancing (except for privates), loan guarantees, and principal subsidies (grants for small, disadvantageds) also are permitted. Eligible projects include expenditures to upgrade or replace drinking water infrastructure, distribution or storage facilities, integral land acquisition, planning and design, and systems restructuring (e.g., regionalization). Although States have considerable flexibility and may use up to 31% of federal capitalization grants in special set-asides, they must use 15% of that money for systems serving less than 10,000 people. States also must take steps such as local capacity building programs to receive certain federal dollars.

Actual Use: By the end of 1997, all States had set up DWSRFs and most had begun making loans. Because drinking water has never been funded to this extent, the demand has been very high. Some SRFs, such as in New York, are taking advantage of provisions permitting the transfer of up to 33% of clean water capitalization grants to drinking water. A number of States already have issued combined CW/DW bond pools to increase the pace of funding and to lower costs.

Potential Use: The DWSRF has great potential for pollution prevention. They are increasingly financing watershed protection and land acquisition, as well as making conservation easement loans. The DWSRFs are still working out tax issues pertaining to leveraged loans for the private sector, and credit issues for private and small borrowers, for whom loan guarantees may be used instead.

Advantages: DWSRFs can support any local water system via low-interest loans and technical assistance. Their funds are more flexible and less costly than commercial loans or private activity bonds. They have great flexibility in directing funds to pressing compliance and public health needs.

Limitations: Competition for DWSRF money is intense. Many federal restrictions apply to the program, such as cross-cutting requirements, planning and other work, and set-asides. Some States still prohibit private and non-profit sector funding. Operations and maintenance funding is banned. Loans cannot finance growth or development (i.e., entirely new facilities), or dams.

Reference for Further Information: U.S. EPA-DWSRF 1997 guidance, Office of Water, Office of Ground Water and Drinking Water, 401 M Street, SW, Washington, DC 20460, Mail Code 4601; Phone: 202-260-5522; Fax: 202-260-4383. U.S. EPA Environmental Financial Advisory Board (EFAB) report, *Funding Privately Owned Water Providers through the SDWA* SRF, July1998.

FEDERAL FINANCING BANK

Description: The Federal Financing Bank was established by Public law 93-224, the "Federal Financing Bank Act of 1973". The purpose of the Act is to assure that federal and federally assisted borrowing programs are coordinated with federal economic and fiscal policies to reduce the costs of these borrowings, and to assure that they are financed in a way that least disrupts private financial markets and institutions. Accordingly, the Bank is intended to be the vehicle through which most federal agencies finance programs involving the sale or placement of credit market instruments, including agency securities, guaranteed obligations and the sale of assets.

Actual Use: The Bank borrows all funds from the Treasury and matches the terms and conditions of its borrowings to the terms and condition of its loans. Obligations issued by the Bank are subject to federal taxation and are classified as exempt securities. Since 1975, the Bank has lent funds at a rate one-eighth percent above the new issue curve of U.S. Treasury securities. Federal agencies using the Bank have included the Departments of Health and Human Services, Defense, Housing and Urban Development, Agriculture (Rural Utilities Service), and Commerce; and the Export-Import Bank, the Resolution Trust Corporation, and the General Services Administration. Federal Financing Bank obligations issued, sold or guaranteed by other federal agencies totaled $58.2 billion on December 31, 1996.

Potential Use: If EPA or other federal agencies sought and obtained the authority to issue environmentally-related securities to pay for their environmental activities, the Bank could be used to handle the financing. Such securities might take the form of green or environmental bonds and might be used in a wide variety of programs including (but not necessarily limited to) brownfields cleanup and redevelopment, ecosystem and watershed protection, environmentally sustainable community development, and pollution prevention/recycling.

Advantages: When federal agencies use the Bank to finance activities instead of using general appropriations, this contributes to deficit reduction. In addition, the use of the Bank is inherently a more sustainable way of financing agency activities.

Limitations: Use of the Bank would be more expensive in the immediate term, thus reducing the amount of assistance provided to program recipients or increasing the cost of that assistance.

Reference for Further Information: Federal Financing Bank, U.S. Department of the Treasury, 1500 Pennsylvania Avenue, NW, Washington, DC 20220. Phone Number: 202-622-2470.

FEDERAL LOAN PROGRAMS

Description: Federal loan programs generally lend funds to State or local governments or nonprofit organizations at fixed or variable rates of interest. The loan programs exist to fund various types of activities and projects.

Actual Use: Generally, federal funds are lent for the purpose of financing a particular activity and/or facility in many areas, including environmental ones. The scope of the federal funds' use for financing the activity and/or facility can be broadly or narrowly defined depending upon the governments desired role.

Potential Use: Loan programs could feasibly be used to fund a broad number of environmental protection priorities and to leverage a considerable expansion in the long-term impact of federal environmental assistance.

Advantages: Unlike grants, larger projects can be undertaken with loans, and subsequently the repaid capital and any interest can be relent to others for additional projects. Properly managed loan program funds can be recycled indefinitely. Many federal loan programs have very low interest rates and/or very favorable loan terms.

Limitations: Some low income areas may find that they are unable to meet the repayment requirement for any type of loan assistance without imposing an undue economic hardship on their community. Federal loan programs may require assistance recipients to meet specific eligibility requirements and/or a test of acceptable credit quality that may disqualify many communities, including even the most needy.

Reference for Further Information: Information on the wide variety of federal loans and loan programs is available in the *Catalog of Federal Domestic Assistance* and on its World Wide Web site located at **http://aspe.os.dhhs.gov/cfda/index.htm** - at which point there will be links to Programs listed by: Alphabetic Listing of Programs, Subject or Topic, Target or Beneficiary Group, Agency within Department, Independent and Other Agencies. There are also links to an Appendix with Agency Contact Information. The U.S. Department of Agriculture's Rural Business- Cooperative Service and Rural Utilities Service are examples of federal loan programs which may be applicable to small and disadvantaged communities.

NORTH AMERICAN DEVELOPMENT BANK

Description: The North American Development Bank (NADBank) was created within the North American Free Trade Agreement (NAFTA) process. Its principal purpose is to finance (primarily through loans) environmental infrastructure projects along the United States-Mexico border, with an emphasis on municipal solid waste management, wastewater treatment, and the supply of potable water. The NADBank is equally capitalized by the governments of the United States and Mexico. Ten percent of the NADBank's capital is to be used for community adjustment and investment program development and financing.

Actual Use: The NADBank and its sister NAFTA institution, the Border Environmental Cooperation Commission (BECC), are working hard to fulfill their mandates (see also **Section 5.A., Border Environmental Cooperation Commission**). The BECC, which must review, approve and refer proposed projects to the NADBank for funding, has developed the necessary criteria and begun to fulfill this responsibility. The NADBank has announced financing packages for an $830,000 water supply and wastewater facility in Naco, Senora, and a $1.1 million wastewater plant for the Fraccionadora Industrial del Norta, S.A. (FINSA) industrial park in Matamoras, Tamaulipas.

Potential Use: Growing populations and trade have increased stress along the border region between the United States and Mexico. The lack of regional infrastructure to handle these growth patterns manifests itself in large backlog of municipal, environmental and public health, transportation, and educational needs. Accordingly, the region can absorb as many environmental projects as the BECC can certify and the NADBank finance.

Advantages: The NADBank's strong private sector and loan orientations represent clear leveraging strengths, and enhances equity of access to loans for hard-to-finance projects.

Limitations: Only projects certified by the BECC can be financed by the NADBank. NADBank does not provide equity funding. Many border communities may not be able to afford to repay loans in any form. Projects financed by the NADBank must address environmental issues within 100 kilometers of either side of the United States-Mexico border. NADBank capitalization may fluctuate in the future.

Reference for Further Information: The North American Development Bank (NADBank), 700 North Mary's Street, Suite 1950, San Antonio, Texas 78205, Phone: 210-231-8000, Fax: 210-231-6232, Internet site at **http://www.nadbank.org/**.

PRIVATE INVESTMENT

Description: Private investment is defined herein as loan and other financial assistance originating from sources other than commercial banks and/or finance companies. Sources of private investment can include, but are not limited to, insurance companies, pension funds, venture capital funds, individual venture capitalists, corporation partners, general capital investors, and even family and friends.

Actual Use: Private investment funds an overwhelming percentage of the new business start-ups in the United States each and every year. The amount of such investment is not calculated in the hundreds of millions of dollars, but rather in the billions. The entrepreneurial ventures funded with this private investment range across the entire spectrum of American private sector activities. It includes, of course, the environmental goods and services sector as well as all environmental-related activities.

Potential Use: The potential uses of private investment for supporting environmentally-related businesses and/or activities is only limited by the degree of profit associated with them. If an idea or activity will make money, or if it even looks like it will, then private investment can be found to support it.

Advantages: The application process for private investment can be much faster than for government loan programs and even faster than that for commercial loans. Private investors usually have no detailed set eligibility criteria in the way that government loan programs do and may have no predetermined limits on the total amount of loan capital available.

Limitations: Private investors will want a significantly higher rate of return on their money than will other sources of capital. They may demand a significant piece of the business itself as a potential reward for risking their money.

Reference for Further Information: Funding information on venture capital funds is available in directories such as, *Who's Who in Venture Capital* (third edition, 1986), published by John Wiley and Sons, Inc. Many sources of information on venture capital and private investment are readily available on the World Wide Web and can be accessed using public search engines such as *Lycos*, *Yahoo*, *Infoseek*, *Excite*, etc. See **Section 10, Tools To Access Financing for Small Businesses and the Environmental Goods and Services Industry**.

STATE LOAN PROGRAMS

Description: Numerous States have loan programs that provide assistance to localities for financing infrastructure or other projects. Many of these loan programs operate as revolving funds, meaning that the programs are at least partially financed by repayment of earlier loans.

Actual Use: Currently, seventeen States administer water-related programs independent of EPA- funded State revolving loan programs (SRFs). The Washington Public Works Trust Fund operates as a revolving loan fund, providing low interest (1 to 3 percent) loans for critical public works projects. Texas created a Water Development Fund to make loans to political subdivisions for constructing dams, reservoirs, and water supply systems. Among other programs, the Kentucky Infrastructure Financing Authority provides low cost loans for drinking water facilities. Connecticut operates a loan program and voluntarily pledges loan repayments to the SRF. Some States operate loan programs for landfills.

Potential Use: State loan programs can be used to assist localities in financing environmental facilities. In some cases, State programs might be able to enable project financing by providing subordinated loans for part of a project. These loans would be the last to be repaid in the event of default, while any commercial investors who participated in the financing would receive their repayments first. For example, if a solid waste facility needed $30 million in overall financing, and the private sector were willing to come up with $15 million, a subordinated loan from a State loan program could fill the gap. The private sector would have the assurance that it would be the first loan repaid in the event of default, and that the entire project would be fully financed.

Advantages: They can often provide low interest loans with favorable terms. States can target investments to specific project types, encouraging localities to build particular facilities.

Limitations: Loan programs may have significant start-up costs; need a source of revenue for capitalization.

Reference for Further Information: Council of Infrastructure Financing Authorities (CIFA), Washington, DC, CIFA Monograph No. 8: *State Revolving Loan Fund Survey*, by the Ohio Water Development Authority, May 1996. Washington Department of Community Development, *Public Works Trust Fund 1992 Priorities Legislative Report*, 1992, describes the Trust Fund's revolving fund program. Government Finance Research Center (GFRC), Government Finance Officers Association (GFOA), *Credit Pooling to Finance Infrastructure: An Examination of State Bond Banks, State Revolving Funds and Substate Credit Pools*, September 1988.

STATE REVOLVING LOAN FUND (SRF) PRE-FINANCING AND SHORT-TERM LOANS

Description: Some State Revolving Fund (SRF) clean water loan programs make short-term loans for planning, design and initial construction in localities which may be later receive long-term SRF loans. Some SRFs pre-finance the loans or grants of other federal and State programs which pay on a reimbursement or other less timely basis. SRF pre-financing loans have been used for Rural Utility Service wastewater loans (paid out after construction is completed), HUD wastewater grants (paid on a cost-incurred basis), and specifically authorized State loans and grants, such as for landfill closure and hazardous waste site clean-up. SRF pre-financing loans may be taken out later by federal or State payments, in whole or in part, based on specific SRF funding choices.

Actual Use: A few SRFs , such in New York, are making short-term, no-interest, clean water loans to regular clients for design and initial construction costs. Others, such as in Texas and Wisconsin, regularly pre-finance other grants or loans, and in theory, most States could do likewise. The Texas SRF uses variable interest rates when pre-financing other loans.
These types of loans depend on funds availability and management decisions. For example, since the New York SRF makes non-point source landfill-related loans, it can pre-finance State landfill grants and loans provided for under a State environmental financing bond act. The extent of pre-financing also depends on the degree and quality of SRF coordination with other program funders.

Potential Use: Since SRFs usually offer prompt funding and seek a wide range of clients by offering one-stop-shopping financing services, pre-financing possibilities are large. Drinking water SRF loans also may be used to pre-finance other federal or State drinking water loans or grants. States like New York are moving to a common, simplified loan application form, and federal and State funders meet regularly to review joint projects.

Advantages: Prompt up-front funding increases the chances that facility construction will move forward in a timely way, or at all. It enhances equity for smaller communities which may not have the resources to plan, design and construct facilities while waiting for reimbursement. SRFs can sometimes fund design work or land acquisition which other federal or State programs cannot.

Limitations: Successful SRF pre- and short-term financing depend on State-specific factors, such as coordination with other agencies, flexibility and/or breadth of funding choices, availability of funds, and State priority lists. If SRF managers are unaware of the intentions of other agencies, or if funding cycles and loan procedures differ greatly, pre-financing opportunities may be limited.

Reference for Further Information: New York State Environmental Facilities Corporation, 50 Wolf Road, Room 547, Albany, NY 12205; Phone: 518-457-4100;. Fax: 518-485-8773.

SRF PRIVATE BENEFICIARY LOANS - CLEAN WATER

Description: The Clean Water SRF program (CWSRF) for wastewater is statutorily limited to publicly-owned projects only, unlike the Drinking Water SRF (DWSRF) program which erases the distinction between the public and private sectors. However, on occasion loans have been made through a municipal lease arrangement that allow private sector use of the funds, as defined under the federal tax code. Under this arrangement, the SRF makes a loans to a publicly-owned entity, State or municipal, which has leased a facility to the private sector. The private project is not part of a shared municipal facility. The public entity acts as a conduit for loan funds to the private beneficiary, who makes lease/loan payments to the public entity through an operating lease or service agreement. The private party serves as the first source of loan repayment.

Actual Use: The New York SRF has made two CWSRF loans to private beneficiaries, including a food processing wastewater treatment facility and a proposed newspaper recycling facility. The funds used for CWSRF private beneficiary lending, called economic development loans, are derived only from SRF "retained earnings", comprised of direct loan interest repayments and investment earnings on recycled dollars, as opposed to federal capitalization grant dollars. Thus, the number of such loans is automatically capped by the amount of retained earnings annually, over $60 million in New York's case. Loans may be made at taxable interest rates to retain the option of refinancing on a leveraged loan pool basis, i.e., so as not to compromise the tax-exempt status of the pool.

Potential Use: The potential uses of CWSRF loans to private beneficiaries is large, and could fund brownfields, solid waste and nonpoint source projects as well as standard wastewater facilities.

Advantages: In terms of the environmental benefits achieved, there is no difference between the public and private sectors. Accessibility to financing and equity considerations are enhanced by extending SRF loans to private beneficiaries, as is authorized under the DWSRF program. Because SRF interest subsidies typically are offered, SRF loans are less expensive than the alternative of tax-exempt private activity bonds or commercial debt, and the uncertainty of accessing State volume cap is eliminated. Including such projects in bond pools further may reduce costs to private borrowers.

Limitations: Loan repayments are directly dependent on the economic health of the private beneficiary. Thus, CWSRFs considering this option must examine carefully the credit of the private beneficiary. Policies and procedures most be adopted to ensure the publicly-owned projects ready for funding are not sacrificed by excessive private beneficiary funding, and that SRF solvency is not affected. Direct competition on priority lists between the public and private sectors would be opposed by the private sector, and circumvent the statutory mandate of the CWSRF.

Reference for Further Information: SRFs should consult their EPA Regional Offices before undertaking private beneficiary loans.

OTHER

Description:

Actual Use:

Potential Use:

Advantages:

Limitations:

Reference for Further Information:

COMPARISON MATRIX FOR LOANS

Criteria/ Loan	Actual Use	Revenue Size	Revenue Cost/ Saving	Administrative Ease	Equity	Financial Leveragng	Environmental Benefits
Agriculture: RB-CS Economic Development	Low	Low	Mod.	Mod.	High	High	Low-Mod.
Agriculture: RHS Community Facilities	Low	Low	High	Mod.	High	High	Low
Agriculture: RHS Housing Site & Self-Help Housing	Low	Low	Mod.	Mod.	High	Mod.	Low
Agriculture: RUS Water/ Waste Disposal	High	Mod.	High	Mod.	High	High	High
***Co-Bank**	Mod.	Low	Mod.	Mod.	High	High	High
Co-Funding	Low	Low	High	Low - Mod.	High	High	High
***Commercial Loans**	High	High	Low	High	Low	Mod.	High
***Direct Source Financing**	High	High	Mod.	High	Mod.	High	High
***EPA: SRFs - Clean Water**	High	High	High	Mod.- High	High	Mod.	High

COMPARISON MATRIX continued

Criteria/ Loan	Actual Use	Revenue Size/ Stability	Revenue Cost/ Savings	Administrative Ease	Equity	Financial Leveraging	Environmental Benefits
***EPA: SRFs Drinking Water**	High	High	High	High	High	Mod.	High
Federal Financing Bank	Low	High	Low - Mod.	Mod.	Mod - High	Low	Low
Federal Loan Programs	Low	Low	Mod.	Low	Mod.	Mod.	Low
***NAD-Bank**	Low	Low	Mod. - High	Low - Mod.	High	High	High
***Private Investment**	Mod.	Mod. - High	Low	High	Low	High	High
State Loan Programs	Low	Low	Mod.	Mod.	Mod. - High	Mod.	High
***SRF Pre-Financing**	Low	Low	High	Low-Mod.	High	Mod.	High
***SRF (CW) Private Beneficiary**	Low	Low	High	Mod. - High	Mod.	High	High

High - High use (over 25 States, many localities/private sector); criteria score high (low cost, accessible, flexible, project specific)

Mod.- Moderate use (10-25 States, many others); criteria score in medium range

Low - Low or rare use (under 10 States, few localities and private sector); criteria score poorly

* Star indicates best-rated mechanisms

2.C. GRANTS

2.C. GRANTS

Description: A grant is a sum of money awarded to an eligible entity without a demand for repayment. Typically, grants are awarded by the federal government to State or local governments, or by States to local governments, for the purpose of financing a particular activity or facility. The grant award represents a monetary transfer payment from one organization to another for a purpose deemed necessary or desirable by the awarding organization. Grants also can be made by or to the private sector, particularly non-profit organizations. Matching grants, for example, on a one-to-one basis, are now being used both the public and private sectors.

Advantages: The primary advantage of grants is that State and local governments and other eligible recipients do not have to use their own resources to pay the specific eligible costs that the grant monies cover. In cases where grant recipients do not have the needed resources, grants enable valuable work to move forward. In other cases, grants make it possible for recipients to pursue additional environmental and/or other activities or to forgo expenditures entirely. Grants can be highly equitable when they address affordability concerns, and may be the only way that some recipients, such as smaller communities, can proceed. Furthermore, grants can leverage additional resources through matching funds.

Limitations: Applying for grants can be costly, time-consuming, and problematical. It requires trained staff on the part of the grantee to determine grant opportunities and submit often detailed grant applications. These grant applications can often take months for the awarding organizations to process and award. Even then, due to the intense competition at both the State and the local levels for the limited pool of grant funds, State and local governments and other recipients may find it increasingly difficult to acquire funding for many projects. Due to grant project eligibility limitations, only a percentage of the total project costs may be eligible for project assistance. Providing matching funds, often ranging from 5 to 50 percent, may be difficult. Even when grant funding is approved, the grantee may need to seek short-term debt instruments to cover cash shortages while awaiting the arrival of the funds.

Grant funds often have conditions that affect the scope, intent, nature or cost of the project or program in question. For example, USEPA Section 105 grants are negotiated grant agreements which obligate State air programs to use the funds to perform certain activities that may or may not coincide with the State's own priorities for its air program. Certain grant conditions, such as mandatory grant reviews and production of detailed reports, may increase the overall cost of the project. Most federal grants also require that grantees comply with other federal laws and regulations regarding a range of factors such as wage rates, anti-discrimination and environmental requirements. In recent years, grant funding has been increasingly unstable, making it difficult to plan ahead.

Summary: Grants remain the cheapest way for grant recipients to fund environmental work, and may be the only way to get a project moving, particularly those of smaller, disadvantaged entities. Federal grants are still the largest source of environmental grant monies compared to States, communities, and then non-profit sector. Grants clearly demonstrate the federal commitment specific environmental priorities. However, federal grants have many limitations. These grant monies tend to be unstable, slow-moving, highly competitive, and not readily expandable, compared to other financing tools such as bonds. Because of the large number of different federal grants and constantly changing requirements, grants are not summarized in a Comparison Matrix at the end of the section. Potential grant recipients should, and need to, consult the **Catalog of Federal Domestic Assistance** available from the U.S. General Services Administration. The catalog also can be accessed electronically on the World Wide Web at **http://aspe.os.dhhs.gov/cfda/index.htm**. The catalog has its own write-up in the *Guidebook* in **Section 5.B.: Electronic Services**.

LIST OF GRANTS
(In Alphabetical Order)

1. Agriculture: Forest Service -- Cooperative Forestry Assistance
2. Agriculture: Forest Service -- Economic Action Programs
3. Agriculture: Forest Service -- Landowner Assistance Programs
4. Agriculture: Forest Service -- Urban and Community Forestry Program
5. Agriculture: NRCS – Environmental Quality Incentives Program
6. Agriculture: Rural Business-Cooperative Service -- Business Enterprise Grants
7. Agriculture: Rural Business-Cooperative Service -- Economic Development Grants
8. Agriculture: Rural Utilities Service -- Distance Learning and Telemedicine Grants
9. Agriculture: Rural Utilities Service -- Water and Wastewater Disposal Systems Grants
10. Appalachian Regional Commission Supplemental Grants
11. Commerce: EDA – Public Works and Infrastructure Development Grants
12. Commerce: EDA – Special Economic Development & Adjustment Assistance Grants
13. Commerce: NOAA – Coastal Services Center Cooperative Agreements
14. Commerce: NOAA – Coastal Zone Management Administration Implementation Awards
15. Defense: Army Corps of Engineers -- Civil Works Projects
16. EPA: Environmental Education and Training Grants
17. EPA: Environmental Justice Grants to Small Community Groups
18. EPA: Environmental Monitoring for Public Access & Community Tracking Grants
19. EPA: Performance Partnership Grants
20. EPA: Program Grants
21. EPA: Section 319 Nonpoint Source Pollution Control Grants
22. EPA: Superfund Technical Assistance Grants
23. EPA: Sustainable Development Challenge Grants
24. EPA: Underground Storage Tank Trust Fund Program Grants
25. EPA: Wetlands Protection Development Grants
26. Environmental Technology Initiative
27. FEMA: Flood Mitigation Assistance
28. FEMA: Hazard Mitigation Assistance
29. Foundation and Corporate Giving
30. HUD: CDBG – Economic Development Initiative Grants
31. HUD: CDBG – Entitlement Grants
32. HUD: CDBG – Small Cities Program Nonentitlement Grants
33. HUD: CDBG – States' Grants Program Nonentitlement Grants
34. Interior: Fish and Wildlife Service -- National Coastal Wetlands Conservation Grants

LIST OF GRANTS Continued

35. Interior: Fish and Wildlife Service -- North American Wetlands Conservation Act Grants
36. State Grant Programs
37. State Revolving Fund (SRF) Drinking Water Principal Subsidies
38. Transportation: Federal Transit Administration -- Livable Communities Initiative
39. Transportation: Transportation Equity Act for the 21st Century (TEA-21)

[**Special Note:** We received a writeup for an innovative new grant tool after this section was completed. Please see the write-up for the **EPA: Clear Air Partnership Fund** in Appendix A on page A-4.]

DEPARTMENT OF AGRICULTURE
FOREST SERVICE
COOPERATIVE FORESTRY ASSISTANCE

Description: Cooperative Forestry Assistance provides formula grants to State forestry agencies to assist in the advancement of forest resource management with respect to non-federal forests and other rural lands. Among the program's objectives are encouragement of the production of timber, control of insects and diseases affecting trees and forests, control of rural fires, improvement and maintenance of fish and wildlife habitat; planning and conduct of urban and community forestry programs, and efficient utilization of wood and wood residues, including the recycling of wood fiber. State agencies can use the assistance to provide funds to owners of non-federal lands, rural communities, urban municipalities, nonprofit organizations, and State and local agencies for programs which help to achieve ecosystem health and sustainability by improving wildlife habitat, conserving forest land, reforestation, improving soil and water quality, preventing and suppressing damaging insects and diseases, wildfire protection, expanding economies of rural communities, and improving urban environments.

Actual Use: In Fiscal Year 1997, cooperative forestry grant obligations totaled $91,629,000, with individual grant amounts ranging from $25,000 to $6 million. Almost sixteen thousand landowners and 2.15 million acres were enrolled in forest stewardship programs. Approximately 1,800 rural and 8,000 urban communities were being assisted.

Potential Use: State forestry agencies can support a wide range of environmental protection and enhancement activities. Sound forestry practices can be essential to watershed protection and preservation of streams, lakes and wetlands. The Forest Service estimates that program grant obligation totals in each of Fiscal Years 1998 and 1999 will be about $104,000,000. The Service projects that more than 4,000,000 acres will be enrolled in forest stewardship programs by the end of the year 2000.

Advantages: This program provides State forestry agencies with resources they would not otherwise have to promote and support environmental protection and remediation.

Limitations: Some cooperative forestry assistance is restricted to owners of non-industrial private forest land.

Reference for Further Information: Contact U.S. Department of Agriculture, Forest Service, State and Private Forestry Division, Cooperative Forestry Staff, P.O. Box 96090, Washington, DC 20090-6090, Telephone: 202-205-1657, Fax: 202-205-1174, Internet: www.fs.fed.us/spf/.

DEPARTMENT OF AGRICULTURE
FOREST SERVICE
ECONOMIC ACTION PROGRAMS

Description: The Economic Action Programs framework under Cooperative Forestry Assistance includes a set of programs aimed at helping communities to diversify and strengthen their local economies through a whole range of forest-based resources. It focuses on integrating economic development and environmental protection concerns in the context of sustainable community development goals. The three major program components are Rural Community Assistance, Forest Products Conservation and Recycling, and Market Development and Expansion. Rural Community Assistance focuses on helping the whole community capitalize on available local human and natural resources to improve the quality of life and the social and economic situation. Communities are helped to organize, plan, and implement actions that are community-based, comprehensive, and partnership oriented. Forest Products Conservation and Recycling encourages and facilitates more efficient use of forest resources to enhance economic development and promote better stewardship of the forest resource. Emphasis is on stimulating public and private sector innovation. Opportunities include new uses for wood and other forest based resources through recycling and value-added secondary manufacturing, and alternative goods and services. Market Development and Expansion is meant to strengthen local and regional economies through the creation of domestic and international markets for forest resources.

Actual Use: The Michigan Forest Management Division emphasizes employment retention through sustainable economic activities in the forest products industry. The New Mexico Forestry Division has initiated a forest health/rural wealth partnership to assist forest-based communities to utilize forest products in ways that help improve the health of forest ecosystems.

Potential Use: State foresters can promote conservation and recycling of forest resources in conjunction with the production and marketing of environmentally friendly goods.

Advantages: Economic Action Programs focus on integrating economic development and environmental protection concerns. They can help organize diverse community interests for renewable resource based economic development and conservation.

Limitations: State forestry agencies must participate meaningfully in the program if it is to provide needed environmental assistance while promoting forest-based economic development.

Reference for Further Information: U.S. Department of Agriculture, Forest Service, State and Private Forestry Division, Cooperative Forestry Staff, P.O. Box 96090, Washington, DC 20090-6090, Telephone: 202-205-1657, Fax: 202-205-1174, Internet: **www.fs.fed.us/spf/**.

DEPARTMENT OF AGRICULTURE
FOREST SERVICE
LANDOWNER ASSISTANCE PROGRAMS

Description: Cooperative Forestry Assistance includes technical and financial assistance to help private landowners create sustainable forest land management plans and implement their forest stewardship objectives. The Forest Stewardship Program (FSP) uses cooperative agreements with State forestry agencies to deliver professional natural resource management advice to non-industrial private forest (NIPF) land owners. It provides technical and planning guidance to landowners who agree to maintain the land under a detailed natural resource management plan for at least ten years. A completed Forest Stewardship plan is required of landowners seeking cost share assistance via the Stewardship Incentives Program (SIP). This program supports a wide range of forest management activities to develop and implement Forest Stewardship plans. Eligible activities beyond plan development include reforestation and afforestation, forest and agroforest improvement, soil and water protection and improvement, riparian and wetland protection and improvement, fisheries habitat enhancement, wildlife habitat enhancement, forest recreation enhancement, and windbreak and hedgerow establishment, maintenance and renovation. Preference is given activities designed to attain multiple objectives, such as forest and agroforest improvements which enhance wildlife habitat or create recreation opportunities. Federal reimbursement of approved landowner expenses may be up to 75%, to a maximum of $10,000/year, in exchange for landowner agreement to maintain and protect SIP-funded practices for at least ten years. The Forest Legacy (FL) Program supports State acquisition of partial interests (e.g., conservation easements) in privately owned forest lands to restrict development of environmentally sensitive areas.

Actual Use: Landowner assistance programs have been a basic component of cooperative forestry and typically involve thousands of landowners and millions of acres.

Potential Use: These programs can improve environmental management of privately owned non-industrial forest land and can induce landowners to replant and maintain private forests.

Advantages: Federal funds help states provide otherwise unaffordable technical assistance and cost sharing to private land owners.

Limitations: Participation by private forest owners is voluntary and the limit on federal reimbursement reduces the attractiveness of the program while program accomplishment standards may promote emphasis on larger parcels within the pool of eligible lands.

Reference for Further Information: U.S. Department of Agriculture, Forest Service, State and Private Forestry Division, Cooperative Forestry Staff, P.O. Box 96090, Washington, DC 20090-6090, Telephone: 202-205-1389, Fax: 202-205-1271, Internet: www.fs.fed.us/spf/.

DEPARTMENT OF AGRICULTURE
FOREST SERVICE
URBAN AND COMMUNITY FORESTRY PROGRAM

Description: The Urban and Community Forestry Program is implemented through Forest Service Regional/Area Offices working with State Foresters and key cooperators such as Soil and Water Conservation Districts, state forestry associations, and city foresters/arborists. Each State Forester is required to establish a State Urban Forestry Advisory Council and a full-time Urban and Community Forestry coordinator position. The State advisory councils recommend program and funding priorities and assist the State foresters in preparing State Urban and Community Forestry Strategic Plans. Projects must include community volunteerism as a major element and must have the objective of solving some specific, described problem. States may use no more than twenty percent of their annual funding for purchasing, planting, or maintaining trees in communities. Direct funding grants for the purchase and planting of trees or for maintenance activities are on a 50/50 matching basis.

Actual Use: The Ohio Department of Natural Resources' Division of Forestry works with the Ohio Environmental Protection Agency and Attorney General's Office to use air pollution fines for pass-through grants to communities for targeted tree planting projects.

Potential Use: State forestry agencies can support restoration of urban watersheds and help preserve forest lands threatened by residential and commercial growth, in coordination with related environmental projects.

Advantages: The program explicitly promotes ethnic and cultural diversity in urban and community forestry efforts.

Limitations: Grants to communities and nonprofit urban forestry organizations require a 50% match, potentially eliminating participation by low-income communities.

Reference for Further Information: U.S. Department of Agriculture, Forest Service, State and Private Forestry Division, Cooperative Forestry Staff, P.O. Box 96090, Washington, DC 20090, Telephone: 202-205-1389, Fax: 202-205-1271, Internet: **www.fs.fed.us/spf/.** Ohio Department of Natural Resources, Division of Forestry, 1855 Fountain Square Court, Columbus, Ohio 43224, Telephone: 614-265-6694, Internet: **www.hcs.ohio-state.edu/ODNR/Forestry.htm.**

DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE (NRCS)
ENVIRONMENTAL QUALITY INCENTIVES PROGRAM

Description: The Environmental Quality Incentives Program (EQIP), authorized by the Federal Agricultural Improvement and Reform Act of 1996, is a single, voluntary conservation program, that replaces the Agricultural Conservation Program, Agricultural Water Quality Incentives Program, Great Plains Conservation Program and Colorado River Basin Salinity Control Program. It provides technical, financial, and educational assistance to farmers and ranchers through the NRCS. In line with maximizing the overall environmental benefits, the NRCS may designate a watershed, an area or a region of special environmental sensitivity as a priority area and give special consideration to applicants who have conservation plans that address the natural resource concern(s) for which the priority area was designated. Half of the program's assistance is targeted to livestock-related natural resource concerns and half to general conservation priorities. It includes cost-share assistance for up to 75% of the cost of conservation practices such as grassed waterways, filter strips, manure management facilities, capping abandoned wells, and wildlife habitat enhancement. Incentive payments can be made for up to three years to encourage livestock and agricultural producers to adopt land management practices such as nutrient, manure, irrigation water, wildlife, and integrated pest management. Total cost-share and incentive payments are limited to $10,000 per person per year and $50,000 for the contract term of 5 to 10 years. Cost-sharing assistance may not be given to construct animal waste storage or treatment facilities serving large confined livestock operations.

Actual Use: In Fiscal Year 1997, EQUIP made $171,000,000 in grants and provided $5,066,644 in educational assistance. The NRCS estimates that EQUIP will make $156,000,000 and $174,000,000 in grant obligations in Fiscal Years 1998 and 1999, respectively.

Potential Use: This program is expected to have a static funding level through fiscal 2002. It can be used for a wide range of water quality protection measures.

Advantages: The effective consolidation of programs can make it easier to use for both the clients and the administering agency, but the cost-share limit may retard participation.

Limitations: If a federal income tax deduction is taken for agricultural soil and water conservation expenses, cost-sharing payments cannot be excluded from gross income. The program has a $200 million/year authorization but annual funding could be less.

Reference for Further Information: U.S. Department of Agriculture, Natural Resources Conservation Service, Conservation Operations Division, PO Box 2890, Washington, D.C. 20013, Telephone: 202-720-1845; Fax: 202-720-1838; Internet: **www.nhq.nrcs.usda.gov/CCS/FB96OPA/ EQIPfinal.html**.

DEPARTMENT OF AGRICULTURE
RURAL BUSINESS - COOPERATIVE SERVICE
BUSINESS ENTERPRISE GRANTS

Description: These grants (also called Rural Development Grants) provide assistance for developing private business, industry, and related employment to improve the economy in areas and communities of less than 50,000 population. They help finance revolving funds, provide operating capital and finance to industrial sites in rural areas, give technical assistance, pay fees, and refinancing. Public bodies and nonprofit corporations serving rural areas are eligible applicants.

Actual Use: Typical project activities include acquiring and developing land; construction; converting, enlarging, repairing or modernizing buildings and equipment; transportation infrastructure; utility extensions; needed water supply and waste disposal facilities; and pollution control and abatement incidental to site development. Most of the environmental projects traditionally funded with these grants involve water and/or wastewater systems. In Fiscal Year (FY) 1997, more 369 grants were made with assistance averaging $160,000 and obligations exceeding $47 million. Grant obligations of $38 million and $40 million are projected for FYs 1996 and 1997, respectively.

Potential Use: These grants could be used to finance and/or help acquire capital for developing drinking water, wastewater treatment, solid waste disposal, non-point source and other environmental facilities. They also might be used to help fund the cleanup and redevelopment costs associated with the redevelopment of brownfields properties and facilities, and to promote the beneficial uses of sludge on agricultural land.

Advantages: Both public and private entities may be supported. The projects supported may have specific and significant environmental impacts.

Limitations: Priority for the grants is given to rural areas having a population of 25,000 or less. Other priorities include projects located in communities with a large proportion of low-income population; projects located in areas with high unemployment, projects that will retain existing jobs, and projects that will create new jobs. Many projects may not have an environmental focus.

Reference for Further Information: U.S. Department of Agriculture, Rural Business - Cooperative Service, 14th & Independence Aves., SW, Room. 5405-South Bldg., Washington, D.C. 20250, Telephone: 202-720-1400. Detailed information on these grants can also be accessed through the Service's World Wide Web site at **http://www.rurdev.usda.gov/rbs/busp/rbeg.htm**.

DEPARTMENT OF AGRICULTURE
RURAL BUSINESS - COOPERATIVE SERVICE
ECONOMIC DEVELOPMENT GRANTS

Description: Provides financial assistance promoting rural economic development and job creation projects. Grant funding may be used for project feasibility studies, start-up costs, incubator projects, and other related reasonable expenses. Eligible applicants include electric and telephone utilities with current rural electrification or rural telephone bank loans or guarantees outstanding.

Actual Use: Examples of projects funded include the establishment or expansion of factories or businesses, medical facilities, water and sewer industrial development parks, business incubators for rural economic development activities, and other jobs projects. Some grants have been used to establish revolving loan funds. Most of the environmentally-related projects funded involve water or wastewater systems.

Approximately $11million in grants were obligated in Fiscal Year (FY) 1997 with assistance ranging from $10,000 to $330,000 and averaging $260,000. Grant obligations are projected at approximately $11 million per year in FYs 1996 and 1997.

Potential Use: These grants could be used to help finance directly and/or acquire capital for additional wastewater and drinking water utilities, and to fund non-point source improvements. Depending on interpretation of authorizing legislation and regulations, they might also fund solid waste and waste-to-energy facilities, as well as brownfields cleanup and redevelopment.

Advantages: The grants are inherently equitable since they fund projects that would not otherwise be funded for an often needy segment of society. When revolving loan funds are created, leveraging is very high.

Limitations: The maximum grant amount is under $500,000. The maximum loan term is ten years at a zero interest rate. Grantees must provide supplemental funds totaling 20 percent of the assistance received from this program.

Reference for Further Information: U.S. Department of Agriculture, Rural Business -Cooperative Service, 14th & Independence Avenues, SW, Room. 5405-South Building, Washington, D.C. 20250, Telephone: 202-720-1400, Internet: **http://www.rurdev.usda.gov/rbs/index.html**. Detailed information on these grants is also available in the *Catalog of Federal Domestic Assistance* and its World Wide Web site at **http://aspe.os.dhhs.gov/cfda/ideptagr.htm** - which has links to these grants and a wide range of federal assistance.

DEPARTMENT OF AGRICULTURE
RURAL UTILITIES SERVICE
DISTANCE LEARNING AND TELEMEDICINE GRANTS

Description: The Rural Utilities Service (RUS) awards grants and loans to schools, libraries, or other eligible organizations that use a telecommunications, computer network, or related advanced technology system to provide educational benefits to rural residents (see also **Section 5.B., Long Distance Learning**). This does not include the purchase of land and buildings or construction of buildings. Nor does it include salaries, wages, or employee benefits of personnel providing educational services or the administrative expenses of the applicant. Grant funding can be for up to 70% of eligible project costs and applications must include funding commitments from other sources for the rest. Grant applications may be submitted at any time and there is no restriction on the length of time to spend grant funds, which are advanced monthly or as needed to reimburse disbursements for approved grant purposes. Audit reports are required for the years in which grant or loan funds are received. RUS will assist in preparing the preapplication form, OMB Standard Form 424. Also, the Office of Telecommunications and Information Applications of the Department of Commerce's National Telecommunications and Information Administration administers the Telecommunications and Information Infrastructure Assistance Program (TIIAP). It awards matching grants to non-profit organizations to buy equipment for connection to networks, to buy software, to train staff and users, to purchase communications services, and to evaluate projects and disseminate findings.
Actual Use: During fiscal 1993 through 1997 RUS awarded 192 grants totaling $52 million.
Potential Use: Estimated program volume for Fiscal Year 1998 is $21 million for grants and $150 million for direct loans. Otherwise unavailable environmental education and training in rural areas could be provided and existing effort could be expanded through distance learning.

Advantages: Grants and loans for required equipment can make distance learning efforts feasible in rural areas where costs per student would otherwise be unaffordable.

Limitations: Beneficiaries must be people living in rural areas and projects must improve rural opportunities, particularly in education and training.

Reference for Further Information: Assistant Administrator, Telecommunications, Rural Utilities Service, Room 4056, South Building, U.S. Department of Agriculture, 1400 Independence Avenue, SW, Washington, DC 20250-1500, Telephone: 202-720-9554, Internet: **www.usda. gov/**. U.S. Department of Commerce, Office of Telecommunications and Information Applications, National Telecommunications and Information Administration, 1401 Constitution Avenue, NW, Room 4096, Washington, DC 20230, Telephone: 202-482-2048, Fax: 202-501-5136, E-mail: tiiap@ntia.doc.gov; . Internet: www.ntia.doc.gov/otiahome/tiiap/.

DEPARTMENT OF AGRICULTURE
RURAL UTILITIES SERVICE
WATER AND WASTE DISPOSAL SYSTEMS GRANTS

Description: These grants provide assistance for meeting rural water and waste disposal needs. Funds may be used to install, repair, improve, or expand water and waste disposal facilities. Eligible grant applicants include political subdivisions of a State (municipalities, counties, districts and authorities), associations, cooperatives, nonprofit corporations, and Indian Tribes.

Actual Use: Projects have included construction of water systems involving lines, wells, pumping stations, storage tanks and treatment plants; improvements to water systems such as new lines, wastewater facilities and booster pumps; renovation of water systems including distribution lines, wells and pressure tanks; construction of wastewater collection and treatment systems; replacement of wastewater plants and upgrade of collection lines; repair of wastewater lines and construction of lift stations; and purchase of landfill sites and trucks/equipment for solid waste disposal.
In Fiscal Year 1997, $518 million was obligated to 617 projects. Assistance ranged from $3,000 to $4.147 million and averaged $677,198. Estimates for the next two years are for 850 and 800 plus grants, and obligations of $522 million and $500 million, respectively.

Potential Use: These grants could be used to acquire capital to finance additional wastewater, drinking water, and solid waste facilities. Depending on interpretation of applicable legislation and regulations, the grants might also finance waste-to-energy and recycling facilities, and non-point source programs.

Advantages: Equity and leveraging possibilities are high, since State revolving funds, as well as HUD and EDA grants or loans, can be combined with these grants. State revolving funds can pre-finance these grants (and/or loans), thus covering up-front design and initial construction costs.

Limitations: Projects cannot service areas in towns of over 10,000 people. Grants (as opposed to loans) are made only if needed to reduce user charges to a reasonable level. For a grant of up to 70 % of eligible costs, service area median household income must be below the poverty level or below 80% of the State nonmetropolitan median household income (whichever is higher).

Reference for Further Information: U.S. Department of Agriculture, Rural Business-Cooperative Service, 14th and Independence Avenues, SW, Room. 5405-South Bldg., Washington, DC 20250, Telephone: 202-690-2670, Internet: **http://www2.hqnet.usda.gov/rus/water/programs.htm**
Information on these grants is also available in the *Catalog of Federal Domestic Assistance*, and at the *Catalog's* World Wide Web site, **http://aspe.os.dhhs.gov/cfda/ideptagr.htm**

APPALACHIAN REGIONAL COMMISSION (ARC) SUPPLEMENTAL GRANTS

Description: ARC supplemental grants are awarded to States, public bodies, and private non-profit organizations for projects that create opportunities for self-sustaining economic development and improved quality of life for the people of Appalachia. The program seeks to stimulate investments in public services and facilities that attract private sector investments and accelerate social and economic development.

Actual Use: In fiscal year (FY) 1997, more than $60 million in grants supported 353 projects, including water and sewer systems, industrial parks, revolving loans, training and education, and business incubators. Grants funded in FY 1997 ranged from $2,150 to $1,500,000 with an average of $170,402. Funding estimates in FY 1998 and 1999, were $104,305,000 and $55,994,000, respectively.

Potential Use: The types of physical infrastructure projects supported could include more water and wastewater treatment systems and could be extended to include solid waste facilities, recycling facilities, waste-to-energy facilities, small business air pollution and waste audits, and recreation. Project resources might also be devoted to brownfields cleanup and redevelopment activities.

Advantages: Funding for the Appalachian Regional Commission has been quite stable over the years, and highly equitable given the economic need of the region as a whole. Project funding is specific and remains an opportunity.

Limitations: Grants are limited to counties in all or part of the States comprising Appalachia -- including Alabama, Georgia, Kentucky, Maryland, Mississippi, New York, North Carolina, Ohio, Pennsylvania, South Carolina, Tennessee, Virginia and West Virginia. The program generally only supplements other federal grants and 20 percent of eligible costs must come from sources other than the federal government. ARC supplemental grant assistance is limited to 50 percent of total project costs except in distressed counties where assistance is limited to 80 percent.

Reference for Further Information: U.S. Environmental Protection Agency (EPA), Environmental Financial Advisory Board (EFAB) Advisory, *Small Community Financing Strategies for Environmental Facilities*, August 9, 1991(this report contains a general description of the ARC supplemental grant program). Additional information on these grants and ARC programs can be found in the *Catalog of Federal Domestic Assistance* and at its World Wide Web site: **http://aspe.os.dhhs.gov/cfda/index.htm** - wherein there the assistance programs of all federal departments and agencies can be accessed via various organizational and topical formats.

DEPARTMENT OF COMMERCE
ECONOMIC DEVELOPMENT ADMINISTRATION (EDA)
PUBLIC WORKS AND INFRASTRUCTURE DEVELOPMENT GRANTS

Description: These grants support projects that promote long-term economic development and help construct public works/development facilities needed to encourage job creation and retention in economically distressed areas. States, cities, counties, other political subdivisions, Indian Tribes, Commonwealths, the Federated States of Micronesia, the Republic of the Marshall Islands, and U.S. territories, and public and private nonprofit organizations are eligible recipients.

Actual Use: Eligible projects include water and wastewater treatment systems, industrial park infrastructure improvements, industrial access roads, railroad siding and spurs, port facilities, tourism facilities, and vocational schools. A basic grant covers up to 50 percent of project costs, but severely depressed areas may get supplementary grants bringing the federal share to 80 percent of project costs. Designated Indian reservations may receive up to 100 percent assistance. In Fiscal Year (FY) 1997, more than $160 million was obligated for these grants covering 188 projects. Obligations are projected to exceed $160 million per year in FYs 1998 and 1999.

Potential Use: These grants could be used to acquire capital for renovating wastewater and drinking water utilities to bring them into compliance with the Clean Water and Safe Drinking Water Acts. They also might be used to help fund brownfields cleanup and redevelopment costs associated with the redevelopment of the types of eligible public facilities listed above.

Advantages: The program has had a significant environmental focus. Grants have on occasion been combined with State revolving fund loans and rural utility grants/loans for water and wastewater. Aid to the private non-profit sector enhances leveraging opportunities.

Limitations: Grants are limited to communities experiencing severe economic distress. Also, communities must generally provide matching funds of up to 50 percent. Further, grant funds are disbursed for costs incurred only after all construction contracts have been awarded. EDA grants have historically been somewhat unstable.

Reference for Further Information: U.S. Environmental Protection Agency (EPA), Environmental Financial Advisory Board (EFAB) Advisory, *Small Community Financing Strategies for Environmental Facilities*, August 9, 1991. An excellent description of the program is also available in the *Catalog of Federal Domestic Assistance* and its World Wide Web site, **http://aspe.os.dhhs.gov/cfda/ideptdoc.htm** which has links to these Department of Commerce Grants, under ECONOMIC DEVELOPMENT ADMINISTRATION.

DEPARTMENT OF COMMERCE
ECONOMIC DEVELOPMENT ADMINISTRATION (EDA)
SPECIAL ECONOMIC DEVELOPMENT & ADJUSTMENT ASSISTANCE GRANTS

Description: These grants help State and local areas to develop and/or implement strategies addressing problems caused by sudden and severe economic dislocation such as business closings, military base closures and natural disasters, or resulting from long-term economic deterioration. Eligible recipients include States, cities, counties, other political subdivisions of a State, groups of political subdivisions, and public or private nonprofit organizations.

Actual Use: The grants are used to develop economic adjustment strategies and fund projects that implement such strategies, including the construction of public facilities, financing (including revolving loan funds), business development, technical assistance, training or other activity that addresses the economic adjustment problem. A 25 percent local share is required for all grants.

In Fiscal Year (FY) 1997, more than $300 million in funds obligated to 268 projects (includes funds for defense adjustment, hurricanes and the Midwest floods). Grant obligations for FYs 1998 and 99 are estimated to be $167 million and $175 million, respectively.

Potential Use: These grants could be used to renovate or build, or acquire the capital to renovate or build, many types of environmental facilities (including water, wastewater treatment, solid waste, waste-to-energy, and/or recycling facilities). They might also finance, or generate financing for, brownfields cleanup and reuse costs associated with the redevelopment of public facilities and businesses.

Advantages: The potential to use grant monies for environmental improvements in disaster areas is high, as improved environmental services are crucial. Equity and leveraging potential are also strong.

Limitations: Grants are limited to areas experiencing sudden economic distress or long-term economic decline. Communities participating in the program must provide matching funds equal to 25 percent of the grant received. The program supports many non-environmental projects, and funding had varied considerably over the years.

Reference for Further Information: A description of this program, as well as other EDA programs, can be found in the *Catalog of Federal Domestic Assistance* and also at the *Catalog's* World Wide Web site, **http://aspe.os.dhhs.gov/cfda/ideptdoc.htm-** which has links to these Department of Commerce Grants, under ECONOMIC DEVELOPMENT ADMINISTRATION.

DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION (NOAA)
COASTAL SERVICES CENTER COOPERATIVE AGREEMENTS

Description: The National Oceanic and Atmospheric Administration's Coastal Service Center supports projects aimed at developing creative, multi-dimensional, science-based solutions to coastal management issues that will allow maintenance or improvement of natural resources while also allowing for economic growth. State and local governments, public non-profit organizations, and other public institutions (e.g., colleges) are eligible for project grants (or cooperative agreements). In fiscal 1998 the Center will support activities in landscape characterization and restoration, coastal change analysis, coastal remote sensing, development and integration of geographic and tabular information, training and meeting facilitation, administration of the Coastal Management Fellowship program, commercialization of environmental technologies, and special projects.

Actual Use: Among others, cooperative agreements have been awarded to the University of Texas at Austin to develop a Coastal Technology Institute and North Carolina State University for commercial technology development, starting with an inventory of technologies. Global markets for four sectors of environmental technologies have been assessed and a technology business incubator has been staffed and opened.
From FY 1996 through FY 1998 twelve awards were made to twelve States. Grant obligations totaled $2 million in FY 1997 and are estimated to be $2 million and $1.7 million in FY 1998 and 1999, respectively.

Potential Use: This program can be used for coastal watershed protection and to support efforts to foster environmental technology businesses.

Advantages: The program's recognition of a need to allow economic growth distinguishes it from narrower efforts.

Limitations: This is a very small program (approximately $2 million) limited to projects to improve or maintain environmental quality in coastal areas.

Reference for Further Information: U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Ocean Service, Coastal Services Center, 2234 South Hobson Avenue, Charleston, SC 29405-2413; Telephone: 843-740-1200, Fax: 843-740-1224, E-mail: csc@csc.noaa.gov, Internet site: www.csc.noaa.gov/

DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION (NOAA))
COASTAL ZONE MANAGEMENT ADMINISTRATION
IMPLEMENTATION AWARDS

Description: The Coastal Zone Management Program, authorized by the Coastal Zone Management Act of 1972, assists coastal states and island territories, including Great Lakes states, in implementing and enhancing coastal zone management activities approved by the Secretary of Commerce. Formula grants, which are based on population and miles of coastal shoreline and require a non-federal match, can be used to support assessment of the impacts of coastal growth and development, as well as projects in coastal wetlands management and protection, natural hazards management, reduction of marine debris, special area management planning, siting of coastal energy and government facilities, and ocean resource planning. No match is required for Coastal Zone Enhancement Program grants (cooperative agreements), which are meant to induce states to improve special area management planning, government and energy facility siting, ocean governance, public access to the coast, wetlands protection, and measures to deal with coastal hazards, marine debris, and cumulative and secondary impacts of development.

Actual Use: Management grants average $1.3 million and range from $500,000 to $2 million. Supported coastal zone management programs have included protection of wildlife and fisheries habitats and regulation of land use impacts on water quality. Grant obligations exceeded $48 million in Fiscal Year (FY) 1997, $49 million in FY 1998, and are projected to be $5.5 million in FY 1999.

Potential Use: Implementation funds can support marine wetlands and watershed protection and other important environmental measures in coastal areas.

Advantages: Federal actions that are reasonably likely to affect any land or water use or natural resource of the coastal zone must be consistent with the enforceable policies of a coastal State's or territory's federally approved coastal zone management program.

Limitations: The programs are limited to oceanic and Great Lakes coastal areas. The governor of the state or territory must designate an agency to participate and the Secretary of Commerce must approve the state's coastal zone management program.

Reference for Further Information: U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Ocean Service, Office of Ocean Resources Conservation and Assessment, Coastal Programs Division, 1305 East-West Highway, Silver Spring, MD 20910, Telephone: 301-713-3155x195, Fax: 301-713-4012, E-mail: juravitch@coasts.nos.noaa.gov, Internet site: www.nos.noaa.gov/ocrm/czm/.

DEPARTMENT OF DEFENSE
ARMY CORPS OF ENGINEERS
CIVIL WORKS PROJECTS

Description: The Army Corps of Engineers' Civil Works Directorate has numerous environmental responsibilities. Not only is the Corps the largest provider of water-based recreation facilities, it also administers a major environmental permitting program and operates hydropower facilities which provide 24 percent of the nation's electricity. Now among the Corps' responsibilities is management of the Formerly Used Sites Remedial Action Program (FUSRAP), which was transferred from the Department of Energy in 1997. Although major projects require congressional approval, the Corps' Continuing Authority projects, which must cost under $5 million, can take care of emergency repairs to streambanks and shorelines, small beach erosion control projects, Section 107 Small Navigation Projects, projects to mitigate shore damage at federal navigation projects, small flood control projects, and snagging and clearing for flood control. Some types of projects have federal cost limits of $500,000. Depending upon the type of project, cost sharing may be 50 percent federal, 80 percent federal, or potentially more complicated. For most assistance, preapplication consultation and coordination is essential and the application is simply a letter to the District Engineer, indicating clear intent to provide all required local participation.

Actual Use: The Corps spends about $500 million a year on environmental activities. The Continuing Authorities Program had $50 million for Fiscal Year 1998 and the President's budget requests $47 million for Fiscal Year 1999. Recent projects include work to prevent Judsonia, Arkansas', sewage lagoon levee from collapsing into the Little Red River and plans to combine structural flood control with creation of fish and wildlife habitats in New Jersey's Raritan River Basin.

Potential Use: State and local governments can work with the Corps' District Engineer to define environmentally sensitive project objectives and identify realistic sources of the non-federal share of costs.

Advantages: The Continuing Authorities Program eliminates the need for project-specific congressional authorizations for relatively small projects and the federal share of costs can make such projects affordable for state and local governments.

Limitations: Projects must be engineering feasible, economically justified, and complete within themselves.

Reference for Further Information: Contact U.S. Army Corps of Engineers, Directorate of Civil Works, 20 Massachusetts Avenue, NW, Washington, DC 20314-1000; Phone: 202-272-1975; Internet: **www.usace.army.mil/**.

ENVIRONMENTAL PROTECTION AGENCY (EPA)
ENVIRONMENTAL EDUCATION AND TRAINING GRANTS

Description: The National Environmental Education Act authorizes project grants to establish environmental education and training programs. EPA's Office of Environmental Education runs an Environmental Education and Training Program (EETP), to train educational professionals in the development and delivery of environmental education programs, and Environmental Education Grants (EEG), to support projects to design, demonstrate, or disseminate practices, methods or techniques related to environmental education and training. EETP supports classroom training in environmental education and studies including environmental sciences and theory, educational methods and practices, environmental career or occupational education, and topical environmental issues and problems. It also supports development of environmental education programs and curricula, including those to meet the needs of diverse ethnic and cultural groups. EEGs support the design, demonstration, or dissemination of environmental curricula, including development of educational tools and materials. Projects must focus on improving environmental education teaching skills, or educating communities, the general public, teachers, or students about public health, or building State, local or tribal government capacity to develop environmental education programs.

Actual Use: In Fiscal Year 1997 EPA awarded a small grant to Haskell Indian Nations University to support extension of environmental education to under-served American Indian audiences through distance learning (See **Section 2.C., Agriculture: RUS – Distance Learning and Telemedicine Loans and Grants**). Large awards have been made to the University of Michigan and the North American Association for Environmental Education. In Fiscal Year 1997, grant obligations totaled $1.95 million. For Fiscal Years 1998 and 1999, grant obligations are estimated at $1.95 and $1.82 million, respectively.

Potential Use: Environmental Education Grants can be used to develop a grass-roots capability to understand and evaluate environmental conditions and measures proposed to address them.

Advantages: Grants make environmental education projects feasible in circumstances in which they are not otherwise possible. Environmental education prepares voters to deal rationally with critical issues which might be manipulated by vested interests.

Limitations: Funds cannot be used for acquisition of real property, including buildings, or the construction or substantial modification of any building. These grants require a 25% non-federal match and the training program grants are for five years subject to the availability of funds.

Reference for Further Information: U.S. EPA, Office of Communications, Education and Public Affairs, Environmental Education Division, Mail Code 1704, 401 M Street, SW, Washington, DC 20460, Telephone: 202-260-4965, Fax: 202-260-4095, Internet: www.epa.gov/.

ENVIRONMENTAL PROTECTION AGENCY (EPA)
ENVIRONMENTAL JUSTICE GRANTS TO SMALL COMMUNITY GROUPS

Description: The Environmental Protection Agency's (EPA's) Environmental Justice Initiative was established in 1994 by Executive Order 12898. Environmental justice is the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations and policies. EPA's Office of Environmental Justice also provides funds to EPA Regional Offices for small grants (up to $20,000) to community groups. Applications are submitted to EPA regional offices, which select projects and award grants.

The Environmental Justice Small Grants Program provides financial assistance to eligible non-profit, tax-exempt, incorporated community groups and federally recognized tribal governments that are working on or plan to carry out projects to address environmental justice issues. Grants may be used for education and awareness programs, technical assistance in accessing available public information, technical assistance with gathering and interpreting existing environmental justice data, and activities such as river monitoring and pollution prevention for environmental justice purposes. Education programs can include provision of environmental justice training for teachers or related personnel as well as design, demonstration or dissemination of environmental justice curricula, education tools and materials.

Actual Use: In Fiscal Year 1997, 139 grants totaling approximately $2.7 million were awarded. The program was funded at $2.5 million in fiscal 1998 and 125 were awarded. Funding in Fiscal Year 1999 is estimated to be $2 million.

Potential Use: Community groups can use small grants to employ technical advice and media services to help residents understand environmental information that provides a basis for concerted action to protect the community's environmental health.

Advantages: Grants can pay for technical assistance, thereby enabling community groups to deal effectively with information needed to undertake a variety of environmental justice activities. There is no match requirement, making the program very practicable for low-income communities.

Limitations: Individual grants may not exceed $20,000. Grant funds may not be used to acquire real property or to construct or modify building.

Reference for Further Information: Environmental Protection Agency, Office of Environmental Justice, Mail Code 2201A, 401 M Street, SW, Washington, DC 20460, Telephone: 202-564-2515 or 800-962-6215, E-mail: environmental-justice-epa@epa.gov,Internet: **www.epa.gov/.**

ENVIRONMENTAL PROTECTION AGENCY (EPA) ENVIRONMENTAL MONITORING FOR PUBLIC ACCESS AND COMMUNITY TRACKING (EMPACT) GRANTS

Description: The EMPACT grants program is a pilot program designed to provide public access to clear, understandable, timely and accurate environmental monitoring data in at least 75 of the 86 larger metropolitan areas. The purpose is to assist the public in day-to-day decision-making about their health and the environment. The emphasis is on active partnerships between local and state government, research institutions, non-governmental organizations, the private sector, and the federal government in the use of advanced and innovative technologies to monitor environmental conditions and communicate clearly understandable, time-relevant and credible information to the lay public. Proposed partnerships must be established with formal agreements which outline the roles and responsibilities of individual partners. Each application must include provision for an Internet home page used for describing the program and for posting local environmental data. Grant or cooperative agreement awards range from $250,000 to $600,000 for a period of 12 to 24 months.

Actual Use: This is a new $3.5 million pilot program, for which full applications were due on May 15, 1998.

Potential Use: If the program is expanded, it could support provision of contemporaneous environmental information in a form readily understood by and useful to voters and taxpayers.

Advantages: Federal funding can facilitate the public understanding of environmental information that is essential for reasoned decision making in both public and private policy arenas.

Limitations: While it may yield valuable experience, this pilot program is for the most populous metropolitan areas and there is no assurance that it will be expanded or continued.

Reference for Further Information: Contact Environmental Protection Agency, Office of Research and Development, National Center for Environmental Research and Quality Assurance, Environmental Engineering Research Division, Mail Stop 8722R, Washington, DC 20460, Telephone: 202-564-6824, Fax: 202-565-2446, E-mail: kam.barbara@epa.gov, Internet: **es.epa.gov/ ncerqa/rfa/empact.html.**

ENVIRONMENTAL PROTECTION AGENCY (EPA) PERFORMANCE PARTNERSHIP GRANTS

Description: Performance Partnership Grants (PPGs) are multi-program grants made to State or Tribal agencies by EPA from funds allocated and otherwise available for categorical grant programs. They are voluntary and provide States and Tribes the option to combine funds from two or more categorical grants into one or more PPGs. PPGs are authorized by the 1996 Omnibus Consolidated Rescissions and Appropriations Act (PL 104-134). The authority covers the following sixteen program grants funded from EPA's State and Tribal Assistance Grants appropriation:

1. Air pollution control (CAA section 105);
2. Water pollution control (CWA section 106);
3. Nonpoint source management;
4. Water quality cooperative agreements (CWA section 104(b)(3));
5. Wetlands program development CWA section 014(b)(3));
6. Public water supervision (SDWA sections 1443(a) and 1451(a)(3));
7. Underground water source protection (SDWA section 1443(b));
8. Hazardous waste management (Solid Waste Disposal Act section 3011(a)):
9. Underground storage tank (Solid Waste Disposal Act section 2007(f)(2));
10. Radon assessment and mitigation (TSCA section 306);
11. Lead-based paint activities (TSCA section 404(g));
12. Toxics compliance and monitoring (TSCA section 28);
13. Pollution prevention incentives for States (PPA section 6605);
14. Pesticide cooperative enforcement (FIFRA section 23(a)(1));
15. Pesticides and program implementation (FIFRA section 23(a)(1))
16. Pesticide applicator certification & training/pesticide program (FIFRA section 23(a)(2));

and

17. General Assistance Grants to Indian Tribes (Indian Environmental General Assistance Act).

Actual Use: States began to seek PPG authority and negotiate with EPA in FY 1997.

Potential Use: All fifty States and the Tribal agencies could negotiate and implement PPGs allowing them increased flexibility in implementing and funding environmental priorities. $169,900,000 in grants were obligated in Fiscal Year 1997.

Advantages: PPGs give States and Tribes more flexibility to address their highest environmental priorities, thus increasing equity and environmental incentives. They provide incentives to States and Tribes to improve environmental performance and links between program goals and outcomes. PPGs also cut administrative burdens/costs for recipients and EPA by reducing the numbers of grant applications, budgets, work plans and reports. EPA will build partnerships with States and Tribes via shared goals and division of responsibilities.

Limitations: No extra funds are available via use of PPGs. States and Tribes must first develop environmental indicators and performance measures to ensure progress is made to agreed on goals.

Reference for Further Information: U.S. EPA, Office of the Administrator, Office of Regional Operations and State/Local Relations, 401 M Street, SW, Washington, D.C. 20460, Mail Code:1501.

ENVIRONMENTAL PROTECTION AGENCY (EPA) PROGRAM GRANTS

Description: Federal grants for various purposes including State and local program research, demonstrations, development, and implementation. The amount available, application criteria, and requirements differ from grant to grant, depending on Congressional authorization and internal EPA grant policies. Some grant programs are specifically authorized for a particular purpose, while other grant programs give significant discretion to the supervising EPA office.

Actual Use: The table on the following page provides a partial list of EPA grants, organized by the office that administers the grant. This list is provided only as an example; it is not necessarily comprehensive or current, since grants change from year to year according to Congressional authorization. Historically, EPA grants have funded both State and local programs in all environmental media. A number of grants are targeted to research and demonstration projects; other grants provide support for State and local program activities that coincide with federal environmental quality priorities.

Potential Use: State and local governments could use EPA grant funds to cover the costs of whatever program activities and/or capital purchases meet the applicable grant criteria.

Advantages: Federal grants provide State and local governments with the means of meeting national environmental quality goals. They may also provide funds otherwise unavailable to State or local programs, thus enhancing equity, environmental incentives, and financial leveraging considerations.

Limitations: Funds may be targeted to specific statutory goals. Programs must compete for limited funds and sign EPA grant agreements to perform activities. Each grant is very specific, thus limiting State and local flexibility.

Reference for Further Information: U.S. EPA grants can be accessed on the Agency's Web Page under: *Grant Programs Administered by EPA* at **http://www.epa.gov/ogd/grants.htm**. The respective EPA program offices will also have information on the grant programs that they oversee. In addition, the *Catalog of Federal Domestic Assistance* contains descriptions of all federal grant programs, including EPA's, and can be obtained at the Government Printing Office. EPA grant programs can also be accessed in the *Catalog* electronically through its Internet Website at **http://aspe.os.dhhs.gov/cfda/ideptaa.htm** - which is the section for Independent Agencies.

PARTIAL LISTING OF EPA PROGRAM GRANTS BY OFFICE, 1995	
Office of Water	Water Pollution Control State and Interstate Program Support Grants (Section 106) Water Quality Control Information System Grants State Public Water System Supervision Grants State Underground Water Source Protection Grants Water Pollution Control -- Lake Restoration Cooperative Agreements National Estuary Program Grants Nonpoint Source Planning Grants Nonpoint Source Set-Asides (under Title VI of the CWA) Wetlands Protection -- State Development Grants
Office of Research and Development	Solid Waste Disposal Research Grants Water Pollution Control -- Research, Development and Demonstration Grants Toxic Substances Research Grants Safe Drinking Water Research and Demonstration Grants Environmental Protection -- Consolidated Research Grants Air Pollution Control Research Grants Pesticides Control Research Grants
Office of Administration	Environmental Protection Consolidated Grants -- Program Support
Office of Prevention, Pesticides, and Toxic Substances	Consolidated Pesticide Compliance Monitoring and Program Pollution Prevention Grants Program Cooperative Agreements Toxic Substances Compliance Monitoring Program Grants Asbestos Hazard Abatement (Schools) Assistance Toxic Release Inventory Data Quality Assurance Program

Office of Solid Waste and Emergency Response	Hazardous Waste Management State Program Support Superfund State Core Program Cooperative Agreements Hazardous Substance Response Trust Fund (Superfund) State Underground Storage Tank Trust Fund Program Solid Waste Management Assistance Grants Superfund Innovative Technology Evaluation Program

ENVIRONMENTAL PROTECTION AGENCY (EPA)
SECTION 319 NONPOINT SOURCE POLLUTION CONTROL GRANTS

Description: Section 319(h) of the Clean Water Act provides for formula grants to States and tribes to implement projects or programs that will help to reduce non-point sources of water pollution within identified priority watersheds. All project funding must implement EPA-approved nonpoint source management programs and include at least 40 percent nonfederal match.
Fundable projects include the design, demonstration, implementation, and evaluation of Best Management Practices (BMPs) for animal waste, nonpoint pollution reduction in priority watersheds, groundwater protection from nonpoint sources, public education programs on nonpoint source management (e.g., basin-wide landowner and homeowner education). Also covered now are lake projects previously funded under the Clean Water Act Section 314 Clean Lakes Program. Nonprofit organizations may submit applications to State lead agencies for funds in accordance with the State's work program.

Actual Use: State grants average $2 million and range from $268,651 to $5,310,372. Indian tribe grants average $50,000 and range from $45,000 to $55,000. In Fiscal Year 1997, grant obligations totaled $100 million. Grant obligation estimates for Fiscal Years 1998 and 1999 are $105 million and $200 million, respectively. Best management practices have been designed and implemented for stream, lake and estuary watersheds and for animal wastes and sediment, pesticide and fertilizer control. Several States have used Section 319 funds to support their Farm*A*Syst source water protection programs (see **Section 5.A., Cooperative Extension Systems**).

Potential Use: States can use funds to implement portions of nonpoint source management programs addressing critical priorities.

Advantages: Grant funds can make some otherwise unaffordable water quality activities feasible.

Limitations: States must provide a non-federal match of at least forty percent and meet maintenance of effort requirements. Only $100 million is available nationally and projects or programs must be conducted within the state's non-point source priority watersheds.

Reference for Further Information: U.S. EPA, Office of Wetlands, Oceans and Watersheds, Assessment and Watershed Protection Division, Nonpoint Source Control Branch, Mail Code: 4503F, 401 M Street, SW, Washington, DC 20460; Telephone: 202-260-7100, E-mail: ow.general@epa.gov, Internet: **www.epa.gov/owow/NPS/guide.html**. A description of this grant program can be found in the *Catalog of Federal Domestic Assistance* and at the *Catalog's* World Wide Web site, **http://aspe.os.dhhs.gov/cfda/ideptdoc.htm**

ENVIRONMENTAL PROTECTION AGENCY (EPA) SUPERFUND TECHNICAL ASSISTANCE GRANTS

Description: EPA's Office of Solid Waste and Emergency Response administers Superfund Technical Assistance Grants (TAG) for Citizen Groups at Priority Sites. The program provides project grants for incorporated community groups to hire technical advisors who can assist them in interpreting technical information concerning the assessment of potential hazards and the selection and design of appropriate remedies at sites eligible for cleanup under the Superfund program. Funds may be used at sites listed or proposed for listing on the National Priority List (NPL) where cleanup is underway to obtain technical assistance in interpreting information regarding the nature of the hazard, remedial investigation and feasibility study, record of decision, selection and construction of remedial action, operation and maintenance, or removal action.

Incorporated groups of individuals who may be affected by a release or threatened release at any Superfund facility are eligible. Affected individuals are homeowners, landowners and others who can demonstrate direct effects from the site, such as actual or potential health or economic injury. Competing groups are encouraged to consolidate and submit a single application. Only one grant is made per site, for a maximum of $50,000 unless waived for up to an additional $50,000. A twenty percent match, including in-kind contributions, is required unless waived or lowered due to financial burden. The Superfund TAG Handbook provides detailed application instructions.

Actual Use: These grants help citizens acquire technical advisors to help them understand proposed clean-up remedies, better understand the technical problem at the site, and respond to EPA actions. Since the program began in March 1988, EPA has issued 196 awards totaling more than $72 million (including new awards, waivers and deviations). EPA superfund technical assistance grant obligations totaled $700,000 in Fiscal Year 1997 and are projected to be $1,000,000 and $500,000 in Fiscal Years 1998 and 1999, respectively.

Advantages: Technical assistance grants provide resources to help those directly affected by hazardous chemical waste sites to understand the situation and what is being done to correct it.

Limitations: Grants are limited to Superfund site communities and can be no more than $50,000-$100,000 for what is typically a six-year period. Funds cannot be used to develop new information or underwrite legal actions.

Reference for Further Information: U.S. EPA, Office of Solid Waste and Emergency Response, Office of Emergency and Remedial Response, Community Involvement and Outreach Center, Mail Code 5204G, 401 M Street, SW, Washington, DC 20460, Telephone: 703-603-8863; Fax: 703-603-9100; E-mail:superfund.info@epa.gov; Internet: **www.epa.gov/oerrpage/superfnd//web/tools/tag/ index.htm**

ENVIRONMENTAL PROTECTION AGENCY (EPA) SUSTAINABLE DEVELOPMENT CHALLENGE GRANTS

Description: This EPA grant program is designed to encourage people, organizations, governments and businesses to work cooperatively to develop flexible, locally-oriented approaches that link place-based environmental management with sustainable development and revitalization. The program funds projects that improve the environment, build sustainable futures for communities, help local economies and encourage partnerships among community groups, businesses, government and others. It looks for projects yielding the greatest environmental and economic benefits, and leverage the most community investment and resources.

Actual Use: The Sustainable Development Grant Program solicits project proposals for grants of up to $250,000. Proposals are received from public entities, agencies, institutions and organizations (such as State and local governments, and federally recognized tribes and regional entities), and non- profit private agencies, institutions and organizations.

The Program obligated $5 million in grants in Fiscal Year 1997. Projects funded have ranged from better forest management practices in New Hampshire to a network of 26 community supported organic farms in the Mid-Atlantic region to a mid-city green projects building materials exchange in Louisiana to a smart wood certification program in Washington.

Potential Use: The program could potentially fund the demonstration of a wide variety of environmentally and economically sustainable projects in all environmental media and program areas. These projects could help identify those practices which show promise of being truly sustainable and those which are not and should be avoided. EPA estimates that the program will have grant obligations in Fiscal Years 1998 and 1999 of $5 million and $9.3 million, respectively.

Advantages: Funding authorities are broad and the program supports an unusually wide range of creative and innovative approaches, and provides support to segments of the private sector. Project support represents seed funding and successful grantees leverage substantial additional public and private resources. Environmental incentives are very high and built into the program.

Limitations: The program requires a nonfederal match of 20 percent of a project's total budget and federal assistance may not exceed $250,000.

Reference for Further Information: U.S. EPA, Office of Air and Radiation, 401 M Street, SW, Washington, D.C. 20460, Telephone Number:202-260-2441, Contact: Pamela Hurt.

ENVIRONMENTAL PROTECTION AGENCY (EPA) UNDERGROUND STORAGE TANK TRUST FUND PROGRAM GRANTS

Description: EPA's Office of Solid Waste and Emergency Response oversees two grant programs dealing with underground storage tanks. The State Underground Storage Tanks (UST) Program provides project grants to assist state governments in the development and implementation of underground storage tank programs, so as to build their capacity to operate their programs in lieu of the federal program. A high priority is to encourage owners and operators to upgrade or replace their tanks well in advance of the deadline. Owners and operators of UST systems have until December 22, 1998, to upgrade, replace or close substandard systems. The Leaking Underground Storage Tank (LUST) Trust Fund Program provides project grants (cooperative agreements) to support state corrective action and enforcement programs that address releases from underground storage tanks containing petroleum. Funds are used to provide resources for the oversight and cleanup of petroleum releases from underground storage tanks where owners and operators are unknown, unwilling or unable to take corrective actions themselves. States may also oversee responsible party cleanups. A ten percent state cost share is required.

Actual Use: The average LUST grant is $1.5 million and the range is from $300,000 to $4.3 million. All 50 states and six territories have cooperative agreements with EPA to conduct cleanups and provide oversight of responsible party cleanups. Some states, such as New York, provide additional funds to support their cleanup efforts. Funding for the grants (cooperative agreements) was approximately $50.3 million in Fiscal Year 1997. Funding estimates for Fiscal Years 1998 and 1999 are $55.25 million and $57.7 million, respectively.

Potential Use: The program can be used not only to solve the immediate problem of leaking underground petroleum storage tanks, but also to raise public awareness of the pollution threat to groundwater.

Advantages: Federal funds make it feasible for states and territories to conduct programs dealing with the environmental threat of leaking underground petroleum storage tanks. The program has been effective, reflecting the specific benefits of cleanup projects and the flexibility afforded the states to consider affordability issues and implement various financing arrangements.

Limitations: The programs are nearing a critical juncture which could lead to premature reductions in effort. The deadline for upgrading or replacing substandard systems is late December, 1998, but some small operators may not yet be in compliance due to financial difficulties.

Reference for Further Information: Contact Environmental Protection Agency, Office of Underground Storage Tanks, Implementation Division, 401 M Street, SW, Washington, DC 20460; Mail Code: 5403G, Telephone: 703-603-7175, Fax: 703-603-9163, Internet: **www.epa.gov/.**

ENVIRONMENTAL PROTECTION AGENCY (EPA) WETLANDS PROTECTION DEVELOPMENT GRANTS

Description: Environmental Protection Agency (EPA) regional offices administer project grants to State or tribal agencies, interstate/inter-tribal agencies, and local governments in developing new or enhancing existing wetlands protection programs. Grants are intended to encourage wetlands protection program development or to enhance/augment existing effective programs. Project proposals must clearly demonstrate a direct link to increasing a state's, tribe's, or local government's ability to protect its wetlands resources. The required minimum match is twenty-five percent of the total project costs. While projects funded should support the initial development of a wetlands protection program or the enhancement/refinement of an existing program, current priorities are Wetland/Watershed Protection Approach Demonstration Projects and River Corridor and Wetland Restoration Projects.

Actual Use: Each state has received at least one grant. In Fiscal Year (FY) 1997, grant obligations totaled $15 million and grant awards ranged from $1500 to $489,000. Grant obligations are estimated to remain at $15 million for both FY 1999 and FY 2000. Funds have been used to support development of wetland water quality standards which can be used as a primary tool in water quality certification decisions. Funding has been focused on wetlands/watershed protection, approach demonstrations and river corridor and wetlands reservations projects.

Potential Use: Grants can be used to support redesign of wetland and watershed protection programs that need to be changed to reflect evolving demographic and ecological realities.

Advantages: Design or improvement of wetlands protection programs can be made financially possible by these federal grants.

Limitations: Grant funds cannot be used for operational support of wetlands protection programs. The lack of operational support funds is a serious impediment to State involvement in wetlands protection.

Reference for Further Information: U.S. EPA, Office of Wetlands, Oceans and Watersheds, Wetlands Division, 401 M Street, SW, Washington, DC 20460, Mail Code: 4502F, Telephone: 800-)832-7828 or 202-260-1917, Fax: 202-260-2356, Internet: **http://www.epa.gov/OWOW/wetlands/partners.html**.

ENVIRONMENTAL TECHNOLOGY INITIATIVE (ETI)

Description: ETI is an interagency effort led by the U.S. Environmental Protection Agency (EPA) supporting partnerships and projects that promote improved public health and environmental protection by advancing the development and use of innovative environmental technologies. The Initiative promotes innovative technologies that prevent pollution, control and treat air and water pollution, remediate contaminated soil and groundwater, assess and monitor exposure levels and mange environmental protection information.

Actual Use: ETI has provided funding support in excess of $100 million for more than 250 partnerships and projects throughout the United States advancing the development and use of innovative environmental technologies. Many of the partners participating in ETI projects are investing three to four dollars for every ETI dollar invested.

Potential Use: As the costs and an difficulties of meeting environmental challenges grow, the need for new and better environmental technologies will grow. The potential prospects for the environmental technology industry are truly staggering. The United States' environmental technology industry is already a high-wage, high growth industry. More than a million Americans are employed in over 50,000 companies nation-wide. Our market for environmental technology is the largest in the world and global markets are expected to grow by hundreds of billions of dollars in the coming years.

Advantages: Use of the innovative environmental technologies being developed and promoted by ETI partnerships and projects can cut regulatory compliance costs, reduce public health risks, gain superior environmental results, make companies more efficient and competitive, and improve community environmental services. Private sector equity, environmental incentives, and leveraging possibilities are all high.

Limitations: Before innovative environmental technologies can achieve regulatory acceptance, technology developers must decipher and meet a disjointed system of verification requirements in each State where a potential market exists. Once regulatory acceptance is achieved, the innovative technologies must then prove themselves and gain acceptance for actual field use.

Reference for Further Information: U.S. EPA; Office of Policy, Planning, and Evaluation, Policy and Technology Innovations Division, 401 M Street SW, Washington, DC 20460, Mail Code: 2127, ETI Infoline: 202-260-2686, Internet site: **http://www.epa.gov/oppe/eti**.

FEDERAL EMERGENCY MANAGEMENT AGENCY (FEMA) FLOOD MITIGATION ASSISTANCE

Description: The Federal Emergency Management Agency (FEMA) provides planning grants to assist communities with development of flood mitigation plans and project grants for implementation of planned measures to reduce flood losses. State agencies, participating National Flood Insurance Program (NFIP) communities, and qualified local organizations are eligible. Planning grants support assessment of long-term risk of flood damage to homes and other structures insurable under the NFIP and identification of actions needed to reduce risk of flood losses. Communities must have Flood Mitigation Plans to be eligible for project grants. Implementation project grants may support measures such as dry flood-proofing, elevation, relocation, acquisition, or demolition of insured structures, erosion control and drainage improvements, and beach nourishment activities such as planting of dune grass. They can be used for minor, localized structural projects, such as erosion control and drainage improvements, that are not fundable by state or other federal programs.

Actual Use: The Flood Mitigation Assistance program obligated about $17 million in grants in Fiscal Year 1997, so risk assessments and mitigation plans were principal activities. FEMA estimates that grant obligations will be $20 million in Fiscal Years 1998 and 1999, respectively. The program's accomplishments, including examples of the types of projects funded, are contained in a Biennial Report to the Congress. This report can be obtained from FEMA upon request.

Potential Use: This program has the potential to help support coastal watershed protection and dune preservation activities.

Advantages: The Flood Mitigation Assistance program can in specific circumstances fill funding gaps left by other federal and State programs. FEMA may fund up to seventy-five percent of the cost of eligible activities. Each State and territory receives a guaranteed base funding for Planning ($10,000) and Projects ($100,000).

Limitations: Communities that have been suspended from the National Flood Insurance Program are not eligible. This is a relatively small program. A twenty-five percent non federal match is required.

Reference for Further Information: U.S. Federal Emergency Management Agency (FEMA), Mitigation Directorate, 500 C Street, SW, Washington, DC 20472, Telephone: 202-646-4621, Internet: **www.fema.gov/home/MIT/fmasst.htm**. FEMA Regional Offices in Boston, MA, New York, NY, Philadelphia, PA, Atlanta, GA, Chicago, IL, Denton, TX, Kansas City, MO, Denver, CO, San Francisco, CA, and Bothell, WA (check with FEMA Headquarters for appropriate contracts and numbers).

FEDERAL EMERGENCY MANAGEMENT AGENCY (FEMA) HAZARD MITIGATION GRANTS

Description: The Federal Emergency Management Agency (FEMA) provides State and local governments project grants to implement measures that will permanently reduce or eliminate future damages and losses from natural hazards. A State Administrative Plan and State 409 Plan, which describe projects, are required for FEMA to identify a need for funding assistance. The State solicits, reviews, prioritizes and selects applications, then forwards them with project narratives, descriptions and fact sheets to FEMA for review. FEMA can fund up to seventy-five percent of eligible project costs and the State or project applicants must provide the nonfederal share. State agencies, local governments, public entities, private non-profit organizations, Native American Tribes, and Alaskan Native villages are eligible for subgrants from the States. Funds may be used for the acquisition of real property.

Actual Use: FEMA funded 51 projects in Fiscal Year 1997 and 45 in Fiscal Year 1998. Drainage improvement and vegetation management projects are among those the types of environmentally-related activities that have been funded.

Potential Use: Real property can be required for treatments which will meet environmental objectives while mitigating natural hazards.

Advantages: The federal share can be up to seventy-five percent of total eligible costs, making otherwise unaffordable projects feasible.

Limitations: The program is based on fifteen percent of all other public and individual disaster grants. Projects must be in Presidentially declared disaster areas and applicants must work through the state agency that is responsible for setting priorities for funding. The State or project applicant must provide a twenty-five percent match. The nonfederal match, however, can be a combination of cash, in-kind services, or materials.

Reference for Further Information: U.S. Federal Emergency Management Agency (FEMA), Mitigation Directorate, Program Implementation Division, 500 C Street, SW, Washington, DC 20472, Telephone: 202-646-4621, FEMA Regional Offices in Boston, MA, New York, NY, Philadelphia, PA, Atlanta, GA, Chicago, IL, Denton, TX, Kansas City, MO, Denver, CO, San Francisco, CA, Bothell, WA, Internet: **www.fema.gov/mit/hmgp.htm**

FOUNDATION AND CORPORATE GIVING

Description: Foundation and corporate giving are an important source of funding for activities in education, health and human services, civic and community affairs, and culture and the arts. They are also a significant and growing source of funding for environmental projects. Most such funding is in the form of grants for well-defined projects (i.e., time, cost, and deliverables) that meet the immediate priorities of the funding source, and are not funded by governments.

Actual Use: More than 7,500 major foundations in the United States with assets totaling about $170 billion make annual donations exceeding $10 billion. Corporations alone support 2,300 philanthropic programs in the form of foundations or as direct-giving programs. In 1995, 703 foundations made environmental gifts totaling more than $425 million.
The Global Futures Foundation is a nonprofit environmental foundation that supports integrated programs leading to source reduction, pollution prevention, low-cost market development and incentive driven regulatory structures which reduce economic and environmental costs. Patagonia, Inc. is a clothing firm that devotes 1% of sales to its environmental grants program and gave more than $1.1 million in 1995-6 to over 200 projects for preserving and restoring the environment.

Potential Use: Foundation and corporate giving could fund innovative environmental projects in many areas, and total support could reach more than a billion dollars. Grants typically go for research, education, and demonstration projects, but also could be used to fund projects involving planning, monitoring, and technology.

Advantages: These grants are not directly dependent on tax dollars and grant conditions may be less burdensome. Innovation is encouraged and equity provided since grantees are not supported by governments. Grantees are forced to leverage other resources or become self-sustaining.

Limitations: Funding levels may be highly variable, competition for resources is very intense and awards are usually directed to innovative projects. Environmental impacts may be limited if projects are too small and esoteric. Since funding is typically for very short, defined periods of time, it is a real challenge for grantees to succeed or become independent.

Reference for Further Information: *The Foundation Directory* features the nation's largest foundation funders. The *National Directory of Corporate Giving* profiles over 2,300 corporate philanthropic programs. These books are available from the Foundation Center, 79 Fifth Avenue, New York, NY 10003-3076, Telephone: 212-620-4320. See also Environmental Data Resources, Inc., *Environmental Grantmaking Foundations, 1995 Directory*, Rochester, NY, 1996.

DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT (HUD) COMMUNITY DEVELOPMENT BLOCK GRANTS (CDBG) ECONOMIC DEVELOPMENT INITIATIVE GRANTS

Description: The CDBG Economic Development Initiative (EDI) awards project grants to help local governments eligible under HUD's Section 108 Loan Guarantee Program carry out economic development projects. The grants must enhance the security of loans guaranteed under the Section 108 Program or improve the viability of projects financed under the Section 108 Program.

Actual Use: Fiscal Year 1996 assistance ranged from $975,000 to $3.5 million, with an average grant of $1.8 million. For Fiscal Year 1998, EDA estimates $38 million in funding for 50-75 standard EDI projects and $25 million for funding for up to 25 brownfields projects. In Fiscal Year 1999, $ 400 million in EDI funds will be allocated to the proposed Community Empowerment Fund and $50 million in funds will be allocated for up to 50 brownfields projects.

Projects funded include a wide range of economic development activities including commercial, industrial and economic development revolving loan funds. Eligible activities include acquisition of real property; rehabilitation of publicly-owned real property, housing rehabilitation, economic development activities, acquisition, construction reconstruction, or installation of public facilities, and, in the colonias, public works and other site improvements. Brownfields EDI grants will result in a similar range of activities for qualified Brownfield sites.

Potential Use: Depending on interpretation of Section 108 criteria, grants might finance or leverage loans funding facilities in water, wastewater, solid waste, recycling, waste-to-energy, and small business air quality improvements.

Advantages: Equity and leveraging opportunities are high and built into the program. Some very specific environmental projects have been completed in low-income areas.

Limitations: EDI grant funds only be used in conjunction with projects and activities assisted under the Section 108 loan Program. Principal beneficiaries of the grants must be low and moderate income persons. Many non-environmental projects are funded and payment is on a cost-incurred basis.

Reference for Further Information: The U.S. Department of Housing and Urban Development (HUD) publication, *Programs of HUD*, contains a description of this CDBG program. Information on it can also be found in the *Catalog of Federal Domestic Assistance* and its Internet site at **http://aspe.os.dhhs.gov/cfda/idepthud.htm** - which has links to these HUD grants.

DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT (HUD) COMMUNITY DEVELOPMENT BLOCK GRANTS (CDBG) ENTITLEMENT GRANTS

Description: The CDBG Entitlement Grants Program seeks to develop viable urban communities by providing decent housing and a suitable living environment, and by expanding economic opportunities. It supports activities that benefit low-to moderate income citizens in cities in Metropolitan Statistical Areas (MSAs) designated by OMB as a central city of the MSA and other cities over 50,000 in MSAs and qualified urban counties of at least 200,000 (excluding entitlement cities located in such counties). Federal formula grants based on population, income, housing, and growth lag are awarded to eligible entities. Specific activities that can be carried out include acquisition of real property, relocation and demolition, rehabilitation of residential and nonresidential structures, and the provision of public facilities and improvements, such as water and wastewater treatment facilities.

Actual Use: HUD obligated more than $3 billion in entitlement grants in fiscal year (FY) 1997 and plans to obligate approximately that much in both FYs 1998 and 1999. Nine hundred and eighty-six local governments were eligible to receive these grants in FY 1998. Grantees must certify that at least seventy percent of grant funds received are spent for activities that principally benefit low- and moderate-income persons. Water and wastewater treatment facilities and brownfields-related activities are among the types of eligible projects that have been funded by these important grants.

Potential Use: Depending on interpretation of grant criteria, these CDBG grants might be used to increasingly finance brownfields cleanup and redevelopment activities, as well as air pollution and solid waste facilities.

Advantages: This grant program is HUD's major program and has been relatively stable.

Limitations: These grants assist a limited number of relatively large communities with distressed areas. To apply, communities must develop and submit a number of detailed documents including a Consolidated Plan, annual action plan and certifications. Post award requirements include annual performance reports, audits, and detailed records maintenance. Many non-environmental projects are funded, competition is fierce, and assistance is provided on a reimbursement basis.

Reference for Further Information: The U.S. Department of Housing and Urban Development (HUD) publication, *Programs of HUD,* contains a description of this CDBG program. Information on it can also be found in the *Catalog of Federal Domestic Assistance* and its Internet site at **http://aspe.os.dhhs.gov/cfda/idepthud.htm** - which has links to these HUD grants.

DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT (HUD) COMMUNITY DEVELOPMENT BLOCK GRANTS (CDBG) SMALL CITIES PROGRAM NONENTITLEMENT GRANTS

Description: These grants support decent housing, a suitable living environment, and expanded economic opportunities for low and moderate income persons. They fund activities in nonentitlement areas (cities with 50,000 or less people and counties with less than 200,000 people that do not receive entitlement grants) in New York and Hawaii. Eligible activities include the acquisition, rehabilitation or construction of public works facilities and improvements, clearance, housing rehabilitation, code enforcement, home ownership assistance, relocation payments, economic development, existing urban renewal projects, and certain public services.

Actual Use: HUD obligated just over $60 million for these grants in fiscal year (FY) 1997 and plans to obligate like amounts in FYs 1998 and 1999. Water and wastewater systems are among the projects funded by this assistance. State fund allocations are determined by formula taking into account population, income levels, per room housing density; age of housing, and other factors.

Potential Use: Depending on HUD interpretation of grant criteria, these grants might be used to finance air pollution control, solid waste, recycling, and waste-to-energy facilities, as well as a range of brownfields cleanup and redevelopment activities.

Advantages: Environmental justice and equity concerns in terms of addressing ability-to-pay are good. Leveraging possibilities with State revolving loans and rural utility water and wastewater funding and/or pre-financing are high.

Limitations: Priority is given to grants that benefit low and moderate income persons or aid in the elimination of slums or blight. At least seventy percent of each grant made must benefit low and moderate income persons. For metropolitan areas, low and moderate income is a level equal to or less than HUD's Section 8 low income limit. For non-metropolitan areas, low and moderate income is defined as eighty percent of the median income for those areas in the State.

Reference for Further Information: The U.S. Department of Housing and Urban Development (HUD) publication, *Programs of HUD*, contains a description of this CDBG program. Information on it can also be found in the *Catalog of Federal Domestic Assistance* and its Internet site at **http://aspe.os.dhhs.gov/cfda/idepthud.htm** - which has links to these HUD grants.

DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT (HUD) COMMUNITY DEVELOPMENT BLOCK GRANTS (CDBG) STATES' GRANTS PROGRAM NONENTITLEMENT GRANTS

Description: These grants help provide communities with decent housing, a suitable living environment and expanded economic opportunities. They finance activities in nonentitlement areas (cities with 50,000 or less people and counties with less than 200,000 people which do not receive entitlement grants) that benefit low to moderate income citizens. Puerto Rico and all States except New York and Hawaii receive funds to administer these grants to localities. Each State develops its own program and funding priorities. Fundable activities include buying real property, relocation and demolition, rehabilitation of residential and nonresidential structures, and providing public facilities and improvements such as water and wastewater treatment facilities.

Actual Use: HUD obligated more than $1.2 billion in nonentitlement grants in fiscal year (FY) 1997 and plans to obligate about as much in both FYs 1998 and 1999. Grantees must ensure that seventy percent of grant funds benefit low- and moderate-income persons. Water and wastewater treatment systems are among the projects eligible for assistance. State allocations are set by formula using population, income levels, per room housing density; age of housing, and other factors.

Potential Use: Depending on each State's interpretation of grant criteria, CDGB entitlement grants might also be used to finance air pollution control, solid waste, recycling, and waste-to-energy facilities, as well as a range of brownfields cleanup and redevelopment activities.

Advantages: The program is equitable from an affordability perspective. Leveraging can be high, as communities can combine State revolving loans, as well as rural utility grants and loans, for water and wastewater systems.

Limitations: Grants are limited to low and moderate income communities experiencing distress. For metropolitan areas, low and moderate income is a level equal to or less than HUD's Section 8 low income limit. For non-metropolitan areas, it is defined as eighty percent of the median income for those areas in the State. A State may only use up to $100,000 plus two percent of its grant to administer the program and must match each federal dollar over $100,000 used for administration with a dollar of its own.

Reference for Further Information: The U.S. Department of Housing and Urban Development (HUD) Fact Sheet, State Community Development Block Grant Program, describes the program. HUD, Office of Block Grant Assistance, Small Cities Division, 415 7th Street, SW, Washington, DC 20410, Telephone: 202-708-1322. The HUD publication, *Programs of HUD*, also has a description of this CDBG program. Information on it can also be found in the *Catalog of Federal Domestic Assistance* and its Internet site at **http://aspe.os.dhhs.gov/cfda/idepthud.htm**.

DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
NATIONAL COASTAL WETLANDS CONSERVATION GRANTS

Description: The Department of the Interior's Fish and Wildlife Service administers the Coastal Wetlands Conservation Grants Program. The Division of Habitat Conservation and the Division of Federal Aid review project selections by the agency's regional offices. All coastal states except Louisiana are eligible to submit project proposals, which are due by September 1 each year. Projects are undertaken by state agencies having responsibility for acquisition of interests in coastal lands or waters and for restoration, management or enhancement of coastal wetlands ecosystems. Projects must provide for the long term conservation of coastal lands or waters and the hydrology, water quality and fish and wildlife dependent thereon. The federal share of project costs cannot exceed fifty percent except that it may be seventy-five percent if the State has established a trust fund for the purpose of acquiring coastal wetlands, other natural areas or open spaces. Although program applicants must be State/territorial agencies, project participants may include State, county and municipal agencies and non-governmental entities.

Actual Use: Grant funds are used to restore wetlands under state/territorial ownership and to acquire new wetlands. The average grant is $507,840 and the range has been from $19,428 to $1,609,731. In fiscal 1997, 18 proposals covering 10,741 acres received approximately $9.1 million. 928 acres were restored and 2,082 acres were acquired.

Potential Use: The program is authorized through fiscal 1999, for which funding will be supported by the allocation of eighteen percent of the Sport Fish Restoration Account up to $15 million. Around $7 million has been available annually.

Advantages: Up to seventy-five percent of the cost of placing critical wetlands in protective public ownership can be covered by federal funds.

Limitations: This is a relatively small program which depends heavily upon State participation. It is limited by law to coastal States.

Reference for Further Information: Contact U.S. Department of the Interior, Fish and Wildlife Service, Division of Federal Aid, Arlington Square, Room 140, 4401 North Fairfax Drive, Arlington, VA 22203, Telephone: 703-358-2156, Fax: 703-358-1837, E-mail: Robert_Pacific@mail.fws.gov, Internet: **www.fws.gov/**.

DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
NORTH AMERICAN WETLANDS CONSERVATION ACT GRANTS

Description: The North American Wetlands Conservation Act Grant Programs promote long term conservation of wetland ecosystems and the waterfowl and other migratory birds, fish and wildlife that depend upon such habitat. It provides project grants on a matching basis for acquisition, enhancement and restoration of wetlands and associated habitat. The programs are meant to encourage voluntary public-private partnerships to conserve wetland ecosystems by creating an institutional infrastructure and providing a source of funding. The funding cap for Standard Grants is $1 million, while the cap for Small Grants is $50,000. The nine-member North American Wetlands Conservation Council, created by the North American Wetlands Conservation Act of 1989, reviews the merits of wetlands conservation proposals submitted for funding. The Council considers the extent to which the project fulfills the purpose of the Act, the North American Waterfowl Management Plan, or the Canadian-Mexican-U.S. Tripartite Agreement, as well as its consistency with the National Wetlands Priority Conservation Plan developed under the Emergency Wetlands Resources Act of 1986. While anyone can apply for a grant at anytime, the Council goes through the proposal selection process three times a year. It then makes recommendations to the Migratory Bird Conservation Commission for consideration of funding.

Actual Use: In March 1998, nineteen U.S. projects in fifteen states were approved for about $10.2 million in federal funding, to be matched by almost $24.5 million from partners. For example, $655,000 was approved for the Teton River Valley Ecosystem Project in Idaho.

Potential Use: The programs can fund acquisition of real property interests such as conservation easements, fee simple title, and wildlife management agreements.

Advantages: The programs take a non-regulatory approach encouraging voluntary partnerships to develop and implement wetland conservation projects to benefit wetland dependent wildlife.

Limitations: The current funding authorization expires at the end of fiscal 1998; however, reauthorization appears likely.

Reference for Further Information: For a copy of the *1998 Grant Application Instructions*, contact the U.S. Department of the Interior, Fish and Wildlife Service, North American Wetlands Conservation Council Coordinator, North American Waterfowl and Wetlands Office, 4401 North Fairfax Drive, Room 110, Arlington, VA 22203, Telephone: 703-358-1784, E-mail: r9arw_nawwo@mail.fws.gov, Internet: www.fws.gov/.

STATE GRANT PROGRAMS

Description: Almost all States have environmentally-related grant programs for eligible local governmental units, and sometimes the private sector. Since the source and type of grant varies considerably from state-to-state, localities should obtain copies of State grant catalogs for specific information. State grants fall into several categories: (1) annually appropriated grant monies; (2) federally mandated grants; and (3) grants arising from referendum bond acts, which historically have been the largest source of State grant monies.

Actual Use: Annually appropriated States grants historically have been small, and typically provide funds for programs (as opposed to construction) for which there has been no federal funding, e.g., water and wastewater operator training, drinking water and air pollution, and nonpoint source control. Federally mandated grants include the twenty percent match required for the SRF, and other environmental requirements such as facility operator certification, monitoring and testing, and small business clean air audits. By far the largest State grants arise from environmental bond acts passed by referendum, which historically have been the main source of funding for environmental infrastructure, parks and conservation, and solid and hazardous waste. Recent years have seen a surge in large State referendum bond acts. For example, New York's 1996 $1.75 billion bond act included money for drinking water grants, watersheds, small business (water and air) and brownfields grants. California passed a $994 million bond act financing drinking water grants, New Jersey a $340 million bond act which included incentive matching grants for localities and nonprofits, Massachusetts a $399 bond act which included watershed and farmland protection grants, and Florida a $300 million bond act which included habitat protection grants.

Potential Use: States have become increasingly creative in leveraging grants, and providing assistance to non-traditional clients such as nonprofits and small businesses. Many States now provide matching incentive grants to localities for local fundraising and to nonprofit organizations, such as in New Jersey and New York. Minnesota and Maryland provide dollar-for-dollar matching grants for private contributions for wildlife and wetlands protection, including private mitigation.

Advantages: State grants can be directed to pressing compliance needs and small communities, thus reducing costs and enhancing equity. State grants may be more flexible and entail less red tape than federal assistance, and can be further leveraged.

Limitation: Historically, State grants have not been large or predictable. Funding tends to come and go, and monies are available on a first-come-first-serve basis, favoring projects ready to proceed. Many restrictions still apply, such as on grants to non-profits and individuals. Grants, compared to loans, may result in more costly and slower projects, since the money is regarded as "free".

Reference for Further Information: Contact State Budget Offices for further information.

STATE REVOLVING FUND (SRF)
DRINKING WATER PRINCIPAL SUBSIDIES

Description: The 1996 Amendments to the Safe Drinking Water Act (SDWA), which established the Drinking Water State Revolving Loan Fund program (DWSRF) capitalized by federal grants and State matching grants, provides for loan subsidies in the form of "forgiveness of principal" to communities defined as disadvantaged. A principal subsidy is the same as grant. The SDWA provisions from creation of revolving loan funds permits states to use up to 30% of the federal capitalization grants for principal subsidies. States must established affordability criteria which guide the circumstances when a "disadvantaged" community may received a principal subsidy. Affordability criteria typically are based on the target service charge compared to median household income. Principal subsidies are not permitted under the Clean Water SRFs.

Actual Use: Most States plan to use the principal subsidy authority under the DWSRF. Principal subsidies are available to private public purpose drinking water projects as well as publicly-owned projects. States with many small communities and low median household incomes may reach the 30% limit set by the Act. However, in many States the loan demand is so large that principal subsidies will be a smaller percentage than this limit. In New York, principal subsidies come from environmental bond act monies instead of SRF funds, and may provide up to 75% of project funding.

Potential Use: Principal subsidies may allow drinking water projects to proceed which otherwise wold be delayed or not undertaken. They also may be combined with SDWA provisions allowing a 30-year loan instead of the 20 year limit on most SRF loans. SRFs can set aside a set amount of monies for investment purposes to assist in subsidizing loans. For a $100,000 principal subsidy, an SRF could invest $71,430 a year at 7%, yielding $5,000 a year for 20 years to pay for the subsidy.

Advantages: SRF grants make projects more affordable for smaller communities and may be the crucial factor is whether such a community proceeds or not. Hence, accessibility as well as equity are enhanced. SRFs can leverage their subsidy potential through sound investments. Based on a states affordability levels, projects entitled to principal subsidies can be prequalified for assistance, thus easing administrative burdens and uncertainties.

Limitations: Principal subsidies reduce the leveraging potential of loanable funds, as well as their revolving nature. Thus, States must be very careful not to undercut the long term solvency of SRF funds by providing too many grants as opposed to loans. Accessibility to loans for other communities declines by the amount of principal subsidies offered.

Reference for Further Information: Localities should consult their State DWSRF officials to determined principal subsidies policies and affordability criteria. State Intended Use Plans published annually will describe principal subsidy benefit recipients.

DEPARTMENT OF TRANSPORTATION
FEDERAL TRANSIT ADMINISTRATION
LIVABLE COMMUNITIES INITIATIVE

Description: The Federal Transit Administration (FTA) Livable Communities Initiative supports sound environmental practices, as part of its effort to improve the quality of life by promoting compact communities with user-friendly transit linked to related development. Metropolitan and other planning organizations that get FTA planning funds must adopt Livable Communities elements in their planning efforts. Eligible activities include assessment of environmental, social, economic, land use, and urban design impacts; evaluation of best practices; participation by community groups; and development of innovative urban design, land use, and zoning. Limited funding exists for technical assistance, planning, modeling, urban design, and community involvement. Recipients may include transit operators, metropolitan planning bodies, local governments, States, planning agencies and other public bodies. Non-profit, community and civic groups are encouraged to join in project planning and development. Eligible capital activities or capital enhancements of demonstration projects include property acquisition, restoration or demolition of structures, site preparation, utilities, building foundations, walkways, and open space physically and functionally related to mass transportation facilities. Also eligible are enhancements to transit stations, park-and-ride lots and transfer facilities with community services such as day care, health care and public safety. Funding is provided by the Intermodal Surface Transportation Efficiency Act of 1991.

Actual Use: Among the Livable Communities projects are the Orlando Park and Play Garage Child Care Center and the Health Station at Roxbury Crossing.

Potential Use: Projects can emphasize sound environmental practices reducing automobile trips, conserving open space, encouraging green areas, and improving air quality.

Advantages: The program recognizes that the purpose of federal transit laws is to improve the quality of life through use of transit, not simply to fund costs of transit systems.

Limitations: The physical or functional tie to transit eliminates many otherwise appropriate projects. Project funding depends on the interest of transit planning and operating agencies.

Reference for Further Information: U. S. Department of Transportation, FTA regional offices: Cambridge, MA, Phone: 617-494-2055; New York, NY, Phone: 212-264-8162; Philadelphia, PA, Phone: 215-656-6900; Atlanta, GA, Phone: 404-347-3948; Chicago, IL, Phone: 312-353-2789; Arlington, TX, Phone: 817-860-9663; Kansas City, MO, Phone: 816-523-0204; Denver, CO, Phone: 303-844-3242; San Francisco, CA, Phone: 415-744-3133; Seattle, WA, Phone: 206-220-7954. Internet: www.fta.dot.gov/.

DEPARTMENT OF TRANSPORTATION
TRANSPORTATION EQUITY ACT FOR THE 21ST CENTURY (TEA-21)

Description: The Intermodal Surface Transportation Efficiency Act (ISTEA) of 1991 set new standards for environmental sensitivity. The Transportation Equity Act for the 21st Century (TEA-21) signed June 9, 1998, reauthorized, modified and extended ISTEA largely continuing the improved relationship between transportation and the environment. ISTEA made wetlands mitigation efforts eligible under both the National Highway System and Surface Transportation Program. Eligible activities included mitigation banking, wetland preservation and restoration efforts, and State and regional wetland planning. TEA-21 retains wetland mitigation project eligibility and adds natural habitat. It allows up to 20% of reconstruction, resurfacing, rehabilitation or restoration project costs for environmental restoration and pollution abatement, including retrofit or construction of stormwater treatment systems to address environmental problems caused or contributed to by transportation facilities. Other eligible activities, including purchase of scenic easements, scenic beautification and landscaping, preservation of abandoned railway corridors, and mitigation to address water pollution due to highway runoff, are reauthorized with 40% more money.
The Congestion Mitigation and Air Quality Improvement Program continues with $9.1 billion authorized. A new Clean Fuels Program is authorized at $1.2 billion. The Congestion Pricing Pilot Program becomes the Value Pricing Pilot Program and the number of project States grows from 5 to 15, with funding of $8 million/year. A new $100 million National Wetlands Restoration Pilot Program to offset wetlands degradation caused by highway construction before 12/27/77, is authorized. A 5-year, $120 million program is authorized to research relationships between transportation, community preservation and the environment, and the role of the private sector.

Actual Use: The new authorities tend to build on experience under ISTEA.

Potential Use: Contingent upon regulations implementing changes made by the reauthorization, state transportation agencies will be able to undertake a variety of measures to combat air pollution, restore and preserve wetlands, and otherwise mitigate environmental impacts.

Advantages: Inclusion of support for environmental measures diminishes counterproductive tensions between transportation infrastructure development and environmental protection.

Limitations: If the legislation's potential is to be realized, transportation agencies must be willing to take advantage of the environmental authorities conveyed.

Reference for Further Information: U.S. Department of Transportation, The Federal Highway Administration, 400 7th Street, SW, Washington, DC 20590; Telephone: 202-366-5004, Internet: **www.dot.gov/**.

OTHER

Description:

Actual Use:

Potential Use:

Advantages:

Limitations:

Reference for Further Information:

3. TOOLS

FOR

ENHANCING CREDIT

3. TOOLS FOR ENHANCING CREDIT

INTRODUCTION

Description: Credit enhancement serves as an assurance to lenders or bondholders that credit is available, and that they will be repaid if the debtor government or private party should default or delay payment. By providing additional guarantees for bond and/or loan repayment, credit enhancement mechanisms may improve the ability of both the public and private sectors to acquire capital in the first instance, to acquire capital at lower costs including issuance, coverage and interest costs, to lower debt service reserve requirements, and to achieve other goals. Credit enhancement tools may be as straightforward as purchasing commercial bond insurance or posting a performance bond, or as complex as State Revolving Fund (SRF) collateral or cross-collateral bond leveraged financing, senior and subordinate debt arrangements, and over funded debt reserve funds.

Advantages: Local governments with poor credit ratings (below investment grade), or no credits ratings, may be able to gain access to capital markets and/or loan funds through credit enhancements, thus increasing the equity of access and allowing environmental projects to move forward. Complex, expensive environmental facilities may benefit from credit enhancement debt structuring, and "risky" environmental projects such as those involving hazardous waste may benefit from bond or liability (indemnity) insurance. SRF bond leveraging creates SRF-backed, and sometimes oversized, debt reserve funds to secure bonds and subsidize interest rates. Bond pools and bond banks result in lower interest costs for some individual recipients through diversification. Bond insurance may result in significantly lower carrying costs than otherwise. The credit enhancements presented here have been as important to the private sector, and in many instances are more widely used, compared to the public sector. Individual borrowers can help assure lenders as to future risks through environmental sand financial due diligence steps.

Limitations: Most credit enhancements involve additional costs that may outweigh the financial advantage from the lower interest rates, or other cost-savings, achieved through the mechanisms. Thus, use of credit enhancements must be evaluated on a case-by-case basis. There may be intense competition for federal and State credit enhancement programs, which in themselves may be administratively difficult to access and arrange. Bond or loan holders may be given a false sense of security if credit enhancements are applied to funding projects which are inherently unaffordable, difficult to structure, or risky. The more complex credit enhancement mechanisms involving bond leveraging and debt reserve fund management may be too difficult for some governments to undertake and entail high administrative/accounting costs.

LIST OF TOOLS FOR ENHANCING CREDIT
(In Alphabetical Order)

1. Association Pooling
2. Commerce: Small Business Administration – Surety Bond Program
*3. Commercial Insurance and Guarantees
*4. Environmental Due Diligence
*5. Financial Due Diligence
6. Grant-Backed Credit Enhancements
7. HUD: Community Development Block Grants – Section 108 Loan Guarantees
*8. Letters of Credit/Lines of Credit
*9. Performance Bonds
*10. Senior and Subordinate Debt Structuring
*11. State Bond Banks
*12. State Guarantees and Insurance
*13. State Revolving Fund (SRF) Bond Leveraging
*14. SRF Common Bond Pools and Cross-Collateralization
*15. SRF Interest Rate Subsidies

* Stars indicate most highly rated mechanisms as described in the Comparison Matrix at the end of the narratives. See Introduction to the Guidebook for a description of the criteria used. Ratings of "High", "Moderate", and "Low" are for comparison purposes only, as some ratings are necessarily subjective and data are incomplete.

ASSOCIATION POOLING

Description: Members of an association combine their resources in a common pool to improve the creditworthiness of participants, thus helping them to obtain financing for environmental capital improvements. For example, a nonprofit trade association representing a manufacturing sector creates a revolving fund that could: (1) provide lines of credit to participating members; (2) purchase insurance or letters of credit to back the borrowings of members; and (3) itself borrow on behalf of members, using the assets of the fund as collateral or reserve. In the latter case, the pool would be a true revolving fund. Besides contributions from participating members, the resources and capability of the pool might be enhanced via assistance from the Small Business Administration.

Actual Use: No examples are known of associations establishing pools to facilitate the financing of environmental improvements. Readers are encouraged to let us know of any new tools (see Appendix A). There are many examples of communities and/or State governments forming bond pools to enable all pool members to have access to affordable capital. Many cooperatives are formed, at least in part, to serve this same function.

Potential Use: The potential use of this tool is impossible to predict, but if pools could be made large enough, then it is conceivable that otherwise uncreditworthy borrowers could become bankable credits at reasonable costs. It would probably have the greatest application with industrial trade associations possessing a wide range of members in terms of their financial conditions.

Advantages: EPA's Common Sense Initiative has clearly demonstrated that there is a need to improve the access to capital for many small businesses in order to make it economic for them to invest in environment capital improvements. Existing public and private institutional arrangements are not meeting this need. Association pooling might be a means for a business sector to help itself without trying to solve the problem through public assistance programs.

Limitations: There is little incentive for already creditworthy association members to participate in the pool unless incentives are offered. For the pool to function effectively, it much reach a critical mass of creditworthiness that could prove difficult to achieve. It may prove difficult to assess and administer sanctions against individual pool members who default on their financing arrangements.

References for Further Information: Small Business Administration Programs can be found under *The Catalog of Federal Domestic Assistance* and at the *Catalog's* Internet site, under Independent Agencies at **http://aspe.os.dhhs.gov/cfda/ideptaa.htm**. Select "Small Business Administration".

DEPARTMENT OF COMMERCE
SMALL BUSINESS ADMINISTRATION (SBA) – SURETY BOND PROGRAM

Description: A surety bond is a bond issued by one party, the surety, guaranteeing that he will perform certain acts promised by another or pay a stipulated sum, up to a set limit, in lieu of performance, should the principal fail to perform. Surety bonds include contractor bid, performance and payment bonds, maintenance bonds, supply bonds, financial guarantee bonds, and license and permit bonds, among others. For example, a performance bond is an agreement whereby an insurance company becomes liable for the performance of work or services provided by a contractor by an agreed-upon date. If the contractor does not do what was promised, the surety is financially responsible (see **Section 10.B., Surety Bonds** and **Section 3., Performance Bonds**). Most large property and casualty insurance companies have surety departments. Professional agents or brokers specializing in providing surety bonds. can provide information regarding specific surety companies.

Actual Use: By law, prime contractors to the federal government must post surety bonds on federal construction projects valued at $25,000 or more. Many state, county, city and private sector projects also require bonding. The Small Business Administration (SBA) can guarantee bid, performance, and payment bonds for contracts up to $1.25 million for small businesses that cannot obtain bonds via regular commercial channels. Contractors apply to SBA for a guarantee through a surety bonding agent, in which case the guarantee goes to the surety, or the contractor may use a "preferred surety" authorized by the SBA to issue, monitor and service guaranteed bonds without prior SBA approval.
Potential Use: The SBA guarantee can enable the participation of otherwise non-competitive small businesses in environmental facility or clean-up projects.

Advantages: The SBA program protects both the principal and the obligee at a lower cost because its guarantee protects the surety.

Limitations: Size standards for construction industry firms limit eligible general and heavy construction contractors to companies with annual revenues of no more than $17 million and special trade contractors to those with no more than $7 million annual revenues.
Reference for Further Information: Small Business Administration, 409 Third Street, SW, Washington, DC 20416; Telephone: 202-205-6485; Fax: 202-205-7064, Internet address: **www.sba.gov/financing/surety.html**. U.S. Department of the Treasury list of surety companies qualified to write bonds required by the federal government (Circular 570 - Surety Companies Acceptable on Federal Bonds). This list is published in the *Federal Register* on July 1 each year and is available from the Surety Bond Branch, Financial Management Service, U.S. Department of the Treasury, 3700 East-West Highway, Room 6F04, Hyattsville, MD 20782, Telephone: 202- 874-6850.

COMMERCIAL INSURANCE AND GUARANTEES
(Page 1 of 2)

Description: Private bond insurance is purchased at the time of bond issuance, and represents a legal, noncancellable commitment by a third party (here a bond insurance company) to make timely payments of principal and interest in the event that the debt issuer cannot. Bond insurance is usually paid at the time of issue as a percentage of the bond amount, and may be used for any bond including general obligation and revenue bonds. The role of municipal bond insurance in the tax-exempt market is threefold: to reduce interest costs to issuers, to provide a high level security to investors, and to furnish improved secondary market liquidity and price support. Four major insurers are active in the insurance of new-issue municipal bonds: the Municipal Bond Investors Assurance Corporation (MBIA); the American Municipal Bond Assurance Corporation (AMBAC); the Financial Guaranty Insurance Company (FGIC); and the Capital Guaranty Insurance Company. Bond insurance may also be used for private-activity bonds and by private companies and corporations.
Private or commercial loan or mortgage guarantees, such as by banks or individuals, may also be used by any private company or individual receiving a loan. Insurance companies may also offer special insurance for hazardous waste projects to cover future liability suits or losses resulting from Superfund joint and several liability statutes, although indemnification is never complete.

Actual Use: The use of private bond insurance by State and local governments for municipal bonds issued to finance environmental facilities varies greatly. In general, the purchase of such insurance by SRFs has been rare, since SRF debt is well regarded by the market. A number of SRFs have AAA ratings on their pooled bonds, with New York, New Jersey and Minnesota receiving AAA from three bond rating companies. Most other bond-leveraged SRFs receive the next highest rating. States more often use bond insurance for private activity tax-exempt bonds, particularly for environmentally "risky" solid waste-type facilities. Bond insurance is one of the few ways qualified exempt private activity bonds have of lowering their interest rate, since insurance expense does not count against the 2% issuance cost limitation and is treated as deductible interest expense by the federal tax code. In 1990, 25%, or $30.6 billion, of new municipal bond issues were insured. Commercial bond insurance also is available for municipal unit investment trusts, private portfolios, and bonds traded in the secondary market.

Potential Use: Bond insurance can be purchased for debt, public or private, covering any environmental media. In general, it may be especially valuable for solid and hazardous waste financings, including recycling and resource recovery facilities, and brownfields redevelopment, which may appear more environmentally risky than water and wastewater systems. In such cases, special insurance funds may help provide protection against future liability suits. Small public and private water systems could use bond insurance more widely to gain investment grade ratings.

COMMERCIAL INSURANCE AND GUARANTEES
(Page 2 of 2)

Advantages: In general, the use of commercial bond insurance will lower annual carrying costs, once premiums are paid, since they result in higher bond ratings which lead to lower annual interest rates. For example, in 1990, Standard and Poor's typically rated investment grade bonds insured by the above-mentioned four companies AAA, while Moody's rated bonds insured by all four as Aaa. Commercial bond insurance allows many small communities and companies to receive investment grade ratings and thus have access to the debt market which might otherwise be unavailable.

Limitations: While bond insurance provides significant additional security, investors should be aware that the issuers are still the first source to look to for payment of principal and interest on their bonds. For that reasons, and other technical and tax-related consideration, all insured bonds do not carry identical rates of return. Moreover, insurance costs will vary considerable with the strength of the borrower and size of the bond, as well as the perceived risk associated with the financing, and thus may not also result in cost-savings particularly for small issues. Of course, some bonds are not, or should not be, insurable at all.

Reference for Further Information: The Bond Market Association (BMA), *Fundamentals of Municipal Bonds*, Fourth Edition, New York, 1990; Council of Infrastructure Financing Authorities (CIFA), *State Revolving Funds Under Tax Reform*, Monograph No. 2, Washington, D.C., June 1989, and *Financing Alternatives for Small Water and Wastewater Utility Systems*, Monograph No. 3 by Michael Curley, Washington, D.C., January 1990.

ENVIRONMENTAL DUE DILIGENCE

Description: Environmental due diligence is an element of qualifying the collateral value of real property, and thereby qualifying credit risks. In addition, purchasers and lenders must document sufficient environmental due diligence to protect themselves from environmental cleanup liability. Without proper due diligence purchasers and lenders face strict liability for pre-acquisition contamination on property.

Although there are no specific standards for examinations in the Comprehensive Environmental Response Compensation and Liability Act (CERCLA), it is common for environmental due diligence to involve five potential levels of environmental assessment. The first level is an environmental screening inspection, which is a check-list inspection to determine the presence or absence of visible environmental concerns. The second level is an environmental risk screening, which evaluates the environmental risks associated with conditions on the property and adjacent parcels. The third level is a phase I environmental site assessment/audit. The fourth level is a phase II environmental site assessment/audit. The fifth and last level is a phase III environmental site assessment/audit.

Actual Use: Due diligence including at least a phase I environmental site audit is a requirement for virtually all commercial and industrial real estate transactions financed by institutional lenders. The American Society for Testing and Materials has published standards for environmental assessments (see Standard Practice for E1527-97, *Environmental Site Assessments: Phase I Environmental Site Assessment Process*; E1528-96, *Environmental Site Assessments: Transaction Screen Process;* PS37-95, *Conducting Environmental Baseline Surveys*).

Potential Use: Competent due diligence can free a property from suspicion of contamination, thereby qualifying it for third-party insurance coverage and use as loan collateral.

Advantages: Proper environmental due diligence may enable a party to undertake an innocent landowner defense under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA).

Limitations: The due diligence process itself can become relatively expensive and it may reveal conditions which require substantial expenditures.

Reference for Further Information: American Society for Testing and Materials, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959, Telephone: 610-832-9585, Fax: 610-832-9555, Internet: www.astm.org/.

FINANCIAL DUE DILIGENCE

Description: Due diligence is a series of tests which must be passed for a financing deal to qualify for investment. In the venture capital arena there typically are five types of risk appraised pertaining to product development, manufacturing, marketing, management, and growth. To investors, the acceptable risks are marketing and management. Therefore, venture capital tends to flow to companies that demonstrate a completely operative product or service.

Due diligence begins with sending a business plan to the potential investor, who applies preset criteria to screen out unacceptable deals. As part of this process, investors should investigate the assumptions supporting a plan's projections. If the plan passes muster, further investigation and appraisal is done. The size of the identified market, proprietary nature of the product, and background of management are factors which may be looked at more carefully at this stage. The scope and rigor of due diligence grow if federal securities laws apply. Financial audits, legal due diligence, personal investigations, and business valuation appraisals can be parts of the process. In an initial public offering, at least one due diligence meeting must be run by the underwriter to allow brokers to question the issuer's representatives. Further meetings may be held for analysts and institutional investors to question the issuer's top managers. They also should examine the reputations of potential investors.

Actual Use: Financial due diligence is commonly used by institutional investors and lenders considering commitment of significant funds to a venture. For example, a subcommittee of the Board of Directors of the Alternative Agricultural Research and Commercialization Corporation conducts due diligence visits prior to final consideration of an investment proposal (see **Section 10.A., Agriculture: Alternative Research and Commercialization Corporation**).

Potential Use: While financial due diligence is essential to protect lenders and investors, it also can bolster confidence in and otherwise assist companies that are examined. Firms seeking financing for producing or marketing environmentally friendly goods must anticipate a due diligence investigation.

Advantages: Due diligence may identify weaknesses that can be corrected, thereby making a loan or investment financially feasible. Careful due diligence can protect brokers against successful lawsuits by investors if the investment goes bad.

Limitations: Due diligence is not a guarantee of a successful investment. It may be difficult to uncover some important factors and impossible to offset market uncertainties.

Reference for Further Information: Lawrence, Gary M., *Due Diligence in Business Transactions*, Law Journal Seminars-Press, 1994; *Due Diligence for the Financial Professional*, Agiato & Nesbit (Eds.), Everest Publishing, 7534 East 2nd Street, Suite 102, Scottsdale, AZ 85251, Telephone: 602-994-5024, Fax: 602-941-5561.

GRANT-BACKED CREDIT ENHANCEMENTS

Description: Grant-backed credit enhancements (GBCEs) are guarantees that assure lenders and bondholders that a percentage of anticipated grant funds will be used to fund bond reserve funds. As a result of GBCEs, investors can achieve higher bond ratings. GBCES may use authorized trust funds, formula and block grants administered by the Federal Highway Administration (FHA), the Department of Housing and Urban Development, the Department of Commerce, and other Federal agencies. GBCES are different from grant-anticipation notes (GANs) used for short-term, or bridge construction financing

Actual Use: Grant-backed credit enhancements have not been widely used, although they have been proposed to build highway projects using State-issued debt back by GBCES from the State's share of FHA funding. Since the EPA's wastewater construction grant program has been replaced by the State Revolving Loan Fund (SRF) program, this credit enhancement technique is less applicable.

Potential Use: There are several ways in which GBCEs could be used in the future. Bond-leveraged SRFs could use a pledge of future federal wastewater and drinking water capitalization grants to build up or over fund, or overcome temporary shortages in, debt reserve funds, which might improve bond ratings and allow for great interest rate subsidy. Second, when grants as opposed to loans are available to communities, for example, new SRF drinking water grants for small communities, they could use GBCEs to back the local debt issued. Third, the concept in theory could be extended to loans, i.e., communities could use a Loan-Backed Credit Enhancement based on anticipated SRF loans. This could not be used by States for federal loans, however, since the implicit double guarantee might affect the tax status of subsequent bonds.

Advantages: Grant-backed credit enhancements might reduce the cost of borrowing by communities, and allow projects to move forward in a timely manner. They require no initial investment by the communities.

Limitations: Since grant as opposed to loan funds for environmental facilities are less prevalent, and SRF loans have been available on a timely basis, there may be a declining need for this kind of credit enhancement for EPA-related programs. In addition, grant funds and policies may fluctuate from year to year, which increases uncertainty on the part of all parties.

Reference for Further Information: U.S. EPA Publication: *Alternative Financing Mechanisms for Environmental Programs*, August 1992. U.S. EPA, Office of the Comptroller, Environmental Finance Program, 401 M Street, SW, Washington, DC 20460. Mail Code: 2731R, Fax: 202-565-2587. Contact: George Ames at **ames.george@epa.gov**.

DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT COMMUNITY DEVELOPMENT BLOCK GRANTS -- SECTION 108 LOAN GUARANTEES

Description: Section 108 is the loan guarantee part of the Community Development Block Grant (CDGB) program. Section 108 helps communities to secure affordable financing for economic development, housing rehabilitation, public facilities, and large physical development projects. CDGB rules and requirements govern eligibility with qualified applicants being those eligible under the CDGB Entitlement Grants, State Grants, and Small Cities programs (see appropriate pages in **Section 2.C.: Grants**). Projects must benefit low- and moderate-income persons, or help eliminate or prevent slums and blight, and meet urgent community needs.
The maximum repayment time for Section 108 loans is twenty years. HUD helps to structure principal amortizations to match the needs of projects and borrowers. Section 108 obligations are financed by underwritten public offerings with interest rates pegged to Treasury obligations of similar maturity plus a small additional fee. The actual loans are secured by the community's current and future CDBG grants and project collateral.

Actual Use: The 108 program has operated since 1974 making more than 930 commitments for economic development and housing purposes totaling in excess of $4.4 billion. In October 1996, HUD approved a $50 million Section 108 loan guarantee to the City of Chicago supporting the Chicago Brownfields Redevelopment Program (funds to be spent over three years).

Potential Use: This program could help finance considerably more brownfields redevelopment projects and public environmental facilities involving drinking water, wastewater, solid waste.

Advantages: A CDGB Section 108 loan guarantee allows public entity applicants to obtain the best possible financing terms. In general, applicants can request up to five times their latest approved CDBG amount minus outstanding Section 108 commitments and/or principal balances.

Limitations: While Section 108 loan guarantees may help access money at good interest rates, they provide no actual funds to the community. Furthermore, the use of 108 loan authority requires that an applicant pledge its current or future CDGB funds as security for the loan, as well as another form of security such as the assets finance by the loan.

Reference for Further Information: U.S. Department of Housing and Urban Development, 451 7th Street, SW, Washington, DC 20410. Telephone: 202-708-1112. Additional information on the 108 program can be accessed at HUD's World Wide Web site at **http://www.hud.gov.**

LETTERS OF CREDIT/ LINES OF CREDIT

Description: Commercial letters of credit (LOCs), usually issued by commercial banks, are security documents that enhance the basic security behind a bond. With "direct pay" LOCs, the bondholder can request the bank to make payment directly rather than via the issuer. Letters of credit specify that funds will be used only for bond or loan repayment. In contrast, lines of credit, also available from commercial banks, assure potential lenders that borrowers will have access to cash if necessary, although lenders have no guarantee that borrowers will not use this line of credit for other purposes In this case, borrowers may be either public or private sector institutions or individuals.

Actual Use: The use of letters and lines of credit is widespread and commonly accepted, particularly for the private sector, which helps to assure all lenders of the security of the bond/ loan. The federal government also uses the letter of credit mechanism as a way for States to periodically draw down on already appropriated federal grants (it was used initially for CWSRF capitalization grants). In this case, the LOC mechanism served federal budget deficit control goals (i.e., outlay controls) and allowed SRFs to make loan commitments without having the cash in hand.

Potential Use: Communities or companies ineligible for other types of credit enhancements may be able to use commercial letters and lines of credit. These tools may be particularly important for privatizing solid waste facilities and brownfields redevelopment. Bank letters of credit may be used in many States to assure DWSRFs that loans to smaller borrowers, with weak credit, will be repaid.

Advantages: Arranging for commercial credit enhancement may be much faster than federal or State mechanisms. Letters and lines of credit reduce borrowing costs and, sometimes at minimal expense, permit access to the debt market for projects considered somewhat risky either from the financial or environmental standpoint. Letters and lines of credit may be used to reduce debt service reserve requirements, or bond "coverage". Coverage, a term usually used in connection with revenue bonds, represents the margin of safety for payment of debt service, as reflected by the number of times (e.g., "120 percent coverage") by which annual revenues exceed annual debt service.

Limitations: Unlike commercial bond insurance which typically is readily available at a predictable (although variable) cost, State and local governments as well as the private sector may have difficulty finding commercial letters and lines of credit at reasonable rates, since it depends on the financial condition of commercial lenders, their willingness to assume risk, their client relationship with the borrower, and many economic factors. Individual lines of credit are negotiated by borrowers and lenders on a case-by-case basis, and the fees charged by the lender may vary considerably. This reduces equity of access as well as the revenue cost/saving ratio.

Reference for Further Information: The Bond Market Association (BMA), *Fundamentals of Municipal Bonds*, Fourth Edition, New York, 1990.

PERFORMANCE BONDS

Description: Performance bonds are issued by commercial institutions on behalf of contractors, such as construction companies, to protect project owners from the consequences the contractors' failure to complete contracts in accord with plans and specifications. These bonds indicate that a financially responsible party, such as a commercial bank or insurance company and termed the "surety" in this case, stands behind the contractor. By furnishing these bonds (often required by the owners of the land to be developed or facility to be built), contractors may obtain credit (i.e., construction loans), at lower rates. These bonds limit surety liabilities to set amounts specified in bond agreements and contracts, and does not cover third parties. "Payment bonds" may accompany performance bonds and cover payment of contractor obligations to third parties, for example, for labor and materials.
Actual Use: Use of performance bonds by the private sector is a widely used and commonly excepted practice. The public sector might furnish a performance bond only if it were actually undertaking construction of an environmental facility itself. More typically, local government is the entity, or owner of a facility to be constructed, requesting the use of performance bonds by the private sector. On occasion, States, including SRFs, have undertaken construction on behalf of State agencies and employed this mechanism as a means of assuring the performance of contractors.

Potential Use: Performance bonds might be particularly helpful in the case of especially environmentally risky or complex projects, such as hazardous waste and brownfields projects.

Advantages: While performance bonds have value as a credit enhancement device for borrowers, they may have even more value in enabling all parties to feel comfortable with a project and helping projects which might otherwise be viewed as to risky or complex to move forward on a timely basis. Also, they help ensure equity of access to the construction market for a wider range of contractors, especially for small businesses, which in itself might assist in lowering contract costs. Performance bond agreements are quite straightforward and simple to arrange, although the cost and exact terms of the bonds vary depending upon whether the contract is public or private, the number of sureties involved, or contractor's status, e.g., whether the contractor is a prime contractor or a subcontractor.

Limitations: A performance bond does not provide absolute assurance that contract work will be completed as specified for the contract price, but it does permit the surety, upon contractor default, to either pay the bond penalty, or finance or hire a new contractor. Validity of the bonds can be impaired by the project owner's actions, such as when an owner fundamentally alters the scope of contract performance or violates contract terms. Historically, "completion bonds" were used to guarantee the performance of owners and contractors but recently this has been viewed as too risky.
Reference for Further Information: The American Institute of Architects, *Performance and Payment Bonds*, Document A312, Washington, D.C., March 1989.

SENIOR AND SUBORDINATE DEBT STRUCTURING

Description: Senior and subordinate debt structuring provides for two categories of lenders, or loans, for a individual project. Those considered "senior" are those that would be repaid first should default or payment delays occur. Those considered "subordinate" are those that would repaid only after the senior debt, or lenders, are paid. Thus, senior debt typically carries lower interest rates of return, because it is "safer", than subordinate debt. In this sense, this kind of debt structuring is a credit enhancement for the senior debt or lender.

Debt structuring can be important to State Revolving Fund (SRF) bond leveraged lending, particularly in loans to large entities issuing their own debt as a pledge of repayment. For example, senior and subordinate debt structuring has been pursued in New York and Massachusetts, where the SRFs issued large revenue bonds for the benefit of a single user, i.e., the New York City Municipal Water Finance Authority and the Massachusetts Water Resources Authority. In Massachusetts, payment by the Authority to the SRF was subordinate to the Authority's obligation to meet debt service on its own bonds. In New York, the SRF loan repayment was a parity obligation to the city's outstanding revenue bonds for several years. In 1994, a senior/subordinate debt arrangement was developed whereby the local debt was subordinate to the debt to the SRF, which resulted in the New York City Water Resources Authority being able to lower its debt reserve requirements and realize the SRF's interest rate subsidy immediately.

Actual Use: The private sector uses senior/subordinate debt structures frequently. The public sector has used this structure for SRF bond leveraged financing on rare occasions..

Potential Use: Public sector use of senior/subordinate debt structuring could be expanded. However, similar to other market tools such as the use of derivative products, structuring is complicated and should be evaluated carefully.

Advantages: The advantages of this kind of debt structuring for the private sector are that it allows a greater number of investors in an individual project, with the credit enhancement pertaining to the senior investors or lenders. For the public sector, particularly SRF bond leveraged debt structuring, cost savings can be significant and accrue to both the and local parties.

Limitations: Bond leveraged transactions involving senior and subordinate debt are complicated, and require drafting of bond resolution and indenture documents which permit debt restructuring.

Reference for Further Information: Merrill Lynch and Co., *Guide to State Revolving Fund Revenue Bonds*, Municipal Credit Research, Christopher Mauro, New York, 1995.

STATE BOND BANKS

Description: State bond banks are public authorities created to help communities, especially smaller ones without financial expertise or credit history, to access the lower loan rates and other efficiencies of the tax-exempt bond market. By pooling smaller issues and giving State credit backing, they cut the cost of borrowing to communities, with significant savings in debt service over the term of borrowing. State credit enhancement may be provided via moral obligation pledges, which guarantee either the local bonds purchased by the bond bank or bonds issued by the bank, or other guarantees such as tax or State aid intercept devices. Bonds banks can be State-wide, or serve special localities.
Actual Use: State bond banks have been active in environmental financing over 25 years, beginning with the Vermont Municipal Bond Bank, and have been replicated in the majority of States with ap/plication to a range of public facilities including sewage and water systems, solid waste, schools and hospitals and other facilities. The State Revolving Funds (SRFs) are a specialized form of bond bank, and several States such as Kentucky, Maine, Michigan and Vermont have designated their previously created bonds banks as their SRF bond issuer.
Potential Use: Bond banks could be used to pool the debt of communities to construct any kind of environmental facility, not simply traditional water and sewer facilities. A private activity, tax-exempt bond pool also could be used for private debt, as was undertaken before the DWSRF in New York for several small, private water suppliers.
Advantages: Besides providing access to the tax-exempt credit market for smaller localities or companies, bond banks provide three main economic advantages to localities. First are economies of scale in bond issuance, resulting from the elimination of duplication of fixed issuance costs and negotiated underwriting, administrative cost savings pertaining to tasks such as arbitrage rebate accounting, and the use of specialized techniques to further reduce interest costs such as variable rates or zero coupon bonds. Second, a pool of credit is generally perceived as more credit worthy than an individual credit because default risk is diversified. And third, a wide issuer typically improves credit quality via enhancement devices such as moral obligation pledges and revenue intercept mechanisms.
Limitations: A great deal of work must be undertaken by State program managers to bring and retain in a bond pool small communities that may have limited management and technical capacity. If one borrower drops out, the success of the pool may be put in jeopardy, since relative to the size of the bond pools issuance and administrative costs already are quite high. Standard and Poor's has been somewhat rigid in providing improved credit ratings based on a diversified pool of borrowers. SRF-related bond pools are limited to a 20-year loan duration limit
Reference for Further Information: Council of Infrastructure Financing Authorities (CIFA), *State Municipal Bond Banks,* CIFA Monograph No. 5 by Daniel Irvin, Paine Webber, New York, NY, March 1993.

STATE GUARANTEES AND INSURANCE

Description: Specific forms of State credit assistance to localities and private borrowers include the State loan guarantee provisions federally authorized for CW and DW SRFs, special State bond insurance programs, and dedicated State revenue guarantees as collateral for debt repayment. State revenue guarantees can take the form of special appropriations to replenish reserve funds, dedicated sources of taxes or other revenue, and State aid intercepts. More general guarantees might include State general or moral obligation pledges for State bonds.

Actual Use: In general, States have not been particularly active in offering specific guarantees and insurance to localities. To date, no State has used the CWSRF loan guarantee provision, primarily because loan funds have been available and credit issues have not been a consideration. There have been few payment delays on CWSRF loans nationwide. Several States, including Maryland and Maine, have special bond insurance programs, but rarely have used them. Some States have loan or bond guarantee programs arising from non-environmental agencies, such as economic development agencies, but use has been limited. Three States, Maine, Minnesota (although not at present) and Wisconsin, have provided moral obligation pledges on SRF bonds as additional bondholder security, and five States including Massachusetts, Michigan, Maryland, New York and Wisconsin have a State aid intercept mechanism although this has not been used for SRF bonds.

Potential Use: The use of State credit assistance potentially may be much greater in the future particularly as SRFs expand into private drinking water financing, and hazardous waste and brownfields. A number of SRFs have indicated that they may use DWSRF loan guarantee provisions more readily for private sector borrowers since this removes the SRF from having to closely scrutinize private client credit conditions, or be involved in enforcement or foreclosure proceedings should defaults occur. DWSRF loan guarantees would be made to commercial banks, which would actually make the loans. States could use pledges of environmental fees, and taxes, as collateral for loans or loan guarantees.

Advantages: State loan or bond guarantees cost communities little to nothing, and thus are one of the cheapest avenues to follow. Additional State guarantees can considerably reduce the costs of borrowing for loan or bond pool recipients, and are the most leveraged of all financing techniques.

Limitations: The debt market may not recognize any form of credit assistance if the underlying recipient or project is weak, and found unacceptable from an affordability or technological standpoint.

Reference for Further Information: U.S. EPA Environmental Financial Advisory Board (EFAB) report, *Funding Privately-Owned Water Providers Through the SDWA SRF*, July, 1998; Council of Infrastructure Financing Authorities (CIFA), *State Municipal Bond Banks*, Monograph No. 5, by Daniel Irvin, Paine Webber, Washington, D.C., March 1993.

STATE REVOLVING FUND (SRF)
BOND LEVERAGING
(Page 1 of 2)

Description: Leveraging, in the State Revolving Fund (SRF) context, means that States have the discretion to use the federal capitalization grants for wastewater and drinking water, as well as their required 20% matching share and other assets such a principal and interest repayments, as "collateral" to borrow in the tax-exempt municipal bond market for purposes of increasing the pool of available funds for project lending and for interest rate subsidization. The leveraging option allows States to use such funds as a security for the payment of principal and interest on their revenue bonds. SRFs may issue individual revenue bonds for large borrowers or pooled bonds for groups of borrowers. Bond pools with a diversity of participants improve bond ratings for the "weaker" borrowers. A few SRFs are issuing common bond pooled debt for both clean water and drinking water projects. SRF bond leveraged loans are contrasted with SRF direct loans to localities, although many bond leveraged SRFs also make direct loans, especially to smaller communities.

Actual Use: By the end of 1997, 25 States had used their Clean Water SRFs (CWSRFs) to leverage a total of $8.8 billion in additional dollars loaned since the initiation of the SRF program. These additional dollars represent 36% of total funds in the lending pool.

There are two basic forms of SRF bond leveraging, with many variations: the "blended rate loan leveraging" or "cash flow" approach and the "reserve fund leveraging" structure. The first is the most simple and direct, using the proceeds from original SRF direct loans, funded by federal capitalization grants and the State match, to help create a debt service reserve fund for simultaneous or subsequent SRF revenue bond sales which finance additional loans. Here, SRFs can make below market rate loans to localities from blend of both the SRF funds and bond proceeds in the debt service reserve fund. The blended rate loan leveraging approach has been adopted by CWSRFs in Arkansas, Maryland, Maine, North Dakota, Oklahoma, Ohio, Texas, South Dakota and other States.

The second approach, the reserve fund leveraging structure, has generated the most sizeable and high-profile SRF municipal bonds issues to date. Here, federal capitalization grants and the State match are deposited into a reserve fund, typically oversized, to serve as security for SRF revenue bonds. The debt reserve fund serves as the source of interest rate subsidies for localities, with the amount of subsidy depending on the size of the reserve fund. CWSRFs using this approach include Alabama, Arizona, Colorado, Connecticut, Massachusetts, Michigan, Minnesota, Missouri, New York and Rhode Island. New York has pursued the most aggressive leveraging -- 2 to 3 times federal capitalization grants -- by creating "extraordinary" reserve funds resulting in interest rate subsidies from 33-50%. Other States have "overmatched" federal funds with their own funds.

STATE REVOLVING FUND (SRF)
BOND LEVERAGING
(Page 2 of 2)

Potential Use: Many Drinking Water SRFs (DWSRFs) are expected to bond leverage. DWSRF bond leveraging and common DW/CW bond pools, discussed later, will allow even greater dollar leveraging. The SRF leveraging approach is being adopted in some States for highway financing, as authorized under the 1990 ISTEA legislation for the Federal Highway Trust Fund, and can be used for solid waste funding. Localities and sub-State districts also could create leveraged revolving loan funds, which may be SRF-subsidized.

Advantages: The credit enhancement advantages of the SRF bond leveraging approach are twofold. First, localities can take advantage of the interest rate subsidy offered by the SRF. Second, SRF pooled revenue bonds loans typically are rated in the highest two categories because of the strong characteristics of the SRF program, low default incidence, and strong collateral. Not only is a large number of pool participants (e.g., over 20) considered advantageous by the rating agencies and may lower collateral requirements, but a diversification of size, low concentration (i.e., since borrowers not responsible for more than 10% of the portfolio) and even credit ratings can provide advantageous to both the borrowers and lenders. By providing large amounts of additional capital in the short term, bond leveraged wastewater SRFs have been able to expand their loan portfolios into eligible non-point source related funding such as agricultural and urban runoff control, sludge management, septic system rehabilitation, estuary protection, and landfill projects, and save local interest cost payment through refinancing and advance refunding.

Limitations: Successful SRF bond leveraging relies on a number of factors, including the immediate demand for SRF loans by localities. Bond leveraging is much more complicated than a direct loan approach, and involves sophisticated, expensive and time-consuming activities, requiring expert account management, legal, tax, and underwriting skills, and market acumen. It also triggers arbitrage rebate requirements and advanced refunding demands. Thus, it may not be suitable for all SRFs. Some cities with high general obligation bonds ratings and the need to offer bonds for longer than 20 years, e.g., for water and sewer pipes, may prefer to finance facilities on their own.

Reference for Further Information: Council of Infrastructure Financing Authorities (CIFA), *Leveraged SRF Programs: A Comparative Review*, Monograph No. 6 by Paul Ladd, Kidder Peabody, Washington, D.C., August 1994; CIFA and U.S. EPA Environmental Financial Advisory Board (EFAB), *State Revolving Fund: A Decade of Successful SRF Performance, 1987-1997*, January, 1998, Washington, D.C.; Merrill Lynch & Co., *Guide to State Revolving Fund Revenue Bonds*, New York, NY, 1995; U.S. EPA Office of Water Fact Sheet, *The Clean Water State Revolving Fund*, Publication 832-F-96-003 (call National Service Center for Environmental Publications at 513-489-8190 or 1-800-490-9198, or access on the World Wide Web at **http://www.epa.gov/ncepihom/**.

SRF COMMON BOND POOLS AND CROSS-COLLATERALIZATION

Description: With the advent of the Drinking Water SRF (DWSRF), bond-leveraged SRFs may issue common pooled debt (i.e., bond pools combining recipients of both drinking water and clean water loans) to increase the size and pace of bond issuance, reduce costs, maximize management options, and increase the size and diversity of bond pools to improve bond ratings. Common SRF bond pools are jointly managed, but money is accounted for separately.
Cross-collaterization, as authorized by the DRSFW legislation, is one approach to common pools, and refers to devices by which security is provided to common pool holders in the unlikely event of inadequate debt reserve funds to cover either DW or CW loan defaults. It does not mean debt reserve fund dollars or loan repayments will be transferred from the DWSRF to the CWSRF or, vice versa.
Actual Use: Since 1997, at least one State, New York, has issued several common bond pools under a Master Indenture, and cross-collateralized using a common debt reserve fund, by assuring that underlying CW and DW loans are proportional to the bonds issued and creating a mechanism whereby deficiency in DW funds (subsequent to a hypothetical DW loan default) can be made up in the form of a new bond issue from CW SRF monies or vice-versa. At least two States, Colorado and Arizona, have issued common DW/CW bond pools but not cross-collateralized the debt reserve funds.
Potential Use: As States clarify their own legislation to permit cross-collateralization, common bond pools may become a more prevalent SRF practice , particularly in States where the DWSRF and CWSRF are co-located. Since cross-collateralization has been controversial and subject to varying interpretations by USEPA, it will take time for States to feel comfortable with this approach.
Advantages: Common bond pools can reduce SRF bond issuance, management and administration costs, and increase the size and pace of loans. Joint pools and debt reserve funds also increase the diversity and size of SRF bond pools, and reduce the percentage of the portfolio of any one borrower, all of which are key determinants the private rating agencies use in rating or "grading" bonds. The new DWSRF also can benefit from the experience gained by the CWSRF over the past ten years.
Limitations: Common bond pools may prove difficult if the DW and CW SRFs are not located in the same State authority. Some States have no authority for either joint bond pools or cross-collateralization. DW and CW monies must be separately accounted for (complex), and must meet USEPA technical definitions of proportionality and cross-collateralization, which have been subject to varying interpretation. SRFs should check with their USEPA regional office before proceeding. Finally, including private drinking water loan recipients in a bond pool raises complex tax issues.
Reference for Further Information: U.S. EPA's Environmental Financial Advisory Board (EFAB) and Office of Water have a number of documents on cross-collateralization, which can be accessed on U.S. EPA's Web site at **http://www.epa.gov/efinpage/efabcoll.htm**

SRF INTEREST RATE SUBSIDIES

Description: The most direct form of credit enhancement is an interest rate subsidy of loans to public and private entities, such as provided under the State Revolving Fund (SRF) loan programs for wastewater and for drinking water facilities. Under federal statutes, SRFs are authorized to make loans at or below market rates of interest. All States have chosen to subsidize CWSRF interest rates, providing zero interest loans in some cases. Interest rate subsidies are a credit enhancement for localities increasing the likelihood that they will receive loans in the first place. They can be seen as a credit enhancement for bond leveraged SRFs since this increases the likelihood of bond repayment.
Actual Use: In 1997, the weighted average of SRF interest rates was 2.90%, ranging from zero interest rates in Utah and Vermont to 4.60% in Texas. Most SRFs offer rates between 2-4%, while the 20-year revenue bond average was 5.78%. Some States offer a fixed, or relatively fixed, rate, while others use a methodology independent of market conditions. Still others base the percent of subsidy on the reality of market conditions, and SRF loan demand. Interest rate subsidies are fixed by several State legislatures including in New York and Indiana. California allows local government to provide the State match portion of their project in return for a zero interest loan. Massachusetts has legislation pending to convert all SRF loans to 50% grant equivalency, with the net effect of reducing loans to a 0% net interest rate. 22 SRFs make a distinction in their programs for loans to small, disadvantaged communities and have developed interest rate criteria, i.e., using medium household income and local debt factors. States also subsidize interest rates for planning, design, and initial construction. New York offers interest-free short-term loans to communities of any size.
Potential Use: Drinking Water State Revolving Funds (DWSRFs) probably will offer similar interest rate subsidies to communities, and the private sector, although the possibility of grants (i.e., principal subsidies) to smaller communities may reduce the demand for zero interest loans somewhat.
Advantages: Interest rate subsidies reduce the costs of environmental infrastructure for communities and the private sector. They make it possible for communities to access affordable credit for which they might otherwise not qualify. DWSRF loans to private sector firms avoid some tax issues.
Limitations: Very low to zero interest rates will not permit SRFs to operate into perpetuity without fund replenishment from other State assets or the federal government. Hence, interest rate subsidies must be evaluated frequently by the SRFs. Interest rate subsidies do not always make the SRF competitive with local tax-exempt bond financing, since SRFs are limited to 20-year loan terms for wastewater and cities may have GO bond ratings stronger than SRF revenue bonds.
Reference for Further Information: Council of Infrastructure Financing Authorities (CIFA) and U.S. EPA Environmental Financial Advisory Board (EFAB), *State Revolving Fund: A Decade of Successful SRF Performance, 1987-1997, Washington, D.C., January, 1998.*

OTHER

Description:

Actual Use:

Potential Use:

Advantages:

Limitations:

Reference for Further Information:

COMPARISON MATRIX FOR CREDIT ENHANCEMENT MECHANISMS

Criteria/ Credit Enhancement	Actual Use	Revenue Size	Revenue Cost/ Saving	Administrative Ease	Equity	Environmental Impact
Association Pooling	N. A.	N. A.	Mod.	Mod.	High	Mod.
Commerce: SBA Surety Bond Program	Low	Low	High	Mod.	High	Mod.
*Commercial Insurance & Guarantees	High	High	Mod.	High	High	High
*Environmental Due Diligence	High	Mod.	Low-Mod.	Low	Mod.	High
*Financial Due Diligence	High	High	Mod.	Mod.	Mod.	High
Grant-Backed Credit Enhancements	Low	Low	Mod.	Mod.	Mod.	Low
HUD: CDBG - Section 108 Loan Guarantees	Low	Low	Mod.	Low	Mod.	Mod.
*Letters/Lines of Credit	High	High	Mod.	Mod.	Mod.	High
*Performance Bonds	High	High	Mod.	High	High	High
*Senior/Subordinate Debt Structuring	High	High	Mod.	Mod.	Mod.	High

COMPARISON MATRIX continued

Criteria/ Credit Enhancement	Actual Use	Revenue Size	Revenue Cost/ Saving	Administrative Ease	Equity	Environmental Impact
***State Bond Banks**	High	Low	Mod.	Mod.	High	High
***State Guarantees & Insurance**	Low	Mod.	High	Mod.	High	High
***SRF Bond Leveraging**	High	High	High	Mod.	High	High
***SRF Common Bond Pools & Cross-Collateralization**	Low	High	High	Low-Mod.	High	High
***SRF Interest Rate Subsidies**	High	High	High	High	High	High

High - Indicates high use (over 25 States, most localities and private sector); criterion scores well; leveraging potential is over $1 billion annually nationwide

Mod.- Indicates moderate use (10-25 States, many localities and private sector); criterion scores in medium range; moderate leveraging potential

Low - Indicates low or rare use by States, localities and the private sector; criterion scores very low; low leveraging potential

* Star indicates best rated mechanisms

4. TOOLS FOR BUILDING PUBLIC-PRIVATE PARTNERSHIPS

4. TOOLS FOR BUILDING PUBLIC-PRIVATE PARTNERSHIPS

INTRODUCTION

Community leaders across the nation face the prospect of building, upgrading or renovating facilities to meet important environmental needs. They are feeling the squeeze of growing environmental expectations and costs coupled with increasing constraints on funding for all types of infrastructure and services. As the pressure to hold rate increases down for facility users grows, local leaders must find new ways to hold down costs and build public support for necessary expenditures. Public-private partnerships offer local governments one possible solution to this growing challenge.

This section evaluates the use of public-private partnerships (P3s). The P3s discussed here are contractual relationships between a public authority (usually a local government) and a private company that commits both parties to providing an environmental or other service, and for which the private sector seeks a profit. They may involve a variety of activities ranging from designing a facility such as a wastewater treatment plant to its financing, construction, operations, maintenance, management, and/or ownership. While each partnership is unique, most fall into one of five general categories: contract services; turnkey; developer financing; privatization; and merchant facility. However, there are important sub-types of partnerships within each of these major categories.

Other types of P3s involving the voluntary and not-for-profit collaboration of many individuals and the nonprofit sector, especially involving areas such as parks and conservation, are not covered in this section. They are presented in sections throughout the guidebook, but perhaps most prominently in **Section 8. : Tools for Financing Community-Based Environmental Protection** and in **Section 9.: Tools for Financing Brownfields Redevelopment**.

In Part A of this section , a number of important types of contractual public-private partnerships are presented and evaluated. Each includes a look at some of their advantages and limitations. Depending on the individual arrangement, a public-private partnership may allow communities to capture some of the following important private sector efficiencies:

- private financing can reduce the burden on public debt capacity;
- private operation, maintenance, and manage can generate efficiency savings;
- private sector procurement and construction methods can provide significant savings;
- the private sector can provide technology and expertise otherwise unavailable to the public sector, or a higher level of quality of services;
- private sector operations can shorten implementation time; and
- private sector involvement can reduce public liabilities through risk-sharing.

In Part B, abstracts of recent case studies developed by USEPA's Environmental Financial Advisory Board are profiled. These case studies are cutting edge examples of how communities have implemented successful public-private partnerships and internal optimization models. The abstracts both supplement and complement the partnership arrangements presented in part A of this section. They provide concrete examples of how successful partnerships and other models can be implemented by communities to provide needed environmental services and result in a "win-win" situation for both public and private parties.

4.A. PUBLIC-PRIVATE PARTNERSHIP ARRANGEMENTS

4.A. PUBLIC-PRIVATE PARTNERSHIP ARRANGEMENTS

Description: A contractual public-private partnership (P3), commits the public sector (usually a local government) and a private sector company to providing a facility-based environmental service, which is undertaken by the private sector for business (profit-making) purposes. The private party can be involved in a variety of ways from designing the public-purpose facility to its financing, construction, operations, maintenance, management, and/or ownership. Although each public-private partnership is unique, most fall into one of five general categories: contract services; turnkey; developer financing; privatization; and merchant facility. There are different responsibilities and benefits associated with each type.

To encourage and facilitate private investment and involvement in local infrastructure, including federally grant funded facilities, Executive Order No. 12803 was issued on May 4, 1992 directing executive agencies to make needed policy and regulatory changes. The order is intended to:

- assist local privatization initiatives,
- remove federal regulatory impediments to private sector involvement,
- relax federal repayment requirements, thus increasing State and local governments' proceeds from privatization arrangements, and
- protect the public interest by ensuring that privatized assets continue to be used for original purposes and that user charges remain consistent with current federal conditions.

Advantages: Depending on the nature of the specific arrangement, a public-private partnership may be able to capitalize on a number of private sector resources. If private financing is used, the burden on public debt capacity can be reduced. If private operations, maintenance, and/or management is used, efficiency savings are generally realized. Private sector procurement and construction methods typically provide significant savings as well. Due to access to sophisticated technologies and specialized expertise, the private sector can sometimes provide services otherwise unavailable to the public sector, or services at a higher level of quality. Private ownership can transfer part or all of the responsibility for financial risk and environmental compliance from the public to the private company (risk-sharing). Finally, private sector operations can frequently have a shorter implementation time.

Limitations: A major concern of governments in public-private partnerships is loss of control. When the public party is not involved in day-to-day operations, it may believe it does not have the same control over quality, including compliance with environmental standards and permits. Public employees and unions may oppose the public-private partnership due to fears about the loss of jobs. Local governments may not always have the legal authority to enter into contracts with private

parties. Tax-exempt and/or other low-cost financing may not be available from federal or State governments for partnership arrangements, and in general, changes in the tax code directly impact private sector profit-making opportunities. At times, for example private landfills, the public and private sectors have been in direct competition, and disputes have occurred.

Summary: The impetus for local communities to undertake a contractual P3 arrangement for environmental services differs for each environmental media, depending on the history of public funding and facility ownership, the tax code, and other factors. Hitherto, most attention has focused on wastewater treatment facilities, compared to drinking water or solid waste, because wastewater has been dominated by federally-funded, and now State Revolving Fund-financed facilities, which by law provide monies only for publically owned systems. Since 98 percent of all wastewater infrastructure is currently publically owned, mechanisms to encourage private sector involvement have been an important topic. Examples of these mechanisms include tax code issues which affect private sector profits, lease arrangement that avoid some funding restrictions, the disposition and use of previously federally-funded (i.e., by construction grants) projects, and private operations and maintenance contracts. In contrast, well over fifty percent of all drinking water and solid waste systems/facilities are privately-owned. Thus, privatization in the drinking water and solid waste areas is a well-established and widely accepted commercial practice, and offers a somewhat different set of topics for discussion. For example, equal treatment for both the public and private sectors is an issue, as exemplified by the ability of the Drinking Water State Revolving Fund to fund both the public and private sectors. Meanwhile, limiting competition has been an important solid waste issue with regards to landfills.

LIST OF PUBLIC-PRIVATE PARTNERSHIP ARRANGEMENTS
(In Alphabetical Order)

1. Asset Sales (Under Executive Order 12803)
*2. Build/Operate/Transfer or Build/Transfer/Operate (New Facility Construction, Operation, and/or Ownership)
*3. Contract Services: Operations and Maintenance (Private Services Contract)
*4. Contract Services: Operations, Maintenance, and Management (Private Services Contract)
5. Developer Financing
6. Lease/Develop/Operate or Build/Develop/Operate (Existing Facility Lease and Renovation)
7. Lease/Purchase (New Facility Construction)
8. Long-Term Lease (Under Executive Order 12803)
9. Merchant Facility
*10. Privatization
11. Sale/Leaseback
12. Self-Regulation (Inspection and Monitoring)
13. Tax-Exempt Lease
*14. Turnkey (New Facility Construction)

* Stars indicate most highly rated mechanisms as described in the Comparison Matrix at the end of the narratives. See Introduction to the *Guidebook* for a description of the criteria used. Ratings of "High", "Moderate", and "Low" are for comparison purposes only, as some ratings are necessarily subjective and data are incomplete.

ASSET SALES
(Under Executive Order 12803)

Description: Executive Order 12803 directs all federal departments and agencies to support the privatization (sale or long-term lease from a State or local government to a private party) of infrastructure assets financed in whole or part by the federal government to the extent permitted by law and consistent with originally authorized purposes. The Executive Order also lays out the transfer price distribution and recoupment priorities needed to meet the disposition requirements of federal administrative grant requirements.

Actual Use: In July 1995, the Miami Conservancy District (MCD), a government flood control agency serving the municipalities and counties abutting the Miami River near Dayton, Ohio, sold its 4.5 MGD wastewater treatment facility to Wheelabrator Environmental Operational Services (see the EFAB case study on the District in **Section 4.B.**). This historic transaction, approved by USEPA represented the first sale of a grant-funded wastewater treatment facility to the private sector under Executive Order 12803.

Potential Use: Asset sales could be used by local governments and authorities to attract private sector investment. This new investment could be used to upgrade and/or expand previously grant-funded, public-purpose wastewater treatment facilities, equipment, and services. Private investment represents a largely untapped, badly needed source of financing to help communities maintain environmental compliance and meet new mandates.

Advantages: An asset sale allows the public sector to take advantage of possible construction and operational efficiencies (faster time frames and lower costs) of the private sector and to unlock the potentially significant economic value of the public sector's wastewater treatment assets. In addition, the partnership arrangement offers an opportunity for the public and private sectors to share the regulatory risks and responsibilities as well as important economic benefits.

Limitations: The "asset sale" privatization process can be complex, politically sensitive, and time-consuming from a legal stand-point. Regulatory agency concerns and inexperience with this type of transactional arrangement may contribute to these barriers. While asset sales have received a lot of attention, few have been concluded successfully. There is little assurance that the public revenues gained will be reinvested in the environment.

Reference for Further Information: USEPA, Office of Water, Office of Wastewater Management, 401 M Street, SW, Washington, DC 20460 (Mail Code: 4201). Phone: 202-260-5880: Fax: 202-260-1040. USEPA, Office of the Comptroller, Environmental Finance Program, 401 M Street, SW, Washington, DC 20460. Mail Code: 2731R.

BUILD/OPERATE/TRANSFER
OR
BUILD/TRANSFER/OPERATE
(New Facility Construction, Operation, and/or Ownership)

Description: Under the Build/Operate/Transfer (BOT) option, the private sector partner builds a facility to the specifications agreed to by the public agency (usually under a turnkey arrangement), operates the facility for a specified time period under a contract or franchise agreement with the agency, and then transfers the facility to the agency at the end of the specified period of time. In most cases, the private partner will also provide some, or all, of the financing for the facility, so the length of the contract or franchise must be sufficient to enable the private partner to realize a reasonable return on its investment through user charges. At the end of the franchise period, the public partner can assume operating responsibility for the facility, contract the operations to the original franchise holder, or award a new contract or franchise to a new private partner.

Actual Use: There have been quite a few BOT arrangements implemented for the provision of environmental services. For example, the City of Bristol, Connecticut, entered into a contractual arrangement with a private partner to design build, operate and own a resource recovery facility. In Lee County, Alabama, the county contracted with a private company to site, construct, operate and own a landfill in the county.

Potential Use: The Build/Operate/Transfer arrangement could be used in a substantial number of situations to build new wastewater and solid waste management facilities.

Advantages: BOT arrangements allow the public sector to capitalize on the construction efficiencies of the private sectors such as faster time frames and lower construction costs. Depending on the individual contractual arrangement, BOT may also allow the public partner to reap the benefits of private sector operating efficiencies. The arrangements may allow the private partner to enjoy the tax benefits of ownership and, in some cases, provide access to lower cost public financing.

Limitations: Like the case with turnkey arrangements, Build/Operate/Transfer arrangements must be individually negotiated. Many traditional low-bid governmental procurement policies often do not work very well.

Reference for Further Information: Apogee Research, Inc., Unpublished Paper: *Private Sector Involvement in Transit Maintenance: Sharing the Benefits and the Risks*, April, 1992.

CONTRACT SERVICES: OPERATIONS AND MAINTENANCE
(Private Services Contract)

Description: A public partner (federal, State, or local government, agency, or authority) contracts with a private partner to provide and/or maintain a specific public environmental service. Examples of the type of service provided include lab testing, auditing, the collection of fines and penalties, solid waste collection and disposal, and the operation and maintenance of water and wastewater treatment facilities and systems. Under the private operation and maintenance option, the public partner retains ownership and overall management of the public facility or system.

Actual Use: This contractual arrangement is used by nearly one thousand local governments for wastewater treatment and by many thousands for the transportation and disposal of solid waste. Local governments have also used contract services to provide recycling services, asbestos encapsulation or removal operations, and many other municipal services. State governments have contracted out various parts of their environmental programs. For example, the monitoring of wastewater discharges in Wisconsin has been contracted out to a private laboratory by the State of Wisconsin's Water Quality Program.

Potential Use: Contract services could be used to provide and/or maintain services involving water and air quality monitoring, hazardous waste facility management, drinking water facility operation, hazardous waste remediation, and many additional activities in these and other environmental media.
Advantages: Depending on the nature of the activity or service, private sector operators have achieved efficiency savings of 10-40 percent compared to public sector operation and maintenance. Under some contract operation or service agreements, the risk of operations is shared with the private partner or even transferred to them entirely.

Limitations: In some cases, the transfer of formerly public services and operations to private companies can cause labor difficulties among public employees. Some local governments and authorities fear that contracting out may result in the possible loss of control over important public services for which they are held responsible by constituents.

Reference for Further Information: USEPA, Office of the Comptroller, Environmental Finance Program publication, *Public Private Partnerships Case Studies: Profiles of Success in Providing Environmental Services*, September, 1990, contains case studies on contract operations in solid waste removal, wastewater treatment, and drinking water utilities. USEPA Environmental Finance Program, 401 M Street, SW, Washington, DC 20460. Mail Code: 2731R.

CONTRACT SERVICES: OPERATIONS, MAINTENANCE, AND MANAGEMENT (Private Services Contract)

Description: A public partner (federal, State, or local government, agency, or authority) contracts with a private partner to operate, maintain, and manage a facility or system providing a public environmental or other service. Under this contract option, the public partner retains ownership of the public facility or system, but the private party may invest its own capital in the facility or system. Any private investment is carefully calculated in relation to its contributions to operational efficiencies and savings over the term of the contract. Generally, the longer the contract term, the greater the opportunity for increased private investment because there is more time available in which to recoup any investment and earn a reasonable return.

Actual Use: Many local governments use this partnership to provide wastewater treatment services. The City of Indianapolis used it for two large advanced wastewater treatment facilities and saved $22.6 million dollars in two years (see the EFAB case study, on the City in **Section 4.B.**). Baltimore also has realized substantial savings. Local governments can use the arrangement for solid waste collection and disposal, recycling services, and other operations and services. States contract with private parties to operate, maintain, and manage highly specialized environmental activities such as the vehicle emissions testing programs needed to comply with the Clean Air Act.

Potential Use: This type of contract arrangement could also be more extensively used to provide services relating to water and air quality monitoring, solid and hazardous waste collection and disposal, drinking water facilities, and hazardous waste remediation. The 1997 Private Activity Regulation liberalized the treatment of tax-exempt funds used to finance public facilities under private management contracts, extending the contract term from five to 20 years.

Advantages: Depending on the nature of the activity or service, private sector operators have achieved efficiency savings of 10-30 percent compared to public sector operation and maintenance. The total projected savings for the Indianapolis project referenced above is $60 million over five years. Under many operations, maintenance, and management contracts, the risk of operations is shared with the private partner or transferred to them entirely.

Limitations: In some cases, the transfer of public services and operations to private companies can cause labor difficulties with public employees. Some local governments fear that contracting out may lead to loss of control over services for which they are held responsible by the public.

Reference for Further Information: USEPA Environmental Financial Advisory Board report, *Cost-Effective Environmental Management Case Studies*. USEPA, Office of the Comptroller, Environmental Finance Program, 401 M Street, SW, Washington, DC 20460. Mail Code: 2731R.

DEVELOPER FINANCING

Description: Under developer financing, the private party (usually a real estate developer) finances the construction or expansion of an environmental facility in exchange for the right to build residential housing, commercial stores, and/or industrial facilities. The private developer contributes capital and may operate the facility under the oversight of the local government. The developer gains the right to use the facility and may receive future income from user fees. While developers may in rare cases build a facility, more typically they are charged a fee or required to purchase capacity in an existing facility. This payment is used to expand or upgrade the facility. Developer financing arrangements are often called capacity credits, sewer access rights, impact fees, or exactions. Developer financing may be voluntary or involuntary depending on local circumstances.

Actual Use: Anecdotal reports suggest the number of developer financed municipal facilities is significant and growing. One survey found 190 cities with populations of over 15,000 had tapped developers to finance wastewater treatment plants and sewer lines. This occurred most often in areas with rapid growth such as California, Colorado, Florida, and Texas. Developer financing also occurs where growth is tightly regulated or restricted, and/or where the value of the development is great. Other developer financed facilities have included drinking water systems (distribution lines, wells, treatment plants, and storage tanks), landfills, and trucks/equipment for solid waste disposal.

Potential Use: Developer financing arrangements might also be used to help acquire the capital needed to finance solid waste disposal, storm water management, and recycling facilities, as well as the establishment and/or purchase of riparian buffer zones. Proffers (exactions) or impact fees also could be used to acquire capital.

Advantages: Current users of the environmental service do not have to provide the capital needed to upgrading or expand the facility. The private partner gets the right, which it otherwise would not have, to develop lucrative residential, commercial, and/or industrial property.

Limitations: Developer financing is almost always limited to certain locations such as in rapid growth areas. The developer receives no preferential tax treatment. Most developers do not like to pay or manage for these facilities and often resist, even to the point of engaging litigation with local governments. Serious environmental problems can result if developers neglect or abandon the facilities, which has occurred in some localities.

Reference for Further Information: USEPA Publication 20M-2005, *Public-Private Partnerships Case Studies: Profiles of Success in Providing Environmental Services*, September 1990. USEPA, Office of the Comptroller, Environmental Finance Program, 401 M Street, SW, Washington, DC 20460. Mail Code: 2731R.

LEASE/DEVELOP/OPERATE
OR
BUILD/DEVELOP/OPERATE
(Existing Facility Lease and Renovation)

Description: Under these partnership arrangements, the private party leases or buys a facility from a public agency, invests its own capital to renovate, modernize and/or expand the facility, and then operates it under a contract with the public agency.

Actual Use: A number of different types of municipal transit facilities have been leased and developed under various Lease/Develop/Operate (LDO) and Build/Develop/Operate (BDO) partnership arrangements.

Potential Use: LDO and BDO arrangements also could be used to acquire the private capital needed to finance upgrades to local environmental facilities, such as wastewater treatment plants or solid waste management facilities, to bring them into compliance with environmental regulations. By facilitating the lease of federally-grant funded wastewater treatment works, Executive Order 12803 on Privatization permits local governments to enter into LDO arrangements if and when they determine it beneficial and appropriate.

Advantages: Under LDO, the public agency may not have to provide the capital investment necessary for upgrading or expanding its environmental facilities. The public agency also may be able to take advantage of possible private sector construction and operational efficiencies. The private partner gets the right to operate the facility for a predetermined length of time and recover its investment through carefully crafted user charges.

Limitations: State and local governments may be concerned about negotiating and guaranteeing the correct operating contract with a particular vendor. In some States or areas, local governments and/or other authorities may lack the power to enter into lease arrangements. State regulatory or statutory action may be required for these governments/authorities to enable them to lease their environmental facilities.

Reference for Further Information: Apogee Research, Inc., Unpublished Paper: *Private Sector Involvement in Transit Maintenance: Sharing the Benefits and the Risks*, April, 1992. Contains a number of examples of LDO and BDO arrangements. USEPA, Office of the Comptroller, Environmental Finance Program, 401 M Street, SW, Washington, DC 20460. Mail Code: 2731R.

LEASE/PURCHASE
(New Facility Construction)

Description: A lease/purchase is an installment-purchase contract. Under this model, the private sector finances and builds a facility which it then leases to a public agency. The public agency makes scheduled lease payments to the private party. The public agency accrues equity in the facility with each payment. At the end of the lease term, the public agency owns the facility or purchases it at the cost of any remaining unpaid balance in the lease. Under this arrangement, the facility may be operated by either the public agency or the private developer during the term of the lease.

Actual Use: Lease/purchase arrangements have been widely used for years by the General Services Administration for building federal office buildings. Pennsylvania and a growing number of other States (Departments of Corrections) have used lease/purchase arrangements to build prisons and other correctional facilities.

Potential Use: Lease/purchase arrangements could be used to provide the financing mechanism for wastewater treatment, solid waste disposal, and water storage facilities, as well as a wide variety of other environmental and non-environmental uses.

Advantages: The basic reason for this transaction is to enable a public agency to obtain a new facility without the need for the additional capital investment or debt. The private sector puts up the investment and the public agency pays for it over a set period of time. Private sector design and construction efficiencies may result in lower costs than would be incurred by a public agency. The interest earned from the transaction may be tax-exempt.

Limitations: The cost of the private capital used to finance the project may be higher than the cost of public capital, and may or may not outweigh the benefit gained from private sector construction efficiencies. There is also a slight possibility that the public agency could default on the lease and not end owning the facility.

Reference for Further Information: USEPA State Capacity Task Force Draft Report, *Alternative Financing Mechanisms*, August 1992. USEPA, Office of the Comptroller, Environmental Finance Program, 401 M Street, SW, Washington, DC 20460. Mail Code: 2731R. See also *Municipal Tax-Exempt Lease Purchasing*, Richard Chambers, Touche Ross.

LONG-TERM LEASE
(Under Executive Order 12803)

Description: Executive Order 12803 directs all federal departments and agencies to support the privatization (sale or long-term lease from a State or local government to a private party) of infrastructure assets (including publicly-owned wastewater treatment works or POTWs) financed in whole or part by the federal government to the extent permitted by law and consistent with originally authorized purposes. The Order also lays out the transfer price distribution and recoupment priorities needed to meet the disposition requirements of federal administrative grant requirements.

Actual Use: No long-term leases have been implemented under the Executive Order to date. However, long-term leases have been successfully used for years in a wide range of public and private real estate and economic development situations.

Potential Use: Under the Executive Order, long-term leases could be used, where needed and appropriate, to attract increased private sector investment to previously grant-funded, publicly-owned, wastewater treatment facilities, equipment, and services. This new investment could be used to fund the rehabilitation, upgrade, and/or expansion of these important public assets needed to maintain environmental compliance and help meet future mandates.

Advantages: Long-term lease arrangements allow the public sector to capitalize on the operational and construction efficiencies enjoyed by the private sector and to unlock the potentially significant economic value of previously grant-funded public wastewater treatment assets. In addition, the public and private sectors can use this type of partnership arrangement to share regulatory risks and responsibilities, as well as economic benefits.

Limitations: The use of long-term leases to privatize wastewater treatment assets under the provisions of Executive Order 12803 remains untested at this time. Given this lack of experience, this privatization process may prove to be complex, politically sensitive, and time-consuming from federal, State, and local regulatory standpoints.

Reference for Further Information: USEPA, Office of Wastewater Management, 401 M Street, SW, Washington, DC 20460. Mail Code: 4201. Telephone Number: 202-260-5880. Fax Number: 202-260-1040. USEPA Environmental Financial Advisory Board Report, *Private Sector Participation in the Provision of Environmental Services: Barriers and Incentives,* November 25, 1991. USEPA, Office of the Comptroller, Environmental Finance Program, 401 M Street, SW, Washington, DC 20460. Mail Code: 2731R.

MERCHANT FACILITY

Description: In this type of partnership arrangement, the private sector party not only owns and operates the environmental facility, as in privatization deals (see the next tool in this section, **Privatization**), but it also makes the decision to provide the environmental service to the community in the first place. The concept is similar to that of fast food, clothing store, or automotive services franchises except that it involves the provision of an environmental service.

Actual Use: Merchant facilities have been generally associated with the provision of solid waste management services such as landfills, composting facilities, recycling plants, and resource recovery facilities (mass-burn incinerators). Examples of diverse communities having merchant facility solid waste composting plants include Milbury, Massachusetts (population 11,500), and Saint Cloud, Minnesota (population 181,570). Lee County, Alabama, (population 80,800), is an example of a community where efficient landfill service is provided through a merchant facility arrangement.

Potential Use: Given favorable economics and community support, merchant facilities could more frequently provide environmental services in any of the solid waste management areas listed above. In addition, if political hurdles can be overcome, merchant facilities arrangements might also be used to facilitate the rail transportation of solid waste from point of generation to point of disposal. This may become necessary as large cities begin to run out of local disposal sites and must transport their solid waste to sites farther away from their metropolitan regions.

Advantages: Through the use of merchant facility arrangements, the public sector enjoys access to private sector financing, superior technology, and considerable operating expertise. Merchant facilities can be built more quickly and at a lower costs, in large part, because they do not need to go through the public sector procurement process. This type of partnership arrangement shifts the regulatory responsibilities to the private sector. If they are efficiently built, maintained and marketed, merchant facilities can be very profitable for the private owner and operator.

Limitations: There may be local employee/union opposition to privately owned and run public-purpose facilities. The private investment required is large and facility use must be maximized. The private party can suffer financial difficulties if service demand falls or low-cost competition Thus, there are many situations in which the public and private sector have competed for solid waste delivery, giving rise to lawsuits and other complaints, such as in New York.

Reference for Further Information: USEPA Publication 20M-2005, *Public-Private Partnerships Case Studies: Profiles of Success in Providing Environmental Services*, September 1990. USEPA, Office of the Comptroller, Environmental Finance Program, 401 M Street, SW, Washington, DC 20460. Mail Code: 2731R.

PRIVATIZATION

Description: In privatization, the public sector (usually a local or State government) decides to provide an environmental service and looks to the private sector for help in meeting that need. The private sector contracts to design, build, own and operate the desired environmental facility. Generally, the private party partially or totally finances the project. They may, however, access tax-exempt financing available through the State for public-purpose projects (see also **Section 2.A., Private-Activity Bonds**, for a summary of eligibilities by environmental media).

Actual Use: Privatization is very common for solid waste management and drinking water systems, but is still rare for wastewater treatment. Frequently, the privatized facilities provide services to more than one government or community. A good example of privatization is a resource recovery facility (mass-burn incinerator) built in Bristol, Connecticut in the late 1980s. In this case, eight Connecticut communities entered into an agreement with a private party to make the facility possible. The State issued private activity tax-exempt bonds to finance the project and an expanded group of eleven communities contracted together to oversee facility operations and agreed to provide a minimum amount of waste to it each year. There are many rate-regulated privately owned water supply companies nationwide, some of which are very large and operate in multi-states. In two States, Connecticut and Missouri, the majority of population is served by private water companies

Potential Use: Further privatization deals are possible in the environmental areas named above in cases where groups of communities can agree to site and share a common facility. They are also possible in areas where high user fees already exist. Such deals could be used to finance other environmental technology approaches such as waste-to-energy-facilities and advanced treatment wastewater plants. The Drinking Water State Revolving Fund can provide low-cost loans to even regulated water companies.

Advantages: Privatization allows the private party to bring sophisticated technology to the solution of environmental management challenges. It also allows the public sector to share or transfer the risks of the technology and future environmental compliance responsibilities with the private sector.

Limitations: Public tax-exempt financing may not be available for all private, public-purpose environmental projects. The reduction in tax incentives resulting from the Tax Reform Act of 1986 greatly reduced private interest in this partnership option, particularly for wastewater. Frequently, privatized facilities must provide services to numerous governments to make economic sense.

Reference for Further Information: USEPA Publication 20M-2005, *Public-Private Partnerships Case Studies: Profiles of Success in Providing Environmental Services*, September 1990. USEPA, Office of the Comptroller, Environmental Finance Program, 401 M Street, SW, Washington, DC 20460. Mail Code: 2731R.

SALE/LEASEBACK

Description: A sale/leaseback is a financial arrangement in which the owner of a facility sells it to another entity, and subsequently leases it back from the new owner. Both public and private entities may enter into sale/leaseback arrangements for a variety of reasons. For example, a tax-exempt lease, is a particular type of sale/leaseback arrangement in which a public entity sells a facility to a private partner in order to finance construction or upgrades, and repays the private partner's investment with lease payments (see write-up on **Tax Exempt Lease** later in this section). Another innovative application of the sale/leaseback technique is the sale of a public facility to a public or private holding company for the purposes of limiting governmental liability under environmental statutes. Under this arrangement, the government that sold the facility leases it back and continues to operate it. Since ownership remains with the holding company, however, the government may not be held financially liable for potential violations of environmental regulations.

Actual Use: Sale/leaseback arrangements can be used by both State and local governments. Phoenix, Arizona is setting up a sale/leaseback arrangement to sell an environmental facility to a municipal holding company that has the power to issue tax-exempt bonds. The government will lease and operate the facility while the holding company will retain ownership and the risk of environmental liability associated with the facility.

Potential Use: Sale/leaseback arrangements could be used to limit potential governmental liability from operation of hazardous waste disposal facilities.

Advantages: Sale/leaseback arrangements can sometimes provide private sector financing for a facility (as with a tax-exempt lease), and may be able to limit a government's potential liability. If a sale/leaseback arrangement involves private ownership, the private partner gains the tax benefits of depreciation on the facility.

Limitations: Enacting sale/leaseback arrangements may be difficult under State or local law. In exchange for the protection from liability, the public partner may be concerned about losing control over the facility.

Reference for Further Information: Gelfand, M. David, *State and Local Government Debt Financing*, Volume 2, Callaghan & Company, Deerfield, Illinois, December, 1988. Contains general definition and description of sale/leaseback arrangements. For further information on sale/leaseback arrangement in Phoenix, contact George Britton, City Manager, (602) 256-3248.

SELF-REGULATION
(Inspection and Monitoring)

Description: Self-regulation is a form of environmental enforcement wherein private sector industry is responsible for inspecting and monitoring its own discharges and emissions with some reduced form of governmental oversight such as a State auditing program. The State auditing program may review all instances of self-regulation or may review a random sampling of these partnerships each year.

Actual Use: Some State governments have already contracted out various portions of their environmental programs and activities. For example, the Wisconsin water quality program has contracted out monitoring of wastewater discharges to a private laboratory. Ohio is in the process of contracting out a significant portion of its State voluntary cleanup program for brownfields properties. Ohio plans to maintain oversight of private party cleanup efforts through the operation of an audit program.

Potential Use: The self-regulation approach works best for industries that generate relatively low quality and quantity pollutant streams. It is also a feasible approach for those industries and/or private companies with minimal incentive to pollute or with good compliance histories.

Advantages: Self-regulation does not generate revenue per se, but does present significant cost savings to the governing enforcement agency through reduction in program implementation, oversight and inspection. It allows the enforcement agency to focus its efforts on other industry (ies) that presents a greater and more immediate environmental threat, or is more capable or likely to pollute the environment.

Limitations: Over time the polluting strength of a given industry may change, thereby presenting a greater risk in allowing self-regulation. The approach imposes costs upon the industry that is self-regulating. Industries that are not designated as self-regulating may protest the burdens they face from excessive governmental regulation. Audit programs using sampling techniques may not catch self-regulators who are violating their agreements (polluting).

Reference for Further Information: The State of Wisconsin's water quality program can be contacted for information on its wastewater discharges monitoring contract. The State of Ohio has information on its State voluntary cleanup program.

TAX-EXEMPT LEASE

Description: Under a tax-exempt lease arrangement, a public partner finances capital assets or facilities by borrowing funds from a private investor or financial institution. The private partner generally acquires title to the asset, but then transfers it to the public partner either at the end or the beginning of the lease term. The portion of the lease payment that is used to pay interest on the capital investment is tax-exempt under State and federal laws.

Actual Use: Tax-exempt leases have been used to finance a wide variety of capital assets, ranging from computers to telecommunication systems to municipal vehicles/fleets such as buses, police cars, fire trucks, and garbage trucks to professional sports arenas and stadiums.

Potential Use: Tax-exempt leases are another method of capital financing that could be applied to environmental facilities and equipment. Since the lease arrangements usually do not count against local statutory debt limitations, they may be a particularly valuable tool for communities whose debt capacity is nearly exhausted.

Advantages: The primary advantage to the local government is the fact that it can use the tax-exempt lease to access capital from the private sector without having to issue a bond or some other public debt instrument. In addition, the public partner can often use the tax-exempt lease to acquire private capital at discounted rates. The private partner, meanwhile, realizes the benefit of tax-exempt income from the interest portion of the lease payments.

Limitations: Since some lease arrangements are long-term, the public partner must have the authority to enter into long-term contracts. If they do not have this authority, State regulatory or statutory action may be necessary to grant it to them. This may prove to be a difficult and time-consuming process.

Reference for Further Information: USEPA State Capacity Task Force Draft Report, *Alternative Financing Mechanisms*, August 1992. USEPA , Office of the Comptroller, Environmental Finance Program, 401 M Street, SW, Washington, DC 20460. Mail Code: 2731R. *Municipal Tax-Exempt Lease Purchasing*, Richard Chambers, Touche Ross.

TURNKEY
(New Facility Construction)

Description: Under a turnkey arrangement, a public agency will contract with a private investor or vendor to design and build a complete facility in accordance with specified performance standards and criteria agreed to between the agency and the vendor. The private developer will commit to build the facility for a fixed price and will absorb the construction risk of meeting that price commitment. Generally, in a turnkey transaction, the private partners will use fast-track construction techniques (such as design-build) and will not be bound by traditional public sector procurement regulations. This combination often enables the private partner to complete the facility in significantly less time and for less cost than could be accomplished under traditional construction techniques. In a turnkey transaction, financing and ownership of the facility can rest with either the public or private partner. For example, the public agency might provide the financing, with the attendant costs and risks. Alternatively, the private party might provide the financing capital, generally in exchange for a long-term contract to operate the facility.

Actual Use: A large number of State and local governments have used turnkey agreements to build wastewater treatment plants and solid waste disposal facilities. For example, the City of Huntsville, Alabama, created a Solid Waste Disposal Authority that contracted with a private partner to design, construct, and operate a mass-burn incinerator owned by the authority. Furthermore, the steam generated by the facility is sold to a federal arsenal.

Potential Use: Turnkey agreements would be particularly suited to build facilities that require highly-specialized technology, such as hazardous waste disposal, waste-to-energy generation, or vehicle emissions inspection.

Advantages: Turnkey agreements take advantage of the private sector procurement process and potential construction efficiencies, which allows private facilities to be built faster and more cheaply than comparable public facilities.

Limitations: Implementation of a turnkey transaction requires that a public agency be able to negotiate a contract with a private vendor. The traditional "low-bid" procurement frequently will not work for a turnkey project.

Reference for Further Information: *Public Private Partnerships Case Studies: Profiles of Success in Providing Environmental Services*, September, 1990, USEPA, Office of the Comptroller, Environmental Finance Program, 401 M Street, SW, Washington, DC 20460. Mail Code: 2731R.

OTHER

Description:

Actual Use:

Potential Use:

Advantages:

Limitations:

Reference for Further Information:

COMPARISON MATRIX FOR PUBLIC-PRIVATE PARTNERSHIP ARRANGEMENTS

Criteria/ P3 Tool	Actual Use	Revenue Size	Revenue Cost/ Savings	Administrative Ease	Equity	Environmental Benefits
Asset Sales	Low	Mod.	High	Low	Mod.	Mod. - High
***Build/Operate/ Transfer, etc.**	Mod. - Low	Mod. - High	Mod. - High	Mod.	Mod.	High
***Contract Services (O&M)**	High	High	Mod.- High	Mod.- High	Mod.	Mod.
***Contract Services (O&M&M)**	High	High	High	Mod.	Mod.	Mod.
***Developer Financing**	High	High	Mod.	Mod.	Low	Mod.
Lease/Develop/ Operate or Build/ Develop/Operate	Low	Mod.	Mod. - High	Low	Mod.	Mod.
Lease/Purchase	Low	Mod.	Low - Mod.	Low - Mod.	Mod.	Mod.
Long-Term Lease	Low	Low - Mod.	Mod.	Low	Mod.	Mod.
Merchant Facility	Mod. - High	High	Mod.	Mod. - High	Low	Mod. - High
***Privatization**	High	Mod. - High	Low - Mod.	Mod.	Mod.	High

COMPARISON MATRIX continued

Criteria/ P3 Tool	Actual Use	Program Size	Revenue Cost/ Savings	Administrative Ease	Equity	Environmental Benefit
Sale/ Leaseback	Low - Mod.	Low - Mod.	Low - Mod.	Low - Mod.	Mod.	Mod.
Self-Regulation (Inspection & Monitoring)	Low.	Low	High	Mod.	Mod.	Mod.
Tax-Exempt Lease	Mod.	Low - Mod.	Mod. - High	Low-Mod.	Mod.	Mod.
***Turnkey**	High	High	Mod.- High	Mod.- High	High	High

High -High use (over 25 States, many localities/private sector); most environmental media covered (water, wastewater, solid waste, air, etc.); criteria score high (e.g., program lowers costs, is easy to use, readily available, and results in improved facility construction and management)
Mod.-Moderate use (10-25 States, some localities/private sector); programs include two or more environmental media; criteria score in medium range
Low - Low or rare use; scope is very limited; one or more major implementation problems exist

*Star indicates best rated mechanisms

4.B. EFAB PUBLIC-PRIVATE PARTNERSHIP AND OPTIMIZATION CASE STUDIES

4.B. EFAB PUBLIC-PRIVATE PARTNERSHIP AND OPTIMIZATION CASE STUDIES

The Environmental Financial Advisory Board (EFAB) is a federally chartered advisory board that provides independent advice to EPA on issues relating to environmental finance. EFAB is comprised of nationally recognized experts drawn from government; the finance, banking, and legal communities; business and industry; and national organizations. EFAB has produced more than twenty major reports and advisories since 1989, identifying numerous policy and program options across a broad spectrum that seek to lower the costs of environmental protection, increase public and private investment, and build and local financial capacity to carry out environmental programs (see **Section 5.A., Environmental Financial Advisory Board**).

The Board's Cost Effectiveness Environmental Management Workgroup has focused on identifying institutional models that communities have used to create more cost effective environmental services. The workgroup recognizes that in some cases these models may be public-private partnership arrangements, while in other cases, communities may look internally to optimization, competitivization, or re-engineering approaches. In its deliberations, the workgroup determined that it would produce two products:

- A "Compendium of Case Studies" showcasing cutting edge examples of how communities have implemented successful public-private partnerships and optimization models. These case studies include a discussion of the lessons learned from these case studies and how this information might be used in helping other communities design their own approaches.

- A "How To Handbook" providing guidance to local officials and managers when evaluating the feasibility of various public-private partnership arrangements and internal models. The handbook would also discuss ways that various models might be implemented.

The case study abstracts on the following pages are brief summaries that attempt to capture the essence of the first series of EFAB public-private partnership/optimization case studies. The work of the Board's Cost Effective Environmental Management Workgroup is freely acknowledged and greatly appreciated. We believe that these abstracts both supplement and complement the public-private partnership arrangements presented in **Section 4.A.**. They provide concrete examples to local officials of how successful partnerships and other models can be used by communities to provide needed environmental services more efficiently. They also show how public-private partnerships can be used as a way to provide substantial benefits to both the public and private sectors, creating the classic "win-win" situation.

LIST OF
EFAB PUBLIC-PRIVATE PARTNERSHIP
AND OPTIMIZATION
CASE STUDIES
(In Alphabetical Order)

1. Charlotte, North Carolina
   (Contract Operations and Maintenance)
2. Indianapolis, Indiana
   (Contract Operations, Maintenance, & Management)
3. Jersey City, New Jersey
   (Contract Services)
4. Miami Conservancy District, Ohio
   (Asset Sale Under Executive Order 12803)
5. New Orleans, Louisiana
   (Contract Operations)
6. North Brunswick Township,
   (Concession Operations)
   New Jersey
7. Oklahoma City, Oklahoma
   (Contract Operations)
8. Philadelphia, Pennsylvania
   (Contract Operations)
9. West New York, New Jersey
   (Contract Operations)
10. Wilmington, Delaware
    (Asset Sale/Privatization)
11. Wixom, Michigan
    (Contract Operations)

CHARLOTTE, NORTH CAROLINA
(Contract Operations and Maintenance)

Description: The City of Charlotte seeks competition and outsourcing to reduce the costs of public services. Water and wastewater services are provided to Charlotte and Mecklenberg County by the Charlotte-Mecklenberg Utilities Department (CMUD) which runs three water treatment plants and five wastewater treatment plants. To explore cost savings through public-private partnership, CMUD offered the Vest Water Treatment Plant and the Irwin Creek Wastewater Treatment Plant for contract operations. The partnership offered was a five-year contract (a three year contract with two one-year renewal options) for operations and maintenance of the facilities only. Each plant was treated as a separate procurement, but firms were allowed to submit a combined proposal in addition to the individual ones, if there was a cost savings to the City.

Demographics: The City and County have a strong economy with significant growth and these trends are expected to continue. The service area includes Mecklenberg County (about 500,000 people) and both plants are in Charlotte, NC. The Vest plant treats 16-24 million gallons a day (MGD) and has a hydraulic capacity of about 30 MGD. The actual range of finished water ranges from 6-46 MGD. The Irwin plant treats an average of 12 MGD of mostly domestic wastewater, with a design capacity of 15 MGD. Secondary treatment is based on a modified Bio-Filter activated sludge process and recently completed upgrades add a single media filter to provide tertiary treatment. CMUD has not experienced recent compliance problems.

Procurement/Competition: The City used a two-stage procurement process which began in late spring 1995. The first was a request for qualifications from firms interested in proposing on one or both projects. Separate statements of qualifications (SOQs) were required for each. The City received nine SOQs for the Vest project and eight for the Irwin project. SOQs were evaluated based on management arrangements, experience, key staff experience and qualifications, technical resources, financial resources, performance history, and project understanding/contracting suggestions. The SOQs received were of high quality and only one firm did make the short-list.

Including the in-house proposal (it was pre-qualified), seven proposals were submitted for Vest and six for Irwin. The main criterion for evaluating proposals was cost. Technical criteria included the quality and reliability of proposed operations and maintenance services, level and skill of staff, transition plan, and specific areas of risk for each proposal. Considerable efforts were taken to ensure a level playing field for all proposers, particularly in regards to separating the in-house proposal team from the procurement team, and in fairly allocating indirect department and City overhead costs to the in-house proposal. In addition, an independent consulting team was hired to manage the procurement process, and assist in evaluating qualifications and technical/cost proposals.

CHARLOTTE, NORTH CAROLINA

Proposer Selected: The City selected CMUD's in-house team to operate both plants. Their proposed price was substantially lower than the lowest privatizer's price. Technically, the City's in-house proposal was comparable to the privatizers' proposals. The in-house proposal reduced costs through staff reductions, increased automation, and improved process control equipment. The City set up a separate cost center to track the performance of the in-house team in meeting cost-saving goals. Failure to meet the goals allows the non-binding memorandum of understanding with the in-house team to be ended and operation of the plants again offered for privatization. Employee bonuses are based on cost savings exceeding those guaranteed in the proposal. The contract began July 1, 1996.

Benefits: Based on the City's in-house proposal, costs savings of about 30% are expected the first year compared to the previous year's budget. Since the operation of these two plants is only a small part of the total CMUD budget, the impact on rates will not be significant over the five-year time frame of the contract. However, the implications for achieving similar savings throughout CMUD operations may have a significant impact on long-term costs and future rates. The City expects to benefit from improved maintenance and the corresponding preservation of its assets.

Drawbacks: None. Cost of capital was not an issue since the City was retaining responsibility for capital expenditures and none are expected over the five-year term of the contract. The City view of privatization is still favorable and perceived loss of control is not an issue. The City believes it can maintain control via the provisions of the service contract and by owning the land and assets.

Lessons Learned: Even though the City choose not to privatize, the procurement was successful and valuable lessons were learned, including:

- Open communications between the City and private parties are essential.
- The evaluation process must be objective and provide a level playing field for all proposers.
- A two-step procurement can be an effective way to streamline the process.
- Requests for Proposal should include comprehensive and explicit draft service agreements.
- Both sides must understand the maintenance risks assumed by the contract operator so that cost-effective proposals can be prepared and evaluated.
- Given the same flexibility as a private party, a public entity can achieve major cost savings.
- The proposal process must provide all participants an equal opportunity to develop creative and cost-effective proposals.

Reference for Further Information: Doug Bean, Director, Charlotte-Mecklenberg Utility Department, 5100 Brookshire Boulevard, Charlotte, NC 28216. Telephone Number: 704-391-5073. EFAB Member George Raftelis, 6100 Fairview Tower, Suite 615, Charlotte, NC 28210. Telephone Number: 704-556-1936. Fax Number: 704-556-1937.

INDIANAPOLIS, INDIANA
(Contract Operations, Maintenance, and Management)

Description: This partnership involves the contract management, maintenance and operations of two advanced wastewater treatment (AWT) facilities by a private operator. Prior to the contract, both facilities were sophisticated, state-of-the-art, and operated at a high level of efficiency. The facilities include preliminary treatment, primary clarification, biological treatment via bio-roughing and oxygen nitrification, followed by secondary clarification, effluent filtration, and ozone disinfection prior to effluent discharge into the river. Also included in the contract were the associated sludge handling facilities, laboratories, and pretreatment programs. Excluded from the contract were sewer collection, billing and collection, and customer service functions. Major capital improvements remain the responsibility of the City.

Demographics: The Indianapolis area has a very stable and diversified economy, with average growth of approximately 1.5% annually. The two AWT facilities serve 850,000 to 900,000 people (400,000 accounts) in the greater Indianapolis area, which includes all of Marion County. Total average treatment capacity of the plants is 300 million gallons per day ("MGD") - 150 MGD each. The plants were 11 years old in 1993 when the procurement began.

Procurement/Competition: The City wanted to improve operation, maintenance, and management (OM&M) while cutting costs and generating revenue for system improvements. The City looked at many options and chose to compete the OM&M of the facilities. In selecting this option, the City retained the tax advantages of public ownership and gained savings via private sector efficiencies.

A task force was formed to evaluate proposals. It included members of the City-County Council, utility management and staff, regulatory officials, general citizens, and the union -- the American Federation of State, County, and Municipal Employees (AFSCME). Relations between the City and AFSCME were originally constrained, but they improved over the course of the procurement. The winning proposer honored the agreement between AFSCME and the City and guaranteed jobs. All employees were placed within two months. The entire process, including the preparation time for procurement, took 8 to 10 months. It cost $200,000 to $300,000 for advisors, consultants and engineers. This amount was recovered by the City through contract savings within a few weeks.

ProposerSelected: White River Environmental Partners (WREP), a group of private firms, was selected to operate, maintain, and manage the two AWT facilities. WREP's proposal guaranteed 38% savings over the previous year's budget, and the professional capabilities of the companies in the group were considered superior to the other proposers. WREP must meet NPDES requirements, is responsible for any penalties as a result of violations, and must maintain the same effluent level or better than under City operations. WREP is subject to selective audit by an overseeing "board" to ensure both compliance with the contract and the quality of private operations.

INDIANAPOLIS, INDIANA

Benefits: WREP operations are projected to save about $60 million over five years. Between 1993 and 1994, the facilities' O&M budget was reduced from $30 million to $17 million and the number of employees reduced from 328 to 196. By June 1996, 168 WREP employees staffed the facilities.

The City has held rates constant due to savings, but they are expected to grow slowly in the future due to inflation. Instead of lowering rates, the City puts savings into a Sewer Sanitary Fund used to improve the City's system. These funds have been used to dry out interceptors and collector systems and to provide sewer service to new areas.

Effluent violations have been cut from seven under City operations to one even though rains have been heavier than usual. The facilities accident rate decreased by 80% in the first two years of the contract and the Indiana Water Pollution Control Association gave its 1995 safety award to WREP. Since the contract began, employee grievances have dropped from 38 in 1993 to 1 in 1994, and none in 1995.

Drawbacks: The contract is only for five years. At the end of the contract term, the contract will have to be renegotiated. Any changes desired by the City or the private operator at that time must be incorporated into a new contract, or the City will need to re-propose the operations.

Lessons Learned: Although Indianapolis approaches each competition individually, it has developed general principles which guide its efforts:

- The key to positive results is public and open competitions.
- Evaluations teams need to be inclusive and formed early in the procurement process.
- Employees are encouraged to compete and unions to be involved in the process. (The creativity of these competitions was recognized in 1995 by an *American Government Award* from the Ford Foundation, presented jointly to the union and the City.)
- Although the City gets advice from experts, when in doubt it lets the marketplace speak. The study conducted for the two AWT facilities underestimated savings of by 30-35%.
- Deal documents need to explicitly address performance standards, and provide incentives for vendors to attain and maintain performance goals. Provisions must be implemented with effective contract oversight and management by the City.

Reference for Further Information: Tom Olsen, Director of Enterprise Development, City of Indianapolis, City-County Building, Suite 2460, 200 East Washington Street, Indianapolis, Indiana 46204. Telephone Number: 317-327-4794. Fax Number: 317-327-4954. EFAB Member George Raftelis, 6100 Fairview Tower, Suite 615, Charlotte, NC 28210. Telephone Number: 704-556-1936. Fax Number: 704-556-1937.

JERSEY CITY, NEW JERSEY
(Contract Services)

Description: In the summer of 1995, the City of Jersey City (City) sought to privatize the operations of its Water Department through the efforts of a new Mayor elected on a pro-business and privatization platform. After investigating options, the City projected that large cost savings and the increased revenue could be achieved through a public-private partnership. After issuing a comprehensive Request For Proposals (RFP) and carefully evaluating the proposals, the City entered into a three-year operating contract (with two optional one-year renewals) with United Water Resources (UWR).

Demographics: Jersey City has a favorable cost of living and tax environment for attracting business. Wages are relatively low as are taxes and other city charges for utility services. Many New York City companies have offices in the City due to the lower cost of doing business. In recent years the City has had economic problems, and as a result, the Mayor has focused on the City's economic development and financial challenges. He has been instrumental in promoting privatization and desires the most cost-effective method for providing water services.

The Jersey City Water Department provides water service to about 32,000 retail customers located in the New Jersey metropolitan area across the Hudson River from New York City. Potable water is pumped via aqueduct to the Jersey City area, where it is distributed to retail customers. Wholesale customers in Hackensack, New Jersey and the municipalities of Hoboken, Lyndhurst, and West Caldwell are served along the aqueduct.

The City-owned system consists of two reservoirs, 5,700 acres of watershed property surrounding them, a treatment facility, and an extensive transmission and distribution system. The reservoirs have capacities of 3.3 and 8.0 billion gallons a day, respectively. The 80 million gallons per day (MGD) water treatment facility receives average daily flows of about 55 MGD. The water treatment plant is located adjacent to one of the reservoirs, 23 miles northwest of the City.

The City has had compliance problems with State and federal regulations in the past. In particular, the City had been stockpiling sludge from the water treatment plant and was forced to dispose of this stockpile, and further sludge generated, into a regulation disposal site.

Procurement/Competition: A steering committee was formed, consisting of members of the City Council and key staff personnel involved in providing water services. Labor unions were active in the process, as were water utility managers and the City's Business Manager. Raftelis Environmental Consulting Group managed the privatization feasibility and procurement process, assisted by W.R. Lazard on financial issues.

JERSEY CITY, NEW JERSEY

A detailed RFP was prepared and proposers were evaluated on technical merit, management, operations and maintenance approach, experience and responsiveness, ability to meet contract obligations, and price. New Jersey had recently passed a privatization procurement act for water utilities and the procurement required approval from several State agencies. The procurement took about one year, cost $300,000 to $350,000, and the contract was signed on April 1, 1996. Given projections for savings and increased revenues, gaining the City Council's support was straightforward. Labor unions were brought into the process early and were heavily involved in negotiating the contract. An innovative leasing of employees was the basis for agreement. The contract required the privatizer to use all employees for at least one year.

Proposer Selected: The City entered into a three-year operating contract with UWR. The contract privatized all water services including source of supply, treatment, distribution, meter reading, billing and collection, and laboratory services. UWR assumed liability for any fines due to regulatory violations. The City retained rate setting and policy making functions. A creative cost-sharing approach was negotiated to encourage a decrease in uncollectible, promote marketing of water services to new wholesale customers, and reduce the amount of unaccounted-for water.

Benefits: The City is projected to save about $38.5 million over the five-year contract period: a $2.5 million up-front concession payment to the City by UWR; $17.5 million in operational savings; and $18.5 million from increased revenues to the utility via improved collections and bulk water sales. The contract has incentive clauses which allow UWR to earn additional revenue if it increases the collection rate and successfully markets excess water. Instead of lowering rates, the City is using cost savings for capital improvements in the system. UWR has begun a comprehensive predictive and preventive maintenance program unavailable to the City. Privatization is expected to lead to improved customer service and expanded opportunities for employees via training and higher pay.

Drawbacks: Although unions were included from the beginning, the transition of labor to private operations was difficult. Since UWR chose to base its customer service operations in its Hackensack headquarters, concerns were raised about UWR's ability to be as responsive as City operations.

Lessons Learned: A comprehensive, detailed RFP and frank negotiations with all parties are essential. A Draft Service Agreement which gave proposers expected contractual requirements was invaluable at the time of actual contract negotiations as all parties were on the same page. Labor negotiations played a major role in the privatization process and cannot be downplayed.

Reference for Further Information: Daniel F. Mahoney, Jr., City of Jersey City, 325 Palisades Ave, Jersey City, NJ 07307. Ph: 201-547-5157. Fax: 201-547-6586. EFAB Member George Raftelis, 6100 Fairview Tower, Suite 615, Charlotte, NC 28210. Phone: 704-556-1936. Fax: 704-556-1937.

MIAMI CONSERVANCY DISTRICT
(Asset Sale Under Executive Order 12803)

Description: This partnership involved the sale of a wastewater treatment facility by the Miami Conservancy District (MCD) to Wheelabrator Environmental Operational Services (WEOS). The transaction was the first sale of a grant-funded environmental facility to the private sector under Executive Order 12803, signed in April 1992. MCD is a flood control government agency serving the counties abutting the greater Miami River in the Dayton, Ohio area. The plant was built in 1972 at a cost of $3.2 million, including a $1.75 million federal grant. Upgrades and expansions totaling $7.5 million were completed in 1984, 1989, and 1991. Since the municipalities and counties had existing service agreements with MCD, it was necessary for them to approve the sale of the facility.

Demographics: The Franklin wastewater treatment plant serves 40,000 people in the municipalities of Carlisle, Franklin, and Germantown, and incorporated areas of Montgomery and Warren counties. Growth has been moderate but steady. Area governments have focused on economic development. The 4.5 million gallons per day (MGD) facility serves 8,000 households. Several major industries represent 33% of the plant's total effluent flow and over 75% of plant loadings. The facility was built to treat a combination of industrial and domestic waste. Current flows average just over 2.0 MGD.

Procurement/Competition: Flood control is MCD's major mission and it recognized the need to divest itself of the wastewater facility and concentrate on this main focus. MCD moved to contract operations of the Franklin facility in July 1987. Over the next several years, MCD considered full privatization. As a result of Executive Order 12803, the full privatization of the Franklin plant became a possibility. The proposed sale of the Franklin facility as an EPA pilot project was approved in December 1992.

The plant is regulated by the Ohio EPA. The transfer of the Domestic Sewage Exclusion (DSE) from MCD to the private and public partners (WEOS and the three municipalities of Carlisle, Franklin, and Germantown) was a key issue in the sale. In addition, the Ohio Water Development Authority (OWDA) had loaned approximately $5.0 million to MCD for upgrades and expansions, and OWDA had to approve the transfer. Another key element of the transfer was the assurance that the OWDA tax-exempt status of the current outstanding bonds would be preserved.

Major community participants included the MCD General Manager and the leaders of the affected communities. The Ohio EPA, EPA Region V in Chicago, the US EPA Headquarters, and the US Office of Management and Budget were all key in approving the sale of the facility. The sale was approved July 11, 1995. The feasibility analysis cost $35,000 and supporting activities cost $150,000. Community consensus was achieved by committed involvement from the municipal managers, MCD Director, community advisors, and Wheelabrator EOS. Montgomery and Warren counties were brought on board at a later date to support the project.

MIAMI CONSERVANCY DISTRICT

Proposer Selected: After significant economic analysis, policy evaluation, and other relevant considerations, MCD, the bulk municipal customers, and WEOS agreed to the sale of the facility to WEOS. WEOS had been the successful contract operator for over six years. WEOS had a long history of dealing with similar transactions in the waste energy business, and Ohio law allowed MCD to conduct negotiations with Wheelabrator EOS without going through a procurement process.

The municipalities retained ownership of the land and a prepaid lease was structured to pay the municipalities for use of the land by WEOS. A 20-year service agreement, with two five year options, was used to effect the transfer. The contract requires WEOS to comply with environmental regulations and maintain customer service levels. The contract also requires that WEOS expand the facility at certain threshold points. Formulas were put in the service agreement which allow for the recovery of expansion costs. The three municipalities and WEOS are co-permitees of the facility. An advisory board of representatives from the municipalities and the counties works with WEOS.

Benefits: The communities were able to assign certain ownership risks to the private partner in the contract, and can repurchase the facilities at the end of 20 years. Over the contract period, the cost of continued MCD operation versus WEOS operation will be basically the same. WEOS can make only reasonable returns, similar to what would be achieved under regulation by the Ohio Public Utility Commission. WEOS's cost in the early years will be much lower than MCD'S, but as existing bonds are paid off, MCD costs will fall. The plant sale to WEOS is, in effect, a refinancing of the mortgage of the plant over the contract term. The rate charged for sewage was cut by 14%.

Drawbacks: The privatization process was complex and the large number of parties involved made reaching consensus difficult. The amount of time it takes to navigate the approval process, particularly when federal approvals are required for the sale of grant-funded assets, is very lengthy.

Lessons Learned: All affected political jurisdictions need to be on board early. By not including Montgomery and Warren counties early on, the consensus process took longer as all agreements were executed. Do not underestimate the time it takes to privatize when federal approvals are needed to sell grant-funded assets. Gaining approvals for a sale is complex and requires appropriate internal and external input and commitment. Negotiation with a private contractor is a careful and important process. It is essential to negotiate with the proper resources, time frame and venue in mind. Appropriate economic, legal, and engineering input is key in the privatization process.

Reference for Further Information: Jim Rozelle, General Manager, Miami Conservancy District, 38 East Monument, Dayton, OH 45402. Telephone Number: 513-223-1271. Fax Number: 513-223-4730. EFAB Member George Raftelis, 6100 Fairview Tower, Suite 615, Charlotte, NC 28210. Telephone Number: 704-556-1936. Fax Number: 704-556-1937.

NEW ORLEANS, LOUISIANA
(Contract Operations)

Description: The Sewerage and Water Board of New Orleans (S&WB), a statutory body of the Louisiana constitution, owned and operated two wastewater treatment plants providing secondary treatment of wastewater in the greater New Orleans area. The S&WB was having difficulty meeting permit levels for effluents, operating costs were increasing, and the maintenance program could not keep pace with facility repair requirements. In 1991, the S&WB funded a $1.7 million capital improvements program to rehabilitate major equipment and contracted with the Professional Services Group (PSG) to operate, maintain, and manage its two sewage treatment plants for a five-year term. PSG operations have saved the S&WB an average of $ 1.1 million a year since 1991.

Demographics: The two plants serve approximately 165,000 customers in the greater New Orleans area (population of 480,000). The customer base consists of retail customers, mainly residential and 1% industrial. In addition to year-round tourism, the City of New Orleans (City) is a major shipping port, especially for grain and petrochemicals.

The East Bank treatment facility is a 122 million gallons per day (MGD) pure oxygen activated sludge plant. It processes over 90% of the City's wastewater. Although the facility is rated at 122 MGD and short-term peak treatment capacity of 239 MGD, extended wet weather flows as high as 250 MGD are not uncommon. The smaller West Bank secondary treatment facility is a 10 MGD trickling filter plant which is being expanded to double its capacity.

The S&WB has had difficulty meeting NPDES permit requirements which resulted in several violations. These violations, prior to privatization, continue to be the subject of litigation between the city, and US EPA and the U.S. Department of Justice.

Procurement/Competition: All research was performed in-house. Beginning in early 1991, the S&WB conducted a ten-month study of contract operations, which included tours of other privately-operated facilities. The study projected that besides achieving permit compliance, annual operating savings of $750,000 were possible under a service contract due to improved worker productivity. The main opponent of the contract was the City Civil Service Commission who make decisions on City employee matters. Agreement was achieved when PSG offered to give the plant's 52 employees better pay and benefits and a two-year job guarantee. Furthermore, employees could choose to remain with the S&WB. Although not quantified by the City, the procurement process probably cost less than $ 100,000, since outside advisors were not used.

Proposer Selected: PSG was selected from a short-list of three firms based on cost, operating experience, technical resources, employee training and development programs, safety programs,

NEW ORLEANS, LOUISIANA

computerized process controls, and procedures for the transition from public to private operations. This contract represents one of the largest OM&M wastewater operations contracts in the nation. PSG assumed OM&M responsibility for the facilities on January 10, 1992.

PSG has established regular reporting mechanisms to provide S&WB management with current information on plant operations. The service contract has been structured so that the responsibility for making all capital improvements and maintenance of items costing greater than $5,000 (or having a service life of over three years) rests with the S&WB. PSG is responsible for all routine maintenance and repair. The contractor's operations remain under the scrutiny of the same regulatory bodies as the S&WB's operations. The S&WB has retained the NPDES responsibilities with the EPA. Any fines resulting from violations under contract operations are the liability of PSG.

Benefits: PSG has achieved operational savings of $1.1 million annually since 1991 and savings are expected to grow in future years. Rates have not been increased since 1987, remaining flat despite the cost savings achieved by privatization. Private operations have provided improved wages and productivity incentives for employees, as well as extensive employee training programs.

PSG set up a preventive maintenance program and a comprehensive odor control plan and did a complete evaluation of the plants on assuming operational control. PSG directed the rehabilitation of a 70 tpd cryogenic plant which had been inoperable for years and restored inoperable 40 tpd and 20 tpd incinerators, whose failure had resulted in numerous compliance violations. Plant discharge quality has been improved. Increased incinerator capacity has cut solids inventory, fecal coliform in the effluent has been reduced because of the rehabilitation of the chlorination system.

Drawbacks: The S&WB believes it was a mistake to sign a five-year contract, renewable for only one-year periods. It believes that a longer-term provider has more financial exposure and thus more incentive to work harder and increase efficiencies. Although the S&WB and PSG have excellent relations, disagreements occur over who should bear certain costs.

Lessons Learned: The key to a successful privatization is having a well-defined contract with a reputable firm. The contracting government should make sure that the term "maintenance" is well-defined in the contract, as well as who will pay for each type of maintenance. This will prevent any arm-wrestling matches during the contract period.

Reference for Further Information: Don Crowder, S&WB Liaison, Sewerage and Water Board of New Orleans, 625 Saint Joseph Street, New Orleans, LA 70625. Telephone Number: 504-585-2271 or 585-2272. EFAB Member George Raftelis, 6100 Fairview Tower, Suite 615, Charlotte, NC 28210. Telephone Number: 704-556-1936. Fax Number: 704-556-1937.

NORTH BRUNSWICK TOWNSHIP, NEW JERSEY
(Concession Operations)

Description: The first US publicly-procured, long-term concession contract for the operation of a water and sewer system was signed in February 1996 by North Brunswick Township (the Township) and US Water Inc. The treatment plant had been run by US Water under contract for ten years prior to the concession agreement. This concession contract was the first application of two New Jersey State laws: the New Jersey Wastewater Treatment Public-Private Contracting Act and the New Jersey Water Supply Public-Private Contracting Act. Under the terms of the concession, US Water will operate, maintain, and manage the systems for 20 years. The Township retains ownership of the facilities and its rate-setting ability.

Demographics: The facilities serve the Township of North Brunswick, population 35,000, and an additional 200 surrounding residences. The number of customers served is about 12,000, consisting of 70% residential, 15% commercial, and 15% industrial. The Township is located in Middlesex County, New Jersey. The economic base of the region includes manufacturing and pharmaceutical companies. The area has steady population growth of about 1/2% per year.

The water treatment plant has a capacity of 10.0 million gallons per day (MGD). Average flows are 4.0 to 5.0 MGD. The Township has a contract with the New Jersey Water Supply Authority to draw 8.0 MGD. The plant is only four years old, but some of the pumping stations and lines are 50 to 60 years old. The Township has experienced minor violations of New Jersey Water Supply Authority and Department of Environmental Protection regulations.

Procurement/Competition: The Township wanted to find a less expensive way to operate the facility, and to relieve itself of billing and collection, customer service, and other responsibilities related to operating the facility, but still retain ownership and control rate-setting. The Township also wanted to improve its balance sheet by decreasing its outstanding debt. A blue ribbon panel comprised of Town Council members and the mayor was organized in the fall of 1994 to study the available options. A combined RFQ/RAP was issued in February 1995 and proposals were due May 1995.

The procurement process was delayed while the Township waited for two New Jersey public-private contracting acts to become law. This innovative new legislation allows payment of concession fees to a municipality. These fees may be paid either up-front, annually, or as a municipality desires. They must be used to reduce or offset property taxes, service rates, nonrecurring expenses, or capital asset expenditures. The laws permit a wide range of contractual forms to meet municipal needs. Competitive procurement is required, and asset sales prohibited. When both acts were finally passed, the Township issued an amended RAP, providing bidders with the opportunity to re-propose based on the passage of these two new laws.

NORTH BRUNSWICK TOWNSHIP, NEW JERSEY

The Township began negotiations with US Water in September of 1995. US Water agreed to hire all six current employees for at least two years. At the end of two years, the employees would either be offered a permanent job with US Water or offered a job with the Township. The Township invested approximately $400,000 in the privatization process. The entire process took one year. The decision to privatize was not an issue since the facility was already being operated under a contract with US Water. This contract was a win-win-win public-private partnership for the taxpayers and utility users, the employees and the private firm.

ProposerSelected: US Water was selected for economic reasons, as well as its experience and expertise in operating the plant. Under the terms of the partnership, US Water operates, maintains and manages both the water and wastewater systems for a twenty-year period, including the distribution and collection systems, billing and collection, and customer service. The Township still owns the facilities, sets rates, and is responsible for capital improvements. The Township does not participate in day-to-day operations, but does oversee the operations and perform annual inspections. US Water must comply with all State and federal standards and pay any fines assessed for violations. The firm must also meet set requirements for repairs and maintenance, as well as customer service.

Benefits: The Township estimates savings of $46 million over the 20-year period. US Water estimated rates for the next 20 years based on their annual fee, with the first year's rates increasing 5.75% over the previous year's, and eventually increasing 3.0% in the latter years of the contract. The cost of operations by US Water was significantly less expensive than Township operations. As a result of the concession, $23 million of Township debt was deceased by US Water, an initial concession payment of $6 million was made to the Township, and royalties of $22.9 million will be paid to the Township over the 20 years of the contract. The system-wide replacement of all water meters was included in the contract as part of US Water's responsibilities.

Lessons Learned: The main questions to ask are: "What is the objective of the municipality?" and "Can this objective be achieved through private operations?" In the case of North Brunswick, the Township wanted to be relieved of all utility requirements, to improve its balance sheet, and to have some budget relief. Because of these goals, the Township took a long-term view.

Reference for Further Information: Paul Keller, Business Administrator, North Brunswick Township. Telephone Number: 908-247-0922 extension 435. EFAB Case Study, EFAB Member George Raftelis, Inc., 6100 Fairview Tower, Suite 615, Charlotte, NC 28210. Telephone Number: 704-556-1936. Fax Number: 704-556-1937.

OKLAHOMA CITY, OKLAHOMA
(Contract Operations)

Description: In 1988, the Oklahoma City Water Utilities Trust (OCWUT), contracted out the operations, maintenance, and management of three wastewater treatment facilities, a pumping station, and all sludge disposal services to Professional Services Group (PSG). Prior contracting with PSG, operations and maintenance duties at two wastewater treatment facilities been performed by two separate companies, while operations at the third had been carried out by City employees. Sludge disposal for each facility had been performed by another company under three separate contracts. This independent structure of operations, maintenance, and sludge removal activities was an unnecessary and expensive duplication of operations, equipment, and personnel. The incorporation of all the facilities into contract operations by PSG has created savings of about 11 % annually for OCWUT.

Demographics: The three wastewater treatment facilities receive mostly domestic waste from about 600,000 residents, as well as process waste from light industries in the service area. The facilities serve a 530 square mile area in and around Oklahoma City (City). In addition to its retail, residential, commercial, institutional, and industrial customers, the City has wholesale contracts with surrounding municipalities, the local Air Force base, and General Motors.

The North Canadian plant has an design capacity of 80 million gallons per day (MGD), and the Deer Creek and Chisholm Creek plants have design capacities of 10 MGD and 5 MGD, respectively. Collectively, the three plants generate about 23,500 tons of sludge per year. The North Canadian plant has primary and secondary treatment processes, as well as chemical scrubbers and a hydrogen peroxide injection system. The Witcher Pumping Complex has two large lift stations and three aeration wastewater storage lagoons. The Deer Creek plant is a rotating biological contractor plant for secondary treatment followed by nitrification and chlorination. Finally, the Chisholm Creek plant has primary, secondary, and advanced treatment prior to discharge.

Procurement/Competition: The City wanted the contract to lower costs. In 1987, the City's wastewater treatment cost about twice what other Oklahoma municipalities were paying on a per unit basis. The Water and Wastewater Utilities Department conducted the procurement. The assistant city manager had an engineering background and easily explained the process and projected results to the City Council. Employment of existing employees was a condition of the RFP. In 1987, the City put sludge management, disposal services and operations of all the facilities up for competition. The RFP directed prospective firms to identify operational changes and/or capital improvements to ensure maximum efficiency and to lower costs. This provision allowed for innovative techniques in sludge processing and disposal. The entire process took about a year, and cost less than $100,000.

OKLAHOMA CITY, OKLAHOMA

Proposer Selected: PSG was chosen for having the lowest costs as a result of the capital improvements and operational changes contained in their proposal. The contract was progressive for its time, since most contract operations agreements for wastewater treatment plants were for operation of the plant "as is." In this case, the agreement permits operational changes and capital improvements to ensure the most efficient and cost-effective operation of the facilities.

Under the contract, the City owns the facilities, but PSG is responsible for operating the three plants, their effluent quality, and paying any fines for compliance violations. The City's Water and Wastewater Utilities Department employs three people to oversee the private operations by looking after the plant and making routine inspections. The operations are subject to regulations and checks by the EPA, the State Department of Environmental Health, and the City-County Health Department.

PSG offered equal salary and benefits to all plant employees. In the first year, the firm conducted intensive training. Many employees attended a local college to prepare for certification, with tuition reimbursed by PSG. Employees who did not choose to work for PSG could remain with the City.

Benefits: In the first year, the City saved about $4.5 million. The City has been saving about 11 % per year over projections due to capital improvements and operational changes from privatization. After three years, the contract was renewed for five years, and will be eligible for renewal again next year. PSG's annual fee is $10.3 million, which is lower than the 1987 cost of OCWUT operations.
Wastewater rates have not increased since October 1983. From 1989 to 1993, a 4% annual decrease in rates occurred due to savings achieved by private operations. Since the last decrease, the City has used the savings from privatization to make improvements in the system instead of lowering rates. The City is considering rate increases of 3 % per year for three years beginning in October 1996.

A post-dewatered lime stabilization process has reduced energy consumption for sludge processing. The largest reduction has been a decrease in transportation costs. Previously, 6,500 gallon tankers carried 60 to 65 loads of sludge per day, seven days a week to application sites. After increasing the sludge solids content, truckloads have been decreased to 18 to 20 per day, five days a week.

Lessons Learned: The City did not anticipate how large a role it would need to play in supervising the contract operations. The City now has three employees dedicated to the oversight of the facilities.

Reference for Further Information: James Couch, Director of Utilities, Oklahoma City Water Utilities Trust. Phone: 405-232-6238. EFAB Member George Raftelis, 6100 Fairview Tower, Suite 615, Charlotte, NC 28210. Telephone Number: 704-556-1936. Fax Number: 704-556-1937.

PHILADELPHIA, PENNSYLVANIA
(Contract Operations)

Description: The City of Philadelphia Water Department (PWD) owns and operates one of the largest centralized biosolids processing facilities in the country, the Biosolids Recycling Center (BRC). In the late 1980's, the BRC faced numerous problems, including: high operations costs, low productivity, community distrust, extremely high overtime expenditures, labor unrest, improper equipment, and most importantly, a consent decree imposed by the State of Pennsylvania for the removal of stockpiled products from unpermitted areas. The BRC was also the target of unfavorable union action and media attention during protracted municipal union negotiations in the summer of 1992. This combination of factors made the BRC a candidate for privatization.

After a new city administration settled the union contract, it set a goal to reduce operating costs at the BRC by $5 million (about one-fifth), and retained the engineering firm of Camp, Dresser & McKee (CDM) to evaluate the BRC and estimate the cost of operations under private management. Contract operations was presumed the only viable option available to the city to achieve the cost savings goal. While no specific assurance was given, the BRC managers believed a challenge had been presented to them to accomplish a successful turn-around, concurrent with the CDM study, which might thereby dissuade officials from proceeding with contract operations.

Demographics: The BRC provides the dewatering and composting processes for two regional wastewater plants which serve about 487,000 accounts (2.3 million people). The PWD provides sludge disposal services via the BRC to the City of Philadelphia and ten counties, townships, and/ or authorities in the surrounding area. The BRC processes liquid sludge from the two regional wastewater facilities and distributes the processed biosolids product to contractors for disposal.

The BRC consists of a centralized biosolids dewatering station and a 72 acre biosolids composting plant. In October 1993, the BRC handled about 15.5 million gallons per week of digested and thickened sludge. A consent decree was imposed on the PWD by the Pennsylvania Department of Environmental Resources for the removal of stockpiled products from unpermitted areas.

Procurement/Competition: The City retained Camp, Dresser & McKee to evaluate the facilities and estimate the cost to operate the plants under private management. The study estimated that contract operations of the BRC would yield annual savings of $6 million to $8 million over current city operations. The City issued an RFQ in October 1993 to begin the privatization process.

PHILADELPHIA, PENNSYLVANIA

Meanwhile, BRC managers made vigorous changes at the facility, focusing on meeting self-imposed "expense goals". Management reduced staffing and funding levels. Staffing for biosolids management fell from 235 positions in 1993 to 133 positions in 1996, a reduction of over 40%. The cost of biosolids processing was cut from $21 million in 1992 to $9.8 million in 1995. Starting from December 1993, the BRC operating budget was decreased from $30.6 million to $15.7 million between 1993 and 1995.

The American Federation of State, County, and Municipal Employees negotiated with PWD management to ensure that no layoffs occurred. In turn, PWD management worked closely with them to develop a strategy for moving employees within the department. Although some employees were placed in lesser positions, no one was unemployed as a result of the changes.

Proposer Selected: The PWD management succeeded in meeting the challenge, and the City halted the privatization process.

Benefits: The BRC rates are set by the PWD for the entire department and are fixed for long periods of time. Rates have not been reduced as a result of cost savings; however, they are not expected to be increased until after the turn of the century. Customer service became the focus for the BRC's operational improvements.

Management modernized the dewatering equipment by replacing eddy current back drives and installing automatic torque control which removed the need for "hands-on" operation and improved the consistency of equipment performance. Vehicular equipment was reassigned to upgrade the BRC's capacity for materials handling, and production of screened compost was reduced from two shifts to one shift of operation as a result of a better coordinated screening system.

Lessons Learned: Municipal operations, even those with a tradition of union activism and strong work rules, present an opportunity for positive change. Sound data and clear operational objectives can set the stage for positive change in municipal operations. A city can realize large financial benefits in changing a municipal operation, and the potential savings can be of a magnitude meeting or exceeding the projected financial benefits of privatization.

Reference for Further Information: Guru P. Bose, Manager of Wastewater Operations, City of Philadelphia Water Department, ARA Tower, 1101 Market Street, Philadelphia, PA 19107. Telephone Number: 215-685-6250. EFAB Member George Raftelis, 6100 Fairview Tower, Suite 615, Charlotte, NC 28210. Telephone Number: 704-556-1936. Fax Number: 704-556-1937.

WEST NEW YORK, NEW JERSEY
(Contract Operations)

Description: In the fall of 1994, the West New York Municipal Utility Authority (MUA) issued a Request For Qualifications (RFQ) for the purchase or lease of its wastewater treatment facility. In early 1995, the MUA issued a Request For Proposals (RFP), and three proposals from private parties were received by June 1995. Concurrent with receipt of the proposals, a new mayor and city administration were elected, creating the need to familiarize the new administration with privatization.

In addition to these political changes, a nearby wastewater authority, the TriCities Authority; expressed interest in buying the assets of the MUA soon after the private proposals had been received. This interest created a new dynamic, since the issues involved in a sale to another public entity differ from those in a sale to a private party. This opportunity has created new possibilities for the MUA not contemplated earlier and has delayed the procurement process for over a year.

The West New York (Town) is still in the process of deciding whether to sell to a public authority or a private contractor. The decision of which privatizer to choose would obviously have to come after this decision is made. The Town wants to put the privatization process officially on hold, so that if the decision is made to sell to the private sector, no backtracking will be necessary.

Demographics: West New York, NJ is located a few miles from Bergen County. The area's economy is composed of service-oriented companies. The MUA serves a population of 60,000 and has 4,900 customer accounts. The MUA serves primarily retail customers in West New York, but also serves portions of Union City and Weehawken as wholesale customers. It operates a 10 million gallons per day (MGD) wastewater treatment facility.

Procurement/Competition: The MUA is having trouble managing the debt service generated from capital investment. The Town Council and the MUA Board are involved in the privatization process. CME Associates are the consulting engineers; Natwest is the financial advisor; and DeCotiss, Fitzpatrick & Gluck are legal counsel for the MUA.

The MUA received three private proposals in June 1995 to purchase the facility, and as of July 1996, the proposals were still being considered. The potential still exists for the procurement process to be put on hold so the MUA can consider another option, the possibility of merging with or selling its assets to another public authority. If the MUA decides on full privatization, it will retain some control over its facility through a service agreement with the privatizer. If the MUA decides to sell to the Tri-Cities Authority, it will not be responsible for any aspects of the wastewater treatment facility, nor will it have any control over operations or rates.

WEST NEW YORK, NEW JERSEY

Proposer Selected: No proposer has been selected yet. The MUA has been considering privatization for approximately two years as of June 1996. As of July 1996, US Water, Inc. and American Anglian Environmental Technologies, Inc. are the only two contractors that remain in the competition.

Lessons Learned: Economic and political factors which may affect the privatization process are really very case specific. The election of a new mayor and the purchase offer from a public authority have hindered the privatization process in West New York.

Reference for Further Information: Arnold Mitnaul, Executive Director, West New York Municipal Utility Authority, West New York, NJ. Telephone Number: 201-295-5240. EFAB Member George Raftelis, 6100 Fairview Tower, Suite 615, Charlotte, NC 28210. Telephone Number: 704-556-1936. Fax Number: 704-556-1937.

WILMINGTON, DELAWARE
(Asset Sale /Privatization)

Description: In the fall of 1994, the City of Wilmington (City) began investigating the economic benefits of privatizing the operation of its wastewater treatment plant. Two options were evaluated initially: (1) leasing the plant to a private operator and (2) the sale of plant assets to a private owner/operator with a 20-year operations contract. Under the guidelines established by Presidential Executive Orders 12803 and 12893, the City sought a substantial up-front payment by the privatizer to be amortized over the contract. After completing an elaborate procurement process to select a preferred privatizer, the project was delayed due to concerns raised by New Castle County (County).

Demographics: The City and surrounding County includes large professional group and industrial presences with almost all growth occurring in the County. The plant, located in the City, serves about 460,000 people. The City generates 30% of flows to the plant and New Castle County 70%. The City provides wholesales wastewater service to the County. Their relationship is governed by an interjurisdictional service agreement which sets the method used to allocate costs to the County.
The plant has a rated capacity to treat 90 million gallons per day (MGD) and is operating at capacity. It provides tertiary treatment of wastewater to meet stringent requirements before release into the Delaware River. The plant has maintained general compliance with environmental regulations, with the exception of some problems related to high flows to the plant during wet periods.

Procurement/Competition: The City expressed three main objectives in privatizing the facility: controlling operating costs; ensuring rate stability; and generating a cash infusion for the City to meet other needs. The privatization option, including the sale of the plant assets with a 20-year operations contract, was the most effective method to achieve these goals. Other objectives included acceptable rate impacts to all customers, preserving the City's capital investment to assure long-term plant reliability and performance, and gaining help in meeting future capital expenditures objectives.

The feasibility study to determine the economic benefits of privatization and the preferred option began in the fall of 1994. The decision to move with privatization came in January 1995, and RFP work began in March 1995. The RFP was issued in early May, with technical proposals due in late June, and cost proposals due by July 21. The proposal evaluation process, including requests for clarification and interviews, took about six weeks, with the notice of rankings issued in late August.

The evaluation was conducted by a City review committee and utility advisors based upon a matrix that included: corporate profile; corporate experience and expertise; regulatory experience; key management and operational personnel; financial strength; employee considerations; references and reputation; use of Disadvantaged Business Enterprises and EEO compliance; and proposal completeness and responsiveness.

WILMINGTON, DELAWARE

Cost proposals were submitted separately from technical proposals, as required by City policies, and were not used in evaluating and ranking submittals. Proposers were scored and ranked solely on the basis of technical proposals. Cost proposals were used for developing a cost basis for negotiating a Service Contract and Service Fee with the preferred vendor. The most qualified privatizer was selected at least cost. The process was challenged in court, but the City won. The cost for project feasibility studies, procurement services, negotiation, and implementation ran $300,000 to $400,000.

Proposer Selected: Wheelabrator EOS (WEOS) was the preferred vendor based on the evaluation. As plant owner, WEOS would maintain all local, State, regional, and federal permits. Since WEOS would not directly deal with customers, it was not expected that the plant would be regulated by the Delaware Public Service Commission. If full privatization included the purchase of plant assets and repayment of federal grants, it was expected that approvals would be required from the State, USEPA Region III, USEPA headquarters, and the federal Office of Management and Budget. The need for regional and federal approvals under a long-term lease privatization was also investigated.

Contract negotiations with WEOS began shortly thereafter and were to have been completed by the end of 1995, with a scheduled project start date of January 1, 1996. However, the County did not approve of the project and voiced significant concerns that the City was going to receive a substantial financial windfall that County customers would pay for in the form of higher rates. Even after it was shown that privatization would benefit all customers, the County believed that it had an "equity position" in the assets and should share in the up-front cash benefits. Disagreement over this issue is the primary reason the privatization initiative failed. However, negotiations are underway between the City, County, and Wheelabrator EOS to develop an acceptable privatization scenario meeting the objectives of all parties, which will likely be a service contract with a 4 to 20 year term.
Benefits: No benefits have yet been realized.

Lessons Learned: All major users or stakeholders should be included in the privatization process from the beginning. Personnel involved in operating facilities to be privatized should be excluded from the process. It is essential to review, understand, and seek clarifications where needed, on any laws, regulations, or guidelines that may affect the procurement, evaluation, selection, or negotiation process. Rigorous compliance with all rules and guidelines is essential to avoid legal challenges. It is important to keep State environmental agencies informed during the privatization process.

Reference for Further Information: Mr. Kash Srinivasan, Water Division Director, City of Wilmington, Louis L. Redding Building, 800 French Street, Wilmington, DE 19801. EFAB Member George Raftelis, 6100 Fairview Tower, Suite 615, Charlotte, NC 28210. Phone: 704-556-1936. Fax Number: 704-556-1937.

WIXOM, MICHIGAN
(Contract Operations)

Description: Dissatisfied with its lessor/public operator, the Oakland County Department of Public Works (OCDPW), the City of Wixom (City) began to investigate the process for contracting the operation and maintenance of its wastewater treatment facility in 1990. The study revealed that savings and improvements could be achieved through private operations and maintenance of the facility. After a lengthy procurement competition and the City's decision to acquire the facility, a private operator was engaged and savings realized.

Demographics: The water distribution system consists of 7 separate systems, 19 wells, 15 miles of water mains with 767 connections. The system has a capacity of 16 million gallons per day (MGD), which is about the level of current use. The wastewater treatment plant is a 5 MGD facility serving 1,620 customers. Of the 5 MGD capacity, 1.5 is used and half of the unused capacity is dedicated, by agreement, to Ford Motor Company.

The wastewater treatment plant was the subject of environmental permitting violations which resulted in a consent order. As a result, the state-of-the-art facility which presently services the community was built. The facility has an oxidation ditch activated sludge process with a chemical phosphorus removal system, and tertiary filtration and ultraviolet disinfection and aerobic digestive system to handle solids with sludge storage (1.7 million gallons) for possible land application.

Procurement/Competition: The City was dissatisfied with the cost, communications and control that they were experiencing with their lessor/operator, the OCDPW. They wanted to become the owner of the wastewater facility and contract operations and maintenance of the water and wastewater systems to a private operator. Consensus was achieved by constant review and attention to the process by the city council, city manager, treasurer, and public works manager. The matter was discussed openly at council meetings and community input solicited.

The Michigan Department of Natural Resources and USEPA became involved regarding dismissal of the consent order. This dismissal was required for transfer of ownership of the plant from OCDPW to the City of Wixom. Advice from the DNR and EPA was also sought as to whether the privatizer/operator could operate both the waste facility and the industrial pretreatment program for Ford Motor Company.

The procurement process cost about $100,000 incurred over three years. A portion of the cost was recouped through a charge of $2,000 from each of the five proposers and as a result of lower interest costs on the bonds subsequently issued for the purchase of the wastewater plant.

WIXOM, MICHIGAN

Proposer Selected: Williams and Works (now Earth Tec) was selected in the spring of 1994 after a competitive request for proposal process, answers to written questions, and personal interviews with three of the most competitive proposers (including OCDPW). They had superior technology and innovative ideas; and they provided additional services not included in the OCDPW proposal. Earth Tec received a five year contract to operate the wastewater which limited price adjustments to changes in flow or content, Consumer Price Index fluctuations, and other escalators. It withdrew from its previous testing and services role in Ford Motor Company's pretreatment program. The City decided to payoff the County bonds and acquire ownership of the wastewater facility.

Labor was addressed in an agreement that OCDPW employees could apply for employment at Earth Tec, OCDPW provided an early retirement program, and reassignment was offered to other positions in the Oakland County system. All issues were openly discussed and resolved without cost to the City of Wixom. Labor issues caused no delays in the project, and there were no layoffs.

Benefits: The community saved about ten percent or $100,000 in the first year of operation and received additional programs and services. The City was impressed with the increased level of information provided by the private operator, including more timely cost and budgetary data. The City believes it is more knowledgeable about wastewater operations and has better information with which to develop its budget and conduct long term planning. The privatization process informed the City, its people, elected officials, and management on the value of analyzing the quality of functions run by government agencies and on the benefits of public-private partnerships.

Drawbacks: The process was lengthy and time consuming, especially for the owner's personnel. It also required an up front commitment of funds to get through the process.

Lessons Learned: Politics are always a factor in anything that involves major change from former municipal ownership and operations. The political process requires patience, flexibility and the ability to fund necessary experts and consultants. Public owners and operators will not give up control until the full administrative/political process has been used and all options carefully explored. It is essential to engage experts early in the process and include them in the review team analyzing proposals and drafting contracts. The city council must be committed to the project and involved in the process. A strong administrative leadership team (city manager, treasurer, and director of Public Works) is essential for a project to remain focused.

Reference for Further Information: Mr. J Michael Doman, City Manager, City of Wixom, 49045 Pontiac Trail, PO Box 155 Wixon, MI 48393-0155. David M. Lick, Partner, Loomis, Ewert, Ederer, Parsley, Davis & Gotting, P.C., 232 South Capitol Avenue, Suite 1000, Lansing, MI 48933. Telephone Number: 517-482-2400. Fax Number: 517-482-6604.

OTHER

Description:

Demographics:

Procurement/Competition:

Proposer Selected:

Benefits:

Lessons Learned:

Reference for Further Information:

5. TOOLS FOR DELIVERING FINANCIAL OUTREACH

5. TOOLS FOR DELIVERING FINANCIAL OUTREACH

INTRODUCTION

Financial outreach and technical assistance at the State and local level can be vital to the success of environmental programs. The outreach tools described in this section are different from direct governmental assistance, such as financial assistance, and traditionally have been offered by a range of non-profit and private sector organizations as well as some governments. Outreach can be very important for environmental programs because of the multiplicity and complexity of constantly changing environmental regulations, both federal and State, and the need to finance, operate, improve or construct facilities to comply with these regulations. Financial outreach is increasingly important because of the growing cost of environmental facilities, programs, and activities. This is particularly true for small community environmental projects because this kind of outreach has not been readily provided by the federal government, and can be a critical link between environmental mandates and implementation of these mandates by local managers in the field.

Two types of financial outreach are presented in this section: **institutional arrangements and electronic services.** Institutional outreach arrangements are provided by organizations, initiatives and mechanisms that provide information, advice and hands-on training on how to finance environmental facilities and implement new programs. Institutional outreach traditionally has been provided by non-profit groups and private associations, such as universities, professional associations, trade organizations, and advisory panels.

However, many States are now providing more financial and technical assistance to communities, especially small ones, in connection with their State Revolving Fund (SRF) Programs for financing clean water and drinking water activities. For example, capacity development assistance in the context of a State capacity development plan is mandated under the Drinking Water SRF program. SRF self-help type outreach also is increasing in a number of States.

Electronic outreach is achieved through computers and electronic technology such as telephone, fax and video links. These electronic services represent one of the fastest growing forms of access and data sharing. They can be a prompt and highly cost-effective method of financial outreach, provided that potential users have adequate access to them. These services can be highly beneficial to even large, sophisticated public and private entities.

5.A. INSTITUTIONAL ARRANGEMENTS

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Description: The term institutional arrangement as used in the context of financial outreach and technical assistance includes organizations, initiatives, and mechanisms that support and facilitate the financing and implementation of sustainable environmental programs, systems, and projects by all levels of government, as well as the private sector and individuals. Such arrangements can range from non-profit environmental and service associations to university-based technical assistance networks, government advisory or ad hoc groups, and State capacity development assistance programs. All arrangements, however, must promote the exchange of information and technical assistance on sustainable ways to pay for the myriad of environmental activities undertaken by regulated entities, public and private.

Advantages: Institutional arrangements have some distinct advantages over direct governmental assistance approaches. Since there are so many types of arrangements, there is a likelihood that one or more can be found to help meet the financing needs of any regulated entity. Theses arrangements tend to be independent, innovative, and non-bureaucratic in nature. They often provide help to clients more easily, faster, and at lower costs. They typically involve face-to-face, hands-on training, and are project specific. They also may require significant client involvement ranging from detailed feedback and cooperation to direct project participation and funding. As a result, the outreach and technical assistance provided is of extremely high quality and may be highly financially leveraged.

The very nature of institutional outreach arrangements presumes a close interaction with client groups. Consequently, such arrangements often have, or come to have, a high degree of credibility and standing with clients. They can also often develop over time a considerable body and degree of technical expertise in a relatively focused area, such as finance, which can be replicated in other locations. Furthermore, since they are not regulatory in nature and operate more informally, client groups often develop and maintain a higher level of comfort with them than they do with federal and State government agencies and approaches.

Limitations: Institutional arrangements are not typically themselves a source of funds, with the exception of the State Revolving Fund Self-Help and Drinking Water Financial Assistance programs that some States have for smaller, disadvantaged communities. However, many efforts may serve as pass-through entities funneling money to assistance recipients (in demonstrations or pilots). Outreach , assistance, and direction provided to clients via these arrangements may be rejected by State or federal regulatory agencies. Care must be taken when designing and establishing these arrangements to give clear guidelines on requirements, responsibilities, and authorities with clients and governments, or the organization may not be able to carry out its mission effectively.

Summary: The fourteen types of institutional outreach arrangements presented here are hardly exhaustive. Many other kinds and sources of outreach and technical assistance exist. Some arrangements/techniques are quite informal and ad hoc, for example, pro bono legal services, business panels and forums, and the like. The mechanisms presented here are arranged or supported more formally by governments, such as the eight university-based Environmental Finance Centers (EFCs). Reader suggestions for additional types of outreach arrangements are not only welcome, but actively encouraged and solicited.

LIST OF INSTITUTIONAL ARRANGEMENTS
(In Alphabetical Order)

1. Border Environmental Cooperation Commission
2. Circuit Riders
3. Cooperatives
*4. Cooperative Extension Systems
*5. Drinking Water SRF Capacity Development
*6. Environmental Finance Center (EFC) Network
7. Region 6 EFC at the University of New Mexico
8. Region 3 EFC at the University of Maryland
9. Region 2 EFC at the Maxwell School, Syracuse University
10. Region 9 EFC at California State University at Hayward
11. Region 5 EFC at Cleveland State University
12. Region 10 EFC at Boise State University
13. Region 4 EFC at the University of North Carolina
14. Region 4 EFC at the University of Louisville
*15. EPA: Environmental Finance Program
16. EPA: Environmental Financial Advisory Board
*17. Finance Charrettes
*18. National Technical Assistance Programs (Non-profit)
19. Retired Volunteers
*20. Rural Community Assistance Corporation
*21. Self-Help
*22. West Virginia University Environmental Services and Training Division

* Stars indicate most highly rated mechanisms as described in the Comparison Matrix at the end of the narratives. See Introduction to the *Guidebook* for a description of the criteria used. Ratings of "High", "Moderate", and "Low" are for comparison purposes only, as some ratings are necessarily subjective and data are incomplete.

BORDER ENVIRONMENTAL COOPERATION COMMISSION

Description: The Border Environmental Cooperation Commission (BECC) was created within the context of the North American Free Trade Agreement process and is a sister agency to the North American Development Bank (NADBank). The BECC reviews proposals for environmental projects in the region along the US-Mexico border region and certifies them for loan funding by the NADBank (see **Section 2.B., North American Development Bank**). The purpose of the BECC is to help preserve, protect, and enhance the environment of the border region in order to advance the well-being of the region's residents and to achieve sustainable development. Environmental areas to be emphasized by the BECC include municipal solid waste management, wastewater treatment, and the supply of potable water.

Actual Use: Before the BECC certifies a project for funding by the NADBank, criteria in the following six categories must be satisfied: 1) general project description; 2) environmental and human health; 3) technical feasibility; 4) financial feasibility and program management; 5) community participation; and 6) sustainable development. By mid-year 1998, the BECC had certified twenty-five projects for funding in a range of environmental areas including water supply, wastewater treatment, regional landfills, water/wastewater facilities maintenance, and a surface water cleanup study.

Potential Use: Growing trade and population has increased stress along the border region between the US and Mexico. The lack of adequate environmental and other infrastructure to handle rising population and traffic has led to additional municipal, environmental and public health, transportation, and educational needs. The growth potential for BECC approved environmental infrastructure projects is very significant.

Advantages: Both the BECC and the NADBank have a strong private sector orientation. Private financial institutions and firms play a key role in financing, building, operating, and maintaining the infrastructure. Because of the strong private sector orientation, employment along the border and equipment suppliers have benefitted from increased economic development.

Limitations: Projects that require grants or equity funding are not considered for certification by the BECC. There is considerable concern that border communities may not be able to repay loans of any kind. All projects certified by the BECC and funded by NADBank must address environmental issues within 100 kilometers of the US-Mexico border.

Reference for Further Information: Border Environmental Cooperation Commission (BECC), Post Office Box 221648, El Paso, Texas 79913, E-Mail: **becc@cocef.interjuarez.com**

CIRCUIT RIDERS

Description: A circuit rider is a dedicated expert who travels on some established regular basis to a number of participating individuals and organizations to provide hands-on technical assistance, professional services, and education. The circuit rider can be either an independent entrepreneur contracting with the participants individually or as a group, or an employee of the participant group acting cooperatively. Furthermore, the circuit rider can work either a full or part-time depending on the number of systems participating and the assistance and services provided.

For example, several publicly or privately owned water or other environmental systems may agree to jointly obtain administrative, management, technical, or other services from a common source to meet their common needs. The common source, the circuit rider, addresses the common need such as the collection of samples from each system and delivery of the batch to a lab for testing.

Actual Use: Cooperatives in many fields use circuit riders to obtain specialized goods and services. State government agencies in fields such as education, the environment, transportation, and small business development use the circuit rider approach to provide technical assistance to small, often rural, communities and businesses. Ohio's T2 Center Circuit Rider program is a good example of a transportation-based effort. AmeriCorps' programs make significant use of circuit riders in implementing their varied activities.

Potential Use: There is high potential for use of circuit riders by smaller environmental systems in areas such as mobile home trailer parks. For many of these systems, circuit riders are a good way to overcome their geographical dispersion and individual inability to afford technical assistance. These same systems are also good candidates for membership in cooperatives.

Advantages: The circuit rider approach is a cost-effective way for smaller environmental systems to be able to afford technical assistance. The pooling of their business needs lets the individual systems negotiate lower overall rates with assistance providers by virtue of being part of a larger business opportunity.

Limitations: Circuit riders cannot be at every location all the time and may not be accessible in a timely manner during an emergency. The circuit rider may try to play one system off against another to negotiate a better deal. Small systems are often very independent.

Reference for Further Information: Ohio T2 Center Circuit Rider Program, Program Coordinator Mike Fitch, Telephone: 614-292-4988. National Association of Service and Conservation Corps (an AmeriCorps T/TA provider), Circuit Rider Program, Telephone: 202-737-6272.

COOPERATIVES

Description: A cooperative is an independent association of people and/or groups voluntary united to meet common needs through a jointly owned and democratically operated venture. For example, several publicly and/or privately owned environmental systems could agree to jointly share administrative, management and technical resources in providing common environmental services. The resulting cost savings would be either passed along to users, reinvested in the cooperative venture, or returned to the member systems.

Actual Use: Some limited numbers of water systems operate jointly in cooperatives. The Water Cooperative of Pierce County located in Washington State is a good example. This organization consists of several municipal and mutual utilities that provide water to almost a quarter million people. It has both an environmental and a legislative agenda. Nationally over 100 million people belong to 47,000 cooperatives. Cooperatives are set up to provide/receive just about any good or service including: business services, child care, financial services, employment, equipment and farm supplies, food and food services, health care, housing, insurance, legal and professional services, the marketing of agricultural and other products, and utilities. They are organized in one of three ways: producer-owned, consumer-owned or worker owned.

Potential Use: There is a high potential for using the cooperatives approach with smaller water, wastewater, and solid waste systems. Cooperatives also could also be very effective in helping implement community-based environmental programs. For example, agricultural cooperatives could promote with their members techniques to reduce fertilizer and pesticide runoff and use. Forming cooperatives to buy environmentally friendly products in bulk would reduce costs and encourage market expansion in the availability of such products.

Advantages: Cooperatives can reduce costs (sometimes dramatically) through the buying/selling power achieved through economies of scale. Cooperatives allow systems to pool not just their resources, but also their technical expertise and knowledge regarding outside sources of assistance.
Limitations: Cooperatives can be a challenge to start as their members are often very independent and used to operating in their own ways.

Reference for Further Information: U.S. Department of Agriculture, Rural Business-Cooperative Service, 14th & Independence Avenues, SW, Room. 5405-South Bldg, Washington, D.C. 20250, Web site: **http://www.rurdev.usda.gov/rbs/index.html**. Information is also available on the National Cooperatives Business Association web site at **http://www.cooperative.org**. The Pierce County Cooperative web site is **http://users.aol.com/waterguy3/waterworks.html**.

COOPERATIVE EXTENSION SYSTEMS

Description: Cooperative extension is a government-supported effort that attempts to link the university(ies) and citizens in each State, usually at the county level, using education and information as tools to help address real-world problems. Traditional areas in which the cooperative extension approach has been applied include agriculture and natural resources. The approach is increasingly being focused on environmental protection and topics such as sustainable development.

Actual Use: The Department of Agriculture's Cooperative State Research, Education, and Extension Service (CSREES) supports community-based environmental education efforts by the land-grant universities and the 57 State/territorial cooperative extension services, which employ over 9,600 local extension agents. The Smith-Lever and Renewable Resources Extension Acts provide formula grants supporting extension programs that promote community-based volunteer activities, collaborations among public and private institutions, and other delivery systems.

Since 1991, the Cooperative Extension Service at the University of Connecticut has provided information on non-point pollution sources and their links to land use. Farm*A*Syst and Home*A*
Syst (in 47 and 30 States, respectively) are voluntary, rural water pollution prevention programs run by the University of Wisconsin. In 1997, CSREES working with EPA, State extension services and others supported four pilot projects applying environmental education to sustainable development issues at the community level. These projects encourage community-based environmental education models, build the capacity of regional, State and community agencies to work via education institutions and systems, and improve the ability of communities to plan/implement development that integrates economic, environmental and social capacities.

Potential Use: If the four CSREES/EPA pilot projects produce workable models, or are extended to and embraced by other communities, the opportunities for environmentally sound, sustainable development projects could be increased.

Advantages: The program can integrate environmental thinking at all governmental levels.

Limitations: Funding for environmental education and technical assistance activities tends to be very limited. Some approaches have limited applicability.

Reference for Further Information: USDA, CSREES, Ag Box 2210, Aerospace Bldg, Rm 826, Washington, DC 20250, Phone: 202-401-6050, Fax: 202-401-1706, E-mail: gcrosby@ reeusda.gov, Internet: **www.reeusda.gov/**. NEMO, 1066 Saybrook Rd, Box 70, Haddam, CT 06438, Phone: 860-345-4511, Fax: 860-345-3357, Internet: **http://www.lib.uconn.edu/CANR/ces/nemo/**. Farm*A*Syst and Home*A*Syst, 550 Babcock Drive, Madison, WI 53706; Phone: 608-262-0024; E-mail: farmasyst@macc.wisc.edu; Internet: **www.wisc.edu/farmasyst/**.

DRINKING WATER SRF CAPACITY DEVELOPMENT

Description: "Capacity" is a term currently used to describe the technical, financial and managerial ability of public and private entities to administer vital services, in this case drinking water facilities.
The 1996 Safe Drinking Water Act authorizing the Drinking Water State Revolving Fund (DWSRF) requires States to prepare capacity development strategies for assessing and assisting adequate local capacity. All DWSRF local applicants must demonstrate that their water system has appropriate capacity to qualify for financial assistance. Since DWSRF's without strategies may lose up to 20 percent of federal capitalization grants beginning in the year 2000, and must use 15 percent of funds to finance water systems under 10,000 customers, local capacity now receives formal attention.

Actual Use: All States are focusing systematically on capacity development, primarily via State Departments of Health, DWSRF's and/or Self-Help programs, and are permitted to use 2% of DWSRF funds for technical assistance and up to 10% for program management including capacity development and operator certification. Technical capacity refers to engineering knowledge and operator skills. Financial capacity describes local revenue, income and cost issues, credit worthiness, and rate systems supporting drinking water facilities. Managerial capacity is the expertise of personnel administering overall water systems on a day-to-day basis and overseeing financial operations to ensure viability.

Potential Use: A number of important issues will be addressed as part of capacity development assistance for water systems, and such strategies are transferrable to other environmental facilities such as wastewater, solid waste and air pollution. These include a stronger focus on local affordability, including cumulative cost of all environmental services, facility operator training and certification, regionalization/consolidation of systems to achieve economies of scale, privatization alternatives such as contract management, and assessment of local environmental conditions such as adequacy of source water and comparative risk ranking.

Advantages: Adequate local capacity to design and administer pollution control projects on a long-term basis is the single most important factor influencing the success of money spent on environmental improvements. Small communities in particular can greatly benefit from capacity development assistance, which further may reduce costs. Systematic criteria such as for affordability can be extremely helpful in determining whether and what type of financial assistance is needed, and enables comparison of alternatives.

Limitations: there is no guarantee that localities needing improved capacity will receive assistance, as projects ranking highest on DWSRF priority lists and ready to proceed will be assisted first. The DWSRF capacity development set-aside decreases the total amount of DWSRF money available to make loans. SRF may find the specific federal compliance dates and set-asides onerous.

Reference for Further Information: The federal capacity development strategy is outlined in Section 1420 of the 1996 SDWA Amendments. Each State will develop and administer its own plan.

ENVIRONMENTAL FINANCE CENTER (EFC) NETWORK

Description: The EFC Network is a system of university-based regional centers that provides State and local governments and the private sector with educational, technical, and analytic assistance on environmental finance (see the following eight pages). Centers are located at: Syracuse University (Region 2); the University of Maryland (Region 3); Cleveland State University (Region 5); the University of New Mexico (Region 6); California State University at Hayward (Region 9); and Boise State University (Region 10). Prospective centers are located at the University of North Carolina (Region 4) and the University of Louisville (Region 4). Coordination of the EFC Network is assisted by the Environmental Protection Agency's (EPA's) Environmental Finance Program.

Actual Use: During the past several years, the Network has helped numerous communities across the nation. Network centers have held more than thirty conferences, meetings, workshops, and advisory panels with more than 1,000 State and local officials, and private parties covering a wide range of financing topics. These have included watershed management, brownfields redevelopment, drinking water and wastewater financial planning, stormwater runoff, environmental business opportunities, and solid waste management. Network centers have developed detailed training courses on innovative financing alternatives. They have also produced approximately fifty guidance documents, reports, articles, and models on these and other environmental financing topics.

Potential Use: The Network has the capacity to assist many more of the large numbers of State, local and private parties who need to identify and access suitable financing tools. It could grow without expanding by allowing individual Centers to set up satellite arrangements with other universities in its EPA Region. For example, the Cleveland State EFC in Ohio might link with institutions in Wisconsin, Minnesota, Illinois, etc., to work jointly on specific brownfields projects.

Advantages: Each EFC has its own environmental finance speciality(ies). The Network is highly leveraged in that it taps the expertise(s) of each, as well as the strengths of the universities at which they are located. Network centers are well distributed and well positioned around the country. By sharing information and serving as a clearinghouse, the Network is able to efficiently help States and localities nationwide identify and access suitable environmental financing approaches.

Limitations: The EFC Network and individual centers are generally not able to provide direct financial assistance for environmental activities to State and local governments and businesses. All fifty States are not yet covered by the program.

Reference for Further Information: U.S. EPA, Office of the Comptroller, Environmental Finance Program, 401 M Street, SW, Washington, DC 20460, Mail Code: 2731R, Contact: Vera Hannigan at **hannigan.vera@.epa.gov**. EFC Network information can also be accessed via the Environmental Finance Program's home page on the World Wide Web located at **http://www.epa.gov/efinpage**

REGION 6 EFC at the UNIVERSITY of NEW MEXICO

Description: Established in 1992, the University of New Mexico Environmental Finance Center (UNM-EFC) is located at the New Mexico Engineering Research Institute. UNM-EFC provides technical assistance to federal, State, and local governments and focuses on public and private water systems. The Center seeks to identify viable financing options and promote low-cost, alternative, and appropriate technologies for environmental projects that strengthen the movement toward sustainable development. The UNM-EFC seeks to develop and implement affordable pollution prevention and source reduction approaches, when possible.

Actual Use: The UNM-EFC has aided New Mexico counties on the US-Mexico border with meeting environmental infrastructure needs by analyzing the feasibility of small regional water systems. The EFC has developed benchmark criteria as an assessment tool/methodology to evaluate the viability of small, rural water systems. The Center is providing assistance to New Mexico State agencies in developing and implementing a program to enhance resources available for small system capacity development. This work has provided a model for mobilizing water systems to better meet the small system capacity/viability requirements of the Safe Drinking Water Act.

Potential Use: The UNM-EFC is undertaking new projects in a variety of environmental areas and locations. These include brownfields site redevelopment projects, a small system rate structuring for the Texas Natural Resources Conservation Commission (TRNCC) using expert rate setting, impact fee, and financial planning computer software known as RateModPro™, municipal water conservation projects, and small system capacity development analysis for the Pueblo of Jemez, New Mexico and the TNRCC.

Advantages: The UNM-EFC participates fully in EPA's university-based Environmental Finance Center Network. Through its own expertise, the sharing of information and expertise between centers, and use of the Network as a clearinghouse on environmental financial issues, UNM-EFC is able to greatly leverage the technical assistance on environmental finance that it provides to Region 6 State and local governments.

Limitations: Although UNM-EFC identifies financing options and low-cost, alternative and appropriate technologies for environmental projects, the Center is not a funding resource.

Reference for Further Information: The University of New Mexico Environmental Finance Center, 901 University Blvd. SE, Albuquerque, NM 87106, Telephone: 505-272-7356, Fax: 505-272-7203. The UNM-EFC World Wide Web site is located at **http://nmeri.unm.edu/ta/efc.htm**

REGION 3 EFC AT THE UNIVERSITY OF MARYLAND

Description: The Environmental Protection Agency (EPA)Environmental Finance Center (EFC) in Region 3 is part of the University of Maryland's Coastal and Environmental Policy Program. It is hosted by the Maryland Sea Grant College, and was created to train, provide assistance, and act as an advisor to State and local governments/private parties on environmental finance issues.

Actual Use: To help communities assess and analyze funding options for specific environmental projects, the EFC has staged over a dozen financé charrettes -- forums for frank discussions between local officials and technical/finance experts. Charrette issues have included wastewater treatment, stormwater management, solid waste facilities, drinking water systems, costal zone protection, and credit access for small businesses. The EFC has also produced reports on financing alternatives for Chesapeake Bay cleanup for setting up riparian buffers in the Bay watershed. Another EFC publication assists air program agencies with financial management of the Clean Air Act Title V program. The EFC also has a pilot project showing the feasibility of extending the State Revolving Fund (SRF) program to sustainable agriculture practices. Finally, the EFC has co-sponsored Regional conferences to discuss and disseminate information on financing environmental projects.

Potential Use: The EFC is designing educational workshops for environmental finance issues that are best addressed via a local watershed-based strategy. For Maryland's multi-county, watershed-specific, "Tributary Teams", it is developing workshops to identify fiscal problems relating to nutrient reduction, policy making processes, and major fiscal options. Excess nutrients have been identified as a major cause of Chesapeake Bay pollution. In cooperation with EPA, the EFC is conducting a series of workshops nationwide to encourage SRFs to move to an integrated watershed planning and priority setting process in considering loan applications to their programs.

Advantages: As part of the University of Maryland's Coastal and Environmental Policy Program, the EFC draws on the expertise of professionals in the fields of environmental research, agriculture, engineering, law, and policy as a holistic response to addressing environmental finance issues. Being part of EPA's network of university-based EFCs and working with its Environmental Finance Program, provides access to information on environmental finance from around the nation.

Limitations: While able to design and demonstrate ways to lower the cost of environmental facilities and services, the EFC does not provide direct funding for environmental projects.

Reference for Further Information: Region 3 EFC, University of Maryland Sea Grant College, 0112 Skinner Hall, College Park MD 20742. Phone: 301-405-6384. Fax: 301-314-9581. E-mail: hickey@umbi. umd.edu; World Wide Web: **http://www.mdsg.umd.edu/MDSG/EFC/index.html.**

REGION 2 EFC at the MAXWELL SCHOOL, SYRACUSE UNIVERSITY

Description: Established in 1994, the Syracuse University Environmental Finance Center (EFC) is located at the Maxwell School of Citizenship and Public Affairs. The EFC provides training, technical assistance, and outreach services to State and local officials relating to financing environmental systems. The EFC has undertaken projects ranging from studies of risk and finance decision-making methodologies to financing strategies and delivery mechanisms for funding water infrastructure. It has interests in the full-cost pricing of environmental services, water and wastewater privatization, and small community environmental infrastructure needs.

Actual Use: In 1996, the EFC completed a Congressionally-requested report for the Environmental Protection Agency (EPA) Office of Water examining alternative strategies for financing the water and wastewater infrastructure needed to meet national environmental mandates. The EFC also has conducted an analysis of the economic and fiscal consequences for Onondaga County (Syracuse) of the court-ordered remediation of Lake Onondaga. It has completed demonstrations and training on the use of an EPA-funded computer software program for setting water and wastewater rates. The EFC also co-sponsored a number of conferences/meetings with the New York State Environmental Facilities Corporation.

Potential Use: The EFC plans to conduct seminars and training throughout New York and the rest of the Region on water/wastewater rate-setting. The EFC plans to work with Cornell University and the Rensselaer Polytechnic Institute on a joint effort to form an Environmental Community Assistance Consortium (ECAC). The ECAC would assist New State and local officials in New York by providing training, institutional expertise, education, and outreach to assist in implementing State environmental programs.

Advantages: The Syracuse EFC benefits from the combined expertise of the network of university-based EFCs. Further, the EFC enjoys close access to the expertise at the Maxwell School, which is renowned for its premier public administration graduate programs and high quality, practitioner-focused training. When and if operational, the ECAC would be an intra-university partnership tapping the further expertise of Cornell University and the Rensselaer Polytechnic Institute.

Limitations: EFC program funding and staff resources are currently limited. Efforts are being made to expand the center's financial base to expand services. The EFC is not a funding source.

Reference for Further Information: U.S. EPA Region 2 Syracuse University Environmental Finance Center, The Maxwell School, 219 Maxwell Hall, Syracuse, New York 13244-1090. Phone: 315-443-9438. Fax: 315-443-5330. World Wide Web: **http://www.maxwell.syr.edu/exed/efc/**

REGION 9 EFC at CALIFORNIA STATE UNIVERSITY at HAYWARD

Description: The Environmental Finance Center, Region 9 (EFC9), is affiliated with California State University at Hayward (CSUH), and exists to benefit Environmental Protection Agency (EPA) Region 9, which includes Arizona, California, Hawaii, Nevada, Guam, and the Marshall Islands. The mission of the EFC9 is to educate and assist public and private business/financial managers, owners, and advisors in the application and use of innovative financing techniques that further the implementation of environmental programs and projects. EFC9 also seeks to support the establishment of environmental businesses and environmental technology development enterprises.

Actual Use: To assist environmental industry entrepreneurs in understanding the dynamics of their markets and identifying those market segments with the greatest potential, EFC9 has developed profiles of the U.S. environmental industry, environmental industry labor market models and databases, a 100 page directory of funding sources, and environmental education and training programs. The EFC has developed a financial model for assessing the viability, short- and long-term financial characteristics, and capital needs required for establishing and operating an Environmental Technology Incubator. EFC9 has also hosted numerous Environmental Business Opportunity conferences throughout California and in Hawaii.

Potential Use: EFC9 will be working to complete development and begin implementation of an innovative financing model designed to stimulate capital investments in the environmental industry. The EFC plans to inventory and assess current/planned water system improvements, expansions, and additions in EPA Region 9. EFC9 also looks forward to hosting and/or participating in future conferences involving such diverse topics as environmental business opportunities and ways to improve and finance the water systems of small and rural counties and cities.

Advantages: The EFC possesses considerable technical expertise on matters relating to the environmental industry, and through its participation in the Environmental Finance Center Network the diverse expertise of the other EFCs. In addition, EFC9 benefits from the expertise of the faculty at CSUH and from its contacts and connections with other colleges, universities, and affiliated laboratories through the State of California's renowned educational systems.

Limitations: While clients can benefit from EFC9's expert advice and technical assistance/outreach, the center is unable to provide direct financial support to businesses and communities in the Region.

Reference for Further Information: U.S. EPA EFC9, Building 7, Alameda Point, 851 West Midway Avenue, Alameda, California 94501, Telephone 510-749-6867, Fax: 510-749–6862, World Wide Web: **www.greenstart.org/efc9/.**

REGION 5 GREAT LAKES EFC at CLEVELAND STATE UNIVERSITY

Description: In May 1995, the Environmental Protection Agency (EPA) established the Region 5 Great Lakes Environmental Finance Center (EFC) in the Urban Center at Cleveland State University (CSU). The Great Lakes EFC serves a six-State area, including Ohio, Indiana, Illinois, Michigan, Wisconsin, and Minnesota. The primary mission of the EFC is to assist State and local government and private sector organizations in devising effective financing strategies for environmental improvement projects. It accomplishes this by providing high-quality technical assistance and training services to its clients. While the EFC's chief client is the public sector, it has steadily increased services to banks, insurance companies, environmental consultants, law firms, and other private businesses serving the environmental industry.

Actual Use: The Region 5 EFC's initial major focus has been on brownfields site redevelopment. This involves the financial issues affecting the availability of credit and financial tools and incentives to spur investment in abandoned commercial and industrial sites. These sites are a major constraint to the redevelopment of central city neighborhoods, which desperately need new jobs and investment. The issue is a top priority in all of the Great Lakes region's major cities, including many small and medium-sized cities. Other areas of importance for the EFC are environmental facility privatization and market-based pollution prevention, both of which are emerging strategies cities are examining to achieve more cost effective environmental cleanup-up goals.

Potential Use: The EFC plans to work more closely in joint projects with other centers. It will be collaborating with the Region 9 EFC in a two-city demonstration project to develop innovative regional strategies to increase the demand for pollution prevention activities by smaller companies. The EFC will continue and expand its efforts to provide on-site advisory assistance to Midwestern cities In addition to working with Benton Harbor, Michigan, the plans to conduct technical assistance workshops in five other Midwestern cities in 1997.

Advantages: The EFC can tap the expertise and resources of CSU's Urban Center as well as the rest of the University. It can also tap the expertise and contacts of the other centers in EPA's EFC Network and those of EPA's Environmental Finance Program in Washington, DC.

Limitations: Most EFC activities are concentrated in the six-States comprising EPA Region 5. The EFC provides financial technical assistance and outreach, but no direct funding support.

Reference for Further Information: Region V Great Lakes EFC, the Urban Center at Cleveland State University, Economic Development Program, UB 215, Cleveland, Ohio 44115, Telephone: 216-687-6947, Fax: 216-687-9227, World Wide Web site: **http://www.csuohio.edu/glefc/**.

REGION 10 EFC at BOISE STATE UNIVERSITY

Description: The Environmental Protection Agency's (EPA's) Region 10 Environmental Finance Center (EFC) was created in 1995 and is contained within the Public Affairs Program of the Boise State University (BSU) College of Social Sciences and Public Affairs. The EFC serves the Pacific Northwest and Intermountain States of Alaska, Idaho, Oregon and Washington. The EFC seeks to assist these States and their communities on environmental financing issues, particularly with regard to drinking water system capacity assessment and the needs of small communities and systems.

Actual Use: The EFC has been an important partner to State and local governments in Region 10 in addressing financing issues relating to unfunded and underfunded environmental mandates in small communities. Program faculty, working with staff from the State of Idaho, have been national leaders in developing multi variate drinking water capacity assessment and strategic planning approaches similar to those in the Safe Drinking Water Act Amendments of 1996. The EFC has been working to improve the financial and managerial capacities of public water and wastewater treatment systems.

Potential Use: The EFC seeks to provide the following technical assistance and outreach services: workshops, conferences, training seminars, and formal education directed at expanding the ability of public and private leaders to address environmental problems; practical guides, handbooks, and reports on financial and management issues relating to environmental systems; assistance to local and tribal governments and other public water and wastewater systems to improve financial management capabilities and, where appropriate, to increase their use of alternative approaches to traditional finance and revenue raising methods; and initiatives to foster regional partnerships in improving public management and innovative financing techniques.

Advantages: The Region 10 EFC participates in EPA's university-based Environmental Finance Network. Using its own expertise, the sharing of information and expertise between centers, and using the Network as a clearinghouse on financing issues, the EFC is at BSU is able to assist in addressing the how-to-pay issues of environmental compliance in Region 10.

Limitations: Although the EFC helps communities to address financing options, low-cost alternative and appropriate technologies, and appropriate technologies and management techniques to meet infrastructure challenges, the EFC is not itself a funding source.

Reference for Further Information: The Environmental Finance Center at Boise State University, 1910 University Drive, Boise, ID 83725, Telephone: 208-385-4293, Fax: 208-385-4370, E-mail: bjarock@idbsu.edu/efc, Web site: **http://sspa.boisestate.edu/efc/index.html**

REGION 4 EFC at the UNIVERSITY OF NORTH CAROLINA

Description: This prospective Environmental Protection Agency (EPA) Region 4 Environmental Finance Center (EFC) is contained within the Economic Development Office of the University of North Carolina (UNC) at Chapel Hill. The UNC EFC primarily will serve the Southeastern United States – including Alabama, Florida, Georgia, Kentucky, North Carolina, South Carolina, and Tennessee. The EFC's initial expertise will be in the areas of environmental finance, management and planning. The Center recognizes the importance of economic development to environmental infrastructure and to the provision of truly sustainable environmental services.

Actual Use: The North Carolina EFC's initial core mission will focus on the environmental financing needs of small- to medium-sized communities, particularly those considering interlocal or regional arrangements for providing environmental infrastructure. In this regard, the EFC's staff has begun working with representatives from four counties in the North Carolina central coastal plain to help promote joint solutions to critical wastewater issues on that coast. The EFC is developing an approach involving enhanced local planning and plans to prepare one or more case studies during and/or upon completion of this project. The EFC also has begun working with the Eastern Band of Cherokee Indians and the North Carolina Attorney General's office to advise the Tribe on accessing State resources for environmental financing needs.

Potential Use: The North Carolina EFC intends to assemble a group of expert advisors drawn from academia, government, and mission-related non-governmental organizations (NGOs) to help set future directions and assess projects. The EFC also plans to develop a matrix of contacts for use by staff and clients on any particular project. The EFC recognizes the need for constructing an Internet web site and developing the information management tools necessary to carry out its planned environmental and finance missions.

Advantages: The Region 4 EFC located at the University of North Carolina hopes to become one of the university-based centers participating in EPA's Environmental Finance Network. Using its own expertise in a number of areas, the sharing of information and expertise between centers, and using the Network as a clearinghouse on financing issues, the EFC at UNC will be able to assist in addressing the how-to-pay issues of environmental compliance in Region 4 and beyond.

Limitations: The EFC's program funding and staff resources are currently quite limited. The EFC plans concentrated efforts to expand the center's financial base in order to expand services. The EFC is not a funding source for environmental financing needs.

Reference for Further Information: U.S. EPA Region 4 (prospective) Environmental Finance Center at the University of North Carolina, Office of Economic Development, CB#3435, Chapel Hill, NC 27599, Telephone: 919-962-8494, Fax: 919-962-5824, E-Mail: **mluger@email.unc.edu**

REGION 4 EFC at the UNIVERSITY OF LOUISVILLE

Description: This prospective Environmental Finance Center (EFC) at the University of Louisville (UL) is located in the University's Kentucky Institute for the Environment and Sustainable Development. The UL EFC's primary service area will be the Southeastern United States -- encompassing Alabama, Florida, Georgia, Kentucky, North Carolina, South Carolina, and Tennessee. The EFC 's staff has expertise and interest in environmental policy and planning, economic development, environmental and other public utilities, sustainable development, urban sprawl, brownfields redevelopment, and cost-benefit analyses.

Actual Use: The prospective Louisville EFC is currently developing a detailed work plan in consultation with the Environmental Protection Agency's (EPA's) Region 4 Office in Atlanta, GA. The UL EFC is also meeting with the other Region 4 EFC located at the University of North Carolina in Chapel Hill to develop joint environmental finance work projects, as appropriate.

Potential Use: The EFC Staff's wide range of expertise gives it considerable leeway in determining the Center's future work areas. Examples of possible future work areas include brownfields finance, environmentally sustainable development/smart growth, multi-media environmental revolving funds, rate-setting for environmental infrastructure services, and capital access for small businesses and businesses in the environmental goods and services industry.

Advantages: The Region 4 EFC located at the University of Louisville hopes to become one of the university-based centers participating in EPA's Environmental Finance Network, and one of two in EPA Region 4. Using its own expertise in a number of areas, sharing of information and expertise with other centers, and using the Network as a clearinghouse, the Louisville EFC will be able to assist communities in Region 4 and beyond in addressing the financial components of environmental compliance issues.

Limitations: The EFC is in the early stages of its development. The EFC itself is not a source of money to help meet environmental financing needs.

Reference for Further Information: U.S. EPA Region 4 (prospective) Environmental Finance Center at the University of Louisville, Kentucky Institute for the Environment and Sustainable Development, 203 Patterson Hall, Louisville, KY 40292, Telephone: 502-852-1851, Fax: 502-852-4677, E-Mail: rabarn01@ulkyum.louisville.edu.

ENVIRONMENTAL PROTECTION AGENCY ENVIRONMENTAL FINANCE PROGRAM

Description: The Environmental Protection Agency's (EPA's) Environmental Finance Program (EFP) is a small, multi-media effort that seeks to bridge the gap between the growing costs of environmental protection and the ability of governments and the private sector to meet those costs. Drawing on the expertise of EFP staff, the Environmental Financial Advisory Board (EFAB) and the Environmental Finance Center (EFC) Network, the EFP works to lower costs, avoid costs, increase efficiencies, stimulate public and private investment, and build financial capacity by creating partnerships with State and local governments and the private sector to help fund environmental needs.

Actual Use: The EFP provides professional staff support to EFAB. EFAB is a federally chartered advisory board composed of finance experts that provides advice and analysis to EPA on how to pay for environmental protection. To date, EFAB has produced numerous advisories and reports on a wide range of environmental financing topics. For more information on EFAB, see the immediately prior tool in this section, **Environmental Financial Advisory Board**.

The EFP also manages EPA's network of university-based, regional EFCs. These EFCs provide State and local officials and small businesses with training, advisory services, publications, and analyses on environmental financing trends and techniques. The eight-university network currently includes the University of New Mexico, University of Maryland, Syracuse University, California State University at Hayward, Cleveland State University, Boise State University, University of North Carolina and University of Louisville.

Potential Use: The EFP could take additional steps to improve its efforts in working more closely with all EPA program offices. It could also seek within resource constraints to expand its efforts in working with those EPA Regions not having EFCs.

Advantages: The EFP provides EPA with an integrated, multi-media environmental financing focus. Through EFAB and the EFCs, the Agency can access real-world, public finance/investment banking expertise which it does not have and could not afford to obtain. Working with these groups, the EFP is able to greatly leverage its own financing expertise and resources.

Limitations: The EFP is small and cannot work with all EPA offices at once. Due to resource constraints and the demonstration nature of the EFC concept, there are EFCs in only seven Regions.

Reference for Further Information: U.S. EPA, Office of the Comptroller, Environmental Finance Program, 401 M Street, SW, Washington, DC, 20460, Mail Code: 2731R, Fax: 202-565-2587, Contact George Ames at **ames.george@epa.gov**, Internet web site: **http://www.epa.gov/efinpage**.

ENVIRONMENTAL PROTECTION AGENCY
ENVIRONMENTAL FINANCIAL ADVISORY BOARD

Description: The Environmental Financial Advisory Board (EFAB), a federally chartered advisory board operating under the Federal Advisory Committee Act, provides independent advice to the Environmental Protection Agency (EPA) on environmental finance issues. The Board consists of nationally recognized experts drawn from government; the finance, banking, and legal communities; business and industry; and national organizations.

Actual Use: EFAB has an impressive record, producing more than over twenty major reports and advisories since 1989. The Board has identified numerous policy and program options across a broad spectrum -- incentives and revenues; environmental costing; institutional efficiencies; outreach and coordination; and rural, urban, and international -- that seek to lower the costs of environmental protection, increase public and private investment, and build State and local financial capacity to carry out environmental programs. Examples of EFAB work includes reports on: financing brownfields redevelopment, Superfund leveraging, international/NAFTA implementation, EPA's Safe Drinking Water Act guidance, finance options to implement the Clean Air Act, the integration of environmental risk and finance, and small businesses' problems in accessing capital. EFAB continues to work with EPA's Environmental Finance Centers (EFCs), with members advising the EFCs and serving on EFC-sponsored expert finance panels (charrettes) designed to help local governments and small businesses.

Potential Use: Senior EPA managers could more frequently request that the Board address financing issues related to important and topical environmental protection activities, including legislation and regulatory matters.

Advantages: EFAB provides EPA with real-world public finance/investment banking expertise which the Agency does not possess, nor can it afford to pay to retain the services of the typical member. The only realistic way to access such expertise is on a volunteer, advisory basis.

Limitations: As a federal advisory committee, the Board's recommendations are purely advice and EPA may choose not to act on them. Also, by the nature of the advisory board process, the Board's recommendations are developed by a group of approximately twenty-five individuals, and not by an all-inclusive, consensus development process encompassing all interested stakeholders.

Reference for Further Information: U.S. EPA, Office of the Comptroller, Environmental Finance Program, 401 M Street, SW, Washington, DC, 20460, Mail Code: 2731R, Fax: 202-565-2587, Contact: Alecia Crichlow at **crichlow.alecia@epa.gov**. EFAB information is also available on the World Wide Web at **http://www.epa.gov/efinpage.**

FINANCE CHARRETTES

Description: A "finance charrette" is a forum where a regulated entity meets with a panel of finance experts from the public and private sectors that offers advice and recommendations on finance issues faced by that entity. The charrette technique has been pioneered in the environmental finance field by the EPA Region 3 Environmental Finance Center (EFC) at the University of Maryland at College Park (see **Section 5.A., Region 3 EFC at the University of Maryland**). The public sector expert participants come from interested federal and State agencies. The private sector experts are drawn from business and industry, banks and other financial institutions, and the professional consultant services arena. Typically, a charrette lasts a half day beginning with a description of the problems by, for example, officials from a local government, followed by questions and answers with the panel, and report out by panel members on the actions they recommend as individuals and as a group. The proceedings are taped and results summarized.

Actual Use: Through April 1999, the University of Maryland EFC has developed and conducted more than twenty charrettes examining the environmental financing problems of communities, counties, and businesses in the mid-Atlantic region and across the nation.

Potential Use: Charrettes could be used by colleges, universities, and other technical assistance providers nationwide to determine, evaluate and help solve the environmental financing problems facing governments, communities, and businesses.

Advantages: Charrettes have proven to be a highly effective outreach tool in providing useful advice and recommendations to local governments not only on the environmental financing problem that brought them to the table to begin with, but also on other issues that they might not have been aware of. A significant spinoff benefit has been that the real world information gleaned from the charrettes can be used to develop and improve finance courses offered by EPA's network of eight university-based Environmental Finance Centers (see tool listings on the EFCs in this section).

Limitations: To maximize the panel's contribution, it is essential to give them clear, accurate and complete information on the issue prior to the charrette. Political issues disguised as finance issues need to be weeded out in advance. The charrettes undertaken to date have tended to work best with communities of populations under 50,000.

Reference for Further Information: Region 3 EFC, University of Maryland Sea Grant College, 0112 Skinner Hall, College Park MD 20742, Telephone: 301-405-6384, E-mail: hickey@umbi. umd.edu., World wide web: **http://www.mdsg.umd.edu/MDSG/EFC/index.html**.

NATIONAL TECHNICAL ASSISTANCE PROGRAMS
(Non-profit)

Description: National non-profit technical assistance entities that facilitate the financing and implementation of environmental projects and programs. Such entities can include non-profit organizations ranging from environmental media-based associations to community-focused programs to university-based groups to professional associations and organizations to cooperative networks.

Actual Use: There are a significant number of excellent nonprofit national technical assistance organizations operating in the environmental arena. Some good examples of this type of organization include the American Waterworks Association, the Environmental Protection Agency's (EPA's) network of eight university-based Environmental Finance Centers, the National Rural Water Association, the six Rural Community Assistance Programs, and West Virginia University's Environmental Services and Training Division.

Potential Use: There is a great need in communities, especially in the thousands of smaller ones, for technical assistance and outreach related to financing environmental systems and activities. As both federal and State budget constraints continue, the costs of environmental compliance grows, and communities face increasing demands in all service areas, this need for financial technical assistance will grow even further.

Advantages: Many national technical assistance organizations have accumulated considerable experience and developed significant technical expertise in dealing with communities and their environmental and financing problems. The best of these organizations have earned the hard-won confidence of their client communities and other groups.

Limitations: Most technical assistance organizations usually do not provide any significant direct financial assistance to communities for environmental activities. Furthermore, providing financial technical assistance and/or environmental assistance may be often only one part of the overall mission of many national technical assistance providers.

Reference for Further Information: American Water Works Association, 6666 West Quincy Avenue, Denver, CO 80235. Phone: 303-794-7711. U.S. EPA Environmental Finance Center Network: see Page 5A-10. National Rural Water Association, P.O. Box 1428, Duncan, OK 73534. Phone: 405-252-0629. Rural Community Assistance Programs, 602 South King Street, #402, Leesburg, VA 22075. Phone: 703-771-8636. Also, see **Section 5.A., Rural Community Assistance Corporation** and **West Virginia Environmental Services and Training Division**.

RETIRED VOLUNTEERS

Description: A group of retired environmental finance practitioners could make their professional services available to small local governments and businesses on a voluntary basis. The program could be publicly or privately sponsored or supported by some combination of public-private partnership. The assistance offered would be advisory in nature, extending to such matters as suggestions for raising revenues to finance environmental improvements, review of capital programs, tracking new developments in environmental finance, and assisting at meetings with citizens and regulatory officials. Travel and living expenses could be paid by host communities/businesses or via cost-sharing arrangements with sponsoring organizations.

Actual Use: None currently known involving this type of technical assistance. However, the Senior Corps of Retired Executives (SCORE) program of the Small Business Administration is a good example of this outreach technique. SCORE volunteers assist small businesses with management issues. No compensation is paid, but volunteers are paid for "out-of-pocket" expenses. The program has over 12,000 volunteers nationwide. Readers are encouraged to let us know of any other examples by filling out a blank tool form (see **Appendix F**).

Potential Use: There is great potential use for this tool given the need by many smaller communities and businesses for financial technical assistance. Volunteer assistance could easily be linked to other outreach efforts such as follow-up to a finance charrette (see in this section, **Finance Charrettes**) and/or a water and wastewater rate model workshop (see in **Section 5.B., Rate Models**).

Advantages: Useful, professional financial outreach services could be provided to needy customers at very low costs. Retired volunteers could also help give State and federal environ- mental officials a more complete and clearer picture of the nature of financing problems faced by small local governments and businesses. This knowledge could help State and federal officials improve their regulatory programs as well as the content and delivery of technical assistance.

Limitations: Connecting volunteers with communities/businesses takes a lot of up-front work. Help provided is only as good as the volunteer. Job benefits such as workmen's compensation can be a problem. Volunteer programs must not to compete unfairly with the private sector.

Reference for Further Information: SCORE Association, 409 3rd Street, SW 6th Floor, Washington, DC 20024, Telephone: 800-634-0245, World Wide Website: **http://www.score.org/.**

RURAL COMMUNITY ASSISTANCE CORPORATION

Description: The Rural Community Assistance Corporation (RCAC) is a recognized 501(c)(3) nonprofit organization. RCAC seeks to improve the quality of life for rural communities and disadvantaged people in 12 western States: Alaska, Arizona, California, Colorado, Hawaii, Idaho, Montana, New Mexico, Nevada, Oregon, Utah, and Washington. Working with rural governments and community organizations, RCAC provides a wide range of development assistance involving housing, environmental services, local organizational capacity, and information and outreach. RCAC environmental activities focus on improving local drinking water, wastewater, and solid waste management and helping communities comply with environmental requirements.

Actual Use: RCAC provides environmental training and technical assistance to more than 120 communities and small utilities each year. It helps these entities to comply with federal and State drinking water standards, reduce or eliminate water pollution, develop and implement low-cost water and wastewater systems, train water, wastewater, and solid waste operators, and acquire affordable environmental systems. In Fiscal Year 1994, RCAC leveraged more than $18 million for water and wastewater facilities development and trained more than 1500 public officials and citizens. The division also provides help to more than 60 native American Tribes in 75 communities. This work includes evaluating the management of wastewater facilities, developing rehabilitation plans for environmental systems, producing reference materials, and assisting in disputes resolution.

Potential Use: RCAC's community-based approach could be successfully applied in many more small communities throughout its 12 State service area. The assistance that RCAC provides in those States could be replicated by similar nonprofit technical assistance providers throughout the rest of the country. Given adequate resources, RCAC could expand the types of assistance that it provides.

Advantages: RCAC stresses low-cost and low-tech solutions whenever possible and appropriate. In almost twenty years of working with small communities and developing solutions to their environmental problems, RCAC has developed considerable expertise and earned the hard-won confidence of rural communities in its service area.

Limitations: RCAC does not assist medium-sized and larger communities/utilities, and does not possess the resources to help all of the small ones. It works only in 12 States located in the western United States. Other rural assistance providers run programs that cover the remaining 38 States.

Reference for Further Information: Rural Community Assistance Corporation, 2125 19th Street, Suite 203, Sacramento, California 95818, Telephone: 916-447-2854, Fax: 916-447-2878, RCAC's homepage on the World Wide Web: **http://www.rcac.org/index.htm**

SELF-HELP

Description: Self-help is an "in the field" strategy supported by many State government and nongovernmental organizations that helps small communities help themselves in solving their environmental problems. Self-help has proven a highly effective, low-cost approach to providing environmental services and achieving compliance in small communities. It depends heavily on local residents to contribute their time, labor and, on occasion, material and equipment in getting the job done. A local project coordinator or "sparkplug" is essential to success. In the self-help paradigm, State and federal agencies are called upon to move to supporting roles -- providing outreach and technical services.

Actual Use: The self-help approach was pioneered in the State of New York by the Rensselaerville Institute. The Institute helped New York State create its "Self-Help Support System," a ten-year old program that has saved nearly 150 New York towns more than $17 million over the cost of initial job estimates. The Institute has taken its program nationwide supporting self-help projects and related activities in Arkansas, Maryland, North Carolina, Oklahoma, and Washington State. The self-help approach has also been employed in countries worldwide -- including Australia, Nicaragua, Japan and Finland.

Potential Use: Self-help could be effectively used to implement environmental projects and activities in thousands of communities nationwide. The approach could provide substantial assistance to the 75% of American communities with less than 10,000. Based on past experiences it could be especially effective with regard to small capital projects providing drinking water and wastewater treatment services.

Advantages: The approach offers a proven, viable local alternative to implementing local environmental that holds down costs, sizes technology to needs, builds local capacity, and supports community independence. Self-help projects can be implemented in a very timely manner due to the lack of bureaucratic red tape.

Limitations: Self-help will not work in every community. There has to be in the community a minimum level of consensus of purpose as well as confidence in local abilities to succeed with the project. In addition, the approach does not work very well in the absence of a local "sparkplug" or champion pushing the project along.

Reference for Further Information: See *"The Self-Help Handbook,"* by Jane W. Schautz, available through the Rensselaerville Institute, Rensselaerville, NY, Telephone: 518-797-3783, Fax: 518-797-3692.

WEST VIRGINIA UNIVERSITY
ENVIRONMENTAL SERVICES AND TRAINING DIVISION

Description: West Virginia University's Environmental Services and Training Division (ESTD) is an important national environmental technical assistance program directed at small communities. The Division is comprised of four major federally-supported technical assistance efforts:

1.)***National Small Flows Clearinghouse*** - proves technical information, educational products, and assistance on wastewater issues to small communities;
2.)***National Environmental Training Center for Small Communities*** - provides information and training to small communities on wastewater, drinking water, and solid waste issues;
3.)***National Onsite Demonstration Project*** - manages six demonstration sites testing alter- native wastewater solutions for small communities in environmentally sensitive areas; and
4.)***National Drinking Water Clearinghouse*** - provides technical assistance, information, and educational products relating to drinking water issues to small communities.

Actual Use: ESTD provides free and low-cost information to every State and US territory. It provides this assistance each year through 30,000 telephone calls, 30,000 computer Bulletin Board System calls, 65,000 product distributions, 100,000 newsletters mailed quarterly, and 10 or more train-the trainer sessions. ESTD assistance helps small communities to understand environmental and public health regulations, save or locate money, solve technical problems, learn about alternative technologies, and locate additional assistance. In its work with small communities, ESTD seeks through its work to increase the environmental knowledge base, spur appropriate technology transfer, create informed decision makers and problem solvers, and enhance professional skills.

Potential Use: The potential use, and growth of use, of ESTD services is high. Many thousands of additional small communities could benefit from the environmental information and assistance provided by ESTD.

Advantages: Access to, and use of, its information/assistance is easy and free or low-cost. ESTD provides a comprehensive one-stop shop for small communities needing environmental information.

Limitations: Providing financial technical information and assistance is only one part of ESTD's overall work. ESTD's single location limits its ability to deliver field technical assistance nationally.

Reference for Further Information: Environmental Training and Services Division, West Virginia University, P.O. Box 6064, Morgantown, WV 26506-6064, Telephone: 304-293-4191, Fax: 304-293-3161, Toll Free: 1-800-624-8301, BBS: 1-800-932-7459.

OTHER

Description:

Actual Use:

Potential Use:

Advantages:

Limitations:

Reference for Further Information:

COMPARISON MATRIX FOR INSTITUTIONAL ARRANGEMENTS

Criteria/ Outreach Tool	Actual Use	Program Size	Program Quality	Administrative Ease	Equity	Environmental Impact
*Border Environmental Cooperation Commission	Low	Mod.	High	Low - Mod.	Mod.	High
Circuit Riders	Mod.	Low	Mod.	High	Mod..	Mod.
*Cooperatives	Low	Mod.	High	Mod.	Low	Mod.
*Cooperative Extension Systems	High	High	Mod.	High	Mod.	Mod.
*Drinking Water State Revolving Fund Capacity Development	High	High	High	Mod.	Mod.	High
*Environmental Finance Center Network	Mod.	Low	Mod.	High	Mod.	High
*EPA: Environmental Finance Program	Mod.	Mod.	Low	High	Mod.	Mod.
EPA: Environmental Financial Advisory Board	Low	Low	Mod.	Mod.	Low	Mod.
*Finance Charrettes	Low	Low	High	High	Mod.	High
*National Technical Assistance Programs (Non-profit)	High	High	High	High	High	Mod.

COMPARISON MATRIX continued

Criteria/ Outreach Tool	**Actual Use**	**Program Size**	**Program Quality**	**Administrative Ease**	**Equity**	**Environmental Benefits**
Retired Volunteers	Low	Low	Mod. - High	Mod.	Low - Mod.	Low
***Rural Community Assistance Corporation**	Mod.	Mod.- High	High	High	Mod.	Mod. - High
***Self-Help**	Mod.	Mod.	High	High	Mod.	High
***West Virginia University Environmental Services and Training Division**	High	High	Mod.	High	Mod.	Mod.

High - High use (over 25 States and many localities); criteria score high (e.g., assistance is hands-on, easy to use, cost-effective, and project specific)

Mod.- Moderate use (10-25 States and many localities); criteria score in medium range

Low - Low use (under 10 States and few localities); criteria score poorly (e.g., printed information only, difficult to access, and not project specific)

*Star indicates comparatively best rated mechanisms

5.B. ELECTRONIC SERVICES

5.B. ELECTRONIC SERVICES

Description: Electronic services are forms of electronic technology used by one party to provide information, training, analyses, advice, and outreach to one or more other parties. These services can include-- but are not necessarily limited to -- computer networks, online data bases and libraries, computer software, and voice, video, and/or data transmission. This last category encompasses such technologies as facsimile transmissions, computerized telephone referral services, telephone conferencing, and video conferencing.

Electronic services are the fastest growing method of conveying information in this country and many others, including environmental and financing information. The use of these services is growing and is increasingly being incorporated into the routine operations of all levels of government, the private sector, professional associations non-profit organizations, educational and training institutions, and large numbers of the general public.

Advantages: Electronic services can greatly facilitate the flow of information and outreach between these many and often varied parties. These services have the capability of making these exchange processes both much faster and much more efficient. Using electronic services, more people and parties, public and private, can interact and access significantly more information in much shorter periods of time. Large, sophisticated users may benefit as much, or even more, from these services as small users.In addition, these interactions and information exchanges can often be implemented in a more cost-effective manner. Properly implemented, electronic services can help control resource consumption and pollution by reducing paper use, cutting transportation and fuel costs, and preventing related air, water and land pollution (and the need to clean it up).

Limitations: Electronic services in one way are almost the exact opposite of institutional outreach since most are impersonal. Not everyone has access to, and/or the inclination to use, these types of services. The costs of obtaining the technological equipment needed can be a financial burdensome, perhaps prohibitively so to some parties. As with many other complex technologies, not everyone has the necessary skills to properly use and/or maintain electronic services and any associated equipment. The popularity of an electronic service such as the Internet/World Wide Web may also cause problems. Growth in use can outstrip the ability of technology vendors to provide and maintain a service. A good example of this limitation is the serious service outage problems experienced by America On Line, Inc. during the winter of 1996-1997.

Summary: The nine electronic services described here are government-sponsored services, with the exception of the World Wide Web which in itself makes many of the others possible. Since electronic services are the fastest growing source of information exchange many other new services are possible. Some private sector electronic services for businesses are discussed in **Section 10 : Tools to Access Financing for Small Businesses and the Environmental Goods and Services Industry**. For almost any environmental finance problem-solving effort, there is probably existing software that is useful, or if not, it could be developed. Suggestions for additional electronic services and software for inclusion in the *Guidebook* are most welcome.

LIST OF ELECTRONIC SERVICES
(In Alphabetical Order)

*1. Catalog of Federal Domestic Assistance
*2. EPA: Environmental Finance Program Home Page
3. EPA: Environmental Financing Information Network
*4. EPA: Home Page
*5. FinanceNet
6. Long Distance Learning
*7. Rate Models
*8. The Environmental Hotline, Earth's 911
*9. World Wide Web

* Stars indicate most highly rated mechanisms as described in the Comparison Matrix at the end of the narratives. See Introduction to the *Guidebook* for a description of the criteria used. Ratings of "High", "Moderate", and "Low" are for comparison purposes only, as some ratings are necessarily subjective and data are incomplete.

CATALOG OF FEDERAL DOMESTIC ASSISTANCE

Description: The *Catalog of Federal Domestic Assistance* (*CFDA*) is a government-wide compendium of federal programs, projects, services and activities which provide grants, loans, and other assistance or benefits to the American public. The *CFDA* contains information on financial and nonfinancial assistance programs administered by departments, agencies, commissions, and other federal government establishments. Potential recipients of assistance or benefits include, but are not limited to: State, local, and other governments; non-profit organizations, groups and institutions; private sector for-profit firms, partnerships and corporate entities; and the general public. The *Catalog* is updated at least twice a year.

Actual Use: *CFDA* data is available in multiple formats: hard copy through the World Wide Web, machine-readable magnetic tape, high-density floppy diskettes, and CD-ROM. These last three formats contain the text published in the program description section of the *CFDA*, as well as characteristics data of coded program information taken from the text. Important information provided in the *CFDA* includes program function, types of assistance, applicants, beneficiaries, circular requirements, obligations, matching requirements, agency contact information and authorizing legislation. The *Catalog* is a valuable and widely used reference document in all of its formats. For example, between January 5, 1997, and February 12, 1997, the *CFDA's* World Wide Web site alone was accessed and searched more than 41,000 times.

Potential Use: The potential future use of the *CFDA* via its numerous forms, but especially its World Wide Web site, is large. As more local officials become more computer proficient and more knowledgeable about the World Wide Web, their use of the *CFDA* should grow rapidly.

Advantages: Accessing the *CFDA* by computer through the World Wide Web is fast, easy, and efficient. Summaries and detailed program information on all types of federal assistance from all federal departments, agencies and other organizations can be accessed and printed.

Limitations: Information retrieval may be slowed by growing use of the World Wide Web and accompanying strains on technical systems support. User uncertainty or lack of specificity as to the agency and/or assistance program in question can complicate and delay the search for information.

Reference for Further Information: The *Catalog* can be accessed via the World Wide Web at **http://aspe.os.dhhs.gov/cfda/index.htm**. Questions and requests to buy magnetic tapes, diskettes, or CD-ROM should go to the Federal Domestic Assistance Catalog Staff (MVS), General Services Administration, 300 7th St., SW, Washington, DC 20407. Phone: 202-708-5126.

ENVIRONMENTAL PROTECTION AGENCY
ENVIRONMENTAL FINANCE PROGRAM HOME PAGE

Description: The Home Page for the Environmental Protection Agency's (EPA's) Environmental Finance Program (EFP) contains detailed information on the program, its primary components, and important work products. Primary EFP components include: the network of eight-university based Environmental Finance Centers (EFCs); the Environmental Financial Advisory Board (EFAB) and the Environmental Financing Information Network. Important information provided on the home page includes contacts for the EFCs, selected EFC documents, such as case studies developed through the Region 3 EFC finance charrettes, the names and affiliations of EFAB members, EFAB advisories and reports; and instructions for accessing the EFIN database.

Actual Use: The EFP Home Page provides wide, unrestricted, and cost-free public access to a large number of computer users desiring information on environmental finance and costs. This information, moreover, is multi-media in scope and covers both the public and private sectors.

Potential Use: The amount of environmental finance information available on the Home Page will continue to grow and this growing body of information will be electronically available to a growing (perhaps exponentially) number of Internet/World Wide Web users.

Advantages: Information on the EFP Home Page is currently quickly accessible to a wide variety of users. Through the electronic medium, users have a central location where they can access important environmental finance information and contacts.

Limitations: The EFP Home Page is only available to users who have World Wide Web access. Growing use of the World Wide Web combined with server constraints may limit or slow access to this and other Home Page sites. The costs of maintaining the Home Page and possible Home Page space limitations may in the future dictate the volume of information (such as full text documents) that can be put on the Web site.

Reference for Further Information: The Environmental Finance Program (EFP) Home Page can be accessed via U.S. EPA's Home Page, **http://www.epa.gov,** under "Money Matters" or directly at **http://www.epa.gov/efinpage/**. The EFP's mailing address is U.S. EPA, Office of the Comptroller, Environmental Finance Program, 401 M Street, SW, Washington, DC 20460, Mail Code: 2731R, Fax: 202-565-2587, E-mail: George Ames at **ames.george@epa.gov**.

ENVIRONMENTAL PROTECTION AGENCY
ENVIRONMENTAL FINANCING INFORMATION NETWORK

Description: The Environmental Protection Agency's (EPA's) Environmental Financing Information Network (EFIN) provides information on financing alternatives for State and local environmental programs and projects and small businesses. Information is available through an online database, which contains abstracts of publications, case studies and contacts, and via the EFIN World Wide Web site at **http://www.epa.gov/efinpage/**. The EFIN Center operates an infoline which provides callers with referrals, assistance with accessing and searching the EFIN database and the Web site, and serves as a point of contact for ordering documents.

Actual Use: Federal, State and local officials, and individuals seeking sources of funding for new businesses and research use EFIN as a reference service. Users can search the EFIN database or request the librarian to conduct a search for them. The EFIN Center also distributes documents published by the Environmental Finance Program (EFP), such as reports and advisories developed by the Environmental Financial Advisory Board (EFAB) as well as information about projects managed by the Environmental Finance Center (EFC) network. The EFIN and Environmental Finance Program Home Page are increasingly being used as a source of information on EFP programs, services and publications.

Potential Use: Through the EFIN Home Page, EFIN will provide electronic information on the EFP programs and full text of EFP publications, for example, case studies developed from Environmental Finance Center charrettes. EFIN can also provide links to other sources of information such as EPA's grant and research programs.

Advantages: EFIN is a central point for environmental financing information. It provides an easily accessible reference service via the infoline, EFIN e-mail mailbox and a link to the EFIN database via the EPA's Online Library System Web site.

Limitations: The EFIN database can be difficult to access if the user does not have the proper Telnet or modem connections. In addition, there can be a lag time between the time material is received by EFIN and loaded onto the database.

Reference for Further Information: U.S. EPA, Office of the Comptroller, Environmental Finance Program, 400 M Street, SW, Washington, DC 20460, Mail Code: 2731R, Infoline: 202-564-4994, Fax: 202-565-2587, E-mail address: **efin@epa.gov**, Internet access to the EFIN database: **http://www.epa.gov/efinpage/efindata.htm**

ENVIRONMENTAL PROTECTION AGENCY HOME PAGE

Description: The Environmental Protection Agency (EPA) Home Page provides public access to the activities and organizational components of the Agency. The Home Page has two sections. The first section is divided into user groups, such as "Concerned Citizens" and "Small Business and Industry". The second includes access to the Agency's "Offices, Labs and Regions" and "Projects and Programs". Links to financial information can be found under the category "Money Matters".

Actual Use: The EPA Home Page provides the first step in locating information in the EPA. A user can select a link from the user and resource categories. The EPA Home Page also has both browse and search capabilities. A user can browse for information on a specific subject(s), or search for sites on a topic(s). There is also the capability to search via zip code.

Potential Use: The EPA Home Page could be more of a source for researching environmental topics rather than a starting point. Currently, there are several levels a user must go through to locate information on a specific topic. The Home Page could be restructured to include more information, such as a list of the "Offices, Labs and Regions" on the page itself. The functions of the Offices and Programs could be more transparent, and the subjects could be shown on the Home Page.

Advantages: The EPA Home Page provides a fairly comprehensive guide to the many types of information located on the overall EPA Web site. Interested users are directed to specific areas to begin their search and further directed at each subsequent step to sub-areas.

Limitation: There are numerous layers on information on the EPA World Wide Web site and it can take considerable time to locate information. The current search engine does not always provide relevant results.

Reference for More Information: U.S. EPA, Information Resource Center, 400 M Street, SW, Washington, DC 20460, Mail Code: 3404, Telephone: 202-260-8674, Internet/World Wide Web access: **http://www.epa.gov/**. There are contacts for various types of questions, which can be accessed by clicking on the Comments section. This includes general questions, comments and technical assistance. There is also an e-mail address: **public-access@epamail.epa.gov.**

FINANCENET

Description: Established in 1994 by Vice-President Al Gore's *National Performance Review*, FinanceNet is the largest government Internet administrative platform in the world. It serves as the Internet's home for public financial management information. FinanceNet is a worldwide network of people spanning federal executive agencies, departments and other groups; International, State, local, and other municipal governments; professional organizations, educational institutions; and the general public.

Actual Use: FinanceNet provides Internet users with access to current and archival electronic reference libraries of financial legislation, Congressional testimony, executive orders and memoranda, minutes and highlights of meetings of the U.S. Chief Financial Officers (CFOs) Council (comprised of CFOs from the 24 largest federal agencies and departments), and federal, State, and local government financial circulars, bulletins, releases, news, notices. It also provides Internet users with access to public Internet mailing lists and discussion forums covering a wide range of government finance topics to stimulate dialogue, information sharing and reinvention ideas.

Potential Use: FinanceNet could play an growing role in improving the delivery of government services by reducing information distribution costs. It could also facilitate access to government information and build the partnerships necessary to make it the electronic vehicle for intra-and inter-governmental communications, coordination, and collaboration. Governments, public and private organizations, and individuals involved in financing environmental protection could take an role in such an effort.

Advantages: As more people access and participate in FinanceNet, the sources and range of financing information will grow. FinanceNet users will be able to research topics more quickly and completely. Government users will able to network more efficiently with their peers and keep better track of innovative developments in financial management. The general public will have better access to information on the activities of their own and other governments.

Limitations: If FinanceNet grows too fast and/or too much, it may become overloaded with information and users. Information searches may be slowed by irrelevant material and heavy suer traffic. There are also a lot of people who do not have (and may never have) Internet/World Wide Web access. If information is distributed electronically, they will not be able to access it.

Reference for Further Information: National Science Foundation, 4201 Wilson Boulevard, Arlington Virginia 22230, Telephone: 703-303-1282. Most importantly, FinanceNet itself can be accessed on the World Wide Web at **http://www.financenet.gov**.

LONG DISTANCE LEARNING

Description: Long distance learning is the use of electronic technology to provide education and training to and between numerous remote locations. The electronic technologies employed in long distance learning may include one-way transmission of voice, video, and/or data or two-way sharing of information with or without video. Long distance learning can be applied in all areas of education, including primary and secondary schools, higher education, continuing education, corporate training, military and government training, and professional meetings and conferences.

Actual Use: Universities and colleges, businesses, governments, primary and secondary schools, private educational vendors, professional associations and organizations, and other groups incorporate long distance learning in their educational, training, and communications programs and activities. For example, the University of Maryland at College Park held a Teleconference on Environmental Finance in September 1995. Using satellite downlinks to sites in Tennessee and New Mexico, the teleconference was an interactive vehicle for environmental professionals to discuss options for financing environmental mandates. The American Bar Association's multi-site teleconference on brownfields redevelopment held in the spring of 1996 is another example.

Potential Use: The long distance learning/teleconferencing technique could be employed much more extensively by governments, professional associations and organizations, and educational institutions to share information on all aspects of environmental protection and finance. It could be especially valuable in helping to get the word out about new cleanup and financing technologies.

Advantages: Long distance learning permits individuals anywhere in the world with access to the necessary technical capabilities to participate in the education/training experience. When two-way communication is available, it allows participants who might otherwise not meet to share information and discuss important issues. Long distance learning can be less expensive than traveling to the primary site from which the education/training originates.

Limitations: There may not be enough individuals at some remote sites to justify the expense of electronically hooking up with the long distance learning session(s). Many remote sites may have poor technical capabilities or they may not have the technical capability to hook up at all.

Reference for Further Information: Many colleges and universities nationwide and across the world have long distance learning departments or centers. There are numerous sites on the World Wide Web accessible under the phrase "long distance learning" by using common and popular search engines such as *Alta Vista.*

RATE MODELS

Description: Rate models are expert utility rate-setting, impact fee and financial planning software for water and wastewater managers. These models prepare cost-of-service studies and multi-year budget, rate, and financial forecasts using widely accepted methods. One such model used by the network of eight Environmental Protection Agency (EPA)-supported Environmental Finance Centers (EFCs) allows users to define up to thirty-three customer groups or four rate blocks. This model automatically generates flat, minimum, uniform, and block rates, and impact fee schedules. It also performs "what if" analysis and designs inside/outside or wholesale rates, excess loading, and fire protection charges. This particular model is suited for smaller systems, and for systems with up to 100,000 connections.

Actual Use: Rate models are being used by local utility managers and finance officers across the country to set user rates and impact fees. They are also being used to examine alternative funding options, plan and schedule capital improvements, determine the impact of planned improvements on system and individual customer ability-to-pay, and forecast system budget and financial data.

Potential Use: While many medium to large communities can access and afford their own rate models and/or consultants, low cost models could help thousands of small communities nationwide to develop, set and test water and wastewater system rates and design. They also could be used by State and federal officials in financing and regulatory agencies to determine ability-to-pay, review rates and criteria, determine rates of return, underwrite and size grant/loan assistance packages and terms, and provide technical assistance to increase local financial and management capabilities.

Advantages: Small community managers can be trained to use models such as the one used by the EFCs at a low cost. These models can be easily customized by the user to meet the needs of a wide variety of system sizes. They have multiple rate design options and "smart" defaults that guide users through rate-setting and cost allocation. Variables affecting rates and finances are available for fast "what if" analysis. The model used by the EFCs comes with a user guide, QuickStart instructions, sample files, and telephone support. On-site training is available directly or through the EFCs.

Limitations: Rate models require a personal computer and laser jet printer. An Impact Fee Model must be acquired separately. Some technical training is necessary with any model.

Reference for Further Information: Information on rate models and training conducted at EFCs is available through U.S. EPA's Environmental Finance Program at 401 M Street, SW, Washington, DC 20460, Mail Code: 2731R, E-mail contact: George Ames at: **ames.george@epa.gov**. Information on the model used by the EFCs is also available from RateMod Associates, 4401-A Connecticut Ave., NW, Washington, DC 20008, Telephone: 202-237-2455, Fax: 202-237-2456.

THE ENVIRONMENTAL HOTLINE, EARTH'S 911

Description:. The Environmental Hotline, Earth's 911, is a 24 hour telephone education service that provides environmental information specific to any "zip code" area in the United States. By dialing a toll-free phone number, anyone in the country can receive current and detailed information concerning any environmental media area on issues ranging from recycling business/household waste products - i.e., paper, plastic, oil, glass, tires, etc to pesticide product registration to air and water pollution. Through the Hotline, citizens, businesses and governments can both access and provide environmental information by dialing a 1-800 phone number.

The Hotline was established and expanded nationwide through a public-private partnership with the Environmental Protection Agency (EPA) and several other public/private partners. It is sustained through the support of private companies and organizations who benefit from the hotline and/or companies and organizations who support its positive impact on the environment.

Actual Use: The Hotline is online and available to everyone in the United States. The hotline can be accessed by dialing the toll-free phone number, "***1-800 CLEANUP***", on any telephone from anywhere in the United States. In its six years of existence, the Hotline has received more than 15 million calls nationwide.

Potential Use: The Hotline concept could be adapted geographically to any environmental and/or other subject area of interest to the general public. For example, the concept could be expanded to Mexico, other counties such as Canada, and even globally.

Advantages: The Hotline provides information free of charge without taxpayer/federal/State government funding. The fact of having one phone number to call nationwide greatly simplifies for businesses, citizens, and governments the task of searching for environmental information. The environmental benefits in terms of pollution prevention and conservation are immense. The accompanying dollar savings are also large and growing (many millions). The hotline concentrates on proactive solutions.

Limitations: In terms of expanding the hotline concept to other subject areas or countries, the basic problem is simply convincing people of the value of this new way of doing business and providing information to the public.

Reference for Further Information: Hotline Address: 5110 North 44th St., Suite L120, Phoenix, Arizona, 85018. The Environmental Hotline, Earth's 911, can be also be accessed at its World Wide Web site address: **http://www.1800cleanup.org/.** E-mail: webmaster@cleanup.org.

WORLD WIDE WEB

Description: The World Wide Web provides users on computer networks with a means of accessing information on a wide variety of subjects, from government legislation to personal home pages. The Web contains an international collection of sites, which are developed by governments, private and commercial sectors, educational institutions and individuals. The Web operates through hypertext, which provides links (connections) within the text of a document to other documents or other sites. This can be a link to text or other media, such as sounds, images or movies. A user selects/clicks on a link to access the next document. This can lead to another source of information, creating a "web".

Actual Use: The World Wide Web is the fastest growing, largest means of locating information on a topic and disseminating information on a product or service. Web users come from all levels and age groups. Grade school students and scientists use the Web for research on projects. The Web has in many cases taken the place of the printed document. It provides a central location for environmental information, such as the Environmental Protection Agency's Home Page/Web site. This site includes information on the Environmental Finance Program and other Agency initiatives, which describe their components and link to contacts and publications (see the **EPA Home Page** writeup earlier in this section). There are also search engines, such as Yahoo and Alta Vista which assist users in finding a number of different sites or documents on their subjects.

Potential Use: As more people access the Web, their sources and range of information will increase. They would be able to perform research more quickly and from one location. Users who do not have physical access to hard copies of information could access them electronically. Examples are newspapers and government reference documents (see earlier in this section the tool, **Catalog of Federal Domestic Assistance**). Information providers also could use the Web as a bulletin board to post current and upcoming events.

Limitations: There is a growing overload of information on the Web, because of unlimited access. When users conduct searches using a Net Search Engine or even an internal search engine within a site, they could get many irrelevant hits. In addition, many users have not caught up with the available and often-changing technology. There are different browsers and several levels of software and hardware. If a document is in one format, such as PDF, the user might not have the software to read it. Finally, there are still many people who do not have access to the Web. If information is only distributed electronically, they will not be able to acquire it.

Reference for More Information: Contact the access providers, such as America On Line, Netscape, or Microsoft. Use a Search Engine such as *Yahoo! (TM)*, *Lycos*, or *Infoseek* to search for terms on the World Wide Web.

OTHER

Description:

Actual Use:

Potential Use:

Advantages:

Limitations:

Reference for Further Information:

COMPARISON MATRIX FOR ELECTRONIC SERVICES

Criteria/ Outreach Tool	Actual Use	Revenue Size	Program Quality	Administrative Ease	Equity	Environmental Benefits
***Catalog of Federal Domestic Assistance**	High	N.A.	High	High	Mod. - High	Mod.
***Environmental Finance Program Home Page**	Mod.	N.A.	Mod. - High	High	Mod.	Mod.
EFIN	Low	N.A.	Mod.	Mod.	Mod.	Low - Mod.
***EPA Home Page**	High	N.A.	Mod.	High	Mod.	Mod.
***FinanceNet**	Mod.	N.A.	Mod.	Mod.	Mod.	Low
Long Distance Learning	Low	N.A.	Low	Low - Mod.	Low - Mod..	Low - Mod.
***Rate Models**	Low - Mod.	Low.	Mod. - High	Mod.	Mod.	High
***The Environmental Hotline, Earth's 911**	High	Low	Mod.- High	High	High	High
World Wide Web	High	N.A.	High	Mod.	Mod.	Low - Mod.

High -High use (over 25 States, many localities); criteria score high (information is abundant, specific, easy to access, cost-effective to provide, and impacts projects)
Mod.-Moderate use (10-15 States, many localities); criteria score in medium range
Low-Low or rare use; criteria score poorly (printed information only, difficult to access, and not project specific)
N.A.-Not Applicable
*Star indicates best rated mechanisms

6. TOOLS

FOR

LOWERING COSTS

6. TOOLS FOR LOWERING COSTS

INTRODUCTION

Environmental protection needs and expectations are continuing to grow, while the resources available to meet those needs and expectations are increasingly constrained at all levels of government. Federal, State and local governments and the private sector are exploring the use of more efficient, effective, and innovative solutions to help address these major challenges. They are aggressively looking for and creating ways and opportunities to lower environmental costs, increase environmental investment, and build environmental capacity by creating partnerships with State and local governments and the private sector to fund environmental needs.

This section presents and evaluates a number of the important mechanisms that these governments are testing and using to lower costs, increase investment, and build capacity through partnerships. It also looks at these mechanisms in terms of their contribution and/or potential contribution to financing environmental needs on a sustainable basis. The mechanisms reviewed in the section vary widely, ranging from specific analytical financial management tools to common-sense financial practices to broad, sweeping, innovative government programs and initiatives.

Some of the tools and initiatives discussed such as refinancing, pollutant loading allocation, and financial capability analysis have been used for years. Others such as cost-benefit analyses, cost-effectiveness analysis, and full-cost pricing are not new, but their use in the environmental arena may be new or growing. Still others such as emissions trading and risk ranking have been used one environmental media or by one level of government, and are their use is now being incorporated in new areas or by new parties. Finally, some such as USEPA's Common Sense Initiative and Project XL are new, innovative, and constantly evolving. But, the one thing that they all have in common is that they represent approaches for lowering costs in the short- and/or long-term) and for helping to address the long-term environmental protection and related financing needs facing the nation.

LIST OF TOOLS FOR LOWERING COSTS
(In Alphabetical Order)

*1. Accelerated Depreciation
2. Activity-Based Costing (ABC)
3. Amortization of Pollution Control Facilities
* 4. Appropriate Technology
5. Barter and Payment-In-Kind
6. Benchmarking
*7. Capital Planning and Budgeting
*8. Comparative Risk Ranking
*9. Cost-Benefit Analysis
*10. Cost-Effectiveness Analysis
*11. Deduction of Agricultural Conservation Expenses
*12. Discounting (Economic)
13. Employee Stock Ownership Plans
14. EPA: Common Sense Initiative
15. EPA: Project XL
*16. Expensing of Assets
*17. Financial Capability Analysis
18. Fiscal Impact Analysis
*19. Full-Cost Pricing
20. Life Cycle Assessment/Costing/Design
*21. Pay-As-You-Go
*22. Pollutant Loading Allocation
23. Refinancing Loans
*24. Reforestation Tax Credit and Amortization
*25. Regionalizaton
26. Rehabilitation Tax Credits
*27. Risk Management and Insurance
28. Value Engineering

* Stars indicate most highly rated mechanisms as described in the Comparison Matrix at the end of the narratives. See Introduction to the *Guidebook* for a description of the criteria used. Ratings of "High", "Moderate", and "Low" are for comparison purposes only, as some ratings are necessarily subjective and data are incomplete.

ACCELERATED DEPRECIATION

Description: Accelerated depreciation is an accounting concept which allows writing off the costs of a fixed asset faster than under straight-line or units-of-production depreciation, thus, increasing the depreciation deduction and decreasing taxable income in the early years of an asset's life. This assumes that spreading an asset's cost equally and evenly over each year of its life is not realistic for many assets. Since repair and maintenance costs are usually higher in later years, the recovery of greater costs in earlier years results in a more nearly equal effect on earnings over the asset's useful life. This allows funds to be retained in a business and encourages modernization. Traditional accelerated depreciation methods such as sum-of-the-years digits and double-declining balance focus on the taxpayer's basis (at-risk investment) in the property, the property's useful life, and its salvage value at the end of its life.

The accelerated cost recovery system eliminates useful life and salvage value as concerns by placing property in one of four categories, which set the number of years over which an item's cost may be recovered. The modified accelerated cost recovery system allowed by the federal tax code provides three preset conventions for depreciation in the year property is placed in service and the year of its disposition and defines five methods of figuring depreciation. The general depreciation system (GDS) allows straight line or either of two methods of accelerated depreciation (150% or 200% declining balance) over the recovery periods assigned to eight property classes. The alternative depreciation system has recovery times that generally are longer and it allows only straight line or 150% declining balance. Under the GDS, even shorter recovery periods are allowed for qualified property placed in service on Tribal lands.

Actual Use: Accelerated depreciation is commonly used for tax purposes when it is allowed; however, straight-line depreciation is preferable under some circumstances, such as when there is insufficient taxable income to be offset by the larger, accelerated depreciation deductions.

Potential Use: Private, for-profit businesses could use accelerated depreciation to reduce their income tax liabilities and cut the after-tax costs of investments in environmental equipment.

Advantages: Accelerated depreciation shelters income from taxation by providing larger early-year writeoffs with no reduction of cash flow. Different degrees of acceleration of depreciation are provided by different methods (e.g., more with 200% than with 150% declining balance).

Limitations: The federal tax code specifies numerous limitations too complicated to summarize.

Reference for Further Information: Consult a tax practitioner. See Internal Revenue Service (IRS) Publication 946, *How To Depreciate Property.* Contact IRS, 1111 Constitution Avenue, NW, Washington, DC 20224; Phone: 800-829-1040; Fax: 703-368-9694; Internet: **www.irs.ustreas.gov/**.

ACTIVITY-BASED-COSTING (ABC)

Description: Activity-based-costing (ABC), a cost accounting methodology, supports activity-based management which portrays an organization as a series of activities related to customer desires and cost. ABC assigns functional costs, direct and indirect, to an organization's activities and traces those activities to the products or services that caused them to be performed. ABC is a basis for strategic management accounting which supports a long-term approach to decision making. ABC may also incorporate Total Cost Assessment (TCA) which uses cost accounting methods and capital budgeting procedures to uncover potentially neglected costs and savings of investments which, when fully accounted for, may yield substantial changes in project profitability. The inventory of costs, savings, and revenues includes indirect, less tangible items typically omitted from project analysis, such as compliance, training, testing, liability, and image. Costs and savings are directly allocated to specific process and product lines instead of being pooled in overhead accounts. Time horizons for calculating profitability are expanded to capture longer term benefits. Profitability indicators capable of incorporating the time value of money and long-term costs and savings are used.

Actual Use: ABC is commonly used in relatively sophisticated cost accounting analyses, especially in the private sector. There are commercially available computer software packages for employing ABC on mainframes, networks, and personal computers.

Potential Use: Activity-based-costing is an aid to business process reengineering, yielding information that may be key in determining whether to restructure or privatize an activity.

Advantages: ABC gives visibility to how effectively resources are being used and how all relevant activities contribute to the cost of a product or service. Such information may be key to making decisions about whether to restructure or privatize an activity.

Limitations: ABC requires extensive data collection as well as the ability to analyze cost data while recognizing cost accounting's difficulties in handling incremental, separable and sunk costs, as well as common costs.

Reference for Further Information: "An Introduction to Environmental Accounting as a Business Management Tool: Key Concepts and Terms", USEPA, Office of Pollution Prevention and Toxics, Mail Code: 7409, Washington, DC 20460, Phone: 202-260-3557; USEPA Full Cost Accounting Program at **www.epa.gov/epaoswer/non-hw/muncpl/fullcost/index.htm**. "Activity Based Cost from the Perspective of Competitive Advantage" at **mijuno.larc.nasa.gov/dfc/abc.html** and "An Annotated Bibliography of Activity Based Costing" at **dfca.larc.nasa.gov/dfc/abc/abcbib.html**; Langley Research Center, NASA.

AMORTIZATION OF POLLUTION CONTROL FACILITIES

Description: The cost of a certified pollution control facility used with a plant or other property in operation before 1976 can be amortized over 60 months. A certified pollution control facility is a new identifiable treatment facility used to reduce or control water or atmospheric pollution or contamination. The facility must do so by removing, changing, disposing, storing, or preventing the creation or emission of pollutants, contaminants, wastes, or heat. It does not include a building and its structural components unless the entire building is a treatment facility. The facility must not significantly increase the output or capacity, extend the useful life, or reduce the total operating costs of the plant or other property. It also must not significantly change the nature of the manufacturing or production processing facility. The facility must be certified by the state and federal certifying authorities, as required by Section 169 of the Internal Revenue Code and the related income tax regulations (Section 1.169). If it appears that all or part of a facility's cost will be recovered from the profit based on its operation, the federal authority will not certify that part of what would otherwise be the amortizable basis. For some corporations, amortization of pollution control facilities is a tax preference item requiring reduction of the amortizable basis by 20% in determining the amortization deduction. If costs are not amortized they can be capitalized and depreciated.

Actual Use: Part VI of Internal Revenue Service Form 4562 is used to claim amortization, including that of pollution control facilities. It appears that use of the deduction is declining as eligible, older facilities have been upgraded, replaced or abandoned.

Potential Use: Deductible amortization can be used to reduce the after-tax cost of pollution control facilities added to older plants to meet or exceed environmental requirements.

Advantages: Amortization over 60 months reduces taxable income for the affected tax years, thereby reducing the real cost of the facility by the amount that income tax is reduced.

Limitations: The amortization provision applies only to equipment used with plants in service prior to 1976. Tax-deductible amortization has no net benefit if there is no taxable income to be reduced by the amortization deduction. Also, amortization is similar to the straight-line method of depreciation rather than accelerated depreciation.

Reference for Further Information: Consult a tax practitioner. See page 53, Internal Revenue Service Publication 535, *Business Expenses* and page 5, Publication 542, *Corporations*. Contact IRS, 1111 Constitution Avenue, NW, Washington, DC 20224; Phone: 800-829-1040; Internet: **www.irs.ustreas.gov/**.

APPROPRIATE TECHNOLOGY

Description: Appropriate technology refers to a socio-economic movement, its conceptual basis, and the technological tools it employs. The movement promoting the appropriate technology approach to problem solving is based on the idea that the most advanced or sophisticated technology, and even tried and tested conventional technology, may be inappropriate in certain circumstances. The corollary is that a relatively basic or intermediate level of technology reliant on locally available skills, materials, geography, and resources may be better suited to specific situations. This recognizes the fact is that technological alternatives can be more efficient and/or effective in different settings. For example, different technologies are characterized by differing economies of scale, so some work better for larger volumes of production. Also, some technologies require more capital investment, while others need more maintenance. Choices among mixes of characteristics are often possible, yielding a technological approach that is more appropriate to a specific context.

Actual Use: Appropriate technology has been a recognized need for some time in wastewater treatment for small communities. Also, it is being used increasingly in some aspects of agriculture to achieve sustainable productivity with reduced chemical inputs.

Potential Use: Appropriate technology can offer opportunities for cost reduction. Total life-cycle costs can be lowered substantially by selection of a technological approach based on a realistic appraisal of input requirements, pollution consequences, and social implications.

Advantages: Lower-cost technologies might be ignored if an appropriate technology perspective is not employed.

Limitations: The use of the appropriate technology approach can be counterproductive if it is biased against technological improvement.

Reference for Further Information: National Small Flows Clearinghouse, PO Box 6064, Morgantown, WV 26506-6064; Phone: 800-624-8301; Internet address: **www.nsfc.wvu.edu/**. Appropriate Technology Transfer for Rural Areas, University of Arkansas, PO Box 3657, Fayetteville, AR 72702; Phone: 800-346-9140; Internet address: **www.attra.org/**. National Center for Appropriate Technology, 3040 Continental Drive, Butte, MT 59702; Phone: 800-275-6228; Fax: 406-494-2905; Internet address: **www.ncat.org/**. Appropriate Technology Institute, W110 Engineering Research Center, Colorado State University, Fort Collins, CO 80523; Phone: 970-491-7189; Fax: 970-491-2729; Center for Renewable Energy and Sustainable Technology, 1200 18th Street, NW, #900, Washington, DC 20036; Phone: 202-530-2202; Fax: 202-887-0497; Internet address: **solstice.crest.org/**.

BARTER AND PAYMENT-IN-KIND

Description: Barter is the trade of goods or services without the use of money. Payment-in-kind (PIK) is payment with something of the same or similar type or quality to that which was received, but not necessarily an identical article. For example, a PIK provision may provide for the issuance of more of the same type of securities to bondholders in lieu of cash interest payments. PIK has been used in farm programs to compensate participants with agricultural commodities. Barter and PIK are recognized methods of payment in many relatively minor and certain specialized business-to-business transactions. In-kind matching is accepted by numerous federal grant programs. In many localities, sophisticated bartering arrangements which eliminate the limitations of one-one-one trades have been formalized by clearinghouses that provide an organized marketplace. These commercial exchanges charge a commission on each barter transaction and keep records of trade credits accruing to members' accounts. Legally, a barter transaction is defined to be an exchange rather than a sale, which involves money, but since 1982 barter income has been taxable just like cash sales income. IRS Form 1099-B, *Proceeds from Broker and Barter Exchange Transactions* is used to report the value of any cash, property, services, credits, or scrip received from exchanges. (See pages 15-16 of IRS Publication 525, *Taxable and Nontaxable Income.*) However, a business can deduct any costs incurred to perform work that is bartered. Payment-in-kind is used in certain securities transactions.

Actual Use: In 1995, barter was an $8.4 billion industry including more than 380,000 clients. The following year, perhaps 85 percent of Fortune 500 companies participated in barter transactions. There are approximately 500 barter/trade exchanges and 100 corporate trade companies and brokers.

Potential Use: Barter or payment-in-kind might be used to obtain services or equipment needed for environmental projects or to produce environmentally friendly products.

Advantages: Organizations that do not have sufficient cash flow to make conventional monetary payment feasible may use barter as an alternative to relatively expensive debt which could further drain cash flow. Even financially healthy companies can benefit from preservation of cash flow and the opportunity to transform surplus inventory into needed goods and services.

Limitations: Barter is not a legitimate method of tax avoidance. Some goods and services may not be available on other than a cash payment basis.

Reference for Further Information: International Reciprocal Trade Association, 175 West Jackson Boulevard, Suite 625, Chicago, IL 60604; Phone: 312-461-0236; Fax: 312-461-0474; E-mail admin1@irta.net; Internet: **www.irta.net/**. National Association of Trade Exchanges, 27801 Euclid Avenue, Suite 610, Cleveland, OH 44132; Phone: 216-732-7171; Fax: 216-732-7172; E-mail: swhite@ibinc.com; Internet: **www.nate.org/**.

BENCHMARKING

Description: Benchmarking is a process of establishing tangible standards of achievement in progressing toward and reaching a specified set of goal(s). After a defined and shared agenda is developed and adopted, benchmarks are used as a tool to focus planning and implementation activities on achieving measurable, desired results. Benchmarking has a long history of extensive use in the private sector, especially in regards to manufacturing industries such as defense and commercial aviation, automobiles and trucks, machine tools, and appliances.

Actual Use: The State of Oregon pioneered the public sector use of the benchmarking technique with its innovative Oregon Benchmarks program begun in 1990-1. The Oregon program established benchmarks to measure the quality of the State's human, environmental (quality of life), and economic well-being over a twenty-year period. Oregon established benchmarks at three time frames within the twenty year period -- 1995, 2000, and 2010 -- for measuring progress in 158 discrete areas from the 1990 baseline. The tool has a long-term focus and is part of the State's efforts to develop sustainable communities.

Potential Use: Communities and States across the country could use benchmarking as a tool to help in addressing environmental, economic, and quality-of-life conditions and problems. Benchmarking could be a powerful way for empowerment zones and enterprise communities to strengthen implementation of their programs and activities. It also might prove useful in supporting community involvement in brownfields cleanup and redevelopment. Finally, benchmarking could be particularly helpful in focusing community-driven efforts on developing truly sustainable environmental systems.

Advantages: The mechanism is community-driven and agreement on shared goals can be a powerful driver towards any successful effort. Benchmarking provides tangible goals and measures of success against which to judge progress and results.

Limitations: The process of developing community consensus can be complex and time-consuming. Reaching a consensus on benchmarks (and even goals) may or may not be possible. Developing and implementing a benchmark program requires a continuing commitment over a long period of time and can be costly.

Reference for Further Information: *Oregon Benchmarks: Setting Measurable Standards for Progress*, Oregon Progress Board, 775 Summer Street, N.E., Salem, Oregon.

CAPITAL PLANNING AND BUDGETING

Description: Capital planning and budgeting, sometimes called capital or public improvement programming (See Section 8: Capital Improvements Program), is a set of techniques for considering the long-term needs for capital facilities and funding options for meeting such needs. Capital planning focuses on current unmet service requirements and needs for expansion, replacement, or renewal of existing facilities. It relies on engineering and feasibility studies to provide objective project appraisals and set project guidelines. If a capital budget is used, day-to-day operating expenses and capital (fixed asset) investments are accounted for separately. The capital budget generally includes appropriations for the acquisition, construction and repair of capital assets such as land, buildings, and other infrastructure improvements.

In the public sector, funds in a capital budget come primarily from general obligation bonds, dedicated taxes, fees, and trust fund revenues. In the corporate finance context, capital budgeting is a decision-making process with respect to investment in fixed assets (plant and equipment). It focuses on measuring the incremental cash flows associated with investment proposals and evaluating the attractiveness of these cash flows relative to the project's costs. Common evaluative techniques include payback period, discounted payback period, net present value, profitability index, and internal rate of return.

Actual Use: Capital budgeting is commonly employed by relatively sophisticated organizations in both the public and private sectors.

Potential Use: Capital budgeting has received increased federal attention. Executive Order 13037, dated March 3, 1997, established an eleven-member Commission to Study Capital Budgeting. Supported by the Treasury Department, it is to report to the National Economic Council, probably at the end of 1998. Capital planning and budgeting can provide a process whereby environmentally sensitive investment decisions will result.

Advantages: A capital budget separates investments from current expenses and focuses attention on long-term planning.

Limitations: Successful capital planning and budgeting depends on political support as well as the capability to collect and analyze data and express results in a form useful to decision-makers.

Reference for Further Information: Government Finance Officers Association (GFOA), 180 North Michigan Avenue, Suite 800, Chicago, IL 60601; Phone: 312-977-9700; Fax: 312-977-4806; Internet: **www.gfoa.org/**. International City/County Management Association (ICMA), 777 North Capitol Street, NE, Suite 500, Washington, DC 20002-4201; Phone: 202-289-4262; Fax: 202-962-3500; Internet: **www.icma.org/**.

COMPARATIVE RISK RANKING

Description: Risk ranking or comparative risk analysis is the management procedure of prioritizing environmental and public health problems that have undergone risk assessment. Risk assessment involves the identification of hazards, determination of their severity and discovery of exposure patterns. Risk ranking involves comparing individual risk characterizations, on a multi-media basis if possible, and ordering them by the priority in which they should or will be addressed.

Actual Use: Risks used in a local context differ from the use of risk in assessments driving federal or State regulations. The latter are often statistical statements of the probability of death, injury, or damage. A local risk assessment might be based on a survey, field-testing, or reliable empirical information that gives an indication of the nature and magnitude of a problem. Currently, separate rankings are generally done for public health and ecological risks, and assessments and ranking may vary from one community to the next due to varying local conditions. However, many States and a growing number of municipalities such as Cleveland, Ohio, and Phoenix, Arizona, are undertaking comparative risk studies.

Potential Use: Comparative risk ranking could be used by all levels of government to assist in financial decision-making, as to which problem to finance first, regardless of compliance deadlines.

Advantages: The consideration of comparative risk ranking permits communities to allocate limited resources to the most serious environmental and public health concerns first, and involves a high level of citizen input. Such risks may be less costly than other more expensive problems with shorter compliance deadlines. In 1995, EPA's Small Town Task Force formally recognized the need for flexibility in reordering priorities and compliance dates.

Limitations: The flexibility to set risk-based policies locally is not recognized in federal law, so specific agreements between the federal government, States, and localities must be negotiated. There is often a lack of objective risk information available and citizen input must be accounted for.

Reference for Further Information: ICMA, *Risk Assessment: The Role of Local Government*, Washington, D.C., 1997. Syracuse University, Environmental Finance Center draft report, *Risk and Finance*, June 1994. USEPA Journal, *Profiles In Risk Assessment: New Science, New Contexts*, Vol.199, No.1, January/February/March 1993. USEPA Science Advisory Board report, *Reducing Risk: Setting Priorities and Strategies for Environmental Protection*, September 1990. USEPA Office of Policy, Planning & Evaluation report, *A Guidebook to Comparing Risks and Setting Environmental Priorities*, September 1993. EPA sponsors Comparative Risk Centers in Vermont and Colorado.

COST-BENEFIT ANALYSIS

Description: Cost-benefit analysis is a short-hand term for a conceptual framework encompassing a variety of techniques for quantifying and comparing the incremental and total costs, risks, and benefits of legislation, regulations, and policies. Cost-benefit analysis attempts to quantify and assign dollar values to the costs and benefits of particular actions regardless of to whom those costs and benefits accrue. The use of cost-benefit analysis is intended to help produce the best decision by revealing the efficiency of proposed approaches.

Actual Use: Cost-benefit analysis has been used to varying extent for many years by federal, State and local governments (and agencies), as well as the private sector, as one tool to aid in important decision-making on a wide variety of topics, including environmental matters. For example, New York State agencies have been required by statute since 1983 to weigh the costs and benefits of proposed regulations during the rulemaking process. The federal government, meanwhile, has incorporated cost and benefit considerations as part of regulatory impact analyses for many years – most recently in the January 11,1996 Office of Management and Budget policy memorandum, *Economic Analysis of Federal Regulations Under Executive Order No. 12866* ("Regulatory Planning and Review").

Potential Use: Cost-benefit analysis could be used by all governments and private sector to help evaluate the efficiency of any and all decision options.

Advantages: Cost-benefit analysis can communicate to decision makers the economic efficiency of proposed/possible approaches. This economic information then can be given appropriate consideration along with relevant social, health, environmental, and technical considerations in making environmental and other decisions.

Limitations: Good cost-benefit analyses may be time consuming and costly, require considerable technical expertise, and depend heavily on good (and available) information from multiple data sources. In the absence of any or all of these factors, a cost-benefit analysis may be considered suspect and/or inadequate.

Reference for Further Information: Executive Office of the President, Office of Management and Budget, New York State, Governor's Office of Regulatory Reform, *Cost-Benefit Handbook: A Guide for New York State Regulatory Agencies*. USEPA's Economy and the Environment Homepage is located at **http://www.epa.gov/oppe/eaed/eedhmpg.htm**

COST-EFFECTIVENESS ANALYSIS

Description: This is an analytic process where the cost-effectiveness of a regulatory or other policy alternative is calculated by dividing the annualized cost of the alternative by some measure of its effectiveness. For environmental protection purposes, the measure of a policy alternative's effectiveness may range from the amount of the reduction in a pollutant generated to statistical and actual improvements in human health and/or the environment. In general, the specific measure of effectiveness chosen should correspond as closely as possible to the final effects sought by the regulatory or other policy alternative.

Actual Use: Cost-effectiveness analyses are routinely used by federal executive departments and agencies, including the Environmental Protection Agency, when performing Regulatory Impact Analyses (RIAs) of regulatory alternatives for which there are many benefits that cannot be easily monetized, or when the law sets forth a specific regulatory objective. Cost-effective analyses are also performed by many State agencies and private businesses.

Potential Use: These analyses could be used more frequently by the federal government in helping to make decisions on selecting environmental regulatory alternatives. It could also be used by more State governments, as well as the governments of large cities to guide and support their environmental decision-making.

Advantages: Cost -effectiveness analysis can be used quite effectively to identify the least-cost way of reaching a pre-determined objective, policies that maximize the level of a stated type of benefit, and the incremental tradeoffs between different levels of controls when no benchmarks exist. It can indicate which pollution control measures or policies are inferior alternatives.

Limitations: It must be emphasized that the use of cost-effectiveness analysis does not necessarily reveal what level of environmental control is reasonable or even desirable. Furthermore, this type of analysis requires considerable analytical expertise on the part of staff) and can be both time-consuming and expensive to implement (outside experts also can be very costly).

Reference for Further Information: USEPA, Office of Policy, 401 M Street, SW, Washington, DC 20460, Mail Code: 2111; Phone: 202-260-4332; Fax: 202-260-0275. See "Guidelines for Performing Regulatory Impact Analysis", reprinted March 1991

DEDUCTION OF AGRICULTURAL CONSERVATION EXPENSES

Description: Certain agricultural soil and water conservation expenses are deductible for federal income tax purposes. These include the costs of soil and water conservation improvements to, or prevention of erosion of, land the owner or a tenant is using or has used for farming. Among the covered activities are leveling, conditioning, grading, terracing, contour furrowing, restoration of soil fertility, and related treatment or movement of earth. Also covered are the construction, control and protection of diversion channels, drainage ditches, irrigation ditches, earthen dams, watercourses, outlets, and ponds. Costs of the planting of windbreaks and eradication of brush also may be deducted. Expenses to drill a water well for irrigation or other agricultural purposes, to prepare land for center pivot irrigation systems, or to drain or fill wetlands are not deductible. Assessments for depreciable property that a soil and water conservation or drainage district levies against farm land also can be deducted. Although not conservation expenses, other ordinary and necessary expenses such as the cost of annual removal of sediment from a drainage ditch are deductible as business expenses on Part II of IRS Schedule F, *Profit or Loss from Farming*.

Actual Use: This deduction is commonly used when the tax reduction benefits outweigh the burdens imposed by inclusion of cost-sharing payments in gross income.

Potential Use: The deduction can encourage farmers and ranchers to undertake soil and water conservation measures they would not otherwise undertake.

Advantages: Deductions in the tax years of covered expenditures can reduce the after-tax cost.

Limitations: Expenses can be deducted only if they are consistent with a plan approved by the U.S. Department of Agriculture's Natural Resources and Conservation Service. If soil and water conservation expenses are deducted, cost-sharing payments for such expenses cannot be excluded from gross income. Any portion of conservation expenses benefitting land that does not qualify as farm land cannot be deducted. Direct expenses for structures or facilities subject to an allowance for depreciation must be capitalized, including expenses for moving dirt when making structures such as reservoirs, tanks, canals, conduits, wells and dams composed of masonry, concrete, tile, metal or wood. Similarly, expenses to drain or fill wetlands must be added to the basis of the land. The deduction cannot be more than 25 percent of gross income from farming.

Reference for Further Information: Consult a tax practitioner. See also pages 30-32 of Internal Revenue Service Publication 225, *Farmer's Tax Guide*. Contact the IRS at 1111 Constitution Avenue, NW, Washington, DC 20224; Phone: 800-829-1040; Fax: 703-368-9694; Internet Address: **www.irs.ustreas.gov/prod/forms_pubs/index.html**

DISCOUNTING (ECONOMIC)

Description: Discounting focuses on the time value of money (a dollar today is worth more than a dollar tomorrow). In financial accounting it is the essence of most capital investment appraisal, comparing present cash flows with cash flows in a later period. Methods often used include net present value (NPV) and internal rate of return (IRR). NPV discounts all cash flows to present values at a predetermined rate of interest (discount rate). The rate estimates the cost of capital adjusted for anticipated inflation and investment risk. The present value of cash outflows is deducted from the present value of inflows to arrive at a net present value. The IRR is that discount rate which when applied to cash flows makes its NPV equal to zero. With the IRR method, more than one solution is possible if the cash flow pattern is not one of net outflows followed by net inflows. In practice, present value and future value tables are used to determine the proper discount factor. In real property appraisal, discounted cash flow (DCF) analysis is used to prepare a cash flow forecast for the property interest appraised. The total present value of the cash becomes the value estimate for that interest. Two common income capitalization approaches are direct capitalization and yield capitalization. A number of alternative algebraic formulas can be used to account for the impact of financing terms, use of a sinking fund, and prospective changes in income and value.

Actual Use: Discounting is commonly used in capital investment decision-making. Discount rates (compound interest rates) are used to convert expected future cash flows into present value estimates for commercial real estate appraisals. In practice, the discount rate is the competitive rate of return applicable to the property interest and cash flows analyzed. Payback period (PBP) and discounted cash flow (DCF) techniques are often used in combination, tilting results toward risk reduction.

Potential Use: Discounting can provide a basis for choices among alternative investments in environmental measures or equipment needed to produce environmentally friendly goods.

Advantages: Discounting is easy to use with financial calculators or personal computer software. Accounting for the time value of money deals with opportunity costs, inflation, and time preferences. NPV and IRR are not subject to problems caused by accounting adjustments as decisions are based on cash flows; however, they tilt results toward maximization of owners' or stockholders' wealth.

Limitations: Discounting does not answer all of the questions involved in capital investment decisions. Its application to public sector investments is criticized as unfair to future generations and as ignoring the essential issue of sustainability.

Reference for Further Information: For real property transactions, consult a licensed/certified commercial real estate appraiser.

EMPLOYEE STOCK OWNERSHIP PLANS

Description: An employee stock ownership plan (ESOP) is a type of tax-qualified employee benefit plan governed by the Employee Retirement Income Security Act (ERISA). As such, it is a defined contribution pension plan (stock bonus and/or money purchase) designed to invest primarily in the stock of the employer firm. Under an ESOP, employees can take over or participate in the management of the employer by becoming stock shareholders through a nonprofit trust. However, the trustee of the ESOP (usually a commercial bank that does not have a lending relationship with the parties) actually votes the ESOP shares. The most sophisticated use of an ESOP is to borrow money. Leveraged ESOPs can use borrowed funds to provide an accelerated transfer of stock to employees and provide new capital to the company. Although the employer must guarantee repayment of the loan, it can take tax deductions for contributions to the ESOP used to repay both principal and interest on the loan, as well as for dividends on ESOP-owned stock. If the leveraging is to provide the company new capital for expansion or capital improvements, the company uses the cash to buy new shares of stock. If the leveraging is being used to divest a division, the ESOP buys the shares of a newly created shell company, which in turn purchases the division and its assets. In the public sector, an ESOP can be used in privatizing a service or function.

Actual Use: There are over 10,000 ESOPs in the U.S. covering almost 9 million participants and controlling over $210 billion in company stock. Only about 15 percent are in publicly traded companies, but this group has accounted for approximately 80 percent of ESOP borrowing.

Potential Use: Leveraged ESOPs can be used to finance environmental investments such as purchases of pollution abatement equipment or development of ecologically friendly products.

Advantages: Contributions to ESOPs are tax deductible to the sponsoring corporation up to certain limits. When employer securities are contributed directly, the employer may take a tax deduction for the full value of the stock contributed. This increases the employer's cash profits by the value of the taxes saved.

Limitations: ESOP participants must be allowed to direct the ESOP trustee's vote of unallocated shares on major corporate transactions, such as a merger.

Reference for Further Information: Consult a tax practitioner. See also the National Center for Employee Ownership, 1201 Martin Luther King Jr Way, Oakland, CA 94612; Phone: 510-272-9461; E-mail: nceo@nceo.org; Internet: **www.nceo.org**. For tax rules, contact the Internal Revenue Service, 1111 Constitution Avenue, NW, Washington, DC 20224; Phone: 800-829-1040; Fax: 703-368-9694; Internet: **www.irs.ustreas.gov/**.

ENVIRONMENTAL PROTECTION AGENCY COMMON SENSE INITIATIVE

Description: The Environmental Protection Agency's (EPA's) Common Sense Initiative (CSI) embodies a new generation of environmental protection. Via the CSI, EPA brings together businesses, governments, and environmentalists to develop cleaner, cheaper and smarter ways of protecting public health and the environment. The Initiative takes an industry-by-industry approach working to prevent and cleanup pollution rather than shifting it around. It seeks to bring all involved parties together to develop consensus solutions. Using innovation and common sense, it strives for cleaner goals using flexible means. The CSI incorporates pollution prevention as a standard environmental tool to be used with cleanup controls. It tries to tailor environmental requirements to fit the way that businesses work to ensure that real environmental results are achieved.

Actual Use: The six industries participating in the first phase of the CSI are automobile assembly, computers and electronics, iron and steel, metal plating and finishing, petroleum refining, and printing. These industries represent over 11% of the Gross Domestic Product, employ 4 million people, and account for 12.4% of toxic releases reported by industry in 1992. For each industry, EPA assembles a team of stakeholders to find ways to change complex and inconsistent environmental policies into better, more usable comprehensive sector approaches. For example, the computer and electronics group is identifying the composition of its waste streams to develop new pollution prevention tools and improve waste collection. The metal finishing industry is looking for ways to improve the ability of firms to access and afford financing for environmental investments.

Potential Use: While currently experimental, the CSI is potentially applicable to all US industrial sectors. It facilitates the development and testing of realistic and effective multimedia environmental policies. The Initiative offers an opportunity to forge a new and better environmental consensus for the future.

Advantages: The CSI's multi-media focus can produce improved environmental results at less cost. Its flexible approach promotes creativity and encourages use of innovative technologies. Industry cooperation means that results will be real and measurable (so they can take credit for them).

Limitations: Current federal environmental laws and corresponding regulations are media-specific (air, land, water, etc.) and are not necessarily flexible. The process of reaching consensus among industry, government, and environmentalists on achievable environmental goals and acceptable flexibility is often slow, not easy, and may not always be possible.

Reference for Further Information: USEPA, 401 M Street, SW, Washington, DC 20460 - Mail Code: 6101; Phone Number: 202-260-7417. CSI's home page is located on the World Wide Web at **http://www.epa.gov/commonsense/**.

ENVIRONMENTAL PROTECTION AGENCY
PROJECT XL

Description: Project XL is a federal program managed by the Environmental Protection Agency (EPA) that gives regulated entities the flexibility to implement alternative strategies that replace or modify specific regulatory requirements, produce superior environmental results and promote greater accountability. While this is a federal program, most XL Projects require the participation of State regulatory agencies and local governments. Project XL seeks to give a limited number of responsible parties the opportunity to demonstrate environmental excellence and leadership. It seeks to develop real world projects that produce costs savings, reduce paperwork burdens, build stakeholder support, test innovative multimedia strategies (with a pollution prevention preference), and can be replicated. Under XL, project sponsors can include private facilities, multiple facilities, industry sectors, federal facilities, communities, and States.

Actual Use: XL projects go through three phases: proposal development; project development; and implementation and evaluation. As of April 1998, seven pilot projects were being implemented and twenty-ne additional projects were being developed. Some of the companies participating in XL projects being implemented include the Berry Corporation, Weyerhauser, the Intel Corporation, Lucent Technologies, Vandenberg Air Force Base (the Department of defense), Merck & Co. Inc., and the HADCO Corporation.

Potential Use: EPA has committed to a goal of implementing fifty pilot projects in four categories: XL projects for facilities, sectors, government agencies, and communities. The new approaches tested in XL projects could be incorporated into EPA and State environmental programs, replicated in other facilities in the same industry or community, and/or transferred for use in other industries and communities.

Advantages: The multi-media focus of XL projects can produce superior environmental results often at less cost. The flexible approach used in XL projects promotes creativity and encourages innovation, especially with pollution prevention. When stakeholder consensus can be achieved, it can mean fewer future disagreements between affected parties and less after-the-fact litigation.

Limitations: Current federal environmental laws and corresponding regulations are media-specific (air, land, water, etc.) and are not necessarily flexible. The process of reaching consensus among stakeholders on acceptable regulatory alternatives, definitions of excellence, and adequate accountability may be slow, difficult, and not always possible.

Reference for Further Information: USEPA, Office of Reinvention Initiatives, Project XL, 401 M Street, SW, Washington, DC 20460; Phone: 202-260-5754; Fax-on-demand line:202-260-8690. Internet: **http://yosemite.epa.gov/xl/xl_home.nsf/all/homepage**

EXPENSING OF ASSETS

Description: The expensing of depreciable assets is a tax accounting concept. Section 179 of the Internal Revenue Code allows businesses to elect a current expense deduction in the year the qualifying property is placed in service, which gives them a more immediate tax benefit than does a depreciation deduction over a specified recovery period. Qualifying property is acquired for use in a trade or business and includes tangible personal property such as machinery and equipment. However, property acquired from related persons, including corporations, does not qualify.

Actual Use:. Expensing is a widely and commonly used current-year income tax minimization strategy. Gasoline storage tanks and pumps at retail service stations are qualifying tangible personal property. Single-purpose agricultural and horticultural structures also qualify. Energy property other than public utility property can qualify. This includes equipment that uses solar energy to generate electricity, to heat or cool, or to provide hot water for use in a structure, or to provide solar process heat. Also included is equipment to produce, distribute or use energy derived from a geothermal deposit up to the electrical transmission stage. Other type of air conditioning or heating units do not qualify.

Potential Use: Environmental equipment acquisitions can be expensed to reduce the after-tax cost, as can be purchases of equipment needed for production of environmentally friendly goods or delivery of environmental services.

Advantages: The use of expensing increases current year cash profits by decreasing taxable income and consequent federal tax liability.

Limitations: The deduction must be claimed on Form 4562. The $18,000 limit for 1997 is reduced dollar-for-dollar by the amount of investment in qualifying property exceeding $200,000. For 1998 the limit is $18,500 and the same investment restriction applies. The maximum deduction for qualified zone property, including buildings, is $38,000 for enterprise zone businesses. Definitions of qualified zone property and enterprise zone businesses were changed effective August 5, 1997.

Reference for Further Information: Consult a tax practitioner. See pages 11-21 of Internal Revenue Service (IRS) Publication 946, *How To Depreciate Property*. Contact the IRS at 1111 Constitution Avenue, NW, Washington, DC 20224; Phone: 800-829-1040; Fax: 703-368-9694; Internet: **www.irs.ustreas.gov/prod/forms_pubs/index.html**.

FINANCIAL CAPABILITY ANALYSIS

Description: Financial capability/affordability analysis is a tool used by public and private entities such as local governments and businesses, to determine if they have the ability to pay for capital investments and the costs of operations, maintenance, and replacement, of specific facilities or pieces of major equipment. It is used to examine the financial impact of proposed projects or purchases on the entity as a whole, as well as on individuals and households. It is used to help size/match investment plans to resources. Affordability analysis is a type of financial capability tool that measures the impact of proposed investments as a percentage of median household income (MHI).

Actual Use: Most State Revolving Funds require communities seeking assistance to submit financial information to them, and this information is especially critical in determining interest rates for hardship loans. The Drinking Water SRF (DWSRF) also uses this information when determining if a principal subsidy is offered. Businesses use financial capability analysis to help determine the feasibility of desired capital investments. Debt/credit rating organizations use them in calculating the quality/strength of bonds being offered by public and private entities. Banks and other financial institutions use them in credit analyses to help decide whether to make loans, and setting proper interest rates. State comptrollers may review local capability when evaluating revenue bond issues.

Potential Use: Ideally, financial capability analysis would be utilized by both public and private entities whenever a substantial environmental or other investment is contemplated and/or made. An example of a financing tool that performs a financial capability analysis is the expert rate-setting and financial planning software for water and wastewater systems known as the "rate model." This electronic tool is described in **Section 5B: Electronic Services**.

Advantages: Proper use of this tool helps to ensure that communities and business alike are able to develop and implement financially sustainable environmental and other systems. It also determines the level and kind of SRF and other government loan programs.

Limitations: Determining financial capability may be difficult and expensive for small communities to perform on their own, as they may lack in-house financial and economic expertise. Affordability analyses typically do not evaluate the cumulative costs of environmental mandates and no standardized or common methodology exists. DWSRFs are finding it difficult to perform such analyses for small private drinking water loan recipients, because of lack of data.

Reference for Further Information: USEPA, Office of Policy, Economy and the Environment Division, 401 M Street, SW, Washington, DC 20460, Mail Code: 2172; Phone: 202-260-5488. Fax: 202-250-5732. New England Interstate Water Pollution Control Commission, *Projected Household Costs of Mandated Environmental Infrastructure Investments,* August 1995.

FISCAL IMPACT ANALYSIS

Description: Fiscal impact analysis is a basic component of development analysis, along with environmental impact analysis. It is a tool for identifying public costs, including the potential cost of public services, associated with private development. (In this regard it is somewhat similar to state legislative fiscal impact analysis, although typically narrower in focus.) At a minimum, fiscal impact analysis considers capital costs, operating and maintenance costs, changes in revenue attributable to the project, impacts on energy requirements, and potential legal liabilities which result from action or inaction on the project. Each element may be weighted to reflect policy priorities. The length of the payback period may be estimated for projects creating savings or revenues, or the project's present worth in terms of the stream of outlays and revenues may be calculated.

Various local governments use different methods and criteria. For example, some look at the public costs of health and safety effects, community economic impacts and quality-of-life factors. Interrelationships among projects, including those in neighboring jurisdictions also are considered in some cases. In any event, the ultimate concern is whether the prospective fiscal impact of a project is the imposition of net additional expenditures.

Actual Use: Most cities and counties in the State of California require fiscal impact analysis prior to project consideration. Many other local governments across the country use limited versions of fiscal impact analysis as part of their land-use planning and zoning processes.

Potential Use: Fiscal impact analysis can be used to show the real costs to the public sector (as a proxy for a community) of public and private development projects and alternatives.

Advantages: Fiscal impact analysis can reveal environmental and quality of life benefits, as well as direct and indirect costs.

Limitations: Useful fiscal impact analysis depends upon adequate data as well as analytical capability. It can be expensive and time-consuming or, if limited to simplistic marginal cost calculations, have little utility.

Reference for Further Information: Government Finance Officers Association (GFOA), 180 North Michigan Avenue, Suite 800, Chicago, IL 60601; Phone: 312-977-9700; Fax: 312-977-4806; Internet: **www.gfoa.org/**.American Planning Association, 1776 Massachusetts Avenue, NW, Washington, DC 20036, or 122 South Michigan Avenue, Suite 1600, Chicago, IL 60603; Phone: 202-872-0611 or 312-431-9100; Fax: 202-872-0643 or 312-431-9985; Internet address: **www.planning.org/info/infoguid.html**. International City/County Management Association (ICMA), 777 North Capitol Street, NE, Suite 500, Washington, DC 20002-4201; Phone: 202-289-4262; Fax: 202-962-3500; Internet: **www.icma.org/**.

FULL-COST PRICING

Description: Full cost pricing for public and private utilities occurs when user fees are set to recover all of the costs associated with providing services -- capital, operations, maintenance, debt service, and replacement. Charging the full cost for environmental facilities and services helps to ensure that the demand for the facilities and services is proportionate with the cost of providing them, and that they are both environmentally and financially self-sustaining.

Actual Use: Historically, not many communities have relied on user fees to cover the full costs of providing environmental facilities and services. Instead, they have elected to subsidize to varying degrees the provision of these facilities and services, particularly non-capital costs, from some other source of revenue. Private businesses, on the other hand, more often ensure that the full costs for facilities and services are passed on to customers/users.

Potential Use: In an ideal world, the full-cost pricing of environmental facilities and services would be adopted as the financing standard in the public sector -- being implemented for all activities in every State and community across the nation. As governmental and/or natural resources become increasingly constrained, the pressure for full-cost pricing will build.

Advantages: Charging fees that recover the full costs of providing facilities and services create financially sustainable environmental systems. Costs are not hidden or ignored, and careful strategies can reduce operations and maintenance costs in the future. In addition, capital investments can be undertaken when market conditions and interest rates are most advantageous. The full-cost pricing of environmental activities may also encourage users to better conserve valuable or limited natural resources.

Limitations: Determining "full-cost pricing" user fees can be a difficult and an expensive job for public agencies. Especially in smaller communities, such agencies often lack general, in-house expertise in determining these costs. Public agencies must also address numerous regulatory issues in determining fair fees that must be set at new levels. They may also face strong political constraints and voter objections to full-price costing if the resulting user fees must be substantially higher than in the past. Local governments may decide to subsidize user fees to achieve some other public policy goal, e.g., to attract industry or control growth.

Reference for Further Information: USEPA Environmental Financial Advisory Board Advisory - *Private Sector Participation in the Provision of Environmental Services: Barriers and Incentives,* November 25, 1991. USEPA, 401 M Street, SW, Washington, DC 20460. Mail Code: 2731R

LIFE-CYCLE ASSESSMENT/COSTING/DESIGN

Description: Life-cycle assessment/costing seeks the most cost-effective alternative that achieves the least long-term cost of acquisition and ownership. A low initial acquisition cost does not ensure a low life-cycle cost, which includes operating and support costs (e.g., spare parts, maintenance and support equipment). Life cycle cost is the total of all costs from project inception through development, acquisition, and support to the decommissioning of a facility or disposal of equipment at the conclusion of its useful life. Life-cycle accounting assigns product-specific costs, including contingent liabilities, in a holistic frame-work. Life-cycle design applies life-cycle assessment to product design and redesign decisions. Four linked components have been defined for life-cycle assessment of environmental impacts. Goal definition and scoping identifies the assessment purpose and the study's expected products. It determines the boundaries of the study and assumptions based on the goal definition. Life-cycle inventory quantifies the energy and raw material inputs and environmental releases associated with each stage of production. Impact analysis assesses the impacts on human health and the environment associated with energy and raw material inputs and environmental releases quantified by the inventory. Improvement analysis evaluates opportunities to reduce energy, material inputs, or environmental impacts at each stage of the product life-cycle.

Actual Use: Life-cycle assessment has become a valuable decision-support tool in examining the cradle-to-grave impacts of processes and products, in part due to the Chemical Manufacturer Association's Responsible Care Program, methodological developments by the Society for Environmental Toxicology and Chemistry, and increasing adoption of ISO 14000 (see **Section 7., Green Code of Conduct (ISO 14000 Standards Voluntary Environmental Standards)**). A 1995 survey of Fortune 500 companies indicated that most who were routinely assessing the environmental consequences of their products and production systems were doing so to reduce environmental costs.

Potential Use: Life-cycle analysis methodologies can be used to assess the environmental impacts of products and industrial processes from the inputs to final disposal.

Advantages: Recognition of life-cycle costs allows an organization to minimize total costs.

Limitations: The data required is extensive and the analytical techniques can be complicated.

Reference for Further Information: *Life Cycle Design Guidance Manual: Environmental Requirements and the Product System* and Life Cycle Assessment: Investments Guidelines and Principles; Office of Pollution Prevention and Toxics, USEPA, 401 M Street, SW, Washington, DC, Mail Code: 7409; Phone: 202-260-3557; Fax: 202-260-0178. Tellus Institute, 11 Arlington Street, Boston, MA 02116-3411; Phone: 617-266-5400; Fax: 617-266-8303; E-mail: INFO@tellus.org; Internet: **www.tellus.org/**.

PAY-AS-YOU-GO

Description: Although, in the public sector, "pay-as-you-go" normally is associated with operating budgets and current expenses, it also is the financial policy of funding capital outlays from the cash budget, which depends on current, usually own-source, revenues, rather than by borrowing. As such, it relies on current tax and fee revenues, intergovernmental transfers, and/or trust fund balances rather than the issuance of even short-term debt. User fees and special, earmarked taxes tend to be the revenue foundations of a pay-as-you-go system. Creation and maintenance of reserve/trust funds often are employed to accrete sufficient amounts for fixed asset projects. The Federal Highway Trust Fund is perhaps the prime example of this approach. A governmental unit which pays for some improvements from current revenues and for others by borrowing is on a partial or modified pay-as-you-go basis. A pay-as-you-go approach to fixed asset financing tends to work best if funds are allocated in an annual capital budget, not an operating budget.

Actual Use: Pay-as-you-go is the traditional approach for financing relatively small fixed asset projects, such as some communications equipment and transportation vehicles. Its popularity increases with higher interest rates and the consequent higher cost of debt.

Potential Use: The pay-as-you-go approach is feasible for relatively small environmental projects that enjoy sufficient political support to compete against other current budget priorities.

Advantages: Avoidance of the interest costs and other fees that are an integral part of borrowing can represent substantial savings. In addition, the fiscal discipline inextricably associated with pay-as-yo-go can encourage public attention to preventive maintenance and proper operation so as to avoid unnecessary capital outlays.

Limitations: Pay-as-you-go tends to be a realistic approach only for capital investment projects that do not cost so much that their funding precludes other, equally important activities. Although some projects can be financed incrementally, the magnitude and/or uneven nature over time of some capital investments (e.g., bridges) precludes such a strategy.

Reference for Further Information: Government Finance Officers Association (GFOA), 180 North Michigan Avenue, Suite 800, Chicago, IL 60601; Phone: 312-977-9700; Fax: 312-977-4806; Internet: **www.gfoa.org/**. International City/County Management Association (ICMA), 777 North Capitol Street, NE, Suite 500, Washington, DC 200024201; Phone: 202-289-4262; Fax: 202-962-3500; Internet: **www.icma.org/**.

POLLUTANT LOADING ALLOCATION

Description: Pollutant loading allocation is a valuable tool for implementing environmental quality standards by establishing the relationship between pollution sources and environmental conditions. The objective of allocation is to distribute allowable pollutant loadings among different pollutant sources so that the appropriate control actions can be taken and the required environmental quality standards achieved. Specifically, the Total Maximum Daily Loading (TMDL) approach provides an estimate of pollutant loadings from all sources and predicts the resulting pollutant concentrations. The TMDL is derived from all point, nonpoint, and background sources. After the TMDL is derived, maximum limits are allocated to various pollution sources.

Actual Use: The Clean Water Act requires that States develop TMDL processes for water-quality limited waters. The TMDL concept has been successfully applied to develop waste load allocations for point sources in low flow situations where nonpoint sources are not a concern. These allocations, which are based on actual water quality impacts, can produce quantifiable pollution reductions.

Potential Use: The TMDL process must take into account nonpoint sources as well. For example, if excess sediment proves detrimental to water quality, nonpoint and point sources of sediment could be identified, and loadings assigned to each kind of source. If the measurement and tracking of air pollution becomes sufficiently exact, a TMDL process might also be applied to help communities better meet water quality standards, as well as meet air quality standards.

Advantages: TMDLs may significantly reduce pollution when attention is focused on all nonpoint sources, some of which may be newly recognized. TMDLs allow (in fact, encourage) the private sector to innovate because they typically do not require use of a particular technology or Best Management Practice (BMP), but let the TMDL holder decide how reductions will be achieved, thus analysis of the least-cost solution is encouraged.

Limitations: In some cases, it may be difficult to determine sources of pollution, particularly nonpoint sources, and therefore determine appropriate loadings. The impacts on water quality from different sources is also a complicated analysis. Currently, a number of States and localities are not, vigorously pursuing TMDL work. Considerable staff expertise may be necessary to credibly pursue TMDL work in an expeditious and timely manner.

Reference for Further Information: U.S. EPA, Office of Water, *Guidance for Water-Quality Based Decisions, The TMDL Process*, April, 1991. See also the U.S. EPA, Office of Water TMDL web page on the Internet at: **http://www.epa.gov/OWOW/tmdl/index.html**.

REFINANCING LOANS

Description: Refinancing loans can be a way to reduce interest payments when the economic climate is one of lower interest rates compared to the time of the original loan. Refinancing may be used to change loan maturity and, if extended or lengthened, can reduce annual repayment costs, in the short term. A related financing tool is bond refinancing, typically termed as refunding or advanced refunding. Bond refinancing occurs when bonds are sold to provide funds to retire outstanding debt of an issuer. This related financing tool is discussed in **Section 2.A., Advanced Refunding**.

Actual Use: Loan refinancing is a long-standing, common, and widely accepted financial practice in both the public and private sectors. Most commercial lending institutions will refinance loans, and the refinancing need not be handled by the original lender. Loan refinancing is much less complex than bond refunding, since the financial return to individual investors is less of an issue. State Revolving Fund (SRF) refinancings are extremely common, although both the Clean Water Act and the Safe Drinking Water Act set time restrictions on refinancing, i.e., refinancings are allowed for bonds issued after March 7, 1985 (Clean Water SRF) and July 1, 1993 (Drinking Water SRF). These restrictions are meant to assist the refinancing of recent short-term municipal debt as well as long-term debt when SRF financing is not immediately available. The Drinking Water SRF, however, may not be used to refinance private sector water projects. Nationally, Clean Water SRF refinancing accounted for 17% of SRF lending in 1995, and exceeded 25% in Maine, Massachusetts, and New York. The Clean Water SRF also may be used to refinance Rural Development loans.

Potential Use: Refinancing can occur for any environmental lending, since it is the interest rate climate and availability of lending monies that influence refinancing rather than the environmental program area. Many commercial institutions specialize in refinancing.

Advantages: The possibilities for lowering costs through the interest rate reductions associated with refinancings are considerable, particular in today's (1998) climate of extremely low interest rates. Annual interest payment costs can be reduced further through the extension of loan maturity dates, although longer maturities can end up costing more. The money which is saved through refinancing can be invested in new environmental projects and other initiatives.

Limitations: Similar to home mortgages, refinancing can be administratively burdensome. Also, borrowers have to absorb new financing costs such as issuance and service fees. Thus, small borrowers may have less access to refinancing than large ones, and commercial lending institutions may be less interested in refinancing small loans because of the time, effort and cost involved.

Reference for Further Information: Council of Infrastructure Financing Authorities, *1995 Revolving Loan Fund Survey*, prepared by the Ohio Water Development Authority, May 1996.

REFORESTATION TAX CREDIT AND AMORTIZATION

Description: Up to $10,000 per year of qualified timber property reforestation expenses can be amortized over an 84-month period. A tax credit of either 10% or 8% of the expenditures qualified for amortization can be claimed. Qualifying expenses include only costs which must otherwise be capitalized (e.g., site preparation, seeds or seedlings, paid labor, small tools, and depreciation on equipment used in planting and seeding). Qualifying timber property must consist of at least one acre planted with tree seedlings in the manner normally used in forestation or reforestation for commercial production of timber. This does not include property on which shelter belts, nut trees, Christmas trees, or ornamental trees have been planted. Nor does timber grown for personal use qualify. However, the site can be owned or leased.

To amortize, the deduction must be entered in Part VI of IRS Form 4562 and a statement describing the expenses attached. A federal income tax credit can apply to up to $10,000 of the costs incurred each year to forest or reforest property held for growing trees for sale or use in the commercial production of timber products. Although costs must qualify for amortization, the credit can used regardless of whether the costs are amortized or added to the basis of the property. If qualified property is disposed of within ten years after the tax year in which amortization of reforestation expenses is taken, gains must be reported as ordinary income up to the amount of amortization taken.

Actual Use: Since 1980, Section 194 of the Internal Revenue Code (26 USC 194) has allowed deduction of the amortization of qualified timber property from adjusted gross income for income tax purposes. Section 48(b) of the Code authorizes the reforestation credit.

Potential Use: Tax credits can induce for-profit entities to make reforestation investments which would otherwise not be considered.

Advantages: Both the tax credit and amortization can make reforestation investments financially feasible for-profit landowners.

Limitations: Expenses reimbursed under any governmental reforestation cost-share program cannot be amortized unless the reimbursement is included in gross income. Qualifying expenses in excess of the $10,000 annual limit cannot be carried over or back to other tax years. If any of the amortized timber stand is disposed of within 10 years of the year in which amortization was elected, any gain up to the amount of amortization taken is recaptured as ordinary income.

Reference for Further Information: Consult a tax practitioner. See page 49, IRS Publication 225, *Farmer's Tax Guide* and page 52, IRS Publication 535, *Business Expenses*. Contact Internal Revenue Service, 1111 Constitution Avenue, NW, Washington, DC 20224; Phone: 1-800-829-1040; Internet: **www.irs.ustreas.gov/**.

REGIONALIZATION

Description: Pollution does not respect political boundaries. Agglomeration economies promoting industrial urbanization and pollution often transcend political jurisdictions. The regional impacts of air and water pollution have meant that States and communities cannot independently solve all of their pollution problems. For example, chemical precursors to ground-level ozone pollution can be carried hundreds of miles downwind from their origins. It is also clear that watersheds and other "trans-boundary" ecosystems cross the territorial lines of governmental jurisdictions, including national borders. In response to these realities, geographic regionalization of some types of environmental facilities and services can produce economies of scale which reduce average unit cost. The regional consolidation of management and overhead functions such as procurement, pooling of debt issuance and risk management, can also reduce costs associated with environmental concerns.

Actual Use: Regional approaches have been used increasingly to solve problems. The Association of Bay Area Governments, a regional organization serving the San Francisco area, offers a wide range of financial programs for issuance of conduit revenue bonds or certificates of participation, general municipal credit obligations, tax increment bonds, community facilities district and special assessment bonds, general capital financing, and low-cost alternatives to vendor financing.

Potential Use: Regional strategies are essential to prevent certain types of environmental degradation and pollution or effectively remediate effects of cross-border pollution. They also offer opportunities to reduce costs and improve services where economies of scale are a significant factor.

Advantages: For drinking water, economies of scale offer the most promising way of lowering the unit cost of production, and thus, consumer bills, in some circumstances. Economies of scale are particularly relevant for source-of-supply and treatment functions and can be achieved via mergers, acquisitions, interconnection, and wholesale water markets. Some economies can be achieved through common ownership or management even without the benefit of physical interconnection.

Limitations: Regional approaches require cooperation and legal authority. They also may be attacked as interfering with local political power or home rule.

Reference for Further Information: USEPA, Office of Air Quality Planning and Standards, Research Triangle Park, NC 27711; Phone: 919-541-5616; Fax: 919-541-2464; National Association of Development Organizations, 444 North Capitol Street, NW, Suite 630, Washington, DC 20001; Phone: 202-624-7806; Fax: 202-624-8813; E-mail: nado@sso.org; Internet: **www.nado.org/**; National Association of Regional Councils, 1700 K Street, NW, Suite 1300, Washington, DC 20006; Phone: 202-457-0710; Internet: **www.narc.org/**. Association of Bay Area Governments, PO Box 2050, Oakland, CA 94604-2050; Phone:510-464-7900; Fax:510-464-7979;Internet: **www.abag.ca.gov/services/finance/abagfs.htm**

REHABILITATION TAX CREDITS

Description: Federal tax credits to support private investment in the substantial rehabilitation of historic and older buildings are authorized by Section 251 of the Tax Reform Act of 1986. This certified rehabilitation of a certified historic structure is supported by a twenty percent tax credit. A depreciable building rehabilitated for office, commercial, industrial, agricultural, or rental residential purposes may qualify for the tax credit if it is listed in the National Register of Historic Places or is located in a registered historic district and is certified by the National Park Service as contributing to the district's historic significance. The owner must hold the building for five full years after completing the rehabilitation, or pay back a portion of the tax credit. A ten percent tax credit is available for substantial rehabilitation of older, non-historic buildings (built before 1936) for non-residential uses. The cost of rehabilitation must exceed the greater of $5,000 or the adjusted basis of the depreciable property and at least seventy-five percent of the building's internal structural framework must remain in place.

Actual Use: Rehabilitation tax credits for historic and other buildings have been authorized in federal income tax laws since 1976. These tax credits have been used extensively in a number of inner-city revitalization efforts.

Potential Use: The availability of a federal tax credit for building rehabilitation offers owners of qualifying historic and older, non-historic buildings the opportunity to accomplish much needed environmental remediation involving the removal of the hazardous substances at significantly lower after-tax costs.

Advantages: Tax credits reduce income tax liabilities dollar-for-dollar, unlike deductions which have a value based on the marginal tax rate.

Limitations: Buildings listed in the National Register of Historic Places are not eligible for the ten percent credit; therefore, owners of historic buildings denied certification for the twenty percent credit may not claim the ten percent credit. Tax credits are useful only to the extent taxes are otherwise owed.

Reference for Further Information: For general information contact National Park Service, Room NC200, 1849 C Street, NW, Washington, DC 20240; Phone: 202-343-9578; E-mail: hps-info@nps.gov. For federal tax rules, contact the Internal Revenue Service, Washington, DC 20224; Phone: 1-800-829-1040; Internet: **www.irs.ustreas.gov/**. For application forms and instructions, contact the appropriate State's historic preservation office.

RISK MANAGEMENT AND INSURANCE

Description: Risk management and insurance can be a key ingredient in a long-term cost reduction strategy. Risk management is the process of managing risk exposure to achieve objectives in a manner consistent with public interest, human safety, environmental factors, and the law. It consists of planning, organizing, leading, coordinating and controlling activities with the intent of providing an efficient pre-loss plan that minimizes the adverse impact of risk on the organization's resources, earnings and cash flows. Risk management involves systematic, continuous investigation of risk loss exposures, evaluation of their nature, frequency, severity and potential impact on the organization, and planning, organizing and implementing appropriate risk control and risk financing techniques to minimize loss impacts on the organization. Effective risk management is needed to avoid adverse effects on an organization's credit rating and cost of capital. Frequently, risk management involves risk transfer via purchase of insurance or other specialized financial instruments (derivatives). The insurance industry includes property and casualty insurers that underwrite the financial risks associated with potential environmental liabilities. Some environmental risks impose potential losses greater than associated profit opportunities. For example, the potential contamination of brownfields can impose liability risks that severely inhibit redevelopment and reuse of such property (see **Section 9., Environmental Insurance**).

Actual Use: Virtually all organizations of significant size exercise some type and degree of risk management, if only the purchase of commercial umbrella liability insurance coverage. Risk transfer mechanisms such as environmental liability insurance are widely available.

Potential Use: Environmental insurance can reduce risks involved in brownfields redevelopment.

Advantages: Risk management lets officials avoid spending excessive time and attention in dealing with unanticipated losses. It protects cash flows, profitability, and growth for-profit firms.

Limitations: Insurance premiums can be prohibitively expensive for small organizations. The relative cost of insurance as policy limits decline, decreasing the feasibility of insurance for smaller transaction requiring lower coverages. Also, the uncertainties of future liability under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) are not eliminated by insurance if the insurer can seek payment from former owners of contaminated property under the Act's retroactive, strict, joint and several liability standard.

Reference for Further Information: American Risk and Insurance Association, c/o Chase Communications, PO Box 9001, Mount Vernon, NY 10552-9001; Phone: 914-699-2025; E-mail: aria@pipeline.com; Internet: **www.aria.org/**. National Center for Environmental Assessment; Phone: 202-564-3361. *Potential Insurance Products for Brownfields Cleanup and Redevelopment*, June 1996, PB96-963244, USEPA, Office of Emergency and Remedial Response.

VALUE ENGINEERING

Description: Value Engineering, also known as Value Analysis, Value Management or Function Analysis, focuses on cost reduction through function cost analysis and engineering. First, a product and all of its components are studied to determine their functions or purposes, then various analytical techniques such as functional analysis, economic analysis, cost analysis, and value-added analysis are used to provide a product with minimum essential function at lowest cost. Function cost analysis differs from activity-based costing (see **Section 6., Activity-Based Costing**) which considers engineering process improvement as a source of cost reduction. Value engineering studies involve information gathering, definition of functions, speculation on alternatives, and the evaluation of all alternative ways of meeting requirements.

Actual Use: Office of Management and Budget Circular A-131 (June 1993) and the National Defense Authorization Act for fiscal 1996 (Public Law 104-106) require federal agencies to establish and maintain cost-effective value engineering procedures and processes. The Department of Defense uses both value engineering incentives and program requirements, including value engineering clauses in procurement contracts. The Federal Highway Administration and the Bureau of Reclamation have used value engineering for design and construction projects for a decade. EPA Region 8 used a value engineering study for the California Gulch Superfund Site (Leadville, CO) which may result in cost reductions of as much as $14 million. In the private sector, Toyota has integrated value engineering into its cost management process.

Potential Use: Value analysis can be applied to environmental protection projects, particularly infrastructure construction and hazardous waste clean-up, to reduce costs.

Advantages: In both public and private sector applications, value engineering can reduce costs while improving performance and client satisfaction.

Limitations: As practiced, value engineering is a powerful tool for cost reduction but generally does not deal with value as a function of quality, and ignores the fact that product choices are usually based on more than the minimum of essential product function. Importantly, it also may ignore certain environmental trade-offs.

Reference for Further Information: Contact Society of American Value Engineers, 60 Revere Drive, Suite 500, Northbrook, IL 60062; Phone: 847-480-1730; Fax: 847-480-9282; E-mail value@value-eng.org; National Aeronautics and Space Administration, Langley Research Center, Design for Competitive Advantage, Mail Stop 159, 18e West Taylor Street, Hampton, VA 23665-2199; Phone: 757-864-8213; Fax: 757-864-9713; Internet: **mijuno.larc.nasa.gov/dfc/ve.html**

OTHER

Description:

Actual Use:

Potential Use:

Advantages:

Limitations:

Reference for Further Information:

COMPARISON MATRIX FOR TOOLS FOR LOWERING COSTS

Criteria/ Tools	Actual Use	Revenue Size	Revenue Cost/ Savings	Administrative Ease	Equity	Environmental Impact
*Accelerated Depreciation	High	Mod. - High	High	Low - Mod.	Mod.	High
Activity-Based Costing	Mod.	Mod. - High	Mod.	Low	Low	Mod.
Amoritization of Pollution Control Facilities	Mod.	Mod.	Mod.	High	Low	Low - Mod.
*Appropriate Technology	Mod.	High	High	Mod.	Mod.	High
Barter and Payment-In-Kind	Mod. - High	Mod. - High	High	Mod. - High	Mod.	Mod.
Benchmarking	Low	Low	Low	Low - Mod.	High	Mod. - High
*Capital Planning and Budgeting	High	High	High	Mod.	Low - Mod.	Mod. - High
*Comparative Risk Ranking	Mod.	Mod.	Mod. - High	Low - Mod.	High	High
*Cost-Benefit Analysis	High	High	Mod.	Mod.	Low - Mod.	Mod.
*Cost Effectiveness Analysis	High	High	High	Mod.	Low	Mod.

COMPARISON MATRIX continued

Criteria/ Tools	Actual Use	Revenue Size	Revenue Cost/ Savings	Administrative Ease	Equity	Environmental Impact
***Deduction of Agricultural Conservation Expenses**	Mod. - High	Mod.	High	Low - Mod.	Mod.	High
***Discounting (Economic)**	High	High	Mod. - High	Mod.	Mod.	Mod. - High
Employee Stock Ownership Plans	High	High	Mod.	Low - Mod.	Low	Mod.
EPA: Common Sense Initiative	Low	Mod.	Mod.	Mod.	Mod.	High
EPA: Project XL	Low	Low	High	Mod. - High	Low - Mod.	High
***Expensing of Assets**	High	Mod.	Mod. - High	Mod.	High	Mod. - High
***Financial Capability Analysis**	High	High	Mod.	Mod.	Mod. - High	High
Fiscal Impact Analysis	High	High	Mod.	Low - Mod.	Low - Mod.	Mod.
***Full-Cost Pricing**	High	High	Mod.	Mod.	Mod.	High
Life Cycle Assessment/ Costing/Design	Mod. - High	High	Mod.	Low-Mod.	Low	Low - Mod.

COMPARISON MATRIX continued

Criteria/ Tools	Actual Use	Revenue Size	Revenue Cost/ Savings	Administrative Ease	Equity	Environmental Impact
***Pay-As-You-Go**	High	High	High	Mod.	Mod. - High	High
***Pollutant Loading Allocation**	High	High	Mod.	Low	Low - Mod.	High
***Refinancing Loans**	High	High	High	Mod.	Low - Mod.	Mod.
***Reforestation Tax Credit and Amoritization**	Mod. - High	Mod.	High	Mod.	High	High
***Regionalization**	High	Mod. - High	High	Low - Mod.	Mod.	High
Rehabilitation Tax Credits	Mod.	Mod.	High	Mod. - High	Mod.	High
***Risk Management and Insurance**	High	High	Mod. - High	Mod.	Low	High
Value Analysis	High	High	Mod.	Mod.	Low	Low

High - High use (over 25 States, many localities); criteria score high (cost-effective, easy to use, accessible, impacts specific projects)

Mod.- Moderate use (10-25 States, many localities); criteria score medium well

Low - Low or rare use; criteria score poorly (complicated, not cost effective or equitable to use, used for analytical purposes only)

* Star indicates best rated mechanism

7. TOOLS FOR ENCOURAGING POLLUTION PREVENTION AND RECYCLING

7. TOOLS FOR ENCOURAGING POLLUTION PREVENTION AND RECYCLING

INTRODUCTION

When the Environmental Protection Agency (EPA) was created in the early 1970's its focus was on cleaning up and controlling the most immediate environmental problems. Over the next twenty years, the nation made huge investments in these efforts and realized major reductions in air, water, and land pollution. However, it became increasingly apparent over time that the traditional "end-of-the-pipe" approaches are expensive (increasingly so), not fully effective, and sometimes transfer pollution between environmental media.

To achieve needed additional improvements to environmental quality, environmental activities must move "upstream to prevent pollution before it occurs and to recycle waste wherever possible. The Pollution Prevention Act of 1990 recognized that pollution should be prevented or reduced at the source whenever feasible. USEPA defines pollution prevention as "source reduction" since that term is defined in the Act (see **Appendix E: Glossary**), and adds protecting natural resources through conservation and increased efficiency.

Pollution prevention is not the only strategy for reducing environmental risks, but it is the preferred one, followed by recycling. This priority is reflected in USEPA's environmental management hierarchy which includes:

1) pollution prevention;
2) recycling;
3) treatment; and
4) disposal or release.

Preventing pollution offers important economic benefits, as pollution never created does not need to be managed or cleaned up. Recycling means that wastes do not have to be disposed and that raw materials can be conserved. Pollution prevention and recycling have the potential to protect the environment and improve manufacturing efficiency and reduce the use of raw materials.

This section evaluates financing tools which States, communities, and the private sector can use to encourage pollution prevention and recycling. Seventeen ways of raising revenues, lowering costs, and influencing behavior are discussed. The tools range from traditional State and federal assistance programs to proven financial management techniques that encourage conservation and reuse to bold new financial management and investment strategies, programs, and techniques.

LIST OF TOOLS FOR ENCOURAGING POLLUTION PREVENTION AND RECYCLING (In Alphabetical Order)

1. Assurance/Performance Bonding
*2. Demand-Side Management Pricing
*3. Deposit-Refund Systems
*4. Development Rights Purchases
*5. Differential Pricing
6. Energy: NICE 3
7. EPA: Pollution Prevention Grants
*8. Environmental Self-Auditing
*9. Full-Cost Environmental Accounting
*10. Green Code of Conduct (ISO 14000 Voluntary Environmental Standards)
*11. Green Investments
12. Liability Assignment
13. Pollution Charges
14. Private Forest Banking
15. State Pollution Prevention (P2)/Recycling Loan Programs
*16. Tax Incentive Programs
*17. Transit Pass Subsidy Programs

* Stars indicate most highly rated mechanisms as described in the Comparison Matrix at the end of the narratives. See Introduction to the *Guidebook* for a description of the criteria used. Ratings of "High", "Moderate", and "Low" are for comparison purposes only, as some ratings are necessarily subjective and data are incomplete.

ASSURANCE/PERFORMANCE BONDING

Description: One method of incorporating social cost into decision making by polluters or developers is to require them to purchase dated assurance or performance bonds that reflect the full value of potential worst-case costs to remedied environmental damage resulting from their actions. The bond would be repaid in full (possibly with interest) at the time of maturity if the bondholder demonstrates that the potential damage has not occurred. The bond would be repaid in part if some level of damage less than the potential baseline has occurred, and would be forfeited if worst-case damages are incurred. If damages did occur, the bond could be used to remedy the environmental damages or to compensate injured parties.

Actual Use: Performance bonding is widely used in the construction business, to assure that work is completed within the specified time period. For environmental purposes, it has been used in surface mine reclamation programs to provide assurance that surface mined areas will be reclaimed and restored to a natural condition. These assurances are particularly helpful for obtaining debt for brownfields redevelopment projects.

Potential Use: An assurance/performance bonding requirement could be administered by a State regulatory agency, which would act as the bonding agency. If the bonds were administered through another agency, the regulatory agency would have to be integrally involved.

Advantages: Assurance/performance bonding is designed to incorporate environmental criteria and uncertainty (i.e., the process and extent of damages is uncertain prior to development) into the market system. This approach reflects the estimated cost of potential future environmental damages in the value of the bond. It provides a strong economic incentive to minimize damages and to develop innovative, cost-effective pollution control technologies.

Limitations: Although based on scientific information on potential damages, setting the value of the bond would still be a subjective decision dependent on numerous assumptions. Where the value of the bond is based on the cost of remediation or replacement, depending on the circumstances, it may not capture the full social cost of environmental damage. Setting bond values might be subject to lengthy legal challenges, requiring extensive documentation and possibly causing program delays.

Reference for Further Information: Costanza, Robert and Perrings, Charles, "A Flexible Assurance Bonding System for Improved Environmental Management," *Ecological Economics* (1990), pp. 57-75.

DEMAND-SIDE MANAGEMENT PRICING

Description: This is a unit pricing structure that is sensitive to the timing of usage (demand) during a utility system's peak hours or peak days. Usage that occurs during these peak periods is charged at a higher rate. The structure is designed to result in more accurate pricing for the usage which occurs during a system's peak demand periods. Utilities must incur additional capital and operating costs to develop the capacity to meet peak demands. Through demand-side management pricing, these additional costs can be shifted to those customers who create the need for the peak period capacity. Such pricing also tends to reduce peak demand by causing system users to reduce their use of the system or at least shift some portion of their usage to non-peak periods. As a result, the utility can "shave" operating costs and stretch existing investment, or reduce future investment in facilities necessary to meet peak period demands.

Actual Use: The demand-side management pricing structure is most commonly used by electrical, gas, and communications utilities, and less frequently by water or sewer utilities. Demand-side management pricing has also been used for a considerable number of years by the airline industry. More recently, it has been adapted to transportation facilities, including roads and bridges, through the use of time-sensitive (rush hour-based) tolls. This type of pricing structure is used most extensively by utilities and other parties which have the capability of metering usage by time of day.

Potential Use: The use of this pricing technique could be extended to other utilities and public infrastructure for which user fees are charged, and for which time of use can be determined, such as park and recreation facilities. Its adoption by water and wastewater utilities could also be greatly expanded if better systems of measuring use were implemented. Demand-side management pricing may have valuable application by these latter utilities with regard to stormwater management.

Advantages: The pricing structure shifts costs to those users who place the greatest demand on the system, creating greater equity in pricing and maximizing the user pays principle. It can significantly reduce or shift demand to less costly periods, and help to avoid costly, and maybe, unnecessary future capital investment required to meet peak demands.

Limitations: The technique requires the ability to monitor consumption by individual users at different times. Only a few water and wastewater systems have this ability. It requires expensive, special metering equipment and billing systems which can accommodate variable rates. Poor customers who cannot shift or reduce their usage are penalized by the resulting higher prices.

Reference for Further Information: USEPA, Office of the Comptroller, Environmental Finance Program, 401 M Street, SW, Washington, DC 20460. Mail Code: 2731R. Contact: Timothy McProuty at **mcprouty.timothy@epa.gov**.

DEPOSIT-REFUND SYSTEMS

Description: Improved price signals can reduce the volume of waste that is reaching our landfills and incinerators. One kind of improved price signal, the deposit-refund system, combines a special front-end surcharge (the deposit) on a particular substance or product with a refund payable to the consumer when quantities of the substance or product in question are turned in for recycling or proper disposal.

Actual Use: Historically, deposit-refund systems have been applied primarily at the State level. The systems have typically applied to glass, aluminum, plastic, or other containers, such as drink bottles and cans. Many States have a five cent deposit-refund on soft-drink bottles and cans. However, such systems are now being expanded to include other types of products. For example, in some areas they are being applied to office products, such as photocopy machine toner cartridges. States such as Maine and Rhode Island have established deposit-refund systems to encourage the recycling of lead-acid/automobile batteries.

Potential Use: These systems could be expanded to include many other types of products. They could be applied to containers that hold chemicals or other environmentally hazardous products. Lead-acid/automobile batteries may be good candidates for inclusion in deposit-refund systems nationwide. Other possible candidates for these recycling systems include motor oil, other automobile fluids, and pesticide containers. For some substances and problems, a federal deposit-refund system might be appropriate. This would be the case when dealing with products that have national markets, are easily transported, and have uniform recycling characteristics and consequences.

Advantages: Deposit-refund systems can be placed on any product which is currently disposable and contains materials that can be reused. It also provides an incentive to recycle and therefore reduces the quantity of solid waste produced. Deposit-refund systems can assist regulatory agencies in accomplishing their enforcement and compliance program objectives by reducing the need for additional regulatory resources while simultaneously augmenting agency efforts.

Limitations: Under this type of system, consumers, not producers bear the economic burden. The market for raw materials in product of deposit-refund system needs to be identified.

Reference for Further Information: Stavins, Robert, N. And Whitehead, Bradley W., Progressive Policy Institute, Policy Report No. 13, *The Greening of America's Taxes: Pollution Charges and Environmental Protection,* February 1992.

DEVELOPMENT RIGHTS PURCHASES

Description: Purchasing development rights, often on agricultural or forest lands, is the buying of the legal "right" of the owner, or subsequent owners, to develop land for residential or commercial uses. Existing land uses are usually maintained, although bans on development may be limited, i.e., allowing some low density development. These rights are bought by State and local governments and/or nonprofits groups. They are like conservation easements, since both entail partial ownership via deed restrictions, contracts or covenants, as opposed to fee-simple transfer of ownership. But, development rights purchases often entail payments to land owners, contrasted to the preferential tax treatment of conservation easements. Buying the rights restricts development whereas conservation easements may require more land management such as soil conservation and plant maintenance to protect water quality and natural habitats (see also the related tool at **Section 8., Conservation Easements**).

Actual Use: Nonprofit organizations have been buying development rights for many years. Recently, government purchases capitalized by bonds and special taxes have been growing rapidly. For example, Peninsula Township, Michigan funds purchases with a small property tax increase assisted by a grant from the State's Conservation Trust Fund. Pittsford, New York issues bonds to buy development rights. New York State's annual debt service payments on its mega-environmental bond, which pays for farmland preservation, are financed by the real estate transfer tax. Virginia Beach, Virginia and Howard County, Maryland buy development rights at market value on an installment basis by making interest-only tax-exempt payments to landowners for 25 and 30 years, respectively, and paying the principal at the end. The landowner thus defers capital gains. The balloon payment is guaranteed by municipal investments in zero interest Treasury bonds.

Potential Use: Any rural or urban site, including green space, forests, wetlands and ranch lands, can be protected from development. Additional environmental protection work could be added to the development rights deed restrictions similar to conservation easements.

Advantages: Partial ownership through deed restrictions, contracts and covenants, is much less costly than outright ownership. Local financing encourages maximum local citizen involvement.

Limitations: The program is voluntary, and some difficult negotiations still may fail. Revenues must be raised to cover costs, so widespread local agreement must exist. Development rights purchases may provide protection only against development, and not for other ecological purposes.

Reference for Further Information: Henry Diamond and Patrick Noonan, *Land Use in America*, Lincoln Institute of Land Policy, Island Press, 1996; American Farmland Trust, *Forging New Protection: Purchasing Development Rights to Save Farmland*, and *Saving America's Countryside*, Washington, D.C., 1996, Telephone: 202-659-5170; The Trust for Public Land, *GreenSense: Financing Parks and Conservation*, Phyllis Myers, editor, San Francisco, CA, Spring 1998.

DIFFERENTIAL PRICING

Description: Differential (nonlinear) pricing, including declining block rates and progressive rate systems, as opposed to single tariff pricing, gives utilities flexibility to handle demand management and service affordability issues. Inclining block rates, peak hour and/or day surcharges, seasonal rates, and excess loading surcharges are forms of conservation pricing. In these systems, the unit price rises as use rises or the time period changes, giving customers a real and growing incentive to control use. Increasing block-rate systems charge higher unit prices for higher levels of usage. By contrast, with a declining block rate the unit price decreases when consumption exceeds a threshold amount. This form of marginal cost pricing recognizes that high volume users may contribute to economies of large scale for a facility or service. Single tariff pricing spreads costs over a wider population so that service to high-cost areas is subsidized by areas with greater cost efficiency. Utility design can affect demand for services as it affects the ability of businesses and households to pay for them. For example, a lifeline rate bills a relatively low price for basic, essential service (See also **Section 6., Full-Cost Pricing**; **Section 7., Demand-Side Management Pricing**; **Section 1.B., Local Water/Wastewater Utility User Fees**; and **Section 1.B., Solid Waste Disposal Fees**).

Actual Use: Although rate structures vary widely, most utilities use some form of differential pricing in their rate structures. These include toxicity charges for industrial wastewater and incentive rates for off-peak use.

Potential Use: Differential pricing can be used for various purposes, including promotion of water conservation (increasing block rates), savings for low-income households, encouragement of industrial location (decreasing block rates), energy conservation (peak use surcharge), and land use growth control (increasing block rates).

Advantages: Not only utilities, but also other agencies that charge fees may be able to use a rate structure to pursue environmental goals while ensuring adequate revenues and serving socio-economic equity objectives.

Limitations: Rate structures are not easy to change, particularly if they must be approved by a local legislative body or state public service commission. Most rate structures are somewhat regressive (insensitive to ability to pay), therefore may be considered socially inequitable. Differential pricing can be complicated by attempts to deal with multiple issues. Some variations also can reduce collectibility in small communities experiencing high rates due to diseconomies of small scale.

Reference for Further Information: Raftelis, George, *Comprehensive Guide to Water and Wastewater Finance and Pricing*, second edition, CRC Press/Lewis Publishers;*Revenue Requirements*, Manual M35, 1990, *Alternative Rates*, 1992, and *Water Rates and Related Charges*, Manual M26, 1996, American Water Works Association, 6666 West Quincy Ave., Denver, CO 80235, Telephone: 800-926-7337 or 303-794-7711, Internet: **www.awwa.org/**.

DEPARTMENT OF ENERGY
NICE 3

Description: This Department of Energy (DOE) program gets its acronym from its purpose -- to promote National Industrial Competitiveness through Energy, Environmental, and Economics. The NICE 3 program seeks to support via cost-sharing grants the development of new processes and/or equipment to reduce the generation of wastes and green house gases and to conserve energy and energy-intensive feedstocks. The program gives preference to proposals that use pollution prevention and integrate pollution prevention and recycling approaches. It focuses on States and industries with high energy consumption and pollution problems, including chemicals and allied products (SIC 28), petroleum and coal products (SIC 29), paper and allied products (SIC 26), and primary metal industries (SIC 33). Eligible applicants include States in partnership with industry, and three-year projects are funded at 45 % DOE federal funds and 55 % industry and State monies.

Actual Use: The NICE 3 program obligated grants totaling $5.8 million in Fiscal Year (FY) 1997, and estimates for FYs 1998 and 1999 are $6 million, respectively. In FY 1997, grant assistance ranged from $69,000 to the legal maximum of $425,000 and averaged $310,000. Projects funded include one in Oregon to recycle raw glass by removing contaminants, one in Ohio to reclaim and reuse wastewater in a water-based paint plant, a New York project to develop an approach to identify optimal volatile organic compound control strategies for industrial facilities, and one in Texas to develop a methanol recovery process for hydrogen peroxide production.

Potential Use: There are an abundance of unexplored and /or untapped opportunities for improving pollution prevention, recycling and energy processes and strategies in many, if not all, of the industrial sectors of the nation's economy.

Advantages: The NICE 3 program is highly leveraged in that it requires industry and States provide a substantial cost-share in order to be able to receive DOE federal funds. The program concentrates its assistance by focusing on those States and industrial sectors with energy consumption and pollution problems.

Limitations: The program's focus on four specific industrial groups may limit the resources that can be used to help other industries. The cost-share requirement may limit the ability of some industries/firms to take part in the program. The three-year project period may eliminate some good longer-term projects. Federal reporting, documentation, and auditing requirements can be extensive.

Reference for Further Information: U.S. DOE Headquarters, E-22, Room 5F-067C, 1000 Independence Avenue, SW, Washington, DC 20585. Telephone Number: 202-586-1641. USEPA, Office of Pollution Prevention and Toxics, 401 M Street, SW, Washington, DC 20460. Telephone Number: 202-260-3557.

ENVIRONMENTAL PROTECTION AGENCY POLLUTION PREVENTION GRANTS

Description: The Environmental Protection Agency (EPA) Pollution Prevention Grants Program awards these project grants to support the establishment and expansion of State pollution prevention programs and address sectors of concern such as industrial toxics, agriculture, energy, and transportation. The program is focused on demonstrating the value of making multimedia pollution prevention an environmental management priority. Eligible recipients include the States, the District of Columbia, the U.S. Virgin Islands, the Commonwealth of Puerto Rico, any territory or possession of the United States, any agency or instrumentality of a State, including State universities, and all federally recognized Indian Tribes. While local governments, private universities, and private nonprofit organizations are not eligible to receive funding, EPA encourages eligible recipients to work with these groups. Grant recipients must contribute at fifty percent of the total cost of their project in dollars or in-kind goods and services.

Actual Use: These grants are used to fund a wide range of pollution prevention projects that build State pollution prevention capabilities and test innovative pollution prevention approaches. Types of projects funded include technical assistance, data collection and dissemination, education and outreach to business and government personnel, training, environmental auditing, technology transfer, demonstration projects, and integration of pollution prevention in State regulatory programs. During fiscal year 1997, the EPA obligated $4.9 million in these grants to fifty-seven State and Tribal agencies. Grant assistance ranged from $20,000 to $200,000 and averaged $75,000. The Agency projects it will obligate approximately $5 million in pollution prevention grants in FYs 1998 and 1999, respectively.

Potential Use: These grants are available for a broad and growing range of pollution prevention uses.

Advantages: The grant assistance is highly leveraged through the fifty percent match required of grant recipients. The assistance is limited to use for pollution prevention related purposes.

Limitations: Some potential recipients may have their grant amount limited by their ability to raise the fifty percent match. Local governments, private universities and other private nonprofits are not eligible for assistance and may not be included as project partners in some States.

Reference for Further Information: U.S. EPA, Office of Pesticides and Toxic Substances, 401 M Street, SW, Washington, DC 20460, Mail Code: 7401, Telephone Number: 202-260-3810, Fax Number: 202-260-0575. Information on these grants is also available in the *Catalog of Federal Domestic Assistance* and its Internet site at **http://aspe.os.dhhs.gov/cfda/ideptaa.htm**. This is the page for the Independent Agencies, select EPA.

ENVIRONMENTAL SELF-AUDITING

Description: Environmental self-auditing, as used in here, relates to voluntary efforts by corporations and other organizations to focus not just on environmental compliance, but also on how efficiently they comply with environmental regulations or how to improve their environmental performance. The voluntary efforts are accomplished by detailed tracking and reporting on a wide range of environmental performance measures. These performance measures include not only traditional output measures such as the number of Notices of Violations and total emissions, but also new, non-traditional measures. Some examples of non-traditional measures are percent of energy usage per unit of output or product managed, number of self-identified environmental audit issues compared to the total number of such issues, percentage of issues resolved within established time frames, and percentage of operating and other personnel receiving environmental training.

Actual Use: Private companies in the forefront of developing these new, more comprehensive self-auditing programs include Waste Management Technologies, Inc., the 3M Corporation(through its famous Pollution Prevention Pays program), Tenneco Gas, and Browning-Ferris Industries. The Illinois EPA (IEPA) in cooperation with Arthur Andersen & Co. has worked on exploring and developing a range new corporate performance measures that better reflect company priorities and performance trends. Some of the companies involved in the IEPA project included Abbott Laboratories, Amoco Corporation, Caterpillar, Inc., Monsanto Co., and Sundstrand.

Potential Use: Corporations, governmental organizations, and non-profit groups nationwide could voluntarily develop and adopt self-auditing programs employing more effective measures of environmental performance.

Advantages: Such programs could allow the corporations and other organizations to better understand their environmental performance and operations. Using this knowledge, they could design programs and processes to operate more efficiently/effectively and to improve their financial performance. Based on the experiences of companies such as 3M, they might be able to re-engineer entire systems and cut waste by up to 35 percent or more.

Limitations: It is not easy to develop and establish comprehensive, cost-effective measures of performance. It requires expertise, time, and resources, that not all companies or organization may have, or be able to access.

Reference for Further Information: Van Epps, Ronald E. and Walters, Susan D., *Measure for Measure: Evaluating Environmental Performance with Tact and Insight*, Corporate Environmental Strategy, The Journal of Environmental Leadership, Volume 3, Number 2.

FULL-COST ENVIRONMENTAL ACCOUNTING

Description: This is a financial and management cost accounting method that allocates all direct and indirect historical costs, including embedded environmental ones, to a product, process, or activity over its life. The method uses three important concepts: full-cost accounting, environmental cost accounting, and life-cycle costing. Full-cost accounting allocates historical costs. Environmental cost accounting brings in environmental costs and ties them to the product, process, or activity. Finally, life-cycle costing identifies the effects of the product, process, or activity at each life-cycle stage (raw materials acquisition, manufacturing, use/reuse/maintenance, and recycle/waste management) and assigns those effects monetary values. Together, the concepts help incorporate in decisions the hidden costs which can hinder efficient management and environmental protection.

Actual Use: The use of full-cost environmental accounting, as well as its component concepts and related approaches, is in its infancy but slowly growing. For example, federal facilities are required under Executive Order 12586 to apply life-cycle analysis and total-cost accounting (a synonym for full-cost accounting) when estimating pollution prevention opportunities. USEPA's Environmental Accounting Project is working with over 650 different individuals organizations including more than 150 from industry. Project case studies include environmental accounting efforts at AT&T and full-cost accounting work at Ontario Hydro, the Canadian power company.

Potential Use: Every organization could adopt these techniques or some combination of them. International standards are under development to encourage companies and governments to better manage their environmental costs. For example, the International Organization for Standardization (ISO) is developing a series of voluntary environmental management standards entitled ISO 14000. These standards could become requirements for conducting trade and business worldwide.

Advantages: Not only are great environmental benefits to be gained from internalizing the value of environmental resources and the costs of damaging them, but large economic efficiencies may be gained from reducing current costs as well as future liabilities.

Limitations: There is a need to decide on clear standards for all of these terms and to make their use universal or major competitiveness concerns arise. This is a major change and may not occur easily or without some significant short-term costs and economic dislocations.

Reference for Further Information: USEPA, Office of the Comptroller, Environmental Finance Program, 401 M Street, SW, Washington, DC 20460. Mail Code: 2731R. USEPA, Office of Pollution Prevention and Toxics, Pollution Prevention Division, 401 M Street, SW, Washington, DC 20460. Mail Code: 7409. Phone No: 202-260-3557. Information on USEPA's Environmental Accounting Project is available on the World Wide Web at **http://www.epa.gov/opptintr/acctg/**.

GREEN CODE OF CONDUCT
(ISO 14000 VOLUNTARY ENVIRONMENTAL STANDARDS)

Description: The International Standards Organization (ISO) has published several standards in its Environmental Management Series covering Management Systems and Auditing to help businesses build sound environmental management/processes into existing systems and practices. These standards have been approved by the American National Standards Institute as American National Standards. The identifying numbers and titles for the standards are as follows: ISO 14001 Environmental Management Systems - Specifications with Guidance for Use; ISO 14004 Environmental Management Systems - General Guidance on Principles, Systems, and Supporting Techniques; ISO 14010 Guidelines for Environmental Auditing - General Principles; ISO 14011 Guidelines for Environmental Auditing - Audit Procedures, Auditing of Environmental Management Systems; ISO 14012 Guidelines for Environmental Auditing - Qualification Criteria for Environ-mental Auditors; ISO 14020 Environmental Labeling; ISO 14031 Environmental Performance Evaluation; ISO 14040 Life Cycle Assessment; ISO 14050 Terms and Definitions; ISO 14060 Environmental Aspects of Product Standards. ISO 14001 is the key standard, containing a pattern of specifications that must be followed if an organization is to be recognized as adhering to ISO 14000. Requirements include a statement of environmental policy, environmental objectives and targets, and procedures to monitor activities that can have significant impact on the environment.

Actual Use: ISO 14000 is being adopted voluntarily by U.S. businesses, particularly those involved in exporting.

Potential Use: Although aimed primarily at industrial situations, the standards could be applied to other organizations and activities.

Advantages: If they have sufficient scope and rigor to achieve environmental improvement, widespread adoption of voluntary standards of conduct can reduce societal costs otherwise imposed by negative environmental externalities produced by businesses and government agencies.

Limitations: Voluntary codes or standards of conduct depend on effective communication, the practicability of implementation, and the willingness of institutional leaders to support adoption.

Reference for Further Information: American National Standards Institute, 11 W. 42nd St., NY, NY 10036; Phone: 212-642-4900; Internet: web.ansi.org/public/ iso14000/default.htm; International Organization for Standardization, 1, Rue de Varembe, Case postale 56, CH-1211 Geneve 20, Switzerland; Phone 41-22-749-0111; E-mail: central@iso.ch; Internet: **www.iso.ch/**; Coalition for Environmentally Responsible Economies, 11 Arlington St., 6th Floor, Boston, MA 02116-3411.

GREEN INVESTMENTS

Description: Green investments are financial investments in companies, financial institutions, monetary funds, and/or other financial entities that to the extent practicable or possible do not engage in, or support organizations that engage in, environmentally harmful behavior. Green investments are deliberate decisions to make informed financial investments that incorporate environmentally responsible behavior. They are made with profit in mind, but tempered by environmental concerns.

Actual Use: There are substantial and growing number of banks, mutual funds, financial networks, financial management companies, and firms advertising claims that their behavior is socially and/or environmentally responsible. For example, the Calvert Group offers the nation's largest family of socially and environmentally responsible mutual funds with screened assets under management exceeding $1.4 billion in stocks, bonds, and money market funds. The Bank of America has a strong program to assist "green" companies with funding. Earth Tones is a long distance telephone company that gives 100% of its profits to environmental campaigns and prints its bills on recycled papers along with Green Alert updates about pressing environmental issues. There are also firms that provide screening services for investors to determine the validity of green advertisements.

Potential Use: The potential for growth in green investments is good as people become more environmentally aware. As these investments develop proven track records of financial success, they will attract more investors. Given their small current size compared to financial markets, they represent an area ripe for further growth.

Advantages: Returns on green investments can be as good or better than most regular investments. Between May 1990 and December 1994, an index of 400 socially responsible firms (includes environment considerations) outperformed the S&P 500 by 70.41 percent to 60.38 percent. Environmentally responsible investments offer an alternative to ones that involve environmentally harmful behavior, take money away from these investments, and may encourage organizations to review and reevaluate their environmental behavior.

Limitations: These investments options are minuscule in size relative to all investment vehicles; and some lenders report a dearth of funding opportunities. Not every investor is environmentally motivated. The range of green investments are not well-publicized, disingenuous advertising occurs, and improved screening of potential investments is needed.

Reference for Further Information: *Social Funds Guide To Environmentally & Socially Screened Mutual Funds* and *Directory of Information Resources for Socially & Environmentally Concerned Investors, Consumers and Business People*, Good Money Publications, 1995.

LIABILITY ASSIGNMENT

Description: Assignment of liability pertains to insurance markets where premiums would reflect the relative degree of risk that activities pose to the environment. Premiums send price signals to polluters and provide incentives (i.e., the possibility of lower insurance costs) to modify behavior and reduce risks. Liability release also is included here and refers to the removal of liability for pollution or contamination.

Actual Use: Liability is assigned through common law (negligence) or environmental statutes. Liability rules provide incentives to prevent pollution or to avoid behavior that will result in paying damages to aggrieved parties. The Resource Conservation and Recovery Act (RCRA) program includes a financial responsibility requirement under which disposers of hazardous substances must show they can handle the costs of corrective action. This encourages companies to buy insurance to cover the costs of potential damages and provides incentives to avoid releases of hazardous wastes or constituents into the environment. Liability standards are also a way to fund remediation activities, i.e., responsible parties are liable for cleanup costs under the Superfund program.

Potential Use: Liability assignment could be used for many types of pollution problems to provide incentives to modify behavior. Liability assignment may be more practical, and have a more direct incentive effect, in circumstances where the relationship between activities and environmental damage is clearly defined. Liability release is commonly used for brownfields applications. A liability release shields property owners from all liability, providing they are in no way responsible for the original contamination. It is intended to encourage prospective purchasers to clean up contaminated property, without exposing them to the risk of being held liable for the original contamination. It may be granted prior to cleanup, and may be conditional on an intention to clean and reuse the site.

Advantages: Where insurance premiums accurately reflect the degree of risk, or the expected frequency and severity of damages, then companies have a financial incentive to take actions that reduce their potential liability.

Limitations: It may be difficult for insurers to underwrite risks for certain types of behavior. In some cases, insurers have been unwilling to write liability policies, and thus insurance markets have not developed as expected. In addition, the unpredictability of court decisions on damage awards makes it difficult for polluters and their insurers to assess potential risks.

Reference for Further Information: Moore, John L., et. al., *Using Incentives for Environmental Protection: An Overview*, Washington, DC, Congressional Research Service, June 2, 1989.

POLLUTION CHARGES

Description: Pollution charges are fees or taxes imposed on polluters based on the amount of pollution generated, rather than the level of pollution-generating activity. Sometimes, the charges can be based on a product's potential pollution. True pollution charges give producers or consumers incentives to reduce polluting behavior by making it a less expensive alterative. These charges reduce economic market inefficiencies by discouraging undesirable activities that have external or unaccounted for costs. They force firms and consumers to pay for the health and environmental consequences of pollution. They can spur technological innovation, as polluters look to cut pollution and its costs (see **Section 1.C., Effluent Charges** and **Emission Charges**, respectively).

Actual Use: While the U.S. does not have much experience with pollution charges, there are some examples at the State and local levels. Under the Colorado Pollution Prevention Act of 1992, the State levies chemical inventory fees on certain hazardous and extremely hazardous waste generators that exceed the threshold planning quantities under the Superfund Amendments and Reauthorization Act. At the local level, some cities have instituted volume charges for solid waste collection and disposal to reduce (through prevention and/or recycling) the amount of waste going to landfills. A number of European nations have considerably more experience with pollution prevention charges including Germany, the Netherlands, the Scandinavian countries, and Great Britain.

Potential Use: Pollution charges could be implemented by any and all levels of government throughout the U.S. These charges might also be more appropriate and effective than traditional "end of the pipe" regulatory approaches in addressing problems such as nonpoint source water pollution and air pollution from small sources. This is because they force producers and consumers when making economic decisions to decide either prevent pollution or pay for it up front.

Advantages: Pollution charges encourage pollution prevention and technological innovation. They make the polluter pay and can lead to savings over the cost of traditional regulation. As noted above, these charges may be able to better address small source, nonpoint source pollution problems. They also could improve the efficiency of the tax system by accounting for the external costs of pollution.

Limitations: It may be difficult to determine the true costs of pollution and thus the proper levels for pollution charges. There may be business competitiveness issues involved in implementing these charges. Governments may have difficulty in switching to a new, relatively untested tax approach.

Reference for Further Information: Stavins, Robert, N. and Whitehead, Bradley W., Progressive Policy Institute, Policy Report No. 13, *The Greening of America's Taxes: Pollution Charges and Environmental Protection*, February 1992. U.S. EPA Report to Congress, *Alternative Funding Study: Water Quality Fees and Debt Financing Issues*, Syracuse University, June 1996; Congressional Research Service, *Funding Water Quality Programs*, 1992.

PRIVATE FOREST BANKING

Description: This is an emerging tool whereby a privately created Forest Bank accepts deposits from forest owners in the form of the permanent rights to grow, manage and harvest trees on their land. In exchange, the landowner receives guaranteed annual payments of interest-only on the "principal" (i.e., the assessed market value of the timber at time of deposit in the Bank), a right to withdraw principal revenue on demand, and a guarantee that the timber will remain forever as forest. Forest owners also are assured that trees will be harvested and marketed in an ecologically sound manner. This concept has been practiced for private mineral rights for some time, but private banking of timber rights is a new business idea developed by the Center for Compatible Economic Development (CCED), a distinct operating unit within The Nature Conservancy. For a closely related tool, see **Section 8., Land Trusts and Reclamation Banks**.

Actual Use: The Forest Bank concept is aimed primarily at non-industrial private forest owners, including very small owners. The first timber rights to be deposited in the Forest Bank will be 5000 acres around the Clinch River in Virginia. The Forest Bank is structured as a limited liability corporation operating for profit, but it is partially owned by the nonprofit Center for Compatible Economic Development. Initial capitalization of the bank may require the sale of bonds. It is anticipated that landowners depositing timber rights will withdraw principal, averaging 10-20 percent a year, in addition to annual interest payments, to meet liquidity requirements.

Potential Use: The concept is applicable nationwide, and could be extended to ranching.

Advantages: The Forest Bank uses private market incentives to answer the needs of forest owners who are uncertain how to manage timber to maximize short-term dollar return while at the same time protecting forest ecology over the long term. The Bank removes the responsibility of landowners to access up-to-date secondary and tertiary markets for ecologically sound forest products, Although conservation easements may be used as an alternative to forest protection, and landowners may receive some financial assistance and/or tax relief from several U.S. Department of Agriculture programs, this approach may offer more monetary return to the landowner.

Limitations: The Bank is still in its infancy. A private bank may be somewhat more risky than a federal similar government program, because it is new, relies in large part on marketing incentives, may compete with more aggressive timber cutting sales, and is guaranteed only indirectly by the financial resources of The Nature Conservancy.

Reference for Further Information: Kent Gilges, Center for Compatible Economic Development (CCED), The Nature Conservancy, 315 Alexander Street, Rochester, NY 14604, Telephone: 716-232-3530, Fax 716-546-7825, E-mail:kgilges@inc.org.

STATE POLLUTION PREVENTION (P2)/RECYCLING LOAN PROGRAMS

Description: These are State funded loan programs that support pollution prevention and/or recycling activities and businesses, particularly with regard to small businesses. They may be direct loan programs requiring annual appropriations support, or revolving funds that recycle a one-time capitalization amount using repayments from earlier loans to make new loans. Eligible projects may include any pollution prevention and/or recycling activity or may be tied to specific activities outlined in a State waste management, pollution prevention, and/ or recycling plan.

Actual Use: Connecticut, Colorado, Maine, Massachusetts, Minnesota, New Jersey, Ohio, and Pennsylvania have pollution prevention, recycling direct loan, or revolving loan fund programs. States considering or developing programs include Arkansas, Montana, New York, and West Virginia. Each State program has unique purposes, loan terms, and eligibilities. For example, Ohio has a $10 million Pollution Prevention Loan Program that is a revolving fund. The program makes low-interest loans for construction and equipment purchases for pollution prevention activities at small-to medium-sized businesses. Loans range from $25,000 to $200,000 per facility and cannot exceed 75 % of the fixed asset costs of the facilities serving as collateral. The RENEW Loan Program in Colorado is very different. It gives close to prime rate loans to any business with a recycling or waste component to purchase equipment, real estate or use as working capital. RENEW is funded from a voluntary fee which tire retailers collect from new tire buyers for each old tire.

Potential Use: Because such programs offer good interest rates and/or flexible financing terms and small businesses frequently need loan support, these programs could be expanded to any State with adequate numbers of small businesses and willing/able to fund the start-up and capitalization costs. Clean Water State Revolving Funds are beginning to make loans for recycling projects, which will substantially increase the amount of funding nationwide (See Section 2B: State Revolving Funds).

Advantages: State loans for small businesses increases the likelihood that pollution prevention and recycling activity will move forward in a timely fashion, or at all. It enhances the financial capacity of smaller firms which may not have the resources and collateral to afford commercial financing. In addition, revolving funds leverage State support by recycling loan monies over a period of years.
Limitations: Program funding is not large and many small businesses are only fair to poor credits. The programs need to be well publicized to capture private sector awareness and interest.

Reference for Further Information: Great Lakes Environmental Finance Center Draft Report (prepared for USEPA), *An Inventory and Assessment of Pollution Control and Prevention Financing Programs*, December 1996. Great Lakes EFC, The Urban Center, Cleveland State University, UB 215, Cleveland, Ohio 44115. Telephone Number: 216-687-4590. Fax Number: 216-687-9277. World Wide Web site: **http://www.csuohio.edu/glefc/**.

TAX INCENTIVE PROGRAMS

Description: Tax incentive programs offer inducements to private firms to encourage them to invest in pollution prevention (and pollution control) equipment and facilities. The inducements offered in these programs may include tax credits, property tax exemptions or abatements, and sales and use tax exemptions.

Actual Use: Numerous States have tax incentive programs that include pollution prevention expenditures as an eligible item. For example, Louisiana, Oklahoma, and Oregon give income tax credit to businesses that spend money on pollution prevention, recycling, and pollution control. Ohio, Texas, and West Virginia have property tax exemption or abatement programs for pollution control/prevention facilities and equipment. Louisiana, Ohio, Texas, and Virginia offer sales and use tax exemptions for environmental investments, including pollution prevention.

Potential Use: Many more States could set up tax incentives programs to encourage businesses to invest in pollution prevention and control. The federal government could establish a federal income tax credit program for pollution prevention investments. Some larger cities might derive real benefit from specialized property and sales tax exemptions for pollution prevention activities.

Advantages: These programs provide strong reasons for firms to make environmental investments, thereby contributing to pollution reduction and control. Since most governments have considerable experience with tax programs, establishing tax incentives programs for pollution prevention investment is technically very feasible. Tax incentive programs may encourage business to stay or locate in a particular State and community.

Limitations: Tax incentives programs take revenues away from governments and keep it in the private sector. Some jurisdictions may not be able to absorb, either financially or politically, such revenue losses. Since most environmental laws still primarily contemplate pollution control approaches, most tax incentive programs are used by business to help meet the costs of pollution control investments rather than pollution prevention ones.

Reference for Further Information: Great Lakes Environmental Finance Center Draft Report (prepared for USEPA), *An Inventory and Assessment of Pollution Control and Prevention Financing Programs*, December 1996. Great Lakes EFC, The Urban Center, Cleveland State University, UB 215, Cleveland, Ohio 44115. Telephone Number: 216-687-4590. Fax Number: 216-687-9277. World Wide Web site: **http://www.csuohio.edu/glefc/.**

TRANSIT PASS SUBSIDY PROGRAMS

Description: Public Law 103-172, the "Federal Employees Clean Air Incentives Act," provides for the establishment of federal programs to encourage employees to commute by means other than single-occupancy motor vehicles. The purpose of this law is to improve air quality and reduce traffic congestion. One of the programs contemplated under the law is the offering of transit passes that subsidize employee use of public transportation. Such passes represent benefits that fall under the "Energy Policy Act of 1992." This act amended section 132 (f) of the Internal Revenue Code to change the tax treatment of employer-provided "qualified transportation fringe" benefits by increasing the tax exclusion for transit passes from $21 to $60 per month and setting a new $60 exclusion for van pools ($60 is an aggregate limit). In other words, it specified that employees are not taxed for these employer-provided transit pass benefits.

Actual Use: Under these laws, the Environmental Protection Agency (EPA) implements the **EPA Transit Subsidy Program** in its offices across the country. In Washington, D.C., this is done through a farecard voucher system in partnership with the Washington Area Mass Transit Authority WAMTA. The farecard vouchers are issued by WAMTA in amounts up to $60 per month for use by more than 2100 participating Agency employees. These vouchers are good for subway rides or they can be exchanged for equal fares on any other type of approved public transportation that serves the Washington, D.C., metropolitan area.

Potential Use: Transit pass subsidy programs such as this could be adopted by State and local governments across the country, as well as by private sector firms. While they might be most effective in large urban areas, they should be environmentally beneficial in any location.

Advantages: These subsidy programs can reduce pollution emissions (estimates for the federal program are 6.6 million metric tons of carbon equivalent by the year 2000), contribute to energy savings, and help reduce vehicular traffic congestion during rush-hour. They can reduce the need to construct new parking facilities, and reduce or delay the need for new highway expenditures. Finally, they raise the disposable income of employees taking advantage of such programs.

Limitations: Transit pass programs are subsidies that must be funded out of employer resources. There may be negative economic impacts on some business sectors by promoting mass transit.

Reference for Further Information: U.S. EPA, Office of the Comptroller, Environmental Finance Program, 401 M Street, SW, Washington, DC, 20460. Mail Code: 2731R. Contact: Timothy McProuty at **mcprouty.timothy@epa.gov**.

OTHER

Description:

Actual Use:

Potential Use:

Advantages:

Limitations:

Reference for Further Information:

COMPARISON MATRIX FOR POLLUTION PREVENTION/RECYCLING

Criteria/ P2 Tool	Actual Use	Revenue Size	Revenue Cost/ Savings	Administrative Ease	Equity	Environmental Benefits
*Assurance/ Performance Bonding	Low	?	Mod.	Mod.	Low-Mod.	Mod.-High
*Demand-Side Management Pricing	Mod-High	High	High	Mod.	Low-Mod.	High
*Deposit-Refund Systems	High	Low	Mod.	Mod.	Mod.	High
*Development Rights Purchases	High	Mod.	High	Mod.	Mod.	High
*Differential Pricing	High	High	Mod.	Mod.-High	High	High
Energy: NICE 3	Low	Low	Mod.	Mod.	Low-Mod.	High
EPA: Pollution Prevention Grants	Low	Low	Low-Mod.	Mod.	Low	High
*Environmental Self-Auditing	Mod.	High	Mod.-High	Low-Mod.	Mod.	High
*Full-Cost Environmental Accounting	Low	High	Mod. - High	Low	Mod.	High
*Green Code of Conduct	Mod.	High	Low	Mod.	Mod. - High	High

COMPARISON MATRIX continued

Criteria/ P2 Tool	Actual Use	Revenue Size	Revenue Cost/ Savings	Administrative Ease	Equity	Environmental Benefits
***Green Investments**	Low	High	Mod.	Mod.	Mod.	Mod. - High
Liability Assignment	Mod.	Mod.	Mod.- High	Low	Low-Mod.	High
Pollution Charges	Low	Low	Low-Mod.	Low	Low	High
Private Forest Banking	Low	Mod.	Mod.	Low	High	Mod. - High
***State P2/ Recycling Loan Programs**	Mod.	Mod.	Mod.- High	High	Mod.	High
Tax Incentive Programs	Mod.	Mod.	Mod.	Mod.	Mod.	Mod.
***Transit Pass Subsidy Programs**	Low	Low	Mod.	Mod.	High	High

High - High use (over 25 States, many localities/private sector); most environmental media covered (water, wastewater, solid waste and air); criteria score high (e.g., program lowers costs, is easy to use, readily available, and impacts special projects)

Mod. -Moderate use (10-25 States, some localities/private sector); programs include two or more environmental media; criteria score in the medium range.

Low - Low or rare use; scope is very limited; one or more major implementation problems exist

* Star indicates good mechanism for future use

8. TOOLS TO PAY FOR COMMUNITY-BASED ENVIRONMENTAL PROTECTION

TOOLS TO PAY FOR COMMUNITY-BASED ENVIRONMENTAL PROTECTION (CBEP)

INTRODUCTION

Community-Based Environmental Protection (CBEP) refers to the tailoring of environmental programs and revenue devices to the unique problems and goals of a particular place – be it a watershed, ecosystem, or a community. The CBEP approach is designed to involve localities more intimately in the choice and use of financial mechanisms, maximize the use of scare resources, enhance the popularity of environmental issues, and more readily involve the private sector in public improvements. CBEP seeks to better reflect regional and local conditions, environmental priorities, and economic goals.

Community-Based Environmental Protection funding approaches now are among the most innovative and fastest growing type of financing in this country today. The hallmark of CBEP tools is that most are voluntary, based on the acceptance and active participation of individuals, and involve both the private and nonprofit sectors in non-traditional roles. Any of the financial tools in this Guidebook can be fitted to local use and priorities, from fees and taxes, grants and loans, public-private partnerships, pollution prevention, to brownfields and small business mechanisms. However, the unique and highly innovative tools described in this section employ traditional forms of financing as the take-off point. They are designed to reward and encourage environmental protection, unite the public and private sectors in interdependent ways, and bend the forces of the economic marketplace toward these ends. In a sense, CBEP views the public and private sectors as interchangeable, with the government sector supporting the private sector and the latter assuming quasi-government roles.

Parks and recreation, open space conservation, and natural habitat protection currently are the most popular focus of innovative community-based environmental protection funding, and represent the area of greatest voluntarism with the nonprofit sector often taking the lead. Here, communities have adapted some structured funding approaches to meet their needs, such as formation of special districts, tax increment financing and special tax bonds, and even a portion of State lotteries. Dedicated trust funds, land trusts and conservation easements have been the target of both of public and private financing, including matching funds, special bonds, and SRF loans to pay for land easements, and corporate and individual donations. Mitigation banking and pollution trading represent a new type of private sector involvement, sometimes voluntary. Donations from "green" credit cards, affinity merchandise and license plates, and ecotourism are growing.

In short, the tools in this section capture the spirit, enthusiasm and love that Americans hold for specific regions, valuable natural locations and the places where they live. They depend also on the enlightened self-interest of individuals, private firms and governments. They finance long-term protection measures which are not necessarily the target or result of government regulation.

Advantages: A chief advantage of the majority of community-based environmental financing mechanisms is that they can generate a great deal of enthusiastic and voluntary support without causing much opposition. They are equitable, flexible and may result in considerable financial leveraging, as in the case of donations or special revenue-raising devices matched by government and private sector dollars and in-kind services, or investment proceeds and loan repayments to trust funds. While government voluntary mechanisms such as income tax check-offs or vanity auto license plates have not raised much revenue, similar private and nonprofit sector programs such as land or easement donations and in-kind services are huge. The novelty of mechanisms involving public and private sector funds advertises the need for environmental improvements and enhances the awareness of even the most reluctant participants. The cost/benefit relationship is particularly high when revenues go to specific local projects such as open space acquisition and protection.

Limitations: Government CBEP measures have been overshadowed by the success of the private and nonprofit sectors, with a few exceptions such as Department of Agriculture's conservation reserve program. While the revenue raising potential particularly of private and nonprofit sector measures is large, revenues may be unstable and unpredictable at times, fluctuating particularly with economic conditions and tax treatment of philanthropic activity. The use of lotteries have been controversial, since individuals purchasing lottery tickets may be those least able to pay, and environmental dedication has not always been assured.

Summary: No CBEP funding mechanism should be regarded as unimportant, because of the enormous potential to harness market forces, heighten environmental awareness, leverage additional resources, and join the public and private sectors in new ways. The focus of CBEP funding, moreover, whether communities or ecosystems, represents the new wave of environmental protection which relies on prevention and cooperation as opposed to regulation.

LIST OF TOOLS TO PAY FOR
COMMUNITY-BASED ENVIRONMENTAL PROTECTION
(In Alphabetical Order)

1. Adopt-An-Animal/Habitat Programs
2. Affinity Merchandise (License Plates, Stamps)
*3. Agriculture: Farm Service Agency -- Conservation Reserve Program
4. Agriculture: Natural Resources Conservation Service -- Wetlands Reserve Program
5. Assurances
*6. Capital Improvements Program
*7. Community Foundations
*8. Conservation Easements
*9. Conservation Partnerships
*10. Contributions of Land
11. Cost-Share for Livestock Waste Storage Systems
*12. Dedicated Government Trust Funds
13. Ecotourism
14. Emissions Trading
15. Environmental Lotteries
*16. Environmental Revolving Funds
17. Green Credit Card
*18. Individual and Corporate Donations
*19. Land Trusts and Reclamation Banks
20. Mini Bonds for Stream Restoration
*21. Mitigation Lands and Banking
22. Municipal Utility Asset Sales
*23. Non-Profit Organizations
24. Point Source/Nonpoint Source Trading
*25. Special Districts (Special Purpose Districts, Regional Authorities)
*26. Tax Increment Financing - CBEP

* Stars indicate most highly rated mechanisms as described in the Comparison Matrix at the end of the narratives. See Introduction to the *Guidebook* for a description of the criteria used. Ratings of "High", "Moderate", and "Low" are for comparison purposes only, as some ratings are necessarily subjective and data are incomplete.

ADOPT-AN-ANIMAL/HABITAT PROGRAMS

Description: These types of programs solicit individuals and corporations to adopt a special animal or species or habitat that is endangered or needs to be helped/improved. For a fee, interested parties support their animal or habitat through the purchase a kit of educational materials on their chosen animal or area. Programs can also include publicity and outreach campaigns where experts visit local schools, community centers, and parks to speak about an endangered or valuable local animal/habitat. The programs may sell the educational information kits at these events and publicize environmental curricula available at local schools.

Actual Use: A prime example of this approach is the now famous "adopt-a-whale program" which was created by the National Wildlife Federation. Another example is the adopt-a-beach program in California, which provides community outreach to schools and youth groups via a special curriculum promoting conservation of natural resources. This beach program is a joint effort of the California Coastal Commission, the California State Parks Foundation, and private corporate sponsors.

Potential Use: These programs could be initiated in attractive and popular areas throughout the nation that represent special habitats and contain threatened species. Examples of such areas could include estuaries such as the Chesapeake Bay, old-growth forests, beaches, as well as local parks, scenic spots, lakes, grassland, wetlands, or woods in any community. Examples of species that could be adopted include (but would not necessarily be limited to) animals such as eagles, condors, sand hill cranes, spotted owls, wolves, turtles, and manatees.

Advantages: This type of program persuades people to become involved in their community by focusing on an animal or habitat that they already prize, or that they can come to value. Furthermore, it accomplishes this purpose while at the same time raising money for environmental projects that benefit the local community or ecosystem.

Limitations: Animal and habitat adoption programs require start up capital and expertise for the development and acquisition of special environmental educational materials. Marketing campaigns can be very costly as well. The revenues raised are moderate at best and would only be a supplemental source of project funding.

Reference for Further Information: State of Maryland, *Financing Alternatives for Maryland's Tributary Strategies*, A Report From the Governor's Blue Ribbon Panel, 1994. University of Maryland Environmental Finance Center, University of Maryland, Coastal and Environmental Policy Program, 0112 Skinner Hall, College Park, Maryland 20742. Telephone Number: 301-405-6384. Fax Number: 301-314-9581. Web site - **http://www.mdsg.umd.edu/MDSG/EFC/index.html**

AFFINITY MERCHANDISE
(License Plates, Stamps)

Description: States and localities, as well as the federal government, can sell various items and dedicate the revenues to environmental programs. Sometimes revenues are earmarked to site-specific environmental projects. Items sold range from the more traditional such as auto license plates and special postage stamps, to items such as governmental publications, maps, logo material such as decals (see also **Section 1.B., Franchise Fees**).

Actual Use: At least 32 States sell special edition license plates to fund the protection and clean-up of natural areas. The plates are decorated with environmental slogans and designs to show the car owner's support of a particular environmental cause. Over 10 million plates have been sold nationwide raising $324 million. For example, Maryland and Virginia sell a special "Save the Bay" license plate for $25-$28 which generate over $1 million a year in each State for the Chesapeake Bay program. Washington and Massachusetts operate similar programs. States and localities also issue and sell stamps, decals, clothing and prints depicting environmental resources. Nebraska and New Jersey sell stamps for $7.50 and $2.50, respectively, on every hunting license. The federal government and nearly all States have duck stamp programs to raise money for waterfowl and wetland projects, and postage stamps and reproductions are considered valuable collector's items. Hats and T-shirts may be sold for lake clean-up or recreational sites.

Potential Use: The potential list of items that might be marketed is long. For example, a share of the proceeds from items sold by authorized vendors on governmental parkland and recreational sites could be dedicated to specific environmental programs. There is little reason why governments could not act more like the private sector in selling special merchandise.

Advantages: Since the purchase of special affinity merchandise by individuals is entirely voluntary, costs are fairly distributed to those persons who choose to incur them. Such programs allow anyone to advocate environmental improvement and support it financially. Advertisement also develops public awareness of the natural resource that the product displays. When products and proceeds are directed to a specific local site, the cost/benefit link is close.

Limitations: Caution must exercised to ensure that the administrative costs of voluntary sales and tours justify the typically small amount of revenue raised, even if such programs are implemented primarily to heighten public awareness. Proliferation of many voluntary programs should be avoided. Governments may also be criticized for competing with the private sector.

Reference for Further Information: Report from the Governor's Blue Ribbon Panel, *Financing Maryland's Tributary Strategies*, University of Maryland Sea Grant College, August 1995; Indiana Legislative Services Agency, *Issues Relating to the Indiana Heritage Trust*, 1997.

DEPARTMENT OF AGRICULTURE
FARM SERVICE AGENCY
CONSERVATION RESERVE PROGRAM

Description: This program, managed by the Farm Service Agency of the U.S. Department of Agriculture (USDA), provides direct assistance payments to eligible applicants to place highly erodible or environmentally sensitive cropland into a 10-15 year contract, i.e., taking it out of crop production. The participant, in return for annual payments, implements a locally approved conservation plan for converting cropland to a less intensive use such as grasses, legumes, fobs, shrubs, or trees. Eligible applicants include any individual, private business, legal entity, State, political sub-division of a State, or any agency thereof owning or operating private, State, and local government croplands. The program seeks to protect the nation's long-term capability to produce food and fiber, reduce soil erosion and sedimentation, improve quality, create better habitat for fish and wildlife, provide needed income support to farmers, and curb surplus production of some commodities.

Actual Use: The Conservation Reserve Program obligated approximately $1.7 billion in cash or generic commodity certificates in Fiscal Years 1996 and 1997, respectively. The assistance ranged from $50 to $50,000 and averaged more than $4,315. The USDA forecasts that it will obligate an another $1.797 billion and $1.694 billion in this type of assistance in Fiscal Years 1998 and 1999. In Fiscal Years 1986 through 1997, the program had signed contracts for 33.1 million acres. The average soil erosion reduction on land contracted in the program is 19 tons per acre per year.

Potential Use: This important federal program can be used to help idle cropland and reduce nonpoint source pollution in watersheds throughout the country.

Advantages: The program provides an incentive to cropland owners to convert overused acreage to a less intensive use and adopt approved conservation plans. The less intensive use helps reduce erosion, as well as accompanying nonpoint source runoff and pollution. The program is leveraged in that it will pay up to fifty percent of the cost of implementing approved conservation practices.

Limitations: The cropland must be owned or operated for at least three years prior to the close of the sign up period. Competition for the program is so intense that some cropland owners with environmentally sensitive properties may not be able to enroll in the program before its annual appropriations are exhausted.

Reference for Further Information: U.S. Department of Agriculture, Farm Service Agency, 14th & Independence Avenues, SW, Washington, DC 20250. Telephone Number: 202-720-6221.

DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE
WETLANDS RESERVE PROGRAM

Description: This program, managed by the Natural Resources Conservation Service of the U.S. Department of Agriculture (USDA), provides cash payments to eligible applicants to place farmed wetlands, prior converted wetlands, pasture and hayland riparian areas, and eligible buffer areas under permanent or long-term (30 years) easement or restoration agreements, i.e., taking it out of crop production. Eligible applicants include individual landowners, partnerships, associations, corporations, estates, trusts, other business enterprises, or other legal entities and when applicable, States, political sub-divisions of States, or any agency thereof owning private croplands. The program seeks to restore and protect farmed wetlands, prior converted wetlands, riparian areas, and eligible buffer zones.

Actual Use: Lump sum payments are made for permanent easements while from five to thirty payments totally 75 percent of easements amounts are made for 30-year easements. The Wetlands Reserve Program obligated direct payments of approximately $106.0 million in Fiscal Year 1997. The USDA further estimated obligations of about $239.3 million and $127.7 million in Fiscal Years 1998 and 1999, respectively. The Agency projected that its Fiscal Year 1998 funds would enroll an estimated 212,000 acres in the program nationwide.

Potential Use: This federal program can be used to preserve environmentally sensitive land and protect water quality by reducing nonpoint source pollution in watersheds throughout the country. The program's goal is to have 975,000 acres enrolled by 2002 with a third in permanent easements, a third in 30-year easements, and a third in restoration agreements.

Advantages: The program provides an incentive to cropland owners to take sensitive acreage out of production. The protection of wetlands helps absorb and reduce nonpoint source runoff and pollution. The program is multi-faceted in that easements can be long-term or permanent

Limitations: The cropland must be owned or operated for at least three years prior to the close of the sign up period. Competition for the program is so intense that some cropland owners with environmentally sensitive properties may not be able to enroll in the program before its annual appropriations are exhausted.

Reference for Further Information: U.S. Department of Agriculture, Natural Resources Conservation Service, Watersheds and Wetlands Division, P.O. Box 2890, Washington, DC 20013, Telephone: 202-690-0848.

ASSURANCES

Description: Private landowners negotiate agreements with the appropriate government(s) to fund specified conservation costs in exchange for "assurances" that their businesses will not be interrupted or seriously impacted due to environmental concerns. The private landowners agree to ensure that their business activities will not have a detrimental impact on specified plant and animal species living on their property for a specified period of time, usually at least twenty years.

Actual Use: The Fieldstone Habitat Conservation Plan program in southern California spent $13 million dollars to secure compliance for Endangered Species Act (ESA) regulations on 63 species for 30 years. Fieldstone had calculated that it would cost much more than that amount to attempt to save some or all of the 63 species at a later date.

Potential Use: Assurances could be used wherever landowners and corporations own and/or operate businesses on economically-valuable property on, adjacent to, or near environmentally valuable habitat. The landowners and businesses would agree to fund the conservation so that they can ensure the profitable use the property without danger, or with reduced danger, of future ESA legal entanglements.

Advantages: Assurance programs harness the calculated economic profit motivations of the private sector to achieve conservation and beneficial use of property. The environmental community gets substantial environmental investment from the private party and a concrete, legally enforceable contract to protect species and habitat.

Limitations: Assurances are expensive and many landowners and businesses may not be able to afford the investment. Some private parties may feel that the practice approaches or represents heavy-handed, environmental arm twisting. The assurances only protect the specific species listed in the contract agreement.

Reference for Further Information: *The Keystone National Policy Dialogue on Ecosystem Management*, October 1996. The Keystone Center, P.O. Box 8606, Keystone, Colorado 80435-7998. Telephone Number: 970-468-5822.

CAPITAL IMPROVEMENTS PROGRAM

Description: A Capital Improvements Program (CIP) is a planning and financial management process used by public sector agencies for identifying, prioritizing and scheduling planned capital improvements, usually over a 5-6 year period. CIP's are usually updated and revised on an annual or semi-annual basis. At their most basic, they involve an internal and public review process which results in a prioritized listing and schedule for future capital investments. More sophisticated CIP's will also contain a financing element which may consider sources of financing, impacts of facilities on operating costs, and effect on tax rates, debt loads and borrowing limitations. Some CIP's are tied more explicitly to the development approval process through concurrency requirements which provide that adequate facilities must be in place, or scheduled in the CIP, in order for zoning or development proposals to be approved.

Actual Use: Used by most medium and large governmental units and public service providers throughout the nation to plan their capital investments, environmental and otherwise. In Florida and Maryland, for example, concurrency requirements are tied to CIPs.

Potential Use: All general and special purpose governmental units and service providers could benefit fromimplementing a formal CIP process, either basic or sophisticated, to implement long-term, community-based environmental investments. Those governments which have a basic CIP could consider expanding it to include a financing element and/or concurrency requirements.

Advantages: Because of the public hearing process, a CIP makes the community infrastructure investment process more open to the public and stakeholders. It also enables general and special purpose governmental units and service providers to consider capital needs on a cumulative or multi-year basis. A CIP can lead to more efficient and effective use of a community's limited capital resources as it provides a framework for continuity and policy commitment.

Limitations: A CIP requires an investment of time and commitment of an organization to develop, approve and implement. It requires expertise that a small and/or disadvantaged community may not have. When tied to concurrency requirements, CIPs can have the effect of "privatizing" the community investment and construction process by allowing developers and property owners to determine when and where facilities are to be constructed.

Reference for Further Information: International City/County Management Association, 777 North Capitol Street, NE, Washington 20002. Internet: **www.icma.org.** Government Finance Officers Association, 180 North Michigan Avenue, Suite 800, Chicago, Illinois 60601. Internet: **www.gfoa.org**.

COMMUNITY FOUNDATIONS

Description: A community foundation is a federally tax-exempt non-profit organization that makes grants for charitable purposes in a specific community or region. The funds available to a community foundation are usually derived from many donors and held in an endowment that is independently administered. Income earned by the endowment is used to make discretionary grants meant to build, strengthen and improve the community. Although a community foundation may be classified by the Internal Revenue Service as a private foundation under Section 501(c)(3) of the tax code, most are classified as public charities and are thus eligible for maximum tax-deductible contributions from the general public under Section 170 of the code.

Community associations' basic appeal to donors is their flexibility. A donor can use a variety of tax-effective ways of giving charitable gifts and can choose how these donations will be used. The flexibility allows many individuals, through gifts and bequests, to establish permanent endowment funds within one foundation. A donor can create a permanent legacy with a cash contribution, gift of securities or real estate, assignment of ownership of a life insurance policy, creation of a charitable remainder trust, a bequest, or even transfer of an existing private foundation.

Actual Use: In 1995, community foundations in the U.S. had more than $12.4 billion in assets and made $806 million in grants. Community foundations are located in every major metropolitan area and state. While the number remains limited, they are a growing source of program-related investments (see **Section 10.B., Foundations: Program-Related Investments**).

Potential Use: Community foundations are excellent vehicles for support of community-based pollution prevention and similar environmental enhancement efforts. Community foundations are increasingly using program-related investments as an adjunct to their grantmaking in support of their purposes.

Advantages: Federally tax-exempt foundations that offer tax deductibility of donations can appeal to profitable businesses and high-income individuals able to donate substantial amounts with the benefit from a consequent reduction in income tax liability.

Limitations: Success in fund raising is essential for community foundations and they tend to make relatively small grants, reflecting the size of the endowments they manage.

Reference for Further Information: Contact Foundation Center, 79 Fifth Avenue, New York, NY 10003-3076, Phone: 212-620-4230, Fax: 212-691-1828, E-mail: mfn@fdncenter.org, Internet: **www.fdncenter.org/**.

CONSERVATION EASEMENTS

Description: Conservation easements are deed restrictions or covenants that prohibit, limit, or permit certain activities on privately-owned land in perpetuity. The easements do not restrict ownership or sale of the parcel, although purchasing an easement constitutes partial ownership in some sense. Not only do easements prohibit or limit the density of development, but also may require additional landowner work, e.g., soil conservation and weed control, or monitoring particular types of plants, animals and habitat (see also **Section 7., Development Rights Purchases**).

Actual Use: These purchases are made by both public and nonprofit organizations, and easement activity has increased greatly in recent years. In Vermont, where easements have a long history, public funds had protected over 62,000 acres by 1997, four times the amount reported a few years ago. Florida, New Jersey, Iowa and Colorado also report recent increases, and States such as Texas and Montana have now started easement funding. The Nature Conservancy's cumulative easement activity quadrupled between 1986 and 1996. Governments are becoming more sophisticated in funding easements, now often financed via bonds, taxes, and trust funds. The new DWSRF program lets SRFs purchase easements to protect drinking water quality, if the land is integral to the project. The Ohio CWSRF loaned easement money to The Nature Conservancy, which will repay it via voluntary contributions. The mixing of public, nonprofit and private funds for easements is growing.

Potential Use: Besides watersheds, wetlands, farmlands and habitats, easements could be used to guide land use on urban brownfields, e.g., to adjust future exposure risks by tying clean-up standards to future use. They could be used to limit or direct development in a more protective and sustainable way. A wider range of required improvements could be added to easements, e.g., restoring habitats.

Advantages: Acquiring conservation easements is much cheaper than fee-simple purchases. Land maintenance costs are reduced, as these are paid by private landowners. The tax base is less severely diminished as property stays in private hands. The private landowner gains federal tax benefits if the easement is permanent. Environmental awareness and citizen involvement are heightened.

Limitations: Laws in each State vary as to the use and tax implications of private land donations to easements. While some States and localities offer income tax and property tax credits or deductions, other States pay the landowner directly or make in-lieu payments to localities. Legal and oversight activities may be very costly, and the possibility exists for easements to be violated.

Reference for Further Information: The Trust for Public Land (TPL), *GreenSense: Financing Parks and Conservation*, Phyllis Myers, ed., State Resource Strategies, Washington, D.C., Spr. 1997, E-mail: greensense@igc.org.; TPL, *Protecting the Source: How Land Conservation Safeguards Drinking Water*, by Richard Stapleton, San Francisco, 1997 and *Doing Deals: A Guide to Buying Land for Conservation*, 1995; Samuel Stokes, A. Elizabeth Watson, and Shelley Mastran, *Saving American's Countryside: A Guide to Rural Conservation*, John Hopkins Press, Baltimore, 1997.

CONSERVATION PARTNERSHIPS

Description: Conservation partnerships are partnerships between conservation organizations, federal and State agencies, and private industry. Through conservation partnerships, industrial and commercial activity is permitted on or near ecologically valuable land without threatening the natural resources on that land. Working together, the non-profit groups, the public agencies and industry determine what industrial and/or commercial activities might be compatible with the ecologically valuable land.

Actual Use: Conservation partnerships can be used to resolve conflicts over land use, while protecting ecosystems. For example, The Nature Conservancy makes extensive use of conservation partnerships in working with the private sector to protect valuable ecosystems. In one California preserve, oil drilling, sand-mining, and agriculture coexist with a protected natural area. The private partners accepted necessary limitations and restrictions on these activities, such as Best Management Practices (BMPs) that prevent or reduce pollution, and the use of advanced pollution control and monitoring technology.

Potential Use: These partnerships could be used to broker arrangements for use of federal land that is currently protected. They could also be structured to protect special habitats such as redwood or old-growth forests, sand dune beaches, and coral reef systems.

Advantages: Conservation partnerships can actually enhance private sector land values because of the proximity of environmentally-protected land. In addition, unlike traditional nature preserves, conservation partnerships maintain important tax bases for local governments.

Limitations: Partnerships may not be feasible in all cases. For example, some industrial or commercial activities may have pollution impacts that are not sufficiently controllable through BMPs or pollution control technology, and thus may be unsuited to use near ecologically valuable areas. Some locations and industries may require technological approaches that make the partnership economically unworkable for the private partner.

Reference for Further Information: The Nature Conservancy, *Last Great Places: The Conservancy's Protection Initiative for the 1990s*, Arlington, VA, May, 1991.

CONTRIBUTIONS OF LAND

Description: Direct contributions of environmentally-sensitive land from individuals and businesses can reduce the need for outright governmental expense, or the land can be sold to raise revenue for other environmental projects. Land donated through conservation easements and the USDA conservation reserve program are discussed elsewhere in this section. A closely related tool is discussed in **Section 7., Development Rights Purchases**).

Actual Use: Many non-profit land trusts which receive direct land donations from individuals and corporations exist on a national, State and local basis. For example, The Nature Conservancy regularly receives donations in land, which it then manages for environmental purposes or, if not environmentally sensitive, sells for other natural lands acquisition. Groups such as these often work in tandem with local non-profit land trusts. Corporate land donations have been increasing in recent years, as large businesses seek to avoid the costs of environmental management or enhance their image. State wetlands mitigation programs, whereby developers altering exiting wetlands must create a wetland elsewhere, are a form of contribution in land sometimes required by regulation. Contributions of land may be offered in lieu of monetary fines.

Advantages: Voluntary contributions of land are a potentially large revenue source, or form of governmental cost-savings, and a valuable form of non-regulatory environmental protection. Potential cost-savings from pollution prevention in the first place, as opposed to cleaning up sites after the fact, could be notable, even if there is an initial governmental monetary outlay such as under the federal agricultural reserve program. The environmental incentives in term of enhancing public awareness of environmental needs are clear-cut, and the opportunity exists to attract additional public or private resources to manage lands set aside for protection is strong.

Limitations: As with all in-kind voluntary programs, revenue is unpredictable or non-existent. Administrative costs for future oversight may be high. Donations may be made to get rid of neglected land, which then must be managed or sold, by governments or non-profit organizations. Thus, these programs must be evaluated on a case-by-case basis.

Reference for Further Information: The Conservation Foundation, *Annual Report: 1995*, Washington, D.C.; The Nature Conservancy, *1995 Annual Report*, Arlington, VA.

COST-SHARE FOR LIVESTOCK WASTE STORAGE SYSTEMS

Description: Under this program, farm owners enroll or are accepted in a State or other government-sponsored livestock waste storage program (usually for hogs, chicken, cattle, and/or horses). The farmers then invest their own money in some form of approved best-management practices for ensuring proper livestock waste storage systems. The program participants receive a matching cost-share payment up to a specified limit from the State or other government sponsoring the program.

Actual Use: A number of States have this type of subsidy program for livestock waste-storage control. For example, Maryland's Agricultural Cost-Share Law authorizes cost-share payments for livestock waste storage systems up to a maximum of $35,000 per system. The Maryland program's cost-share payments currently cover 30 percent to 60 percent of the cost of the typical farm waste storage system.

Potential Use: This kind of community-based program could provide valuable assistance to pollution control efforts in any watershed. The program would encourage farmers to adopt the best currently available management practices for their livestock herds.

Advantages: The program is leveraged in that it elicits a matching share from the private sector. The assistance provided to farmers in this type of State or local program could be combined with that provided in other federal programs to leverage even more moneys and to fund larger projects (for example, see **Section 7., Conservation Reserve Program**).

Limitations: The incentives provided by typical livestock waste control programs may be too low to attract all or most farmers to participate in the programs. Some smaller and/or needy farmers may not be able to afford to share any amount of the share.

Reference for Further Information: *Financing Alternatives for Maryland's Tributary Strategies*, A Report From the Governor's Blue Ribbon Panel, 1994. Copies are available from the University of Maryland Environmental Finance Center, Coastal and Environmental Policy Program, 0112 Skinner Hall, College Park, Maryland 20742. Telephone Number: 301-405-6384. Fax Number: 301-314-9581. World Wide Web site - **http://www.mdsg.umd.edu/MDSG/EFC/index.html**

DEDICATED GOVERNMENT TRUST FUNDS

Description: A government trust fund is a special account set up to receive and disburse revenues for a specific program/activity. States and localities earmark revenue to trust funds either constitu-tionally or by legislation. The most commonly used include earmarked portions of taxes and fees, referendum bond act dollars, environmental fines and penalties, lotteries, budget surpluses, and even private donations. Some federal grants are targeted to trust funds. Most constitutionally earmarked funds need no legislative appropriation to release fund deposits. Deposits accrue automatically and usually are available only for the purpose named in the constitution, hence their dedication. In other cases, the legislature pledges revenues from a funding source(s), and creates a trust fund to manage them. Legislative appropriations may or may not be required to release statutorily dedicated funds.

Actual Use: All States have dedicated environmental trust funds, some very large (over $100 million), and local trust funds are growing rapidly in popularity. Fund revenue sources, uses and financing techniques are getting more innovative. State and local funds typically make loans as well as grants, require public or private matching dollars, and fund public and nonprofit sector projects. Common dedicated uses are open space acquisition and easements, parks and recreation, habitat restoration, green ways, trails and historic sites, and pollution control facilities. Examples include New Jersey's Green Acre Program funded by multiple bond acts and real estate transfer taxes, which gives 25% grants and low-interest loans to local trust funds with voter-approved "open space" property assessments. Minnesota's Environmental Trust and Colorado's Great Outdoors Funds are funded in part by lottery revenues, Missouri's Soil and Water Fund by sales tax set-asides, Florida's Everglades Fund and Maryland's Program Open Space by environmental fees, and North Carolina's Clean Water Fund by a 6.5% budget surplus earmark. Washington's Public Works Trust Fund uses the cigarette tax. Federal ones include the Inland Waterways, Highway, and Superfund Trust Funds.

Potential Use: The potential uses of dedicated trust funds are large and growing, and capable of funding any environmental project or program.

Advantages: Trust funds help ensure that revenues are used for intended purposes, but fund managers may have flexibility in what projects to finance. Some revenue sources, e.g., specific taxes, are even more predictable than legislative appropriations. Revolving funds and matching requirements are highly leveraged, and investment earnings add to revenues. Particularly local trust funds have a high cost/benefit relationship, are popular, and have voter approved funding sources.

Limitations: There is some administrative burden to set up and maintain trust funds. Temporarily idle resources may be targets of budgetary raids and, historically, not all earmarks have been assured.

Reference of Further Information: The Trust for Public Lands, various publications including *GreenSense: Financing Parks and Conservation*, Phyllis Myers, editor, States Resource Strategies, 1616 P. St. NW, Washington, D.C. (email: greensense@igc.org)

ECOTOURISM

Description: Ecotourism is the use of recreational revenues (often generated by non-indigenous peoples) to fund conservation activities in natural areas which are visited. The Ecotourism Society expands this concept by defining ecotourism as "purposeful travel to natural areas to understand the culture and natural history of the environment, taking care not to alter the integrity of the ecosystem, while producing economic opportunities that make the conservation of natural resources beneficial to local people."

Actual Use: A number of countries have used ecotourism to both finance environmental protection efforts and prevent additional environmental damage. For example, Australia established a National Ecotourism policy that mandates environmental impact review in areas that experience significant natural resource tourism.

Potential Use: Ecotourism could be further applied to many natural areas in additional countries worldwide. The rainforests in South America represent an excellent opportunity to further test and develop the ecotourism concept.

Advantages: If carefully targeted and properly implemented, ecotourism offers the real hope of protecting valuable ecosystems while producing a source of revenue for the local community. In Rwanda, for example, ecotourism has helped save mountain gorillas from extinction. Rwanda's Volcano Park has become an international attraction and represents that third-world country's largest source of foreign exchange.

Limitations: Ecotourism may be infeasible, or even harmful, in natural areas that are too fragile to support visitation. For example, along popular Himalayan tourist routes, litter has been strewn on trails and the alpine forest devastated by travelers looking for fuel to heat food and bath water. On the other hand, many natural areas may not attract a sufficient number of paying visitors to warrant ecotourism. Some countries may decide not to use the revenues generated by ecotourism to protect and support the natural areas visited.

Reference for Further Information: Apogee Research, Inc. draft report, *Environmentally-Sustainable Tourism in APEC Member Countries*, prepared for the Asian-Pacific Economic Council, March, 1995. World Wide Web site article titled, " Can Ecotourism Save the Rainforests?", located at **http://www.ran.org/ran/info_center/ecotourism.html**

EMISSIONS TRADING

Description: Emissions trading programs allow sources of air pollutants to trade pollutants in some fashion, either geographically, over time, or among other sources. Many emissions trading programs incorporate a "bubble" structure. A bubble program treats multiple emission sources as if they were included within an imaginary bubble, allowing existing sources to adjust emissions levels within the bubble as long as an aggregate limit on emissions is not exceeded. "Offset" programs allow new sources to obtain emissions credits from existing sources to offset new emissions. "Banking" programs allow sources to store emission reduction credits for future use or sale, while "netting" programs allow sources undergoing modification to avoid new source review if plant-wide emissions are reduced.

Actual Use: The EPA's air emissions trading program began in 1975 with a proposal to exempt emissions at new or modified existing sources from New Source Performance Standards as long as total emissions from the facility did not increase. Since that proposal, the EPA's air emissions trading program has included bubbles, offsets, banking, and netting elements. An emissions trading program is an integral part of the sulfur dioxide control plan outlined in the Clean Air Act Amendments of 1990. In California, the South Coast Air Quality Management District is setting up a Regional Clean Air Incentives Market (RECLAIM) that will allow around 2,000 sources of reactive organic gases, nitrogen oxides, and sulfur oxides to buy and sell emission reduction credits on an open market.

Potential Use: State and local air programs may be able to use emissions trading as a tool to meet the air quality standards outlined in the Clean Air Act Amendments of 1990.

Advantages: According to a GAO study, emissions trading can save up to 90 percent of private control costs. It encourages private research into air pollution control technologies, and lets the private sector allocate resources to produce emissions reductions in the most cost-effective manner.

Limitations: Emission trades may require extensive and time-consuming prior approval, and may be hindered by legal and regulatory requirements. Establishing emissions and air quality levels before and after trading is often difficult.

Reference for Further Information: American Petroleum Institute, *The Use of Economic Incentive Mechanisms in Environmental Management*, June, 1990. Provides a general discussion of all types of economic incentive programs, including a discussion of current and historical emissions trading programs.

ENVIRONMENTAL LOTTERIES

Description: Lotteries sell tickets for a chance to win a sum of money or other valuable prize. Where operated for the benefit of State or local government, they generally retain a portion of the revenue from ticket sales, ranging from 10 to 50 percent depending on the game, for a dedicated use. Lottery games can be designed to appeal to particular demographic groups, including those who support various types of environmental protection programs or ecological enhancement measures. State lotteries regularly change the appearance of their games as part of their marketing strategies. State legislatures could take this concept a step further by requiring changes in the purposes of lottery games to attract participants who might not otherwise play.

Actual Use: Lottery profits are contributing significantly ($14 billion) to the revenues of 37 states. Portions of lottery revenue are earmarked for education, and profits from specific games are devoted to special agencies such as stadium authorities. Minnesota has had an environmental lottery for over ten years and voted in 1990 to require that not less than 40 percent of net proceeds go to the Environmental and Natural Resources Trust Fund. Colorado has a lottery-funded conservation program (GOCO). Maine's lottery dedicates most profits to the Outdoor Heritage Trust. Kansas also dedicates a small, fixed percentage of lottery proceeds to wetlands and nonpoint source control.

Potential Use: Earmarking of portions of general lottery profits for purposes such as K-12 education has been happening. Whether environmental purposes receive part of lottery profits depends on their political appeal in state legislatures.

Advantages: Lottery revenues can substitute for unpopular taxing or borrowing. There is a large, relatively stable revenue potential and lottery advertising can be used to heighten public awareness of environmental needs.

Limitations: Lotteries, off-track betting and other legalized gambling are controversial means for raising public sector revenues. Some critics raise equity issues regarding a shift in fiscal burden among socio-economic groups. Off-track betting and other gambling are criticized for attracting and promoting criminal activities. The bottom line is that legalized gambling has social costs, such as the high suicide rate among compulsive gamblers. The Governor of South Carolina is leading an effort to eliminate legalized video poker despite its $61 million contribution to the state budget.

Reference for Further Information: Contact North American Association of State and Provincial Lotteries, 1700 East 13th Street, Suite 4-PE, Cleveland, OH 44114; Phone (216)241-2310; Fax (216)241-4350. See *States as Water Quality Financiers*, National Conference of State Legislatures, Denver, Colorado, May 1991.

ENVIRONMENTAL REVOLVING FUNDS

Description: Multi-media Environmental Revolving Funds are State run lending institutions generally modeled after the wastewater and drinking water revolving funds established under the Clean Water Act and the Safe Drinking Water Act with several important differences.

Actual Use: The notion of a single lending entity based on the revolving fund principle is not a new one at the State level. Several States, including Texas and Ohio, have long-established multi-media revolving funds making loans for a wide variety of environmental infrastructure needs. An example of an even broader entity is the Kentucky Infrastructure Authority which includes eligibility for environmental, transportation and other public purpose facilities.

Potential Use: Environmental SRFs hold great promise in their capacity to direct and apportion subsidies to multi-media eligibilities. In that sense, they allow States to plan and target limited resources to their highest priority needs. The environmental SRF concept represents an excellent vehicle for directing and apportioning funding to a wide variety of community-based, watershed protection and nonpoint source projects.

The States might establish these multi-media SRFs in tandem with the Environmental Protection Agency (EPA)-supported wastewater and drinking water programs operating them in a kind of corporate group structure. At the very least, the EPA-funded SRFs could co-finance water related projects with the multi-media purely State-funded entities.

Advantages: Comprehensive (multi-media) funding eligibilities make the environmental SRF concept extraordinarily well suited to meeting the goals of community-based environmental protection.

Limitations: Not all communities can afford loans, even at subsidized rates. The initial capitalization of a revolving loan fund is expensive and raising adequate money to capitalize the funds may not always be politically feasible.

Reference for Further Information: Council of Infrastructure Financing Authorities, 1625 K Street, NW, Suite 200, Washington DC 20006. Telephone Number: 202-371-9694. Facsimile Number: 202-371-6601. USEPA, Office of the Comptroller, Environmental Finance Program, 401 M Street, SW, Washington, DC 20460. Mail Code: 2731R. Contact: George Ames at **ames.george@epa.gov**

GREEN CREDIT CARD

Description: A private company or a nonprofit environmental organization works with a bank or other financial institution to issue a major credit card on a State, regional, or even national basis. The card is structured to benefit an existing or new fund in an organization dedicated to watershed protection, habitat management, species protection, or other environmental goals. For each "green card" issued by the sponsors, a fixed amount per card and a small percentage of the spending would be donated to the fund in the card user's name. The fund would then be drawn upon by the host environmental organization to finance individual environmental projects and activities.

Actual Use: Many State, regional, and national credit cards are issued by banks and affiliated organizations such as major automobile manufacturing companies for special purposes or "affinities." In the environmental arena, the National Wildlife Federation and the Sierra Club have explored and/or developed green credit cards directed at existing and potential members. The Chesapeake Bay Foundation has issued a regionally-based green credit card to help finance projects and activities in the Bay watershed.

Potential Use: Like the Chesapeake Bay Foundation example, special watershed groups located in other parts of the country could issue regional green credit cards. The Puget Sound (Seattle market) area, the Great Lakes (Milwaukee, Chicago, Detroit, Toledo, Cleveland markets), and the Gulf of Mexico (Houston, New Orleans, Mobile, Tampa-St. Petersburg markets) are possible examples of prime areas for this approach ,if they have not already implemented it.

Advantages: This type of program allows people to become involved in their community by focusing on an ecosystem/place that they already value. Furthermore, it accomplishes this purpose while simultaneously time raising money for worthwhile environmental projects that benefit the local community or ecosystem in which they live or visit.

Limitations: Start up and marketing campaign cost may be high. There has been a proliferation of special "affinity" cards in recent years and the competition for each card user's account is intense. The revenues raised would be moderate at first and probably suited to project rather than major system funding.

Reference for Further Information: See *Financing Alternatives for Maryland's Tributary Strategies*, A Report From the Governor's Blue Ribbon Panel, 1994. Copies are available from the University of Maryland Environmental Finance Center, Coastal and Environmental Policy Program, 0112 Skinner Hall, College Park, Maryland 20742. Telephone Number: 301-405-6384. Facsimile Number: 301-314-9581. Web site - **http://www.mdsg.umd.edu/MDSG/EFC/index.html**.

INDIVIDUAL AND CORPORATE DONATIONS

Description: Donations are the voluntary giving of money. Most frequently, donations are made to non-profit foundations or trusts, or company-sponsored organizations or trusts, or company-sponsored foundations. Frequently, private sector corporations and/or foundations match individual donations. Donations to governments are made through line item check-offs on income tax returns or to government trust funds.

Actual Use: At least seven States, including Arkansas, Ohio, North Carolina, Virginia and Wisconsin, now use a check-off box on the State income tax return to allow taxpayers to earmark a portion of tax refunds for non-game wildlife programs and natural areas such as wetlands. The federal government also experimented with this form of fund-raising for a time. However, compared to government efforts, donations to non profit organizations are huge, measuring in the hundreds of millions annually. Many non profit organization operating budgets come largely from individual, as opposed to corporate, donations.

Potential Use: The use of voluntary programs has grown steadily, and has become increasingly innovative to attract more potential donors. Voluntary programs are best suited to finance environmental programs that attract significant public interest and are highly visible, such as an estuary, urban lake, or wetland. The use of income tax check-off donations has grown in popularity as a State funding mechanism, and could be used locally as well. Corporate and individual giving may also take the form of in-kind payments or special services.

Advantages: There is little public opposition to voluntary donations, and the advantage of enhancing public interest through a well-publicized campaign and equitable financing means can be extremely important. Although government revenue collection may be limited, money can provide valuable supplemental funding for specific cleanup programs. The ability to leverage additional financial resources, e.g., through corporate matching contributions and in-kind services, is high.

Limitations: Donations tend to fluctuate with the economy, and also to some extent depending on current tax code restrictions on philanthropic activity. Thus, the revenue stream may be unpredictable and unreliable for financing some necessary program costs. Administrative costs may be high, and it may be difficult to track the use of funds which may be demanded by donors.

Reference for Further Information: Environmental Data Resources, Inc., *Environmental Grant Making Foundations: 1995 Directory*, Rochester, New York, 1996 (Email: edri@eznet.net); The Foundation Center, *National Directory of Corporate Giving*, New York, 1995 (212-620-4320).

LAND TRUSTS AND RECLAMATION BANKS

Description: Land trusts acquire and manage natural lands and resources on behalf of State or local governments. They are fund/ed by a variety of sources similar to dedicated government trust funds, especially land-related sources like real estate transfer and property taxes. Nonprofit land trusts are supported by government monies and private donations. Revenues from timber-cutting, farming, recreation, and other land uses may be rededicated to trusts. Land bought for mitigation purposes often are put in trusts. Land reclamation banks are publicly or privately funded institutions that buy contaminated sites, remediate them, and sell or lease them to raise income for further remediation.

Actual Use: All States and a growing number of localities have land trusts. A recent survey of 22 States describes how they manage some 135 million acres of trust land, in forests, farmland, and parks. State trusts are funded by a combination of State (sometimes multi-State) and local revenues, federal and private foundation support including matching grants, and corporate donations. Land acquisition often is brokered by nonprofit groups such as The Trust for Public Land, American Farmland Trust, Nature Conservancy, and local counterparts. A recent example is the Sterling Forest 16,000 acre acquisition in New York and New Jersey. Land management also is often a joint endeavor, lasting in perpetuity. A local example is Nantucket Island, which set up a trust in 1983 to buy up to 15% of its shores and moors by 1990, financed in part by a 2% real estate transfer tax on all property sold. The trust manages the resources for long-term protection and recreation, using volunteers. Several cities have used land reclamation banks to clean up and redevelop brownfields.

Potential Uses: State, localities and the nonprofit sector could use land trusts as mechanisms to encourage protection of any natural land and unique habitats, including watersheds.

Advantages: Land trusts combine financing, management and planning functions in a single entity. They are highly leveraged linking public and private of funding, and are one of the most innovative approaches today. Cost/benefit linkage is high, as contributors know what land is protected. The concept helps to protect land use revenues, such as from timber. Land reclamation banks allow the public or nonprofit sector to take liability risks that private businesses may be unwilling to assume.

Limitations: Staffing land trusts and managing land assets over time can be very costly, trust administrators must have adequate resources for land management activity, which may be up to one-third of acquisition costs. Use of volunteers reduces needs somewhat. Land management also may result in considerable controversy, for example, over timber cutting, burning or recreational access. If proceeds from the lease or sale of remediated property are insufficient to cover remediation cost, investment of public funds may be required. Localities will suffer a loss of tax revenues.

Reference for Further Information: Souder, Jon A. and Fairfax, Sally K., *State Trust Lands: History, Management and Sustainable Use*, University Press of Kansas, 1996; The Trust for Public Land, *Land and People*, Vol. 10, No.1. San Francisco, Spring 1998.

MINI BONDS FOR STREAM RESTORATION

Description: Small denomination bonds sold directly to the general public to finance capital projects, such as tree planting, that promote stream restoration. First proposed by the Maryland Governor's Blue Ribbon Panel that prepared *Financing Alternatives for Maryland's Tributaries Strategies*. Please see also the closely related tool in **Section 2.A., Mini Bonds**.

Actual Use: None known by the authors as of this date specifically for stream restoration purposes, although small denominational general revenue bonds (e.g., $500.00 at par) have been sold by a number of governments.

Potential Use: Very promising, because it would provide the general public a tangible and politically popular personal opportunity to invest in general and/or specific environmental activities and improvements

Advantages: Use of this innovative financing tool broadens the base of public support for stream restoration by directly connecting individual investments with environmental improvement(s).

Limitations: Administrative costs may be high due to the large number of bond holders.

Reference for Further Information: See *Financing Alternatives for Maryland's Tributaries Strategies*. Report from the Governor's Blue Ribbon Panel (1993). See cross reference with the writeup in **Section 2.A., Mini Bonds**.

MITIGATION LANDS AND BANKING

Description: Mitigation land is a publicly-owned and managed natural site that has been purchased or protected with public or private funds, in the form of direct payments, voluntary land donations and/or required mitigation credits to permittees for set fees, which may be banked. Mitigation banking was begun to meet wetlands mitigation requirements for development impact. Mitigation occurs off-site, but usually in the same area. Wetlands mitigation fees are based on impaired acreage or wetlands value, and sometimes, credits may be sold to other permit applicants. The mitigation idea is used by governments to acquire any valuable natural area, perhaps unrelated to the impacted area, to compensate for negative construction consequences. Here, the mitigation bank is the special account to support the property. Public agencies may require mitigation from other public agencies.

Actual Use: Wetlands mitigation banking fulfills mitigation requirements under federal and State regulations when on-site solutions are not possible. Mitigation is often required by CWA Section 404 wetlands permits (and by State programs such as Oregon's Removal-Fill Permit Program) to compensate for adverse removal or fill activities. It is used widely by States and localities to protect a variety of natural areas such as farmlands, forests, ranches and watersheds. Public agencies such as those in California and Florida are growing more innovative in designing mitigation packages. Escondido, California bought a 3,000 acre ranch as an off-site mitigation bank, with sales of credits for approved projects funding acquisition and management. Florida acquired a 3,636 acre ranch and a 6,700 acre property to build the Suncoast Parkway with public funds and toll revenues (brokered by the Trust for Public Lands). In South Carolina, 17,000 acres of sensitive watershed was bought as highway mitigation, with The Nature Conservancy managing the $12 million bank. Corporations such as Disney and paper/pulp companies make voluntary mitigation donations to green their image.

Potential Use: States and localities may operate multiple mitigation banks, with the bank serving as the account for a particular parcel of mitigation land. The concept could be extended to brownfields, with publicly-owned sites generating credits for private developers to use in other areas.

Advantages: Requiring compensatory mitigation is consistent with, and advertises, the goal of protecting natural areas including wetlands. Mitigation banking offers a potentially more efficient and beneficial approach than conventional case-by-case, off-site mitigation, by providing larger mitigation parcels, partnerships between government and conservation groups, attention to ongoing management, and interagency cooperation. Mitigation may reduce costly development delays.

Limitations: Ongoing management of mitigation lands is costly, and must be factored into revenue projections. Some mitigation packages are still too small for ecological protection.

Reference for Further Information: The Trust for Public Lands, *GreenSense: Financing Parks and Conservation*, Phyllis Myers, editor, Fall 1996 and Spring 1997, San Francisco, CA; USEPA, Wetlands Hotline, 1-800-832-7828.

MUNICIPAL UTILITY ASSET SALES

Description: Local governments and special authorities use these sales to tap the large capital potential locked up in the valuable municipal facility assets that they already own. These public entities then use the revenues generated to fund community-based watershed management activities, particularly nonpoint source pollution projects. Under this approach, the municipal utility would sell the capital asset(s) such as water mains, pumping stations, and storage tanks to private investors interested in reducing their tax burdens.

Actual Use: The editors are aware of no public municipal utility examples at this time. Any such examples of this funding tool provided by *Guidebook* users would be welcomed. Private utilities including telephone and electric companies have traditionally depreciated their facility assets such as telephone and electric power transmission lines and generating stations over an established period of their useful lives (usually 30 years or more).

Potential Use: The environmental municipal utility asset could be sold to large profitable companies and other wealthy investors who would use the asset's depreciation schedule to reduce their tax liabilities over a number of years. The use and maintenance of the capital asset would remain with the municipal utility and ownership could revert to the utility at the end of the asset's depreciated life.

Advantages: New source of private investment that can be used to fund public environmental projects and activities would be generated. The mechanism taps into, and leverages, the previously unrealized value of already existing, major public capital assets.

Limitations: This new investment strategy would probably require legislative approval at some level of government. If approved, it could result in a net loss of tax revenues to federal and State treasuries over time. Any program would need to be financed, developed, and marketed to potential private investors.

Reference for Further Information: USEPA document, *Identifying, Planning, and Financing Beneficial Use Projects Using Dredged Materials: Beneficial Use Manual*, 1996. USEPA, Office of Water, Oceans and Coastal Protection Division, 401 M Street, SW, Washington, DC 20460 (mail code: 4504F). Telephone Number: 202-260-1962. Fax Number: 202-260-8742.

NON-PROFIT ORGANIZATION

Description: Non-profits, such as foundations and trusts, are defined as non-governmental organizations (NGOs) that accrue no profit to individual members, but spend resources pursuing specific goals. NGOs can be formed for many purposes, including natural lands acquisition, land management, environmental monitoring compliance, research, education, (discussed separately) and other activities. They include independent private foundations, 501 C (3) community foundations, (discussed separately) operating foundations which make grants to pre-selected organizations, and public foundations funded by government (see also **Section 7., Foundations: Program-Related**).

Actual Use: Environmental non-profit organizations are a fast growing and important mechanism in terms of cooperative activity with all levels of government. An NGO such as the Chesapeake Bay Foundation can mix public and private donations to support governmental goals. Organizations such as The Nature Conservancy, Ducks Unlimited, and The Trust for Public Lands may acquire and manage valuable natural lands in lieu of government, or until governments can afford to purchase them. Others raise funds for air pollution, recycling, and contaminated sites. Many States fund nonprofits, e.g., since 1987, New Jersey voters have approved $45 million for nonprofit projects.

Potential Use: The potential use of NGOs to pursue quasi-governmental environmental activities in lieu of governments, or on their behalf, is growing. NGOs constitute a logical place for governmental out-souring for technical, resource management, training and other work. While NGOs cannot perform any legal functions pertaining to environmental enforcement or represent governmental policy, they can perform innumerable activities on highly cost-effective basis.

Advantages: Nonprofits can leverage more monetary donations, volunteer manpower, resources and in-kind services, than can public agencies. This is due to their tax-exempt status, but also because they provide a safe and seemingly unbiased focal point that draws attention to the resources protected and environmental issues addressed. Many governments match private donations. NGOs may perform tasks more quickly and efficiently than government, since they are less bureaucratic, can effectively cross jurisdictions for greater ecosystem protection, and can act as "honest brokers".

Limitations: Revenue generation may be quite unpredictable. Since nonprofits are controlled by their individual membership and boards, they may evolve over time and cannot always be held accountable by government, potentially undercutting the cost/benefit relationship. Some nonprofits are criticized for using too large a portion of donations for internal, administrative purposes.

Reference for Further Information: USEPA, *The Use of Nonprofit Organizations to Support Comprehensive Conservation and Management Plans*, Office of Water, Washington, DC, 1993; The Nature Conservancy, *Ecosystem Initiative Strategy*, Arlington, VA, 1993; Water Environment Federation, Water Quality 2000 Project, *A National Water Agenda for the 21st Century*, Alexandria, VA, November 1992.

POINT SOURCE/NONPOINT SOURCE TRADING

Description: Although it can take many different forms, point source/nonpoint source trading in principle involves point sources financing reductions in nonpoint source pollution in lieu of undertaking more expensive point source pollution reduction.

Actual Use: In North Carolina's Tar-Pamlico watershed, the Tar-Pamlico Basin Association (a coalition of point source dischargers) and State and regional environmental groups proposed a two-phased nutrient management strategy that incorporates point source/nonpoint source trading. The plan obligates Association members to finance nonpoint source reduction activities in the Basin if their nutrient discharges exceed a base allowance.

Potential Use: Several conditions appear necessary if a point source/nonpoint source trading program is to achieve ambient water quality objectives. The water body must be identifiable as a watershed or segment. There must be a combination of point sources and controllable nonpoint sources each contributing a significant portion of the total pollutant load, and accurate and significant data to establish targets and measure reductions. There must be significant load reductions for which the marginal cost (cost per pound reduced) for nonpoint source controls are lower than for upgrading point source controls. Finally, point sources must be facing requirements to either upgrade facility treatment capabilities or trade for nonpoint source reductions in order to meet water quality goals.

Advantages: Point source/nonpoint source trading programs increase the potential for cost-effective reduction in pollutant loading, since nonpoint source reductions funded by trading are typically achieved at lower cost per unit of pollutant than point source reductions. Under ideal conditions, a trading program should produce both cost savings to point source dischargers and improved water quality. Including both point and nonpoint sources in a single management strategy tends to force the development of a watershed-wide or basin-wide approach to pollution reduction.

Limitations: Implementing trading programs may require cooperation and information sharing between agencies without previous cooperative experiences (e.g., regulatory agencies with water quality authority and farmer assistance programs.) Technical limitations between point source and nonpoint source controls can make it difficult to arrive at an appropriate trading ratio. Administrative costs are also incurred for review and approval of individual trades.

Reference for Further Information: Office of Water, Office of Policy, Planning and Analysis, USEPA, *Incentive Analysis for Clean Water Act Reauthorization: Point Source/Nonpoint Source Trading for Nutrient Discharge Reductions*, April, 1992. Provides an analysis of trading programs, including case studies of trading programs in North Carolina and Colorado.

SPECIAL DISTRICTS
(Special Purpose Districts, Regional Authorities)

Description: A special district is an independent government entity formed to provide and finance governmental services for a specific geographic area. Residents of special districts pay taxes to finance the improvements that they will benefit from. For example, a sewage special district might tax residents to finance extension of wastewater treatment services.

Actual Use: Primarily at the local level. Examples include:

- Sewer Districts;
- Water Districts;
- Stormwater Management Districts;
- Regional Solid Waste Authorities;
- Water Resource Authorities;
- Regional Port Authorities; and
- Regional Air Quality Management Districts.

Special districts target costs and benefits of services to a particular population. For example, a drinking water district might be formed to finance extending municipal drinking water services to a newly-developed area. Special districts may issue revenue bonds in a number of States. Local governments use special districts to finance capital facilities independently, relieving the burden on general debt capacity. For example, a regional port authorities issue revenue bonds to finance port construction and/or renovation. Consortiums of local governments form special districts to address common problems. Examples include regional air quality and solid waste management authorities.

Potential Use: Special districts could be formed from nonattainment areas classified by the Clean Air Act Amendments, so that special taxes in these areas could finance air quality control programs.
Advantages: Costs are borne only by taxpayers who will benefit from improvements. Regional special districts can provide more specialized services than smaller governments (e.g., a regional solid waste authority may be more able to finance a solid waste facility than any one county.) Special districts can issue bonds, which reduces debt load on the general purpose government.

Limitations: Special districts are not directly accountable to the electorate -- most special district officials are appointed, not elected. May require special legislation in some areas.

Reference for Further Information: Porter, Douglas R., Lin, Ben C., Peiser, Richard B. *Special Districts: A Useful Technique for Financing Infrastructure*, Washington, D.C., Urban Land Institute.

TAX INCREMENT FINANCING - CBEP

Description: Tax increment financing (TIF) provides for the temporary allocation of the increased tax proceeds in a carefully designated area generated by increases in assessed property values. TIF uses the increased tax revenues stimulated by redevelopment to pay for the capital improvements required to induce the development. In a basic TIF, property assessments are frozen at a pre-development level in the specified area. Bonds are then issued to finance a portion of the redevelopment. As property values and assessments in the area increase, the municipality uses the added increment in tax revenues to meet the debt service on those bonds. The technique requires the creation of a special district and the maintaining of two separate sets of tax records.

Actual Use: Tax increment financing has been used for many years by local governments across the country for a wide variety of economic development projects. It is a particularly effective financing tool for projects that provide measurable specific benefits to select, well defined groups of taxpayers. More than thirty States nationwide have TIF laws on the books at the present time.

Potential Use: Tax increment financing could be used to help direct development away from sensitive environmental areas and to guide community-based development in economically and environmentally sustainable ways. It could also be used to help finance brownfields cleanup and redevelopment (see the closely related tool writeup in **Section 9., Tax Increment Financing**).

Advantages: Tax increment financing makes development self-financed. TIF is very flexible. Local control is retained and in most cases no local government debt limitation applies. With TIF, the development risks are shifted from taxpayers to the bondholders. The revenue potential and generation is very clear and very specific.

Limitations: TIF bonds pose a greater risk to investors and, thus, bear higher interest rates than general obligation bonds. TIFs are complex. Financial, development, engineering, and other technical expertise are necessary.

Reference for Further Information: Baker & Daniels, *Local Government Funding Sources*, Seventh Edition, July 1995, Baker & Daniels, 300 North Meridian Street, Suite 2700, Indianapolis, Indiana 46204. Telephone Number: 317-237-0300. This excellent handbook describes a variety of local government funding sources, focusing on Indiana. USEPA Environmental Financial Advisory Board Brownfields Report No. 3: *Financing Strategies for Brownfields Redevelopment*, March 1996. USEPA, 401 M Street, SW, Washington, DC 20460. Mail Code:2731R. Contact: EFAB staff member: Timothy McProuty at **mcprouty.timothy@epa.gov**

OTHER

Description:

Actual Use:

Potential Use:

Advantages:

Limitations:

Reference for Further Information:

COMPARISON MATRIX FOR COMMUNITY-BASED PROTECTION

Criteria/ CBEP Tool	Actual Use	Revenue Size	Administrative Ease	Equity	Financial Leveraging	Environmental Benefits
Adopt-an-Animal/Habitat Programs	Mod.	Low	Mod.	High	Low	Mod.
Affinity Merchandise	High	Low	High	High	Low	Mod.
***Agriculture: FSA Conservation Reserve Program**	High	High	Mod.	Mod.	High	High
Agriculture: NRCS Wetlands Reserve Program	Mod.-High	Mod.-High	Mod.	Mod.	Low	High
Assurances	Low	Low	Low - Mod.	Low - Mod.	High	High
***Capital Improvements Program**	High	High	Mod.	High	High	Mod.
***Community Foundations**	High	Mod.	Mod.	High	High	Mod.
***Conservation Easements**	High	High	Mod.	Mod.	High	High
***Conservation Partnerships**	High	Mod.	Low - Mod.	Mod.	High	Mod.
***Contributions of Land**	High	High	High	Mod.	Mod.	Mod.

COMPARISON MATRIX continued

Criteria/ CBEP Tool	Actual Use	Revenue Size	Administrative Ease	Equity	Financial Leveraging	Environmental Benefits
Cost-Sharing for Livestock Waste Storage Programs	Low	Low	Mod.	Low - Mod.	High	High
***Dedicated Government Trust Funds**	High	High	Mod.	Mod.	High	High
Ecotourism	Mod.	Low	Mod.	Low	Mod.	Mod.
Emissions Trading	Low	Low - Mod.	Low	Mod.	Mod.	Mod.
Environmental Lotteries	Low	Mod.	Mod.	Low	Low	Mod. - High
Environmental Revolving Funds	Mod.	High	Mod.	Mod. - High	High	High
Green Credit Card	Low	Low	Low	Mod.	Mod.-High	High
***Individual and Corporate Donations**	High	High	High	High	High	High
***Land Trusts and Reclamation Banks**	High	High	Low - Mod.	High	High	High
Mini Bonds For Stream Restoration	Low	Low	Low - Mod.	High	Mod.	High

COMPARISON MATRIX continued

Criteria/ CBEP Tool	Actual Use	Revenue Size	Administrative Ease	Equity	Financial Leveraging	Environmental Benefits
***Mitigation Lands and Banking**	High	Mod. - High	Mod.	Mod.	High	High
Municipal Utility Asset Sales	Low	High	Low	Mod.	Mod. - High	Low - Mod.
***Non-Profit Organizations**	High	High	Mod.	High	High	High
Point/ Nonpoint Source Trading	Low	Low	Low	Mod.	Mod. - High	High
***Special Districts**	High	High	Mod.	Mod.	Mod.	High
***Tax Increment Financing - CBEP**	Mod.	Mod.	Mod.	High	Mod.	High

High - High use (over 25 States/many localities); criteria score high (e.g., program is specific, manageable, accessible, cost/effective, etc.)
Mod.- Moderate use (10-25 States/some localities); criteria score in medium range
Low- Low or rare use; scope is limited; one or more major implementation problems exist

*Star indicates best rated mechanisms

9. TOOLS FOR FINANCING BROWNFIELDS REDEVELOPMENT

TOOLS FOR FINANCING BROWNFIELDS REDEVELOPMENT

INTRODUCTION

The term, "brownfields", refers to any abandoned, idled, or under used site (whether, urban, rural, industrial or non-industrial) where expansion or redevelopment is complicated by real or perceived contamination. This term distinguishes them from "greenfields", or undeveloped properties located mainly in suburban or rural areas. Although the full extent of the problem of environmental contamination is not known, the United States General Accounting Office estimated in 1996 that there are about 450,000 brownfields sites across the country.

While many factors can influence economic development decisions, the existence or fear of contamination, often steers development to greenfields. This promotes the use of undeveloped land, contributing to urban sprawl, increased traffic congestion, and habitat destruction. It also limits the reuse of brownfields, hurting economic growth in cities. Since many brownfields are located in poor and minority communities, such economic decisions may also raise environmental justice concerns. Failure to address the brownfields issue will relegate substantial portions of our cities to environmental and economic wastelands.

The Environmental Protection Agency believes a "environmental cleanup is a building block, not a stumbling block, to economic development, " and that cleaning up brownfields properties must go hand-in-hand with bringing economic vitality to communities. Environmental policy makers must understand the major role of finance in brownfields redevelopment. Similarly, the development community must understand the importance of environmental requirements. Without adequate linkages between environmental and financing realities, sustainable brownfields redevelopment will remain problematical. Most of the financing tools presented here are deeply rooted in local community goals, and combine both the public and private sectors in a variety of different kinds of financing arrangements.

This section evaluates financing tools which the federal government, States, communities, and the private sector can use to finance brownfields cleanup and redevelopment. Twenty-three ways of raising revenues, lowering costs, and influencing behavior are discussed. The tools include traditional governmental assistance programs, bold new initiatives that target brownfields sites and disadvantaged communities, innovative private sector arrangements, risk limitation techniques, powerful tax incentives, and use of the Drinking Water and Wastewater State Revolving Funds. In addition to the tools discussed in other parts of the Guidebook, including special taxes, fees, bonds, loans, credit enhancements, technical assistance, and community-based environmental financing mechanisms.

LIST OF TOOLS FOR FINANCING BROWNFIELDS REDEVELOPMENT
(In Alphabetical Order)

*1. Brownfields Cleanup Tax Deduction
*2. Clean Land Fund (Revolving Fund)
*3. Community Development Financial Institutions
*4. Empowerment Zones/Enterprise Communities
*5. Environmental Insurance
*6. Environmental Liability Releases/Agreements
7. EPA: Brownfields Assessment Demonstration Pilots
8. EPA: Brownfields Workforce Development
9. EPA: SRF Brownfields Loans (Clean Water)
10. EPA: Superfund Trust Fund
*11. Environmental Risk-Management (Real Estate)
*12. Federal Assistance Programs
13. Industrial Development Funds
14. Land Reclamation Banks
15. Land Recycling Companies
16. Property Parcelization
* 17. Qualified Empowerment Zone Facility Bonds
18. Real Estate Investment Trusts
* 19. State Voluntary Cleanup Programs
* 20. Tax Abatements
* 21. Tax Incentives
22. Tax Increment Financing
23. Transferable Development Rights

* Stars indicate most highly rated mechanisms as described in the Comparison Matrix at the end of the narratives. See Introduction to the *Guidebook* for a description of the criteria used. Ratings of "High", "Moderate", "Low" are for comparison purposes only, as some ratings are necessarily subjective and data are incomplete.

BROWNFIELDS CLEANUP TAX DEDUCTION

Description: The Taxpayer Relief Act of 1997 broadened the concept of the increased Section 179 deduction (see also **Section 6., Expensing of Assets**) to include qualified environmental cleanup costs both inside and out of empowerment zones and enterprise communities. A qualified business can elect to deduct costs paid or incurred after August 5, 1997, to abate or control a hazardous substance as defined by sections 101(14) and 102 of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, but not covered by Section 104(a)(3) at a qualified contaminated site in the tax year of the costs. Expensing rather than capitalizing such costs (adding them to the basis for depreciation) can be a major benefit, depending on otherwise taxable income. Targeted areas include census tracts with poverty rates of at least 20%, census tracts with populations of less than 2,000 and more than 75% of their land zoned for commercial or industrial use and a common border with one or more tracts having poverty rates of at least twenty percent, empowerment zones, supplemental empowerment zones, enterprise communities, and EPA brownfields pilot project sites. A qualified contaminated site must be held for use in a trade or business, for the production of income, or as inventory and there has to have been a release, threat of release, or disposal of a hazardous substance at or on the site. Sites on EPA's Superfund National Priorities List are excluded. A maximum dollar limit is not imposed but there is a limit on property used in connection with abatement or control of hazardous substances.

Actual Use: Use has been less than hoped since the deduction was made available in 1997.

Potential Use: The deduction can be used to reduce taxable income and federal tax liability.

Advantages: This change in federal tax law allows purchasers of qualified contaminated property to deduct their environmental remediation expenses. The value of the deduction depends on the extent to which it reduces income tax liabilities. Because cleanup costs can be deducted, brownfields property can be more likely to be redeveloped as well as more valuable in the real estate market.

Limitations: The deduction may have to be recaptured as ordinary income under Section 1245 when the property is sold. Expenditures paid or incurred after December 31, 2000, are not covered.

Reference for Further Information: Consult a tax practitioner and the State environmental agency regarding certification of a property as eligible. U.S. EPA, Office of Solid Waste and Emergency Response, Outreach and Special Projects Staff, Washington, DC 20460, Telephone: 202-260-3525, **http://www.epa.gov/swerosps/bf/**. Internal Revenue Service, 1111 Constitution Avenue, NW, Washington, DC 20224, Telephone: 800-829-1040 or 703-321-8020, Fax: 703-368-9694, **www.irs.ustreas.gov/**. See Revenue Procedure 98-17 for directions on requesting written guidance on the tax treatment of environmental cleanup costs for projects spanning several years.

CLEAN LAND FUND

Description: The Clean Land Fund is a private sector, non-profit environmental organization dedicated to providing financing for brownfields revitalization. The Fund is a collaborative effort between businesses, communities, and environmentalists. It is structured as a sustainable, leveraged revolving fund and will make loans for financing the acquisition, remediation, and reuse of brownfields properties. The Fund will make these loans to non-profit and for profit brownfields owners and/or developers and will manage the environmental and financial risks associated with these types of real estate development projects.

Actual Use: The Clean Land Fund is in the developmental state and plans to be operational in the near future. A number of localities already have set up revolving loan funds to finance a variety of local infrastructure projects. The Economic Development Administration and the United States Environmental Protection Agency are supporting the creation of revolving funds in cities around the nation to finance economic development and brownfields cleanup projects respectively.

Potential Use: Credit-worthy non-profit and for-profit borrowers located in the Northeast and Mid-Atlantic will be able to access loan monies from the Clean Land Fund when it is operational. Sources of projects to be financed will include small and medium-sized companies and municipalities, and possibly some financial institutions. The brownfields revolving fund concept is potentially replicable by States, cities, communities, and/or non-profit organizations nationwide. Loans could be combined with Clean Water SRF loans and other funding sources.

Advantages: The Clean Land Fund will be financed by contributed capital leveraged by debt capital and does not require a commitment of federal resources. The Fund's credit enhancements will leverage additional monies into a diversified loan pool to reduce risks. The non-profit nature of the Fund will reduce the interest rates needed on loans to protect its financial stability.

Limitations: The Fund will only be able to provide loans at good taxable rates in line with its own capital borrowing and investments. Loan interest rates must be set at a high enough level to cover the interest costs of the debt capital of the Fund.

Reference for Further Information: William J. Penn, Environmental Financial Advisor, P O. Box 725, Block Island, RI 02807, Telephone/Fax: 401-66-2065. E-mail: 102024,2544@CompuServe.com.

COMMUNITY DEVELOPMENT FINANCIAL INSTITUTIONS

Description: Community Development Financial Institutions (CDFI's) are specialized private financial institutions that fill niches in the market that banks and other traditional financial organizations do not serve. CDFI's focus on economic development by providing capital and technical expertise to communities in these market niches. Because of the broad needs of these communities, CDFI's include such diverse entities as community development banks and intermediaries, credit unions, housing funds, loan funds, micro-loan funds, and venture capital funds.

Actual Use: CDFI's of various types have been in existence for more than 30 years. The South Shore Bank in Chicago and the Community Preservation Corporation in New York are two notable examples. The number of CDFI's have increased significantly since 1980's. CDFI's have taken innovative and lead roles in facilitating development and creating jobs in distressed communities.
The CDFI concept received new stimulus with the creation of a CDFI Fund at the U.S. Department of Treasury (see **Section 10.B., Treasury: Community Development Financial Institutions Fund**). In Fiscal Year (FY) 1997, Treasury issued 48 awards obligating over $37 million in grants. For FY 1998, Treasury issued 50 awards obligating an estimated $62 million. Award amounts ranged from $78,500 to $3,200,000 and averaged $797,902. Organizations funded have included community development banks, credit unions, loan funds, venture capital funds, micro-loan funds, community development intermediaries, housing funds and multi-purpose CDFI's. The **Rural Community Assistance Corporation** described in **Section 5.A.** was one of those organizations so named.

Potential Use: These CDFI's could take lead in promoting the cleanup and redevelopment of the many brownfields properties located in distressed communities across the nation. They could serve as intermediaries for leveraging and delivering a variety of public and private incentives, capital and financial outreach services to these areas.

Advantages: Many CDFI's have extensive community development expertise and experience in applying that expertise in economically distressed areas. These institutions have earned the trust of the residents of distressed areas and understand their special needs and concerns.

Limitations: CDFI's are often small, under-capitalized institutions and may have to rely heavily on public subsidies. They may be limited in experience with brownfields and/or in the number of development projects, brownfields or otherwise, that they can sustain at any one time.

Reference for Further Information: U.S. Department of the Treasury, Community Development Financial Institutions Fund, 1500 Pennsylvania Avenue, NW, Washington, DC 20220. Telephone: 202-622-8662.

EMPOWERMENT ZONES/ENTERPRISE COMMUNITIES

Description: Empowerment Zones and Enterprise Communities (EZ's/EC's) are designated geographic areas, usually distressed, to which special incentives and monies are targeted for development purposes. EZ's/EC's may be set up by city, State, or federal governments and may receive benefits ranging from financial to regulatory to technical assistance from these governments.

Actual Use: The federal government created a national EZ/EC Program in 1993 to revitalize distressed urban and rural communities. The program seeks to create economic opportunities; improve physical, environmental, community, and human resources; and build partnerships between governments. All levels of governments have important roles. The federal government removes regulatory barriers, simplifies rules, coordinates programs, and allocate part of their private activity bond caps. Local governments involve communities, develop plans, leverage private resources with public capital, and streamline local actions. In 1995, nine empowerment zone and ninety-eight enterprise community winners were selected. The federal assistance included over $1 billion in grants, special tax benefits, and priority funding/special consideration under other federal programs. Independent of this federal initiative, more than thirty States administer their own enterprise zone programs to spur investment in distressed areas. Many of these programs have been operating since the 1980's, and States have designated over 1,400 zone areas as of this date.

Potential Use: The federal government proposes to designate 15 new urban EZs in 1999. These new EZs would receive tax incentives and proposed funding is $10 million per year for each EZ for a period of ten years. Significant brownfields problems have been identified in many EZ's/EC's. There exists in the context of federal and State programs to revitalize all of these communities opportunities to channel benefits to brownfields assessment, cleanup and redevelopment activities.

Advantages: The EZ/EC idea targets and concentrates on federal, State, and local resources and benefits on communities with great needs, including environmental ones. This increases chances for impact and success in these efforts.

Limitations: The EZ/EC concept by it's very nature cannot reach the great majority of communities/citizens because it targets resources and benefits to a limited number of areas.

Reference for Further Information: U.S. EPA Environmental Financial Advisory Board (EFAB) report, *Financing Brownfields Redevelopment: Linkages to the Empowerment Zone/Enterprise Community Program*, Contact: Timothy McProuty at **mcprouty.timothy@epa.gov**. U.S. Department of Housing and Urban Development (HUD), Office of Community Planning and Development, 451 7th Street, SW, Washington, DC 20203, Telephone: 202-401-1020. U.S. Department of Agriculture (USDA), Office of Community Development, 300 7th Street, SW, Washington, DC 20024, Telephone: 202- 619-7981.

ENVIRONMENTAL INSURANCE

Description: Environmental insurance can be a cost-effective way to limit the risk of having to pay for unforseen environmental cleanup. Such insurance is an environmental management tool for managing a party's environmental liability by transferring some of the associated financial risk to another party (under the very limited provisions of the policy). Essentially, it is an agreement that in return for premium payment(s) and/or payment of a set negotiated deductible amount, the insured party is provided some protection against unanticipated costs, third party claims, the acts or omissions of other parties, and impairment of property values. Environmental insurance policies may facilitate (make possible) some real property transactions and help resolve environmental liability disputes.

Actual Use: Through years of hard-earned experience, the insurance industry has gradually developed environmental insurance as a discrete subset of property and casualty insurance. There can be many different names for environmental insurance policies, but the most three common types that apply to brownfields and other contaminated properties include property transfer insurance, cleanup cost cap or stop loss insurance, and owner-controlled insurance. These policies are offered by a growing number of firms with typical coverage ranging from $2 to $10 million. Minimum coverage for most policies starts at $100,000 and maximum coverage for policies can reach $40 million. In 1996, environmental insurance premiums averaged $5,000 per $ 1 million of coverage.

Potential Use: Environmental insurance is increasingly available and desirable for any and all real estate/business projects involving the assessment, cleanup and redevelopment of brownfields and other contaminated properties.

Advantages: Environmental insurance can transfer certain carefully-defined, environmental risks. In brownfields projects, it may substitute for, or shore up, indemnities and hold-harmless agreements lessening the purchaser's need to worry about the seller's financial condition. It may also eliminate the need to report brownfields as environmental liabilities. Some environmental insurance policies
require the insurer to pay covered costs up-front and not on a reimbursement basis after cleanup.

Limitations: Environmental insurance policies may require a substantial up-front premium payment, have substantial deductibles, and set strict caps on monetary payouts. These policies may be prohibitively expensive for some brownfields owners and developers.

Reference for Further Information: U.S. EPA publication 500-R-96-001, *Potential Insurance Products for Brownfields Cleanup and Redevelopment*, U.S. EPA, Office of Emergency and Remedial Response, 40 M Street, SW, Washington, DC 20460, Mail Code (5101), Telephone: 202- 260-4610, Fax: 202-260-3527. There are many environmental insurance sites and home pages on the World Wide Web. They can be accessed using the commonly offered web browsers.

ENVIRONMENTAL LIABILITY RELEASES/AGREEMENTS

Description: An environmental liability release agreement is a benefit (concession) granted by federal, State, and/or local governments to owners or operators of facilities of businesses (including commercial real estate properties) that frees them from all or part of responsibility for environmental cleanup costs under federal, State, and/or local laws. These liability agreements may be structured in advance for prospective purchasers of properties or negotiated between the public sector and private owners/developers with specified conditions delineating the extent of liability relief granted and the degree of private contribution to any planned and/or unanticipated cleanup effort.

Actual Use: More than thirty State governments offer some type release of environmental liability within the context of voluntary cleanup or other programs to remediate contaminated properties. While these liability agreements generally focus on the less contaminated properties known as brownfields, they have also been used at sites that are on the federal Superfund National Priority List. The most common types of environmental liability agreements offered by State governments include covenants-not-to-sue, no-further-action letters, and certificates-of-release.

Potential Use: All fifty States could incorporate environmental liability agreements within voluntary cleanup programs or other State efforts to support brownfields redevelopment as well as hazardous waste cleanup efforts. During Superfund preauthorization, protections in environmental liability agreements may be reexamined, clarified, and/or expanded with regard to municipalities, prospective purchasers, innocent landowners, small businesses, and other private parties.

Advantages: Environmental liability agreements may provide considerable comfort to potential owners, developers, lenders, and investors with regards to contaminated or potentially contaminated properties. To the extent that these releases can help control and quantify the risks associated with investment in brownfields and other contaminated properties, they will help spur the cleanup and redevelopment of those sites.

Limitations: The liability agreements envisioned are rarely total, and coordination between all levels of government is often not uniform or necessarily easy. Every liability release granted to a public or private party currently or potentially responsible for environmental contamination cleanup costs represents resources that must be found elsewhere.

Reference for Further Information: State Voluntary Cleanup Programs. U.S. EPA, Office of Solid Waste and Emergency Response, 401 M Street, SW, Washington, DC 20460, Mail Code: 5101, Telephone: 202-260-4610, Fax: 202-260-3527. U.S. EPA Environmental Financial Advisory Board (EFAB) report: *Financing Brownfields Redevelopment*, U.S. EPA 401 M Street, SW, Washington, D.C. 20460, Fax: 202-565-2587.

ENVIRONMENTAL PROTECTION AGENCY BROWNFIELDS ASSESSMENT DEMONSTRATION PILOTS

Description: Brownfields Assessment Demonstration Pilots are an important part of the Environmental Protection Agency's (EPA) Brownfields Economic Redevelopment Initiative. These pilots are designed to empower State, communities, and other stakeholders in economic redevelopment to work cooperatively in a timely manner to assess, cleanup, and sustainable reuse brownfields properties. The pilots seek to test redevelopment models, remove regulatory barriers without sacrificing protection, and facilitate coordinated public and private efforts at the federal, State, and local levels.

Actual Use: Through March 1999, EPA had awarded 227 Brownfields Demonstration Assessment Pilots (170 National Pilots and 57 Regional Pilots) distributing more than $42 million to a wide range of States, cities, towns, counties and Tribes. These pilots are funded through cooperative agreements that offer assistance of up to $200,000 over a two-year period. In addition, EPA awarded 24 of the Assessment Pilots further assistance in the form of Brownfields Cleanup Revolving Loan Fund grants of up to $350,000. All told, these grants have leveraged over $1 billion for redevelopment and created over 2,500 jobs.

Potential Use: EPA expects to select up to 100 additional National Assessment Pilots in Fiscal Year 1999. The Agency estimates that it will obligate up to $66 million in cooperative agreements during Fiscal Year 1999 for all types of brownfields projects – including Assessment Pilots, Cleanup Revolving Loan Fund Pilots, and Job Training and Development Demonstration Pilots..

Advantages: For the States, local governments, and tribes awarded EPA Brownfields Pilots, the assistance provided through these two Programs can help them overcome the barriers that brownfields assessment and cleanup cost may represent. Funding recipients may be able to use this federal assistance to leverage additional money, both public and private, from other sources.

Limitations: This type of federal funding assistance for brownfields projects is limited to fewer than 100 governmental jurisdictions. The funding available is only large enough to help fund the assessment and cleanup of a small percentage of the total number of brownfields sites nationwide.

Reference for Further Information: U.S. EPA, Office of Solid Waste and Emergency Response, Outreach and Special Projects Staff, 401 M Street, SW, Washington, DC 20460, Telephone: 202-260-1223. U.S. EPA, Brownfields Applications, Superfund Document Center (5201G), 401 M. Street, SW, Washington, DC 20460. The Brownfields web site located on the U.S. EPA Home Page at **http://www.epa.gov/swerosps/bf/pilots.htm** has information on applying for the pilot programs, as well as other mechanisms for funding brownfields cleanup and redevelopment.

ENVIRONMENTAL PROTECTION AGENCY BROWNFIELDS WORKFORCE DEVELOPMENT

Description: The Environmental Protection Agency (EPA) seeks to build partnerships with States, cities, local job training organizations, community colleges, and other federal agencies to foster job training and workforce development in brownfields communities. These efforts help ensure that communities have the trained workforce needed to revitalize contaminated properties and that community members have a chance to compete in the economic mainstream. The Agency seeks to facilitate cleanup and prepare trainees for employment in environment fields (e.g., sampling, analysis and site remediation.

Actual Use: EPA funded eleven Brownfields Environmental Job Training and Development Demonstration Pilot Projects in 1998, at an average of $200,000 each for two years. EPA and the Department of Labor's (DOL's) Employment and Training Administration (ETA) are supporting pilot projects in which ETA provides information and technical assistance to state Job Training Partnership Act (JTPA) liaisons and community-based JTPA programs. EPA is also working with the Department of Health and Human Services' (HHS') National Institute of Environmental Health Sciences (NIEHS) and Office of Community Service (OCS) to ensure that Minority Youth Worker Training Program grants are tied closely to ongoing activities in brownfields pilot cities. EPA and the Department of Education's Office of Vocational and Adult Education are identifying outreach mechanisms for local public schools regarding brownfields efforts. EPA and the Department of Veterans Affairs are working to establish policies and procedures aimed at providing trained veterans to work in brownfields projects.

Potential Use: While job training and workforce development in and around brownfields communities can make essential contributions to cleanup and redevelopment, it also can equip those trained with knowledge and skills required for further employment dealing with hazardous chemicals and environmental contamination problems.

Advantages: EPA's Brownfields Economic Redevelopment Initiative is designed to prove that economic development and the environment can co-exist.

Limitations: Interagency and intergovernmental coordination tends to be time-consuming and can be difficult. Eligibility for this effort is limited to 121 brownfields pilot cities and EPA's staff resources limit its applicability beyond these locations.

Reference for Further Information: U.S. EPA, Office of Solid Waste and Emergency Response, Outreach and Special Projects Staff, Mail Code:5101, Washington, DC 20460, Telephone: 202-260-6285, Fax: 202-260-6606, Internet: **http://www.epa.gov/swerosps/bf/**.

ENVIRONMENTAL PROTECTION AGENCY
SRF BROWNFIELDS LOANS
(Clean Water)

Description: There are fifty-one Clean Water State Revolving Fund (CWSRF) programs (one in each State and Puerto Rico). These programs are capitalized through federal and State contributions, and operate as banks making low or no interest loans to communities and other eligible public recipients for water quality projects. The loans are repaid over terms as long as twenty years and repayments are recycled to fund other water quality projects. See also the related writeup in **Section 2.B., Environmental Protection Agency State Revolving Fund - Clean Water**.

CWSRF resources may in certain circumstances be available to augment the resources available under the Environmental Protection Agency's (EPA's) Brownfields Initiative to assess, cleanup, and redevelop brownfields. Brownfields are abandoned or are under-utilized former industrial and commercial sites that are or may be environmentally contaminated. There are more than 450,000 of these brownfields sites nationwide.

Actual Use: The CWSRFs in some States may already be making loans to communities for eligible brownfields-related water quality projects. However, the authors are currently (April 1999) not aware of any firm loan information in that regard.

Potential Use: Examples of brownfields mitigation activities that correct or prevent water quality problems, and may be eligible for CWSRF funding include the abatement of polluted runoff, control of stormwater runoff, correction of groundwater contamination, and remediation of petroleum contamination.

Advantages: The CWSRFs have more than $27 billion in assets and fund nearly $3 billion in projects a year. They are established entities with proven environmental and financial track record.

Disadvantages: The total costs of the water quality needs of applicants far exceed the loan resources of the CWSRFs. Any eligible brownfields project must compete with all other water quality projects for a place on the particular State's CWSRF priority funding list.

Reference for Further Information: The Clean Water State Revolving Loan Funds programs in each State and Puerto Rico. U.S. EPA, Office of Water, The Clean Water State Revolving Fund Branch, 401 M Street, SW, Washington 20460, Mail Code: 4202, Telephone: 202-260-7359, Fax: 202-260-1827, Internet: **http//www.epa.gov/owm**. U.S. EPA, Office of Solid Waste and Emergency Response, Outreach and Special Projects Staff, 401 M Street, SW, Washington, DC 20460, Mail Code: 5101, Telephone: 202-260-4039, Fax: 202-260-6606, Internet: **www.epa.gov.brownfields**.

ENVIRONMENTAL PROTECTION AGENCY
SUPERFUND TRUST FUND

Description: The Superfund Trust Fund, also known as the Hazardous Substance Response Trust Fund, was established in 1990 to pay for cleanup and enforcement activities at waste sites. This dedicated trust fund has historically been financed primarily by petroleum excise taxes, chemical feedstock excise taxes, and environmental income taxes. The fund has also received monies through cost recoveries from parties determined responsible for contaminating particular sites, penalties, income taxes, and interest income.

Actual Use: The Superfund Program has cleanup activities, short-term removal actions and/or long-term remedial actions, underway or planned for the approximately 1300 seriously contaminated sites on the Environmental Protection Agency 's (EPA's) National Priority List. Actions at Orphan Sites, where no responsible party can be identified, are funded by the Trust Fund. The Trust Fund also funds actions begun at sites with responsible parties but prior to a final determination and acceptance of liability. More than 400 of these seriously contaminated sites have been brought to the "construction complete phase" -- an advanced milestone in the cleanup process.

Superfund Trust Fund monies are also being used to fund brownfields national demonstration pilots as part of USEPA's Brownfields Economic Redevelopment Initiative (see **Section 9., Brownfields Assessment Demonstration Pilots**).

Potential Use: Use of the Trust Fund to fund brownfields projects similar to the pilot projects in the Brownfields Economic Redevelopment Initiative could be further expanded to include sites in communities across the nation.

Advantages: The Trust Fund is potentially a large source of monies for the cleanup of hazardous waste sites, including brownfields. The Trust Fund's use in this effort could be further leveraged through traditional credit enhancement mechanisms such as leveraged revolving loan funds.

Limitations: There are statutory restrictions on the use of monies in the Superfund Trust Fund monies. In addition, any resources committed to brownfields sites represent resources unavailable for use at the more seriously contaminated sites found on the National Priority List.

Reference for Further Information: U.S. EPA, Office of Solid Waste and Emergency Response, 401 M Street, SW, Washington, DC 20460, Mail Code: 5101, Telephone: 202-260-4610, Fax: 202-260-3527. U.S. EPA Environmental Financial Advisory Board (EFAB) report, *Leveraging the Superfund: Ideas and Opportunities*, USEPA, 401 M Street SW, Washington, DC 20460, Mail Code: 2731R, Contact: Tim McProuty at **mcprouty.timothy@epa.gov**.

ENVIRONMENTAL RISK-MANAGEMENT (REAL ESTATE)

Description: The real estate industry faces serious environmental uncertainties, representing potential financial risks, that can negatively affect the willingness and ability of property owners, purchasers, developers, investors, and lenders to participate in brownfields redevelopment. The environmental risks at these properties fall into three categories: cleanup, property value impairment, and personal injury. Parties involved in brownfields real estate transactions can reduce or eliminate these risks using a number of environmental risk-management techniques. The techniques either absorb risks, transfer risks among involved parties, or transfer risks to a third party. They include:

- *Indemnification* - The seller agrees to cover costs to the purchaser resulting from specific risks.
- *Price Adjustment* - The seller reduces the property price to reflect potential contamination risks.
- *Self-Insuring* - The purchaser sets aside monies to cover the costs of potential environmental risks.
- *Third-Party Insurance* - The seller/purchaser buys insurance to cover potential environmental risks.

Actual Use: These techniques are used by private parties to make real estate transactions work. Indemnification has been used for a long time, but may be giving way to other techniques. Price adjustments may be the most common private technique used in brownfields transactions. Self-insuring is used most often by large and/or economically strong firms, or by firms confident of their environmental assessment. In addition, the use of environmental insurance is increasing (see **Section 9., Environmental Insurance**).

Potential Use: Environmental insurance is increasingly available and affordable. Its use may be expected to continue to grow. All of these tools will continue to be used to some extent, especially in transactions that do not entail significant contamination or in support of public sector assistance.

Advantages: Given favorable circumstances, all of these risk-management techniques can fully transfer risks and make otherwise unworkable brownfields redevelopment transactions occur.

Limitations: Many sellers and buyers may be too small to be indemnitors. An indemnity is worth only as much as the indemnitor. Regulatory agencies will pursue a party regardless of indemnification. Price reductions and risk assumptions may be too large for some parties or exceed the value of transactions. Transferring risks between parties may lead to contract disputes, or parties may be unwilling or unable to meet their obligations. Insurance may not be affordable.

Reference for Further Information: Hollingshead, Susan, M., *Environmental Insurance for Real Estate Valuation*, "Brownfields 96" Conference Presentation, September 1996, Pittsburgh, PA. U.S. EPA report, *Potential Insurance Products for Brownfields Cleanup and Redevelopment*, U.S. EPA, Office of Emergency and Remedial Response, 1235 Jefferson Davis Highway, Arlington, VA 22203, Telephone: 703-603-8960, Fax: 703-603-9146.

FEDERAL ASSISTANCE PROGRAMS

Description: The federal government through its departments, agencies, and other establishments offers a broad range of programs, projects, services, and activities that provide assistance to eligible parties for eligible purposes. This assistance may take the form of direct payments, grants, loans, credit enhancements, technical support, etc. Brownfields assessment, cleanup, and redevelopment activities are, or may be, eligible activities under a substantial number of these federal efforts.

Actual Use: During the past two years, the Environmental Protection Agency (EPA) has awarded $13.2 million in grants to 76 States, cities, towns, counties, and Tribes nationwide to fund Brownfields Assessment Demonstration Pilots. EPA plans to award another 25 Assessment Pilots in 1997 and up to 300 Brownfields Pilots over the next four years (see page 9-4, Brownfields Assessment Demonstration Pilots). The Department of Housing and Urban Development (HUD) approved in 1996 a $50 million project to cleanup and redevelop a number of brownfields sites in Chicago. This is the first brownfields project financed by a loan guarantee using entitlements under HUD's Community Development Block Grant (CDBG) Program as collateral.

Potential Use: Federal programs that may have the potential to contribute additional and/or new funding to brownfields activities include:

- Appalachian Regional Commission Supplemental Grants Program - see **Section 2.C.**;
- CDBG Programs - see pages in **Section 2.C.**;
- Economic Development Administration Grant Programs - see pages in **Section 2.C.**;
- Empowerment Zone/Enterprise Community Program - see **Section 9.**;
- Rural Business-Cooperative Service Grant and Loan Programs - see **Sections 2.B.** and **2.C.**;
- Rural Utilities Service Grant Programs - see pages in **Section 2.C.**; and
- Rural Housing Service Loan Programs - see **Section 2.B.**.

Advantages: Federal grants provide State and local governments with the means of meeting many national goals. They may provide funds otherwise unavailable to State or local programs, thus enhancing equity, environmental incentives, and financial leveraging considerations.

Limitations: Funds must be targeted to specific statutory goals. Brownfields activities must compete for limited funds and follow federal rules, terms and conditions. Grants may be very specific, limiting State and local flexibility.

Reference for Further Information: *Catalog of Federal Domestic Assistance*. Its World Wide Web site is at **http://aspe.os.dhhs.gov/cfda/index.htm**. Requests for magnetic tapes, diskettes, or CD-ROM should go to the Federal Domestic Assistance Catalogue Staff (MVS), General Services Administration, 300 7th St., SW, Washington, DC 20407, Telephone: 202-708-5126.

INDUSTRIAL DEVELOPMENT FUNDS

Description: Industrial Development Funds are special funds established by State and local governments for the purpose of improving real estate properties in order to make them suitable for industrial development. These funds are economic development tools that governments use to attract or retain industry. Industrial Development Funds may be structured as direct pass-through funds or as special purpose revolving funds. They draw funding through a variety of mechanisms including special property and other taxes, industrial development bonds, unappropriated surpluses in the controlling government's budget, and the proceeds from the sale of real estate and other property.

Actual Use: Many States, cities, towns, and counties have laws establishing Industrial Development Funds or related economic development funds. These funds may be operated by established government economic development agencies or they may fall under the jurisdiction of special-purpose authorities or corporations. One example of this latter form are quasi-governmental, non-profits corporations that answer to the controlling government through an appointed board.

Potential Use: Industrial Development Funds and related economic development funds are ideally suited to working with brownfields properties. They may already have experience in assessing, cleaning up, and redeveloping brownfields properties, or they may just need to expand their existing expertise acquired in improving less-contaminated properties. These funds could either handle brownfields properties as part of their overall real estate portfolio, or they could be reconstituted as brownfields development funds handling only brownfields properties.

Advantage: These funds are well-established and familiar economic development tools. Their purpose and expertise are closely tied to many of the same types of activities and goals that are necessary in successful brownfields redevelopment.

Limitation: The addition of brownfields properties may degrade an Industrial Development Fund's real estate portfolio. Such funds may not be economically viable if they handle only brownfields properties. Legislation may be needed to establish an Industrial Development Fund and/or the sources of financial capital required to operate it.

Reference for Further Information: Baker & Daniels document, *Local Government Funding Sources*, Seventh Edition, July 1995, Baker & Daniels, 300 North Meridian Street, Suite 2700, Indianapolis, IN 46204, Telephone: 317-237-0300. This book describes various funding sources for local governments, focusing quite naturally on Indiana.

LAND RECLAMATION BANKS

Description: Land reclamation banks are publicly funded or capitalized trust funds that actively acquire, manage, assess, cleanup, and develop properties, including brownfields, on behalf of a State or local government. These banks may be financed in wide variety of ways, including tax-increment financing, land transfer taxes, land registration fees, and property sales and leases. Land reclamation banks may take title to properties via tax foreclosure, eminent domain, or purchase. Once properties are cleaned up and developed, the bank sells or leases them to generate income for future development projects.

Actual Use: The Minneapolis Light Industry Land Acquisition Program is an example of a land reclamation bank. The program on behalf of the City of Minneapolis spends about $5 million per year to acquire, assess, cleanup, and redevelop potentially contaminated industrial sites. Funds for the program are generated by tax-increment financing plan and used for both site purchase and cleanup. The City assumes all liability for cleanup and resells the land to private purchasers following completion of redevelopment.

Potential Use: Land reclamation banks could be used in cities and communities across the country able and willing to fund or capitalize their start up costs. They could prove especially valuable in cleaning up and redeveloping properties when used in combination with other financing concepts such as EZ/EC programs. They could be specifically structured as brownfields reclamation banks to focus and direct local efforts toward brownfields cleanup and redevelopment.

Advantages: Land reclamation banks combine planning, financing, management, cleanup, and redevelopment functions in a single organization allowing local efforts to be focused. Land reclamation banks may elect to assume environmental and financial liability risks that the private sector is unwilling to bear.

Limitations: Legislation may be necessary to establish a land reclamation bank. Considerable funding/capitalization may be necessary for a bank's startup and operational costs. There may be institutional pressure against consolidating many functions and authorities in a single agency or entity. If not run efficiently and successfully, they may be a resource drain on the public treasury.

Reference for Further Information: U.S. EPA Environmental Financial Advisory Board (EFAB) report, *Strategies for Financing Brownfields Redevelopment,* March 1996, U.S. EPA, 401 M Street, SW, Washington, DC 20460, Mail Code: 2731R, Fax: 202-260-0710, Contact: Tim McProuty at **mcprouty.timothy@epa.gov**.

LAND RECYCLING COMPANIES

Description: Land Recycling Companies are 501(c)(3) non-profit organizations that seek to provide an innovative and energetic response to the problems of potentially contaminated brownfields properties that affect communities across the country. These organizations identify brownfields properties, serve as information clearinghouses, seek to bring together members of the communities, government agencies, financial institutions, and the other private parties necessary to make brownfields redevelopment work. Land Recycling Companies may also help finance brownfields assessment and cleanup activities.

Actual Use: Land Recycling Companies have been formed and begun work in a number of States. For example, the Pennsylvania-based Phoenix Land recycling Company focuses on reducing brownfields uncertainties by using its own resources to conduct assessments and develop cleanup plans. Phoenix was founded by Clean Sites, Inc., a respected, national environmental organization, with funding support from the Vira I. Heinz and Howard Heinz Endowments, as well as other philanthropic organizations. The California Center for Land Recycling provides a somewhat different model for this tool. The California Center focuses on identifying brownfields development opportunities and works to assemble the public and private partners needed to carry out successful projects. It will also serve as an educational partner by documenting and publicizing the lessons learned during these projects. The California Center for Land Recycling is run by the Trust for Public Land and was begun with a $2 million grant from the James Irving Foundation.

Advantages: These types of companies can bring innovative and flexible approaches to brownfields assessment, cleanup, and redevelopment. They offer the opportunity to leverage not only their own environmental expertise and financial resources, but also the public and private resources that they may attract to specific brownfields projects.

Limitations: Land Recycling Companies may be limited by their size to involvement in a small number of pilot-type brownfields projects. State legislation and time may be needed to permit Land recycling Companies to effectively participate in brownfields redevelopment.

Reference for Further Information: The Trust For Public Land, 116 New Montgomery Street, Fourth Floor, San Francisco, CA 84105, Telephone: 415-495-4014, Fax: 415-495-4103, World Wide Web home page -- **http://www.tpl.org/tpl/**.

PROPERTY PARCELIZATION

Description: The "parcelization" of real property that includes a hazardous waste site is a potential solution to an often significant financial problem for the property owner. The remediation of environmentally distressed real properties can be financially facilitated by delisting and selling clean portions of the properties to obtain the financing necessary to remediate the remaining environmentally impacted portions of the properties. Cooperation from the appropriate regulatory agencies is essential and some portions of the clean properties probably will have to be devoted to buffer zones, thereby reducing the market value of the properties (see **Section 9., Brownfields Cleanup Tax Deduction**).

Actual Use: Parcelization is a relatively little utilized financing technique for a variety of reasons, including the practical requirement that the real property in question must be of an appropriate size and configuration that permits its division into two or more economically and legally viable parcels. However, interest in the possibilities of using parcelization with regards to brownfields clean-up and redevelopment has been increasing.

Potential Use: This real estate/financing technique could be applied to any environmentally distressed property situation in which the original parcel is large enough to be divided so that there is a marketable, clean portion which can be sold or leased to help pay for cleaning up the remaining contaminated portion, and an acceptable buffer zone.

Advantages: When parcelization works, the approach solves a major financial problem which otherwise could keep property tied up for a protracted clean-up period and impose a substantial cash flow burden, even in situations where only part of the property is contaminated.

Limitations: The parcelization approach can work only for properties that contain significant portions which are environmentally clean. Local zoning and subdivision ordinances may prevent the division of parcels and/or current property values may be too low to make parcelization a worthwhile alternative.

Reference for Further Information: See "Financing Remediation by Delisting and Selling Clean Portions of Affected Property", Nestor & Adamowski, *Remediation*, Summer 1995, John Wiley & Sons, 605 3rd Ave., New York, NY 10158-0012, Telephone: 800-825-7750.

QUALIFIED EMPOWERMENT ZONE FACILITY BONDS

Description: Private activity bonds are bonds issued by State or local governments for public purposes. To qualify for tax-exempt status, at least 90 percent of bond proceeds must be used by the State or local government, and no more than 10 percent of the debt service on the bond may be derived from, or secured by, a trade or business. Each State may only issue private activity bonds in amounts whose cumulative value in any year does not exceed $50 per capita or $150 million (the volume cap), whichever is greater.

In creating the federal Empowerment Zone/Enterprise Community (EZ/EC) Program, the 1993 Budget Reconciliation Act also created a new category of tax-exempt private activity bonds for use in the designated EZs and ECs, "Qualified EZ Facility Bonds." At least 95 percent of the net proceeds of a Qualified EZ Facility Bond must go to finance property or land in the EZ or EC used by a qualified business in the EZs. The value of such bonds per qualified business may not exceed $3 million for each EZ/ or EC. Also, total bond financing for each principal user may not exceed $20 million for all EZs and ECs. Qualified EZ Facility Bonds are subject to State volume caps.

Actual Use: Information on the use of these Qualified EZ Facility Bonds in the eight previously existing urban empowerment zones is not clear. We are checking with the EZs/ECs themselves to update this information and plan to include it in the write-up of this tool on the Internet version of the *Guidebook* as soon as possible.

Potential Use: The federal government could (and plans to do so) name additional communities as EZs and/or ECs and extend eligibility for these bonds to qualified businesses in those locations. The bonds could be used to assist in the purchase, rehabilitation, and redevelopment of brownfields properties and the structures and facilities located on them. Federal law could be changed so that EZ facility bonds do not count against State volume caps, or count against the caps at a reduced rate.

Advantages: Used in combination with other incentives available in EZs and ECs, these facility bonds provide a potentially powerful economic inducement to invest in these areas.

Limitations: EZ facility bonds by definition can only be used in federally designated EZs and ECs, and only by qualified businesses in those locations.

Reference for Further Information: Omnibus Budget and Reconciliation Act of 1993, Public Law 103-66. U.S. Department of Housing and Urban Development (HUD), Office of Community Planning and Development, 451 7th Street, SW, Washington, DC 20203, Telephone: 202-401-1020. U.S. EPA, Environmental Financial Advisory Board (EFAB) report: *Financing Brownfields Redevelopment: Linkages to the Empowerment Zone/Enterprise Community Program*, U.S. EPA, 401 M Street, SW, Washington, DC 20460. Mail Code: 2731R.

REAL ESTATE INVESTMENT TRUSTS

Description: A real estate investment trust (REIT) is a privately or publicly-traded investment corporation (whose shareholders may include either or both retail and institutional investors) that specializes in buying, improving, managing and selling real estate properties. A REIT is essentially a mutual fund that specializes in pooled investments in real estate. Most REITs have a particular real estate investment focus such as residential housing, industrial properties, general commercial properties, shopping centers, etc.

Actual Use: Hundreds of REITs exist across the country providing investment vehicles for billions of dollars in real estate properties located in thousands of communities. They are a major force in the development of apartment housing and shopping centers. REITs as an industry have been in existence for more than thirty years and they are the vehicle for billions of dollars in real estate investments each year ($6.5 billion in 1992).

Potential Use: REITs focusing on industrial and commercial real estate could begin to include select brownfields properties in their portfolios. New REITs could be established that focus on buying, assessing, cleaning up, redeveloping, and/or selling brownfields properties. They could also be structured to focus investments on real estate properties located in empowerment zones and enterprise communities.

Advantages: REITs are fully integrated companies with professional management and staff that put real estate planing, acquisition, development, management, and sales under one roof. With their investment focus, REITs can assemble a diverse portfolio of real estate properties to spread and reduce financial risks. REIT dividend earnings can be tax-exempt for tax-exempt investors such as pension funds.

Limitations: REITs can be complex to develop and establish and they require skilled management and staff to operate. They traditionally promise fairly high rates of financial returns to participating investors which may be difficult to manage with brownfields properties in their portfolio.

Reference for Further Information: U.S. EPA Region 5 Great Lakes Environmental Finance Center (GLEFC), The Urban Center at Cleveland State University, Economic Development Program, UB- 215, Cleveland, Ohio 44115, Telephone: 216-687-6947, Fax: 216-687-9227, World Wide Web site: **http://www.csuohio.edu/glefc/** Other good sources include National Real Estate Investor and Urban Land magazines, which frequently have articles on REITs.

STATE VOLUNTARY CLEANUP PROGRAMS

Description: State Voluntary Cleanup Programs are structured to address the environmental and financing problems associated with brownfields and other contaminated properties. These programs seek to encourage the cleanup of such sites in a timely manner by eliminating many of the procedural and economic barriers to cleanup and reuse. They provide a variety of incentives for private companies and developers to voluntarily clean up sites. These programs set clear environmental standards and provide protection from future environmental liability. They include oversight, review, and approval mechanisms to ensure that cleanup standards are met. While every program is unique, many contain most or all of the following elements: consolidated permits, land use-based cleanup standards, flexible and clear cleanup procedures, liability release mechanisms, professional certifications, proportional liability provisions, tax incentives, and voluntary agreements.

Actual Use: Since Minnesota set up the first State Voluntary Cleanup Program in April 1988, more than thirty States nationwide have established similar programs. Moreover, the pace at which these programs are being established is accelerating. In the last two years alone, twelve States have set up Voluntary Cleanup Programs. The Environmental Protection Agency (EPA) has developed interim policies for defining its relations with these programs and offers official recognition via memoranda of agreement (MOAs). To date, EPA has signed MOAs with ten States and is negotiating MOAs with eight others.

Potential Use: All fifty States, Puerto Rico, Territories, and Indian Tribes could develop Voluntary Cleanup Programs offering some or all of the features described above to help cleanup and redevelop brownfields and other contaminated properties. In addition, these entities could define their programs' relationships with USEPA through MOAs.

Advantages: These programs offer participants the possibility of considerable savings in terms of time and money. They offer at least partial (sometimes considerable) protection from environmental liability. They make contaminated site cleanup easier and more understandable by standardizing cleanup procedures and streamlining State programs. Lenders may feel more comfortable (may lend money to finance cleanup) with properties processed through a State Voluntary Cleanup Program.

Limitations: EPA does not have to recognize State Voluntary Cleanup Programs and/or honor any liability protection they provide. Some cleanups cost more under these programs than if property owners do it themselves. Once a property owner enters a program, they may not be able to opt out.

Reference for Further Information: U.S. EPA, Office of Solid Waste and Emergency Response, 401 M Street, SW, Washington, DC 20460, Telephone: 202-260-4610, Fax: 202-260-3527. U.S. EPA, Office Enforcement and Compliance Assurance, Ariel Rios Building, 1200 Pennsylvania Avenue, NW, Washington, DC 20044, Telephone: 202-564-2440.

TAX ABATEMENTS

Description: A tax abatement is a temporary moratorium on charging the usual tax rate on a new investment. It may take the form of a full or partial exemption from taxes such as tangible personal property and/or real estate. The exemption will only be in effect for a specific period of time such as five or ten years. The tax abatement granted may be restricted to new development in special designated areas such as empowerment zone/enterprise community, or it may be targeted on a case-by-case basis to particularly desirable individual development. Tax abatements are individually tailored regarding time and scope to allow the State or local government to calculate the exact cost of the tax change, and thus, the exact tax benefit offered as well.

Actual Use: States and communities across the country use various forms of tax abatements to encourage and support economic development. For example, Ohio, New York, and Minneapolis, Minnesota, are currently using tax abatements to attract economic development to specific locations, including brownfields properties.

Potential Use: Many additional communities nationwide could direct the use of this type of tax incentive toward brownfields redevelopment and realize substantial environmental and economic benefits. If more States and communities nationwide used this financial tool in this way, it could become a major force in spurring increased brownfields cleanup and redevelopment.

Advantages: Tax abatements can make otherwise uneconomical projects attractive to property owners, developers, and financial supporters. These abatements can often provide a substantial incentive for all parties to participate in particular projects. If the new development is properly structured and successful, the community tax base will grow at a rate, and to a size, that more than offsets the loss of taxes due to the abatement.

Limitations: Tax abatements detract from the resource base of States and communities. If given when investment would have occurred anyway, they represent the waste of an incentive and an unnecessary loss of resources. The granting of tax abatements only to select projects may raise concerns about equity.

Reference for Further Information: U.S. EPA Environmental Financial Advisory Board (EFAB) report, *Financing Strategies for Brownfields Redevelopment*, March 1996, U.S. EPA, 401 M Street, SW, Washington, DC 20460, Mail Code: 2731, Contact: Timothy McProuty at **mcprouty.timothy @epa.gov**. See also, Berger, Robert S., Campbell, Patricia, C., Crolle III, James, A, Marsh, Wendy A., et. al., *Recycling Industrial Sites in Erie County: Meeting the Challenge of Brownfield Redevelopment*, Buffalo Environmental Law Journal, Volume 3, 1995.

TAX INCENTIVES

Description: There are three basic types of tax incentives offered by federal, State, and local governments -- exemptions, credits, and deductions. Exemptions provide a release from taxation. Credits provide dollar-for-dollar reductions in taxes owed. Deductions allow certain costs or expenses to be subtracted from income over one (exspensing) or more years (depreciation). Governments offer incentives to encourage behavior deemed desirable for economic, social, or other reasons. Incentives help to level the economic playing field between brownfields and greenfields.

Actual Use: A number of States use tax incentives to promote brownfields redevelopment. The Massachusetts Economic Development Incentive Program offers tax benefits to businesses in blighted areas. Benefits provided to eligible projects (including brownfields requiring cleanup) include a 5% State Investment Tax Credit, a 10% Abandoned Building Tax, priority for State capital funding and special municipal tax assessment. Ohio's Brownfield Site Clean-up Tax Credit Program provides franchise or income tax credits for the voluntary cleanup of contaminated sites. The basic tax credit is 10% of eligible costs or $500,000, whichever is less. In designated areas, the credit is 15% of eligible costs or $750,000, whichever is less. The credits are only available to companies who have participated in the State Voluntary Action Program and received a "Covenant Not to Sue."

Potential Use: There are a number of other tax incentives being considered by the States and the federal government to promote brownfields redevelopment (see **Section 9., Brownfields Cleanup Tax Deduction** which permits non-responsible parties, including owners and prospective purchasers, to fully expense cleanup costs in the year incurred). This particular proposal provides a potential $2 billion in incentives over seven years and be targeted to existing and proposed empowerment zones/enterprise communities, Environmental Protection Agency (EPA) brownfields pilots, and areas with high poverty rates. Another proposed incentive is a tax credit equal to 75 % of the costs of cleanups approved by federal or State agencies. Finally, some have proposed making brownfields cleanup activities eligible for tax-exempt industrial bond financing.

Advantages: Tax incentives make it less costly for businesses to undertake brownfields redevelopment activities. They may be combined with other incentives such as liability releases, grants/loans, and insurance to leverage significant private investment. They may also motivate investment by signaling to businesses that the development is desired and will get special attention.

Limitations: Tax incentives represent a direct loss to the resource base of governments. They may be so costly that they can be offered to only a limited number of special areas or projects. If tax incentives are given when not absolutely needed, they can be a significant waste of resources.

Reference for Further Information: Northeast-Midwest Institute 218 D Street, SE, Washington, DC 20003, Telephone: 202-544-5200, Fax: 202-544-0043.

TAX INCREMENT FINANCING

Description: Tax increment financing (TIF) provides for the temporary allocation to carefully defined redevelopment districts the increased tax proceeds in an allocation area generated by increases in assessed property values. TIF utilizes the increased tax revenues stimulated by redevelopment to pay for the capital improvements required to induce the development. In a basic TIF, property assessments are frozen at a pre-development level in the specified area. Bonds are then issued to finance a portion of the redevelopment. As property values and assessments in the area increase, the TIF authority or the city use the increment in tax revenues to meet the debt service on those bonds.

Actual Use: Tax increment financing has been used by local governments nationwide for years for a wide variety of economic development projects. The technique was originally used to raise the local share or match required for urban renewal projects. It is most often used for economic development projects that provide specific, measurable benefits to a select, well defined group of taxpayers. TIF laws are on the books in more than thirty States. The City of Cleveland, Ohio, has used this type of financing in a specifically defined geographic area containing a number of contaminated properties.

Potential Use: Tax increment financing could be used across the nation as one more incentive offered by cities to encourage and support the cleanup and redevelopment of contaminated brownfields properties. TIF also might be used by State and local governments to direct development away from environmentally sensitive areas (see the closely related tool in **Section 8., Tax Increment Financing - CBEP**).

Advantages: Tax increment financing makes development self-financed. TIF is very flexible and very focused. Local control is retained and no debt limitation usually applies. Redevelopment risks are shifted from taxpayers to the bondholders.

Limitations: TIF bonds pose a greater risk to investors and, thus, bear higher interest rates than general obligation bonds. TIFs are complex and require considerable financial, development, engineering, and other expertise.

Reference for Further Information: Baker & Daniels document, *Local Government Funding Sources*, Seventh Edition, July 1995, Baker & Daniels, 300 North Meridian Street, Suite 2700, Indianapolis, IN 46204, Telephone: 317-237-0300. This booklet describes numerous local government funding sources, focusing on Indiana. See also, U.S. EPA Environmental Financial Advisory Board (EFAB) report, *Financing Strategies for Brownfields Redevelopment*, March 1996, U.S. EPA, 401 M Street, SW, Washington, DC 20460, Mail Code: 2731R, Contact: Timothy McProuty at **mcprouty.timothy@epa.gov**.

TRANSFERABLE DEVELOPMENT RIGHTS

Description: In traditional transferable development rights (TDR) programs, rural property owners are allocated a specified number of TDRs in exchange for agreeing not to develop, or to limit development on their land. These mostly rural property owners are permitted to sell these TDRs to real estate developers, who are then permitted to use them to exceed zoning requirements on properties they own in other more developed areas.

Actual Use: TDRs have been used by local governments to preserve land for agricultural uses, as forests, or as nature preserves. Fauquier County, Virginia, and Montgomery County, Maryland, have long standing TDR programs whose purpose are to preserve land but not to generate revenues. Since the landowners receive all funds related to the purchase of development rights, existing TDR programs are either revenue-neutral or are operated at-cost to local governments.

Potential Use: If local governments took a percentage of each TDR transaction, enough funds might be raised to use for land purchases and development. TDR programs might be adapted to encourage brownfields redevelopment, thus protecting greenfields from development. Under a brownfields TDR system, developers that agree to redevelop brownfields could be given additional zoning credits that let them exceed density or height requirements, or provide some other flexibility. These credits could be used at the brownfields site or on other properties owned by the developer.
TDRs could also be used within the context of a community-based environmental protection program to distribute and direct growth in a designated geographical area such as a watershed. Development could might be precluded on strips of land adjoining main waterways and tributaries.

Advantages: Properly structured TDR programs would allow local governments to better control and direct growth. They would enable landowners whose properties will not be developed to receive full value for their land, and permit development to be redirected to already-developed areas.

Limitations: As currently structured, TDR programs are not a revenue-generating mechanism. Even with this incentive, landowners and developers may not want governments dictating what they do with properties that they own and want to sell and/or develop.

Reference for Further Information: *Financing Alternatives for Maryland's Tributary Strategies: Innovative Financing Ideas to Restore the Chesapeake Bay*, Report of the Governor's Blue Ribbon Panel, December 1994; *The Growth Dilemma: The Chesapeake in the 21st Century* (Conference Proceedings), Maryland November 1989. Contains good description of TDR programs and rules of thumb for implementing successful TDR programs.

OTHER

Description:

Actual Use:

Potential Use:

Advantages:

Limitations:

Reference for Further Information:

COMPARISON MATRIX FOR FINANCING BROWNFIELDS REDEVELOPMENT

Criteria/ Brownfields Tool	Actual Use	Revenue Size	Adminis-srative Ease	Equity	Financial Lever-aging	Environ-mental Benefits
Brownfields Clean-up Tax Deduction	Low	Mod.	High	High	Mod.	High
***Clean Land Fund (Revolving Fund)**	Low	Mod.	Mod.	Mod.-High	High	High
***Community Development Financial Institutions**	Mod.	Mod.	Mod.	High	High	High
***Empowerment Zones/Enterprise Communities**	High	High	Mod.	Mod.	High	Mod.
***Environmental Insurance**	High	High	Mod.	Low	Mod.-High	Mod.-High
***Environmental Liability Releases/ Agreements**	High	High	Mod.	Mod.	Mod.-High	Mod.-High
EPA: Brownfields Assessment Demonstration Projects	Mod.	Low-Mod.	Low	Low	Mod.-High	High
EPA: Brownfields Workforce Development	Low	Low	Low	Low	High	High
EPA: SRF Brownfields Loans (Clean Water)	Low	Mod.-High	High	Mod.	High	High

COMPARISON MATRIX continued

Criteria/ Brownfields Tool	Actual Use	Revenue Size	Administrative Ease	Equity	Financial Leveraging	Environmental Benefits
EPA: Superfund Trust Fund	Mod.	Low-Mod.	Low-Mod.	Low-Mod.	High	High
***Environmental Risk Management (Real Estate)**	High	High	Mod.	Low-Mod.	High	High
***Federal Assistance Programs**	Mod.	High	Mod.	Mod.	High	High
Industrial Development Funds	Mod.	Mod.	Mod.	Low	Mod.	High
Land Reclamation Banks	Low	Low	Mod.	Mod.	Mod.	High
Land Recycling Companies	Low	Low	Mod.	High	High	High
Property Parcelization	Low	Low	Mod.	Mod.	High	Mod.
***Qualified Empowerment Zone Facility Bonds**	Low	Mod.	High	Mod.	High	Mod.
Real Estate Investment Trusts	Low	Mod.	Low - Mod.	Mod.	High	Mod.
***State Voluntary Cleanup Programs**	High	Mod.-High	High	Mod.	Mod.	High
***Tax Abatements**	Mod.	Mod.	High	Low-Mod.	Mod.	High

COMPARISON MATRIX continued

Criteria/ Brownfields Tool	Actual Use	Revenue Size	Administrative Ease	Equity	Financial Leveraging	Environmental Benefits
***Tax Incentives**	High	High	Mod.	High	High	High
Tax Increment Financing	Low	Mod.	Low-Mod.	Mod.	Mod.	Mod.
Transferable Development Rights	Low	Low	Mod.	Mod.	Low	Low-Mod.

High - High use (over 25 States, many localities); other criteria score high (e.g., specific, easy to use, available, flexible, highly leveraged and almost always results in actual redevelopment)
Mod. - Moderate use (10-25 States, some localities); criteria score in medium range, may not always result in project completion
Low - Low or rare use thus far; one or more major implementation problems exist

*Star indicates best-rated mechanisms

10. TOOLS TO ACCESS FINANCING FOR SMALL BUSINESSES AND THE ENVIRONMENTAL GOODS AND SERVICES INDUSTRY

10. TOOLS TO ACCESS FINANCING FOR SMALL BUSINESSES AND THE ENVIRONMENTAL GOODS AND SERVICES INDUSTRY

INTRODUCTION

The United States is the largest producer and consumer of environmental goods and services in the world. The U.S. Government defines the environmental goods and service industry (EGSI) as those environmental technology companies selling specialized goods and services used for pollution prevention, abatement and remediation. For example, EGSI businesses sell goods to water and wastewater treatment facilities such as in pumps, instruments, and treatment chemicals, and services such as engineering construction and environmental monitoring and testing. EGSI companies also produce "green" products, or environmentally friendly alternatives to traditional products such as chlorine, or new production processes such as sludge dewatering or handling facilities. For solid and hazardous waste, EGSI firms sell recycled paper products, and biotechnology products or processes for waste reduction. For air pollution control, they sell product alternatives to dry cleaning solvents or metal finishing, and indoor air pollution reduction equipment. Energy reduction and alternative products for agricultural production also are included in the definition of EGSI technology.

A small business is often described as a business having under 50 employees. In this country, small businesses account for over 90 percent of all businesses but produce a clear minority of goods and services. However, in the past five years, they accounted for most of the growth in the economy.

While large and medium-sized EGSI companies are prospering in this country, small environmental goods and services businesses still present financing challenges. In general, small businesses traditionally are difficult and costly to capitalize adequately because of weak credit considerations, inadequate experience, poor economies of scale, the lack of established markets and other factors, all of which increase the cost of capital. Small EGSI businesses remain relatively small in number, particularly for "green" products compared to specialized services, and small EGSI businesses must compete against much larger engineering and technology companies with market niches, in-house research and development, and years of operating experience, including overseas.

Whether the small EGSI business sector remains fledgling because of a scarcity of capital or inability to access financing or other services is debatable. Some traditional lending institutions such as commercial banks report that even when they offer special programs to lower lending costs or waive other credit requirements to assist small EGSI businesses, the supply of financing appears to exceed the demand. In contrast, others argue that financial and environmental risk factors inhibit the flow of capital to small EGSI businesses. Also included in the definition of the problems of small businesses is their access to EGSI technology and services. For example, a small dry cleaning facility may find it difficult to learn about new wet cleaning processes, and/or may find acquisition of such new technology unaffordable.

This Section of the *Guidebook* has been expanded to a considerable degree in the 1999 revision. The tools presented in the Section continue to include both equity mechanisms such as venture capital, grants and private placements, and debt mechanisms such as loans. A number of non-capital mechanisms/tools such as the use of business plans and networking devices also continue to be presented. However, for the first time, government programs administered by the U.S. Department of Commerce's Small Business Administration and other federal agencies are covered in some depth.

Readers also should note that in addition to the tools presented in this Section, a considerable number of tools presented in other Sections may prove useful to small businesses and the EGSI. For example, many of the types of information exchange tools described in **Section 5: Tools for Delivering Financial Outreach** are very applicable to these businesses. In addition, some of the tools (and/or the concepts they embody) presented in **Section 2: Tools for Acquiring Capital, Section 3: Tools for Enhancing Credit,** and **Section 6: Tools for Lowering Costs** may prove helpful to small businesses and the EGSI.

10.A. EQUITY CAPITAL

10. A. EQUITY CAPITAL

Description: Equity capital is investment in a business made by external sources, and generally entails some ownership and/or partnership arrangement. Equity contributions also may be made via special grants or credit enhancements, or in-kind contributions. As contrasted with the financial interest created by borrowing which creates a debt by the business to the lender, equity investments may not result in added financial liability reflected on a firm's balance sheet. Most start-up small EGSI businesses require some equity investment, since 100% debt financing is too risky for most lenders. However, equity investments usually are combined with debt tools in funding packages.

Equity investment is a highly creative, entrepreneurial activity in this country, and in periods of economic growth may account for a high proportion of business growth. Equity investments in small EGSI businesses can come from a variety of sources, including individuals, other companies such as venture capital companies or parent companies, governments, and via the stock exchanges. Non-monetary equity contributions can be made with contributions of land, buildings and equipment, goods and personnel, and the use of a larger company's name, technology, business plan or markets (including franchising and strategic alliances between businesses). A number of management tools such as investment forums and networks, and the use of business plans for marketing purposes are presented.

Advantages: The greater the equity investment in a small business, the less debt that must be incurred. Equity investments can be more flexible than debt structuring, as terms are negotiated on a case-by-case basis. Such investments may leverage additional monies by opening the doors to more traditional credit sources. Small business managers sometimes can benefit greatly from the expertise and personal commitment of equity investors. These investors may allow small businesses to survive short-term solvency problems, unlike debt instruments which must be regularly repaid.

Disadvantages: Equity investors will demand some return on their money, ranging from normal interest, dividends, and profit distributions to a large ownership stake, perhaps even a controlling position, in a company. They may demand repayment in a relatively short time period, for example, from three to five years. Arranging equity investment is difficult and time consuming from the point of view of the small business, particularly since investment terms vary considerably, and outside advice such as attorney fees can be very expensive. Different States have different laws pertaining to partnerships. Many investors, particularly large investors, avoid investing in start-up companies or in high risk situations. Small businesses may lose their sense of ownership or identity if outside equity contributors assume controlling positions or become difficult to handle. The overall economic climate substantially influences the amount and kind of equity investment.

Summary: The equity tools presented here entail considerable initiative on the part of the small or EGSI business, but are widely available. With the exception of government grants, equity investments also are highly expandable and frequently highly leveraged, and result in the kind of entrepreneurial innovation representing the best of the American enterprise.

LIST OF EQUITY TOOLS
(In Alphabetical Order)

*1. Agriculture: Alternative Agricultural Research and Commercialization Corporation
*2. Angels (Personal Investors)
*3. Business Plans
*4. Commerce: Small Business Administration (SBA) – Angel Capital Electronic Network
5. Commerce: SBA – Small Business Innovation Research Program
*6. Commerce: SBA – Small Business Investment Companies
7. Environmental Capital Network
8. Environmental Opportunity Funding Corporation
*9. Franchising
10. Investment Forums
*11. Investment Networks
*12. Joint Ventures
*13. Private Placements
14. Public Offerings
*15. Strategic Alliances
*16. Venture Capital

* Stars indicate most highly rated mechanisms as described in the Comparison Matrix at the end of the narratives. See Introduction to the *Guidebook* for a description of the criteria used. Ratings of "High", "Moderate", and "Low" are for comparison purposes only, as some ratings are necessarily subjective and data are incomplete.

DEPARTMENT OF AGRICULTURE
ALTERNATIVE AGRICULTURAL RESEARCH AND COMMERCIALIZATION CORPORATION

Description: The Alternative Agricultural Research and Commercialization (AARC) Corporation is a federal-government-owned corporation which reports to the Secretary of Agriculture and is authorized to receive annual appropriations from Congress. It is a venture capital firm that makes investments in companies to help commercialize environmentally friendly biobased industrial products (non-food and non-feed) made from agricultural and forestry materials and animal by-products. The corporation's investments typically include an equity position and/or a royalty on sales. Preference is given to funding pre-commercialization activities in companies that already have marketable products. Any private individual or company can apply for an investment. Applicant's must demonstrate management, technical, marketing, and financial expertise and are expected to provide at least one-to-one match.

Actual Use: Investments range from $100,000 to $ 1 million and the average initial investment in a company has been $300,000. In its first five years the Corporation invested $33 million in 70 projects in 33 states, leveraging $105 million in private funds. Innovations brought to market include kenaf fiber erosion mats, soy-based cleaning products, and biodegradable, seed-based automotive engine and transmission lubricants.

Potential Use: AARC Corporation investments can enable a firm to bring to market innovative, environmentally friendly products which other venture capitalists might not be willing to fund.

Advantages: The 1996 Farm Bill established a federal procurement preference for products produced in partnership with the Corporation. This gives companies receiving AARC Corporation investments and advantage in marketing their products to the federal government.

Limitations: This is not a grant program. It is a source of venture capital investment for which the Corporation expects to receive a premium in return for the risk incurred. The AARC Corporations is a relatively small player in the $35 billion organized venture capital market.

References for Further Information: Contact Alternative Agricultural Research and Commercialization Corporation, U.S. Department of Agriculture, 0156 South Building, 1400 Independence Avenue, SW, STOP 0401, Washington, D.C. 20250-0401, Telephone: 202- 690-1633,
Fax: 202-690-1655, Internet: **www.usda.gov/aarc/**.

ANGELS
(Personal Investors)

Description: An angel is an individual who as a private investor buys into a company usually in its early stages. Many of these adventurous investors are highly paid professionals such as doctors, dentists, lawyers, accountants, etc. Other types of angel investors can include, middle managers, entrepreneurs, associates, friends, and even relatives. While angels include wealthy, sophisticated millionaire investors, the average income of an angel is around $100,000. Angels are distinguished by the fact that they are investing only their own money, not other people's money. The average angel investment is less than $50,000.

Actual Use: Angels are the largest source of risk investment capital in the United States. Reliable estimates place the number of investor angels in the country at nearly one million strong. These angels invest over $27 billion in business ventures each year with about half of that amount going to fund early-stage businesses. Moreover, 90 per cent of this informal venture capital goes to financing of less than $1 million and 82 per cent to financing under $500,000. Angel investors review more than two million proposals for capital a year and fund about 20 per cent. Thus, they provide financing to 400,000 small businesses a year.

Potential Use: For small businesses and environmental firms, investor angels represent the greatest single source of capital. They are ideal for start-up companies who are too new to qualify for bank loans, expanding companies with growth potential who are too small to attract traditional venture capital, and companies needing only a small amount of money.

Advantages: More than 85 per cent of angel investors do not seek voting control of the businesses that they finance. Angels are willing to make small investments. As a group, angels invest 60 per cent of their money in start-up businesses. They also often invest in other types of risky business deals. Angel investors are local, numerous, and they are everywhere.

Limitations: It is difficult to raise more than $500,000 from angel investors. Angels are expensive, often wanting a return on their money ranging from 20 to 40 per cent. Alternatively, they may demand 10 to 30 per cent or more of the company. Further, angels expect to get their investment back relatively quickly (four years). Most invest only in companies that are physically located within 50 miles of where they live or work.

Reference for Further Information: Blechman, Bruce Jan, and Levinson, Jay Conrad , *Guerrilla Financing: Alternative Techniques to Finance Any Business*, Houghton Mifflin Company, 2 Park Street, Boston, Massachusetts 02108, November 1991.

BUSINESS PLANS

Description: A business plan is a detailed, written description that outlines what the company's activities, goals, progress to date, plans for growth, and financial projections. The plan is both a strategic and an operating document. It should include a detailed blueprint for action to which the enterprise's management team has voluntarily committed. The business plan is the most important document that a company will ever produce as a means to obtain financing. Every potential equity investor will want to see a detailed business plan which informs them as to what management intends to do with its monetary and human resources. The plan may include information on what the company seeks from investors and what it is willing to give, what the potential returns are for investors, and who management is and why they are the right people to run the company.

Actual Use: Business plans are used by almost every firm, large or small, in the private sector, and in larger non-profit agencies. Their use is expanding to the public sector. Some local government privatization or contracting-out initiatives resulted from the development of formal or informal business plans. These documents identified the "business" of the organization as the provision of a high quality environmental service, and that the responsibility of the operations side of the business was to implement this in the most effective and cost-efficient manner, which does not in all cases require public employees to deliver the service. Business plan software also is widely available.

Potential Use: Business plans can be used by any organization as a means to identify and integrate its operations around its core services or products. Recently, business plans have been suggested as a way for smaller and medium-size environmental and other utilities to bolster their financial, managerial and technical capacities to deliver services. Business plans can also be used by governments to spur the optimal in-house provision of environmental and other services.

Advantages: The business plan requires the managers and/or operational staff to identify the "business" they are engaged in, and to articulate the directions in which they wish to proceed. It encourages managers and employees to think in a more efficient, cost-effective and strategic manner by placing day-to-day operational functions in the context of a detailed plan based on carefully defined goals and objectives.

Limitations: Requires the analytic, financial, personal, and time commitments of management and staff to honestly examine the business (products and/or services provided), develop the detailed business plan, and then implement it.

Reference for Further Information: Brandt, Steven C., *Guide for Preparing a Business Plan*, Gainer & Associates, 863 H Street, Suite A, Arcata, California 95521, Telephone: 707-822-4448, Fax: 707-822-4457. A good example of software is BizPlan Builder, JIAN 1996, 1975 W. El Camino Real, Mountain View, CA 94040, **http://www.jian.com/**.

DEPARTMENT OF COMMERCE
SMALL BUSINESS ADMINISTRATION
ANGEL CAPITAL ELECTRONIC NETWORK

Description: The Angel Capital Electronic Network (ACE-Net) is a nationwide Internet-based listing service that provides information to accredited investors on small businesses seeking $250,000 to $5 million in equity financing. Sponsored by the Small Business Administration's (SBA's) Office of Advocacy, ACE-Net requires companies seeking capital to submit a completed Small Corporate Offering Registration (SCOR) Form U-7 and pay an annual $450 subscription fee. Entrepreneurs first must complete and sign an entrepreneur enrollment form and send it to the nearest Network Operator, who will then issue a password to allow online completion of required forms. Entrepreneurs must be prepared to provide detailed business plans and financial statements to potential private investors. Investors also must complete an investor subscription form and mail it to the nearest Network Operator. The system is designed for companies to use the Accredited Investor Exemption for offerings under Regulation A or Regulation D (Rule 504). Accredited investors must have a net worth of $1,000,000 or have an annual income of more than $200,00.

Actual Use: ACE-Net was announced in October 1996.

Potential Use: Firms in a position to raise funds under Regulation A or Rule 504 might use ACE-Net as a method for contacting potential investors. ACE-Net is planned to become a private, independent, not-for-profit organization.

Advantages: ACE-Net offers a formalized method for small, entrepreneurial firms to contact potential investors. It operates on a secure server meant to safeguard confidential information from unauthorized access.

Limitations: Internet access is required. Postings of SCOR forms on ACE-Net are securities offerings and entrepreneurs should consult with a securities attorney regarding possible requirements to make certain filings with the SEC prior to listing on ACE-Net. Legal and other costs probably make it impractical for companies to seek less than $250,000.

Reference for Further Information: Consult a securities law practitioner. Contact ACE-Net on the Internet at: **http://www.sba.gov/advo/acenet.html**. Contact the U.S. Department of Commerce, Small Business Administration, Office of Advocacy, 409 Third Street, SW, Washington, D.C. 20416, Phone: 202-205-652, Fax: 202-205-6928, Internet: **www.sbaonline.sba.gov/ADVO**.

DEPARTMENT OF COMMERCE
SBA SMALL BUSINESS INNOVATION RESEARCH PROGRAM

Description: The Small Business Administration (SBA) Small Business Innovation Research (SBIR) Program is a highly competitive federal award system. It seeks to stimulate technological innovations in the private sector, strengthen the role of small business in meeting federal research and development needs, increase private commercialization of innovations derived from federally supported research and development efforts, and foster participation in technology innovation by women-owned and socially and economically disadvantaged small business firms. It has three phases, the first two of which involve contract or grant funding agreements between participating federal agencies (listed below) and qualified small businesses. A qualified small businesses is a for-profit firm which, including its affiliates, has no more than 500 employees, is independently owned and operated, and is at least 51% owned by U.S. citizens or permanent resident aliens. Phase I funding is up to $100,000 for up to six months, to conduct a feasibility study to evaluate scientific and technical merit of an idea. Phase II funding is up to $750,000 for up to two years, to expand on the results of, and further pursue development of, Phase I. Phase III relies on other federal or private funds to support the commercialization of Phase III results. SBA's Commercialization Matching System helps SBIR awardees locate funding sources needed to bring their innovations to market.

Actual Use: Technical abstracts of previously funded Phase I and II projects are available from agencies, including some on Internet sites.

Potential Use: The program could help firms in the environmental goods and services industry.

Advantages: Phase I and II funds are grants. However, commitment of private funds for Phase III increases the likelihood of Phase II funding.

Limitations: The program is extremely competitive. Some agencies offer less funding than others (e.g., USDA offered $65,000 for Phase I in fiscal 1998).

Reference for Further Information: SBA, Office of Technology (for federal-government-wide SBIR program information and tips on proposal preparation), Telephone: 202-205-6450. Federal contacts include Department of Agriculture, Telephone: 202-401-4002, Fax: 202- 401-6070; Department of Commerce, Telephone: 301-713-0829; Department of Defense, Telephone: 800-382-4634, Fax: 800-462-4128; Department of Education, Telephone: 202-219-2004; Department of Energy, Telephone: 301-903-1414; Department of Health and Human Services, Telephone: 202-206-9385, Fax: 301-206-9722; Department of Transportation, Telephone: 617-494-2051; Environmental Protection Agency, Telephone: 800-490-9194, Fax: 202-565-2447; National Science Foundation, Telephone: 703-306-1390, Fax: 703-306-0298; National Aeronautics and Space Administration, Telephone: 703-281-1745 or 301- 918-1980.

DEPARTMENT OF COMMERCE
SBA SMALL BUSINESS INVESTMENT COMPANIES

Description: Small Business Investment Companies (SBICs) are privately organized and privately managed investment firms licensed by the Small Business Administration (SBA). Using private capital and capital borrowed at favorable rates via the federal government, SBICs channel monies to small, fast-growing companies, both new and established. They provide equity capital, long-term loans, and expert management assistance to qualifying businesses. As profit-motivated entities, SBICs expect to share in the success of the small businesses in which they invest. There are two types of SBICs, regular SBICs and Specialized Small Business Investment Companies (SSBICs). SSBICs are targeted to the needs of socially or economically disadvantaged entrepreneurs.

Actual Use: SBA requires a minimum private capital investment of $5 million from an SBIC or SSBIC, and a $10 million investment if they intend to utilize participating securities. An SBIC or an SSBIC in good standing may receive leverage equal to 300 percent of its paid in private capital. To obtain leverage, SBICs issue market rate debentures which are guaranteed by the SBA. There are 271 SBICs nationwide with $3.5 billion in private funding and $1 billion in federal monies to invest or lend. Some SBICs are general-purpose in nature, while other focus on specific industries, geographic areas, or types of borrowers. Some industries sponsor SBICs to encourage innovation. SSBICs focus on women, minorities, and other socially or economically disadvantaged groups.

Potential Use: An SBIC could be formed for the express purpose of providing capital to small businesses in the environmental goods and services industry, and/or to specific sub-segments of that industry. The SBIC could focus its investment on start-up companies and/or on promoting environmental technology innovation.

Advantages: SBIC funds can open the door to other more traditional financing such as lines of credit. SSBICs support businesses that cannot qualify for investments from regular SBICs and venture capitalists. SBICs benefit from government leverage and enjoy certain tax advantages. SBICs specialize in small business financing and have considerable experience/expertise in that area. SBIC may make investments or loans in cooperation with other public or private parties.

Limitations: SBIC funds have more requirements and involve government officials. SBICs may have limited monies to invest and not be able to help in future financings. They are restricted in the kinds of real estate investments they can make, and may invest no more than one-third of their portfolios in real estate. SBICs may not invest in businesses whose main activity involves relending or reinvesting.

Reference for Further Information: U.S. Small Business Administration, 409 3rd Street, SW, Washington, DC 20416, Telephone: 202-205-6600.

ENVIRONMENTAL CAPITAL NETWORK

Description: The Environmental Capital Network (ECN) is a project of the Center for Environmental Policy, Economics and Science, a 501 (3) not-for-profit, tax-exempt corporation. The ECN offers services to bring together environmental companies and investors. Its goal is to help individual, professional, corporate and institutional investors access early-stage and expansion companies commercializing environmental and "green" technologies, products and services, thereby aiding such companies in more efficiently and effectively raising capital. Its Services include a monthly Investor's Bulletin, periodic Capital Forums, a Business Plan Review program, and an Environmental Business Capital Access Site (EBCAS) Internet site in conjunction with the Angel Capital Electronic Network (ACE-Net) (see **Section 10.A., Angel Capital Electronic Network**).

The Investors' Bulletin, mailed to registered investors, provides key information about companies seeking capital. Companies must complete a questionnaire and sign an application and pay a $350 fee for three distributions of the company profile in the bulletin over twelve months. The Capital Forums periodically give entrepreneurs a direct audience with potential investors for a registration fee of $245. The Business Plan Review program requires three copies of the company's business plan and a $500 fee. The business plan is reviewed by two independent, knowledgeable investors and its marketing/sales section is analyzed by an independent business development center. The Environmental Protection Agency's (EPA's) Office of Pollution Prevention and Toxics helps pay for this service. The EBCAS will provide a gateway to the ACE-Net service for environmental and energy technology companies and investors. EBCAS is supported by an EPA grant and is a joint venture with the Michigan Energy and Resource Research Association, a regional network operator for ACE-Net.

Actual Use: This is a relatively new effort to use the Internet to facilitate contacts between potential investors and entrepreneurial environmental companies.

Potential Use: If it attracts enough favorable attention from investors, ECN could be extremely valuable to both entrepreneurs and venture investors.

Advantages: The partial funding by EPA cuts the cost to companies for the business plan review.

Limitations: Internet access is needed. ECN is not registered as an investment advisor or securities broker-dealer with the federal Securities and Exchange Commission. But, it is registered as an investment advisor conducting business as a finder pursuant to the Michigan Uniform Securities Act.

Reference for Further Information: Environmental Capital Network, 416 Longshore Drive, Ann Arbor, MI 48105, Telephone: 734-996-8387, Fax: 734-996-8732, E-mail: mccabe@recycle.com, Internet: **http://bizserve.com/environmental.capital.network/**.

ENVIRONMENTAL OPPORTUNITY FUNDING CORPORATION

Description: The Environmental Opportunity Funding Corporation (EOFC) is a flexible funding mechanism designed to broker capital packages for environmental businesses and environmental projects, both public and private, where capital is not otherwise available from conventional sources. The EOFC will be primarily used by the Environmental Protection Agency-funded Environmental Finance Centers (EFCs) to help package and meet the capital requirements of their small business clients (see the individual pages for the EFCs in **Section 5.A.: Institutional Arrangements**). The EOFC will charge fees for its services and after an initial injection of public/private donated capital resources will become self-sufficient within a reasonable period of time.

Actual Use: The Environmental Opportunity Funding Corporation is in the planning and developmental stage, and as such, is not currently operational.

Potential Use: The EOFC will be established by an EFC or a group of EFCs as a non-profit 501(c)(3) corporation under the laws of a State, probably in California. The EOFC will function nationwide and locate an office or offices only as needed to provide prompt and efficient services to its clients. For example, it could use the offices of individual EFCs on an as needed basis. The Corporation's main tools will be indirect financial incentives such as loan guarantees, surety bond guarantees, letters of credit, interest rate increments, or subsidies. These incentives will help to provide the inducements needed to motivate private capital investments. The EOFC will help develop financial packages that provide flexibility to the recipient businesses and reasonable rates of return to investors.

Advantages: The Environmental Opportunity Funding Corporation will focus its efforts on small businesses in the environmental goods and services industry. Its brokering efforts and financing assistance will be highly leveraged, using secondary financing mechanisms such as credit guarantees to attract private capital. The EOFC will operate nationwide in a flexible manner with exceptionally low overhead costs.

Limitations: The EOFC is not yet operational and is still exploring ways to raise the needed start-up capital. Until the EOFC is fully operational and earning fees for its services, it will be limited in the amount of assistance it can provide to small environmental businesses.

Reference for Further Information: USEPA Region 9 Environmental Finance Center, Urban Environmental Research and Education Center, California State University at Hayward, Building 7, Alameda Point, 851 West Midway Avenue, Alameda, California 94501, Telephone 510-749-6867, Fax: 510-749-6862, Internet/World Wide Web: **http://www.greenstart.org/efc9**.

FRANCHISING

Description: Franchising is a partnership where one party, the franchiser, grants a second party, the franchisee, the right to use the franchiser's trade name, trademark, or advertising to market/distribute the franchiser's goods and/or services in a particular territory. The franchiser usually provides expertise on a proven business plan to the franchisee through training and ongoing support. The franchisee may prescribe a marketing plan or allow the franchisee to participate in group distribution. The franchisee pays the franchiser for the right to become and remain a distributor or dealer. This may involve an up front cash payment, as well as payment(s) above and beyond the wholesale price of inventory or goods. Besides money, the franchisee brings to the partnership an owner's motivation to make the business a success.

Actual Use: Franchising comprised over $800 billion dollars in sales in 1992 and this figure is projected to reach $1 trillion by the year 2000 (International Franchise Association figures). More than 40% of all retail sales are generated by franchise companies and one out of every twelve businesses is a franchise. Perhaps, the most famous franchise in the world is MacDonald's, but there are many others in all fields of business, including environmentally-related ones. For example, Environmental Air Services is a franchise firm that seeks to reduce the contamination in air distribution systems. The firm was started in 1992 and has thirty franchised units and one company-owned unit. Roto-Rooter Corporation, the well-known plumbing and drain care services firm, is a franchise operation with over 600 locations worldwide.

Potential Use: Franchising could be used to help provide any kind of service or product that can be marketed and sold in a wide number of locations based on a standardized plan of operations. The concept can be applied to almost any category of business from water leak detection services to marketing environmentally-friendly hair care and other personal products.

Advantages: Franchising permits entrepreneurs to participate in a proven business using the business' already-recognized name and already developed business and marketing plans. It leverages the franchiser's expertise with the franchisee's money and hard work.

Limitations: The franchiser must come up with the money to buy the franchise and then generate enough revenues to pay any continuing fees. The business concept may not be equally applicable in all areas. The franchisee must carefully investigate the franchiser and its business concept.

Reference for Further Information: International Franchise Association, 1350 New York Avenue, NW, Suite 900, Washington, DC 20005, Telephone: 202-628-8000, Fax: 202-628-0812, World Wide Web site: **http://www.franchise.org/**.

INVESTMENT FORUMS

Description: Investment forums are special events designed to bring businesses together with investors, economic development officials, and investment intermediaries (underwriters, venture investment bankers, finance consultants, financial planners, loan brokers, venture clubs, etc.) for their mutual benefit. These forums are typically annual events in which selected businesses make presentations to a group of investors and investment intermediaries. Forum organizers also arrange networking opportunities for the businesses and investors during these one to three day events. Finally, organizers provide keynote speakers who discuss issues of interest to the private investors.

Actual Use: Annual investment forums may select high growth companies likely to appeal to venture capitalists, corporate investors, and sophisticated individual investor angels (see **Section 10.A., Angels**). These forums usually serve a State or region. Examples of investor forums with an environmental focus include the Northeast Recycling Forum in Brattleboro, VT; the Southeast Recycling Investment Forum in Columbia, SC; and the Midwest Recycling Forum in Lincoln, NE. The first National Environmental Capital Forum took place in New York City, NY. Privatization forums are numerous, however, most investment forums are more generic events looking to aid many types of businesses, including small businesses.

Potential Use: Investment forums could be held that focus on small businesses in the environmental goods and services industry (EGSI). They might even be narrowly focused on an EGSI sub-sector such as firms working on biotechnology approaches to environmental remediation. There may be a largely untapped market of undetermined size in this regard. The geographic range of businesses invited to forums could be broadened to improve investment opportunities to better attract investors.

Advantages: These forums can be efficient and cost-effective ways to bring fast-growing, under-capitalized, small businesses together with equity capital investors and supporting financial intermediaries. Investment forums can heighten investor and financial institution interest in a particular group of firms and industry by educating them on the variety of investment opportunities. They also educate businesses about investor priorities and highlight barriers to business expansion.

Limitations: Investment forums bring limited number of businesses (10-40) and potential investors together at a time. The forums provide no financial assistance to attending businesses and do not participate in business-investor discussions or negotiations once contacts have been made. Many are limited in the geographic scope from which they draw businesses and investors.

Reference for Further Information: U.S. EPA Publication-30-R-96-012, *A Financing Guide for Recycling Businesses: Investment Forums, Meetings and Networks*, September 1996. U.S. EPA, Office of Solid Waste and Emergency Response, Municipal and Industrial Solid Waste Division, 2805 Crystal Drive, Arlington, Virginia 22202, Telephone: 703-308-8254, Fax: 703-308-8686.

INVESTMENT NETWORKS

Description: Investment Networks are for-profit or non-profit business services that match the interest of investors with companies seeking capital. These networks operate very much like a computer dating service (which is in fact what they are for firms and investors). The match-making processes used by these services usually have four steps:

1.) Companies submit business summary information, financial projections, and business profile applications. At the same time, investors submit investment preference profiles. Both companies and investors pay a fee to be listed on the network(s).
2.) The data from both parties are entered in a computer database, interest matches made, and investors sent summary business profiles of companies that meet their stated investment requirements. At this point in the dating process, investor and company names are held confidential by the network.
3.) Investors review company profiles and contact the networks to indicate whether or not they are interested in meeting with any of the companies. If investors indicate interest in meeting, the Investment Network provides both parties with information on how to contact each other.
4.) Once introductions have been made between investors and companies, both parties can begin investment discussions. From this point on, it is up to them where the negotiations go.

Actual Use: There are a growing number of Investment Networks around the nation. Most are State or regional in scope, but at least five are national in scope: the Technology Capital Network (MIT) in Cambridge, MA; the Seed Capital Network in Knoxville, TN; the Investor's Circle in Chicago, IL; the Capital Network in Austin, TX; and the Environmental Capital Network in Ann Arbor, MI.
Potential Use: There appears to be room for more regional Environmental Investment Networks. Specialized ones could be formed for specific types of environmental businesses such as recycling companies, pollution prevention enterprises, and environmental remediation technologies firms.

Advantages: Investment Networks provide an easy, structured way for new investors to enter the venture capital markets. They also provide a confidential way for companies and investors to efficiently broaden their range of business contacts. Participating in them can help business owners learn how to improve their companies and their presentations to attract investment capital.

Limitations: Investment Networks do not provide financial assistance themselves and usually do not provide any consulting assistance. They have no role in the actual business negotiations.

Reference for Further Information: U.S. EPA Publication-30-R-96-012, *A Financing Guide for Recycling Businesses: Investment Forums, Meetings and Networks*, September 1996. U.S. EPA, Office of Solid Waste and Emergency Response, Municipal and Industrial Solid Waste Division, 2805 Crystal Drive, Arlington, Virginia 22202, Telephone: 703-308-8254, Fax: 703-308-8686.

JOINT VENTURES

Description: A joint venture differs from either a corporate venture investment or a strategic alliance, although all three are known as corporate venturing. It is a separate legal organization (corporation or partnership), often with a separate management team, while a strategic alliance is a collaboration that typically uses a research contract and marketing or licensing agreements, rather than equity or debt transactions (see **Section 10.A., Strategic Alliances**). A joint venture that has a speculative purpose in addition to an expectation of profits is sometimes called a "joint adventure".

In a joint venture, a partnership is established to take advantage of tax deductions for the partner ship losses, then, after the research and development efforts are completed, t/he organization is switched to a corporate form. There may be collateral restraints such as agreements between the parties to limit competition between themselves in certain areas. The joint venture agreement should include provisions governing termination, withdrawal, and buyout procedures. Some common termination procedures include a put, which requires one venture partner to purchase the interest of the other, a call, which requires one partner to sell its interest to the other, liquidation, which is an option simply to dissolve the venture, an offer to buy or sell, or a right of first refusal. Under a research contract, a company performs research for the sponsoring corporation for cash. However, there is an issue of ownership of rights to the technology developed. Unless it receives exclusive rights, the sponsor may demand stock warrants as an equity kicker. Under a marketing or licensing agreement, a company gets an up-front payment or a future payment stream in return for giving an exclusive or nonexclusive right to another firm to produce or sell the former's product as the latter's own.

Actual Use: Joint ventures are a relatively common "off-balance-sheet" financing technique among firms seeking to bring new products to market.

Potential Use: A joint venture can offer a small firm an opportunity to bring an environmentally friendly technology or products to market.

Advantages: A rapidly growing company with limited resources can use a joint venture with a larger corporate partner to exploit its technology in an identifiable market.

Limitations: An ill-designed joint venture can be financially disastrous.

Reference for Further Information: Consult an attorney on applicable State and federal laws. Contact the U.S. Department of Commerce, Small Business Administration at 800-827-5722 for referral to the nearest Small Business Development Center, to ask general questions about joint venture techniques.

PRIVATE PLACEMENTS

Description: A private placement is the sale of a limited number of shares of stock in a company directly to a relatively small number of pre-selected buyers, often institutional investors. While private placements are exempt from most of the procedural hurdles that apply to major public offerings, they still fall under Regulation D of the Securities and Exchange Act of 1933. These regulations limit the number and type of investors who can participate in a private placement (usually 35). The most common type of private placement is the limited partnership. A typical limited partnership involves one general partner who holds full authority for all business decisions and a number of limited partners who serve as angel investors (see **Section 10.A., Angels**).

Actual Use: Private placements are used by new companies that must raise a significant amounts of money, but are not likely to attract a single investor to come up with the entire amount. They are also used by established businesses that need money but do not want to expose themselves to the scrutiny, expense, and/or other difficulties of a public offering.

Potential Use: Private placements could be used very successfully by small and environmental businesses nationwide. They offer the real opportunity for firms such as these to raise substantial investment capital with a moderate level of difficulty. There is significant room for growth in the use of this financial instrument.

Advantages: Private placements require much less paperwork and they are faster, easier, and less costly to complete than public offerings. They do not require a business to distribute substantial profits to a large number of investors. They access capital from a number of investors with very limited ownership interests. Private placements are normally very effective in raising anywhere from $100,000 to $1,000,000, and sometimes even more.

Limitations: Successful private placements require a very good business plan. They also require that the entrepreneur be a very good salesperson for their business. Private placements fall under both federal Securities and Exchange Commission regulations and State laws (which vary significantly from State to State). They may require a good attorney and an experienced business plan consultant.

Reference for Further Information: Blechman, Bruce Jan, and Levinson, Jay Conrad, *Guerrilla Financing: Alternative Techniques to Finance Any Business*, Houghton Mifflin Company, 2 Park Street, Boston, Massachusetts 02108, November 1991. There are numerous sources on the World Wide Web for information on private placements and capital investments. Log on and use one of the generic search engines such as *Lycos, Infoseek, Yahoo!, Excite,* etc. to locate sites under these and related terms.

PUBLIC OFFERINGS

Description: A public offering (PO) is the selling of a company's shares to the public in the form of stock. It requires registration with the Securities and Exchange Commission (SEC) and with State regulators. The first time a company sells shares to the public is known as an initial public offering or IPO. Small Corporate Offering Registrations allow smaller companies to raise less than $5 million with fewer regulations.

Actual Use: A few successful IPOs have been completed with companies that focus on environmentally-related technologies. The companies involved in these IPOs include Shaman Pharmaceuticals, Molten Metals, and Recycling of America.

Potential Use: Most environmental firms are growing only as fast as their own capital, venture capital, or bank loans will allow. Public offerings of environmental firms represents an area with enormous growth potential over the next twenty years as more environmental industries and technologies are created and introduced worldwide. Small Corporate Offering Registrations offer the most potential for raising money for small businesses through public offerings.

Advantages: Public Offerings are a good way for companies with well-established records of successful performance to raise a lot of money to invest in product development, marketing and business expansion. Through these offerings, companies normally raise at least $5 million, often raise tens of millions, and can sometimes raise in the hundreds of millions of dollars.

Limitations: Public Offerings open up the internal company operations to intense, ongoing scrutiny from the SEC and State regulators (as well as to regulation), the financing community, the media, and the general public. These offerings can be time-consuming, expensive, and distract management attention from running the business enterprise. They usually require outside professional expertise in the form of investment bankers, a top-notch accounting firm, and a good securities attorney.

Reference for Further Information: Securities and Exchange Commission, 455 5th Street, NW, Washington, DC 20549, Telephone: 202-942-4150. The Small Corporate Offering Registration Network (**Scor-Net**) offers information on SEC regulations and venture capital, as well as links to attorneys, brokers, and investors. Scor-Net is located on the World Wide Web at **http://www.scor-net.com/**. The Venture Capital Resource Library has information on the addresses of State regulators, the offices of the SEC, and securities law. It is located on the World Wide Web at **http:// www.vfinance.com/** .

STRATEGIC ALLIANCES

Description: A strategic alliance is a partnership or agreement with another company who shares common goals to undertake business activities together for mutual benefit. There may be some exchange of equity in these corporate partnerships but both companies continue to operate as independent entities. Strategic alliances are typically used in research contracts, marketing and licensing agreements, but they can also be used for financing, product distribution or many other business activities. The strategic ally or partner may share the same market, but provide a related product or service. They may have excess demand or need the first company's help in serving their client base. A strategic partner may provide financing in some situations. This financing can be structured as an investment, a loan, prepayment for work to be performed, or as an exchange or sharing of resources such as space, personnel, and equipment.

Actual Use: More and more small businesses are forming strategic alliances with larger companies to get their products or services to the market faster. Larger companies are increasingly investing in innovative small businesses, or sharing resources and facilities, in return for a piece of the smaller firm. This investment approach has been, and remains, particularly popular in many high technology industries such as electronics, computer software design, pharmaceuticals, and bioremediation technology.

Potential Use: Over the next ten to twenty years, there should be very good and increasing opportunities for high technology, environmental businesses to find and pursue corporate alliances, if they so desire. Prospects for corporate alliances should also be good for any small business with products or specialized personnel that larger firms want.

Advantages: Strategic partnerships can allow companies to enter markets, grow stronger, and expand much faster than they could on their own. It can be much less risky to use a corporate partner to help finance a business as such partners often do not insist on control, but rather accept some business service in exchange.

Limitations: Corporate alliances must be mutually beneficial and the partners must share common goals. Corporate partners must carefully screened each other, or there is the real risk that one may be able to economically damage or take over the other. Good corporate partnerships depend to a great degree on mutual trust.

Reference for Further Information: Blechman, Bruce Jan, and Levinson, Jay Conrad, *Guerrilla Financing: Alternative Techniques to Finance Any Business*, Houghton Mifflin Company, 2 Park Street, Boston, Massachusetts 02108, November 1991.

VENTURE CAPITAL

Description: Venture capital is any money invested in business enterprises, particularly at early stages. Traditional venture capitalists are individual investors or groups (partnerships) who provide equity financing to under-capitalized businesses. Venture capitalists also may provide expert business and strategic advice and support. In return for financing or other assistance, the venture capital firm usually receives an equity or ownership stake in the company. Some may become active owners, while others may take stock or stock options assuming more of a lender profile, allowing the original owner to run the company provided a certain level of financial performance is achieved.

Actual Use: There are fewer than 1,000 traditional venture capital firms in the United States. These companies fund about 2,000 businesses each year investing $3 billion of the $30 billion in total annual venture capital. Start-up businesses represent around 15% of their total investments, or fewer than 250 businesses. Traditional venture capital firms require applicants to have a detailed business plans, and may also require extensive additional information about the concern and its principals. Traditional venture capitalists are highly selective. There are a limited number of green venture capital firms. For example, the Environmental R&D Capital Corporation was begun in 1994 to invest in emerging growth opportunities in and related to the environmental industry. Pauley Financial invests in environmental and high technology companies. A larger number of other firms such as Hambrecht & Quist and Ventures West include environmental businesses as one of a number of investment specialities.

Potential Use: Traditional venture capitalists will be interested in any small and/or environmental business with a potentially valuable idea, product and/or service that has a good business plan and the management skills to successfully implement it. There is room for growth in the number of green venture capital firms or venture capital firms with environmental investments as a speciality.

Advantages: Most venture capital firms can provide a quick answer to a business seeking financing assistance. Such companies can provide substantial financial assistance, usually exceeding $500,000.

Limitations: Traditional venture capital companies invest mainly in businesses with extremely high growth potential offering the opportunity for substantial investment returns within 3-5 years. Venture capitalists may demand large ownership stakes in return for risking their capital on new or unproven products or owners. They rarely invest in a service business as profit margins are too low.

Reference for Further Information: Blechman, Bruce Jan, and Levinson, Jay Conrad, *Guerilla Financing: Alternative Techniques to Finance Any Business*, Houghton Mifflin Company, 2 Park Street, Boston, Massachusetts 02108, November 1991. See also *Guerilla Selling and Guerilla Marketing*, Levinson et. al., 1992 and 1993.

OTHER

Description:

Actual Use:

Potential Use:

Advantages:

Limitations:

Reference for Further Information:

COMPARISON MATRIX FOR SMALL BUSINESS/EGSI - EQUITY CAPITAL

Criteria/ Equity Tool	Actual Use	Revenue Size	Administrative Ease	Equity	Financial Leveraging	Environmental Benefits
*Agriculture: Alternative Agricultural Research and Commercialization Corporation	High	Mod. - High	Mod.	Mod.	High	High
*Angels (Personal Investors)	High	High	Mod.	Mod. - High	Mod.	High
*Business Plans	High	High	Mod. - High	High	High	Mod.
*Commerce: SBA Angel Capital Electronic Network	Mod.	Low	Mod.	High	High	High
Commerce: SBA Small Business Innovation Research Program	Mod.	Mod.	Mod.	High	High	High
*Commerce: SBA Small Business Investment Companies	High	High	Mod.	High	High	High
Environmental Capital Network	Low	Low	High	Mod.	High	Mod.
Environmental Opportunity Funding Corporation	N.A.	Low	Mod.	Mod.	Mod.	Mod.

COMPARISON MATRIX continued

Criteria/ Equity Tool	Actual Use	Revenue Size	Administrative Ease	Equity	Financial Leveraging	Environmental Benefit
***Franchising**	High	High	Mod.	Mod.	High	High
Investment Forums	Mod.	Low	High	Low-Mod.	Low	Low-Mod.
***Investment Networks**	High	High	High	High	Low	Mod.-High
***Joint Ventures**	High	Mod.-High	Low-Mod.	Mod.	High	High
***Private Placements**	High	High	Mod.	Mod.	High	High
Public Offerings	High	High	Low	Low	High	High
***Strategic Alliances**	High	High	High	Low-Mod.	High	High
***Venture Capital**	High	High	High	Mod.	High	Mod.-High

High - Used by a majority of small businesses; other criteria score high (e.g., investors willing to incur risk or lend expertise; relatively simple and flexible, available at reasonable interest costs; highly leveraged and influences success/stability of business)

Mod.- Used by many small businesses; other criteria score in medium range

Low - Low or rare use so far; risk-adverse, complicated, and expensive; one or more major implementation problems exist

*Star indicates best rated mechanisms

10.B. DEBT

10.B. DEBT

Description: Debt financing for small business and the Environmental Goods and Services Industry (EGSI) includes loans, notes, lines of credit, bonds, leases, and various credit enhancements. Debt financing is the most traditional method of financing, but is less creative and flexible than equity financing. Under debt arrangements, the lender or creditor acquires a prior claim to the income, earnings or assets of the borrower for interest and principal repayment, which must be paid before equity investors/owners are repaid. Borrowing may be short- or long-term, secured or unsecured.

Advantages: Debt financing may be a relatively low cost in times of low interest rates and for established, credit-worthy customers. Moreover, many interest costs are deductible from taxable income. Debt financing also entails no dilution of equity in the business, since creditors are entitled only to the rate of interest specified and repayment of principal when due. Likewise, creditors have no voice in the conduct of the business, except to the extent that restrictive provisions might be included, for example, in bond covenants. Some forms of debt financing may be more readily available than equity financing, since major institutional investors such as banks and life insurance companies invest only or mainly in bonds and notes and, in good economic times, represent stable and "rich" sources of funding.

Disadvantages: The disadvantages of debt financing are that the quantity and quality of institutional lending is influenced by swings in general economic conditions. Debt financing also is much less predictable and more costly as a source of funding for small, start-up businesses than for larger, established corporations. Interest on debt is a fixed charge that must be paid even when earnings decline. If a business suffers an operating deficit, its loss will be increased by the need to pay interest and these losses also will offset any advantages to interest deductibility from taxes. Fixed interest charges limit managerial discretion in formulating business policies, and in difficult economic times the need to maintain interest payments may lead to a decline in business investment in operations and maintenance and strategic initiatives. There is always the threat that default may occur, and foreclosure ensue. Many enterprises find it advantageous to preserve their borrowing power as a last recourse, but small businesses often do not have this option.

Summary: The debt mechanisms described here range form traditional commercial loans and bonds, new types of leasing arrangements and a multitude of federally-sponsored programs such as those of the Small Business Administration, credit unions, and even international programs. Small business, in particular, may wish to combine debt and equity financing. Government grants and loans may be less intrusive than equity financing, since lenders may require only repayment and not any other personal stake in the recipient's company. Other debt financing and State/local government methods are available including personal loans and loan guarantees , some of which are described in **Section 2.B.: Loans**.

LIST OF DEBT TOOLS
(In Alphabetical Order)

1. Agriculture: Rural Business-Cooperative Service -- Intermediary Relending Program
*2. Bank/Insurance Financing
*3. Commerce: Small Business Administration (SBA) -- Business Development Corporations
*4. Commerce: SBA -- LOWDOC and FA$TRAK Loans
*5. Commerce: SBA -- Minority and Women's Prequalification Pilot Loans
6. Commerce: SBA -- Section 504 Certified Development Companies
*7. Commerce: SBA -- Section 7(a) Loan Guarantees
*8. Commerce: SBA -- Section 7(m) Microloans
9. Commerce: SBA -- Short Term Loans and Revolving Lines of Credit
10. Community Reinvestment Act
*11. Convertible Debt
*12. Credit Analysis
13. Credit Cards
*14. Export-Import (EX-IM) Bank
15. Foundations: Program-Related Investments
*16. Leasing
*17. Mezzanine Financing
18. Micro-Loan Funds
19. National Cooperative Bank
20. National Credit Union Administration: Community Development Revolving Loans
21. Receivables Factoring (Accounts Receivable Financing)
*22. Surety Bonds
23. Treasury: Community Development Financial Institutions Fund

* Stars indicate most highly rated mechanisms as described in the Comparison Matrix at the end of the narratives. See Introduction to the Guidebook for a description of the criteria used. Ratings of "High", "Moderate", "Low" are for comparison purposes only, as some ratings are necessarily subjective and data are incomplete.

DEPARTMENT OF AGRICULTURE
RURAL BUSINESS-COOPERATIVE SERVICE
INTERMEDIARY RELENDING PROGRAM

Description: The Intermediary Relending Program (IRP) provides loan funds for business facilities and community development projects in rural areas. Intermediary recipients include private non-profit corporations, public agencies, Indian groups, and rural cooperatives, which provide loans to ultimate recipients. The maximum loan to any one intermediary is $2 million. The maximum loan maturity is 30 years and the interest rate is fixed at one percent per annum. A reserve for bad debts of six percent of outstanding loans must be accumulated over three years and then maintained. Loans made by an intermediary to an ultimate recipient are limited to no more than 75 percent of the financed project costs or no more than $150,000. Both intermediaries and ultimate recipients (borrowers) must be unable to obtain the loan at reasonable rates and terms through commercial credit or other federal, State or local programs.

Actual Use: This is not a new federal program, but it has been administered by the Department of Agriculture only since 1995. Loans have ranged from $250,000 to $2 million and have average $773,810. In Fiscal Year (FY) 1997, 77 loans were approved from 135 applications and loan obligations totaled $37.6 million. The Department estimates that loan obligations will be $37.1 million and $35 million in FYs 1998 and 1999, respectively..

Potential Use: Pollution control and abatement are eligible purposes for loans by intermediaries to ultimate borrowers.

Advantages: The purpose of the program is to provide below-market interest rate loans to businesses unable to finance the proposed project through commercial credit or other government programs at reasonable rates and terms. Loans to intermediaries are at a very low fixed interest rate of one percent.

Limitations: This is not a grant program, but a federal loan to the intermediary, which cannot use loan funds for administrative or technical assistance expenses. Applications for potential intermediaries are considered in a quarterly national competition. An ultimate recipient cannot be located in a city with a population of 25,000 or more.

Reference for Further Information: See pages 6045-6063, Volume 63, Number 25, Federal Register, February 6, 1998. U.S. Department of Agriculture, Rural Business-Cooperative Service, Room 6321, South Agriculture Building, Washington, DC, Telephone: 202-690-4100, Internet: **http://www.rurdev.usda.gov/rbs/index.html**.

BANK/INSURANCE FINANCING

Description: Banks extend credit (commonly through loans and lines of credit) to businesses and individuals for a wide variety of reasons. A bank typically loans money for a specific period of time with the borrower paying a fixed payment each month that consists of a portion of the amount borrowed plus an interest charge. The interest charge covers the bank's expenses and the risk it assumes in making the loan. There are two types of bank loans, secured and unsecured. For secured loans, the borrower puts up collateral such as real estate, stocks, business assets, or something else of value that the bank can take if the borrower defaults on the loan. Unsecured loans are based on the credit of the borrower and often have a higher interest rate. Lines of credit are open accounts that can be drawn upon as needed up to their limit. They have a higher interest rate than most loans.

Actual Use: There are over 9,000 federally insured commercial banks in the United States. These banks make the majority of business loans in the country. Banks usually extend credit to stable, profitable businesses and individuals to help pay for business operations and expansion. They finance just about any asset for any business reason except for most types of business starts-ups. Bank loans for small businesses may range in size from a few thousand dollars to a few hundreds of thousand. Small business lines of credit generally have a smaller upper limit than loans.

Potential Use: Bank financing is a good option for established businesses that are profitable and have a good credit record. This generalization should hold true for any small businesses and any business in the environmental goods and services industry that fits this profile.

Advantages: Banks will make loans and offer lines of credit at reasonable interest rates to established businesses/people who need money for good reasons. Banks often lend to franchise businesses even as start-ups. Bank loans are a good source of financing for specific large purchases or business activities that will increase profitability. Banks may offer conveniences to their customers such as telephone or online funds transfers, single-account credit cards and checks, and detailed record keeping on accounts.

Limitations: Banks rarely lend to start-up businesses and to businesses in financial difficulties. For example, banks will usually not loan money to cover business operating losses. Banks may be hesitant to loan money to even profitable businesses in industries that are in a recession. Lines of credit are generally more expensive than loans.

Reference for Further Information: American Bankers Association (ABA), 1120 Connecticut Avenue, NW, Washington, DC, Telephone: 202-663-5221, Internet/World Wide Web site: **http://www.aba.com/abatool/showme_rel.html?location=homepage** or **http://www.aba.com/**.

DEPARTMENT OF COMMERCE
SMALL BUSINESS ADMINISTRATION
BUSINESS DEVELOPMENT CORPORATIONS

Description: Business development corporations or BDCs are special-purpose institutions owned by private investors, financial institutions or large corporations, that are chartered and licensed by States to make loans to small businesses with the primary goal of job creation. Funding for BDCs is generally provided by participating financial institutions and corporations who interests are tied to making small business loans and increasing the availability of jobs.

Actual Use: As of 1996, fifteen States had BDCs including Arkansas, Georgia, Iowa, Kansas, Maine, Massachusetts, Mississippi, Montana, Nebraska, New Hampshire, New Mexico, New York, North Dakota, South Carolina, and Wyoming. BDCs can make conventional loans, enter into purchase/leasebacks, make SBA-guaranteed loans, and provide venture capital.

Potential Use: Business development corporations could be used to support or create small businesses working directly in, or in support of, the environmental goods and services industry. Alternatively, they might support an industry sub-sector such as environmental remediation firms involved in the assessment and cleanup of brownfields properties. BDCs could potentially be developed and established in all fifty States. In addition, some Indian Tribes may wish to adopt this particular financing strategy.

Advantages: BDCs generally qualify as lenders under the Small Business Administration's 501 program, which means they can make loans 90% guaranteed by the SBA. Some BDCs own and operate their own Small Business Investment Companies, enabling them to provide venture investment capital along with debt financing.

Limitations: Business development corporations are limited to the States supporting the concept and BDC assistance is limited to small businesses.

Reference for Further Information: U.S. Small Business Administration, 409 3rd Street, SW, Washington, DC 20416, Telephone: 202-205-6600. Association of Small Business Development Centers, 1050 Seventeenth Street, NW, #810, Washington, DC 20036, Telephone: 202-887-5599. State Departments of Commerce or Economic Development are also a good source of information about BDCs. Information on these and other State agencies can be accessed on the World Wide Web using FinanceNet, the Internet's home for public financial management information. FinanceNet is located at **http://www.financenet.gov**.

DEPARTMENT OF COMMERCE
SMALL BUSINESS ADMINISTRATION
LOWDOC AND FA$TRAK LOAN PROGRAMS

Description: The LowDoc (low documentation) and FA$TRAK loan programs are streamlined variations of the Section 7(a) Loan Guarantee Program limited to loans of no more than $100,000. LowDoc offers a simple, one-page application form (Form-4-L) and quick turnaround on loan reviews. The applicant must first satisfy all of the lender's requirements, then the lender may request a LowDoc guaranty, up to 80% of the loan amount. Completed applications are usually processed by SBA within two or three days of receipt from the lender. Consequently, the loan decision process relies heavily upon the strength of the applicant's character and credit history. Business startups and firms with fewer than 100 employees and average annual sales not exceeding $5 million for the past three years are eligible.

FA$TRAK is a pilot program with a limited number of lenders who are authorized to use their existing documentation and procedures to make, service and liquidate SBA guaranteed loans. There are no additional forms and no waiting for SBA loan approval. Under this program SBA may guarantee up to 50 percent of the loan but the terms, interest rates and uses are the same as for any 7(a) loan. Maturities of term loans are usually 5 to 7 years for working capital and up to 25 years for real estate or equipment. Revolving credits must have a termination date not more than 5 years after the first disbursement. The interest rate on a fixed rate loan must not exceed the Prime rate plus 2.25 percent if the maturity is less than seven years and Prime plus 2.75 percent if the maturity is seven years or longer. However, for loans of less than $25,000 the maximum interest rate . The SBA optional peg rate for variable rate loans is calculated and published quarterly in the *Federal Register*.

Actual Use: In Fiscal Year 1997, the SBA made 14,738 LowDoc loans and 4,103 FA$TRAK loans, although relatively few lenders have been certified for FA$TRAK.

Potential Use: Small firms can use a LowDoc or FA$TRAK loan to pay for needed environmental equipment.

Advantages: Because the loan decision process relies heavily upon the strength of the principal's character and credit history, good ideas may be given less weight.

Limitations: SBA limits on firm size are lower for LowDoc guarantees and the percentage of the loan guaranteed is lower under FA$TRAK.

Reference for Further Information: U.S. Small Business Administration, 409 Third Street, SW, Washington, DC 20416, Telephone: 800-827-5722, Internet: **www.sbaonline.sba.gov/**.

DEPARTMENT OF COMMERCE
SMALL BUSINESS ADMINISTRATION
MINORITY AND WOMEN'S PREQUALIFICATION PILOT LOAN PROGRAMS

Description: As variations on the Section 7(a) loan guarantee program, the Minority and Women's Prequalificaition Pilot Loan Programs use non-profit and for-profit intermediaries to assist prospective minority and woman borrowers in developing viable loan application packages. To be eligible, a business must be at least 51% owned and operated by racial/ethnic minority or women. It also must employ 100 or fewer and have had $5 million or less annual sales for the past 3 years. Once the loan package is assembled, it is submitted to the SBA for expedited consideration. The focus is on credit history, ability to repay, and probability of success. A decision usually is made within three days. If the application is approved, the SBA issues a letter of prequalification stating the SBA's intent to guarantee the loan. The maximum amount for loans under the programs is generally $250,000, although some districts set other limits for minority loans. SBA will guarantee up to 80% of loans no larger than $100,000 and 75% of loans up to $250,000. The intermediary then helps the borrower locate a lender offering the most competitive interest rates. Intermediaries (usually small business development centers) may charge a reasonable fee for loan packaging. Generally, fees charged by for-profit organizations will be higher than those charged by non-profits. Two different forms are used, Form MPQ-APPL for minorities and Form WPQ-APPL1 for women.

Actual Use: The minority program has operated since April 1995, with over $26 million in guaranteed loans. Both programs are pilots but appear likely to be retained.

Potential Use: Woman and minority owned firms can use SBA guaranteed loans to pay for needed environmental equipment.

Advantages: The use of intermediaries to assist potential borrowers in developing viable loan packages has allowed SBA to expedite consideration of applications.

Limitations: The minority program is available at 16 pilot sites and the women's program is available statewide in 6 states and elsewhere in 11 metropolitan cities. Limitations of the Section 7(a) guarantee program apply to both programs.

Reference for Further Information: U.S. Small ;Business Administration, 409 Third Street, SW, Washington, DC 20416; Telephone: 800-827-5722 or 202-205-6673, Fax: 202-205-7064, Internet: **www.sbaonline.sba.gov/.**

DEPARTMENT OF COMMERCE
SMALL BUSINESS ADMINISTRATION
SECTION 504 CERTIFIED DEVELOPMENT COMPANIES

Description: Under Section 504 of the Small Business Investment Act, the Small Business Administration (SBA) guarantees debentures issued by private nonprofit Certified Development Companies (CDC's) to provide up to 40 percent of a long-term, fixed-rate financing package for major fixed assets. The guaranteed loans are to assist small businesses in the acquisition of land and building, construction, expansion, renovation and modernization, machinery and equipment. Typically, the small business must provide at least ten percent equity and a private-sector lender must provide fifty percent of project cost, in return for a senior lien. The maximum SBA-guaranteed debentures generally is $750,000, but may be up to $1 million. Interest rates are pegged to an increment above the current market rate for five-year and ten-year U.S. Treasury issues. Maturities of ten and twenty years are available. Fees approximate three percent of the face amount of the debenture and may be financed with the loan. The project assets being financed are used as collateral and personal guaranties of the principal owners are also required.

Actual Use: There are about 290 Certified Development Companies that can participate. SBA guarantees have averaged approximately $350,000 and have been as much as $1 million. In Fiscal Year (FY) 1997 guaranteed loan obligations were $2.65 million. SBA guaranteed loan obligation estimates for FYs 1998 and 1999 are $1.7 million and $3 million, respectively.

Potential Use: Section 504 debentures can be used in conjunction with senior private lending to finance major fixed assets needed to meet environmental requirements.

Advantages: The SBA-guaranteed portion of a total financing package serves as a credit enhancement. CDC's work with private sector lenders to make loan financing deals feasible.

Limitations: For fiscal 1998 the estimated program volume is only $1.73 million. SBA expects one job to be created, on average, for every $35,000 guaranteed. The business cannot have a tangible net worth in excess of $6 million and cannot have an average net income in excess of $2 million after taxes for the preceding two years. In addition, the business cannot be engaged in speculation or investment in rental real estate.

Reference for Further Information: Contact Office of Loan Programs, Small Business Administration, 409 Third Street, SW, Washington, DC 20416, Telephone: 202-205-6485 or 800-)827-5722, Fax: 202-205-7064, Internet: **www.sbaonline.sba.gov/financing/**.

DEPARTMENT OF COMMERCE
SMALL BUSINESS ADMINISTRATION
SBA SECTION 7(a) LOAN GUARANTEES

Description: Section 7(a) of the Small Business Act authorizes the Small Business Administration (SBA) to guarantee commercial loans to small businesses that cannot get financing on reasonable terms via normal lending channels. Eligibility is determined by the type and size of business, use of the loan, and certain special circumstances. As a rule, an independently owned and run business which is not dominant in its industry will be eligible. The SBA has developed industry-specific size standards in terms of number of employees or sales revenues. Holders of at least 20% ownership in a business usually must guaranty the loan. The basic loan guaranty program is used for long-term loans to qualified firms for purposes such as real estate acquisition, working capital, or purchase of inventory or equipment. The SBA can guarantee 75% of the loan amount up to $750,000 and 80% of loans of $100,000 or less. The interest rate on a fixed-rate loan of $50,000 or more is not to exceed 2.75 over the prime lending rate. Maturities are for up to 10 years for working capital and up to 25 years for fixed assets; however, they may be shorter, depending on the borrower's ability to repay. Equipment loan maturities cannot exceed the life of the equipment. SBA charges lenders a guaranty fee of 2% of the guaranteed portion of the loan when it is $80,000 or less; 3% of the guaranteed portion of the loan if it is more than $80,000 but less than $250,000; 3.5% of the next $250,000, up to $500,000; and 3.875% of the guaranteed portion over $500,000. All loans have a 0.5% annualized servicing fee on the outstanding balance of SBA's guaranteed portion of the loan.

Actual Use: Section 7(a) guaranteed loans account for more than 95% of the dollar volume of SBA's lending activity. The SBA approved 34,610 loans totaling $7.8 billion in Fiscal Year 1997. SBA loan estimates for Fiscal Years 1998 and 1999 are $8.9 billion and $10 billion, respectively.

Potential Use: SBA guaranteed loans could be used to buy equipment needed to meet environmental requirements and for purposes related to producing and marketing environmentally friendly goods.

Advantages: The SBA guarantee gives small firms access to loan funds not otherwise available by protecting lenders against loss.

Limitations: A bank may not be interested in processing an application for an SBA-guaranteed loan because of the limited interest rate. SBA guaranteed loans cannot be used for real estate held primarily for investment. Also, SBA size standards for small businesses limit eligibility to firms below certain revenue or employment levels, as a general rule. There is a $500,000 loan limit.

Reference for Further Information: U.S. Small ;Business Administration, 409 Third Street, SW, Washington, DC 20416, Telephone: 800-8-ASK-SBA, Internet: **www.sbaonline.sba.gov**/or **www.business.gov/**. See also: **www.sbaonline.sba.gov/regulations/siccodes** for SBA small business size standards by Standard Industrial Classification (SIC) codes.

DEPARTMENT OF COMMERCE
SMALL BUSINESS ADMINISTRATION
SECTION 7(m) MICROLOANS

Description: Under Section 7(m) of the Small Business Act, the Small Business Administration (SBA) uses non-profit organizations with experience in lending and technical assistance as intermediary landers to make short-term loans of fro under $100 up to $25,000. Although microloans may not be used to purchase real estate or pay existing debts, they may be used for working capital and to buy machinery and equipment, furniture and fixtures, inventory, and supplies. Virtually all types of for-profit businesses that meet SBA eligibility requirements can qualify for a microloan and complete applications can usually be processed in less than one week. The average loan size has grown from $10,000 to $10,500 and the loan maturity may be as long as six years. Interest rates are pegged to no more than four percent over the prime rate. In most cases, any assets bought with the microloan serve as collateral and the personal guaranties of the business owners are required.

Actual Use: Started as a demonstration program in 1992, the program has become a regular part of SBA's complement of tools. In Fiscal Year (FY), the program made available approximately $19.5 million for direct loans, $24.6 million for loan guarantees, and $12.9 million for technical assistance grants available in fiscal 1998. Program estimates for FY 1999 are $60 million in direct loans, $11.9 million in loan guarantees, and $12 million in technical assistance grants.

Potential Use: SBA microloans have a maximum loan amount large enough for very small firms to pay for many types of environmental measures which might be required or to provide working capital needed by a small environmental services venture.

Advantages: Microloans can provide needed capital to start an environmental services business or produce/market environmentally friendly goods.

Limitations: Interest rates are not subsidized and borrowers risk losing personal property based on required personal guarantees if they cannot pay back loans. Also, relatively easy availability of microloans can cause some businesses to borrow less than they really need.

Reference for Further Information: U.S. Small Business Administration, 409 Third Street, SW, Washington, DC 20416, Telephone: 800-827-5722 or 202-205-6485, Fax: 202-205-7064, Internet: www.sbaonline.sba.gov/.

DEPARTMENT OF COMMERCE
SMALL BUSINESS ADMINISTRATION
SHORT TERM LOANS AND REVOLVING LINES OF CREDIT (CAPLines)

Description: A line-of-credit, or bank line, is a moral, as opposed to a contractual commitment, to make loans to a borrower up to a set maximum during a set period, usually a year (see **Section 3., Letter of Credit/Lines of Credit**). It is not typical to charge a commitment fee but it is common to require that compensating balances be kept on deposit. A revolving line-of-credit is an agreement between a bank and a customer whereby the bank extends a line-of-credit during the term of the agreement, usually a year or more. The customer can convert it to a term loan by borrowing as needed. As the borrower repays the loan, an amount equal to the repayment can be borrowed again under the terms of the agreement. In addition to interest on loans, the bank charges a fee for the commitment to hold funds available. A compensating balance also may be required.
CAPLines is the SBA collection of five programs for helping small businesses meet short-term and cyclical working capital needs. Most of the regulations governing the Section 7(a) loan guarantee program govern CAPLines. Except for the Small Asset-Based Line, SBA usually can guarantee up to $750,000 from a commercial lender. Seasonal Liens are revolving or non-revolving working-capital advances against anticipated inventory and accounts receivable during peak seasons for firms that experience seasonal fluctuations. Contract Lines pay the direct labor and material cost of performing assignable contracts. Builders Lines finance direct labor and material costs, with a commercial or residential construction or rehabilitation project as collateral. Standard Asset-Based Liens are revolving lines of credit for firms unable to meet credit standards associated with long-term credit. Small Asset-Based Lines are asset-based revolving lines of credit of up to $200,000.

Actual Use: Lines-of-credit are common in commercial bank lending, particularly to meet customers' working capital needs. Guarantees of working capital account for a significant percentage of SBA's Section 7(a) funds.

Potential Use: Guarantees or lines of credit can provide the capital needed by small firms to meet payroll, acquire inventory or pay other costs involved in producing environmental goods/services.

Advantages: SBA guarantees let companies obtain otherwise unavailable or unaffordable capital

Limitations: SBA limits on firm size could preclude some growing environmental goods and services companies from eligibility.
Reference for Further Information: U.S. Small Business Administration, 409 Third Street, SW, Washington, DC 20416, Telephone: 800-827-5722 or 202-205-6485, Fax: 202-205-7064, Internet: **www.sbaonline.sba.gov/** or **www.business.gov/**.

COMMUNITY REINVESTMENT ACT

Description: The Community Reinvestment Act (CRA) of 1977 requires federally insured banks and thrift institutions to make capital available in low- and moderate-income communities. Regulations are issued and compliance audits are performed by the Comptroller of the Currency and Office of Thrift Supervision, the Federal Reserve Board, and the Federal Deposit Insurance Corporation (FDIC). Institutions are required to prepare CRA Statements indicating the types of credit they offer in their local communities and to maintain a file of public comments on their CRA performance. They are evaluated by the regulatory agencies on twelve assessment factors relating to ascertainment of community credit needs, types of credit offered and extended, discrimination and other illegal credit practices, and participation in community development. Possible performance ratings range from substantial noncompliance to outstanding. Federal regulators are required to consider institutions' CRA records in their reviews of applications for expansions or restructuring. Although there is a tendency to emphasize economic development, the definition of community development includes environmental clean-up or redevelopment of an industrial site as part of an effort to revitalize the low or moderate income community in which the property is located.

Actual Use: All federally chartered or insured depository institutions that grant credit to the public in the ordinary course of business are covered by a continuing and affirmative obligation to help meet the credit needs of their entire communities. Some institutions have better records than others.

Potential Use: The CRA requirement can be used to help persuade regulated financial institutions to participate meaningfully in environmental clean-up. This can be helpful to small firms needing bank loans to finance environmental equipment or pay for environmental services.

Advantages: Regulated lenders tend to be more responsive to credit needs in the communities they serve. Many are more receptive to participation in federal programs such as Small Business Administration loan guarantees.

Limitations: Credit unions are not covered and small institutions are not required to collect CRA information or report their community reinvestment activities.

Reference for Further Information: Comptroller of the Currency, Compliance Management Division, 250 E Street, SW, Washington, DC 20219. Federal Deposit Insurance Corporation, Office of Consumer Affairs, 550 Seventeenth Street, NW, Washington, DC 20429, Internet address: **www.fdic.gov/**; Board of Governors of the Federal Reserve System, Division of Consumer and Community Affairs, 20th & Constitution Avenue, NW, Washington, DC 20551; Office of Thrift Supervision, Compliance Programs, 1700 G Street, NW, Washington, DC 20552; Federal Financial Institutions Examination Council, 2100 Pennsylvania Avenue, NW, Suite 200, Washington, DC 20037. See also EPA's web site at: **www.epa.gov/swerosps/bf/html-doc/cra.htm**

CONVERTIBLE DEBT

Description: Convertible debt is loan instrument obtained from a potential capital investor that can be converted to equity in the business under certain conditions at some future date. The lender earns interest on the loan until it is either paid off or the conversion option exercised. The decision regarding whether or not to convert the debt to equity usually rests with the lender. Convertible debt offers lender/investors flexibility by permitting them to control some of the risks and rewards of their investment. The lender or potential investor may be a venture capital firm, a financial institution, a Small Business Investment Corporation, or individual angel investors.

Actual Use: The most common forms of convertible debt issued by businesses are securities such as debentures or bonds and stock options. Many businesses, including small companies, use convertible debt as a means of raising capital to finance business start-ups and/or expansion. In 1996 alone, U.S. companies raised approximately $13 billion dollars through the issuance of an ever expanding array of convertible securities. At the current pace, securities convertible into stock alone should constitute three to four percent of the total capital raised by all companies nationwide.

Potential Use: The growing use of convertible debt is projected to continue over the next few years although maybe not at such dramatic rates as enjoyed in 1996. Convertible debt is a valuable financing tool that has the potential to help any business. Small businesses in the environmental goods and services industry should certainly evaluate this alternative when looking to raise capital.

Advantages: Convertible debt is an option that is often suggested by the lender making its eventual implementation more likely to succeed. This financing option is a way that potential investors can control some of their risk when they may not feel totally confident about an investment. It also affords the business the opportunity to negotiate down the future equity offer in return for higher debt interest returns on the debt up-front.

Limitations: Convertible debt is still debt and will be reflected on a company's balance sheet. This may make it difficult for the company to borrow in the future until the convertible debt is repaid or converted to equity. Convertible debt is usually more expensive than a straight business loan and more complicated than a straight investment.

References for Further Information: *INC. Magazine Archives*, INC. Online. This source is located on the World Wide Web at **http://www.inc.com/incmagazine/**. Another good source is *CFO Magazine* located on the Web at **http://www.cfonet.com/**.

CREDIT ANALYSIS

Description: A credit analysis is the process of measuring a credit applicant's ability and willingness to repay debt. It is an assessment of the probability that a potential customer will pay on time and in full. The standard framework for credit analysis that has developed over a number of years includes the "*four C's of credit,*" capacity, capital, character, and conditions. The definition of these terms as they apply to credit applicants, both individual and businesses, are:

- Capacity: a measure of ability to pay debts out of discretionary income (salary less living expenses and other debt) under normal conditions;
- Capital: the difference between the assets and liabilities (their equity or savings);
- Character: the desire to meet or fulfill responsibilities based on references and prior debt-repayment record; and
- Conditions: any special circumstances that are beyond the control of credit applicants and will be temporary in nature.

The information in these four areas is gathered through a review and analysis of the applicant's credit history (including payment practices), financial statements (looking at liquidity and solvency), and records on file with credit reporting companies (such as Dun and Bradstreet)/ bureaus; discussions with bankers and suppliers; and applicant interviews. The detail of the credit analysis will be based on a ongoing comparison of the value of information obtained with the benefits gained.

Actual Use: Credit analyses of one form or another are performed routinely by banks, savings and loans, other financial institutions, investors, businesses, and individuals whenever extending credit to a business or individual. The intensity of the credit analysis is directly related to the amount of money involved.

Potential Use: If small and/or environmental businesses seek credit from an established professional financing source, they will likely undergo a credit analysis, whether they know it or not.

Advantages: A credit analysis helps protect the lending party from poor credit risks. If shared with the applicant, credit analysis information can reveal valuable facts about their business or finances.

Limitations: A credit analysis does not provide answers, only information. The credit decision must be made by the lending party and only time will tell whether the right decision is made.

Reference for Further Information: The credit department of any bank, savings and loan, finance company, or other lending institution. Basic financial management texts in local libraries.

CREDIT CARDS

Description: Millions of credit cards are issued to individual and businesses each year by banks and other financial institutions. These cards, both personal and corporate, represent de facto lines of credit or potential debt. They can be used to pay for almost any expense within the credit limits of the particular account. Credit cards may be revolving accounts that roll over debt on a monthly basis while charging interest rates of up to 21 percent or more. Alternatively, they may be the equivalent of simple cash advances that must be repaid in full each month.

Actual Use: Small, medium, and even large-sized companies frequently use credit cards on a frequent and ongoing basis to meet a wide variety of business needs ranging from travel and accommodation expenses to the purchase of office supplies and small equipment. Many entrepreneurs/small businesses use credit cards (sometimes extensively) to help finance their business start-ups. The financial entities that issue credit cards also frequently supply their card holders with special checks that can be drawn against their credit card accounts. These checks can even be used to pay some business suppliers who normally might not accept a credit card.

Potential Use: Properly used, credit cards will continue to represent a good source of modest amounts of debt capital for small- and other-sized businesses. These cards will remain an excellent choice for meeting any business expenses that can, and will be, repaid in a short period of time (less than two months). The use of credit cards for business-related travel is one area that is expected to continue to enjoy strong growth. Many airlines, hotels, car rental agencies, and other travel-related businesses are increasingly showing preference for travelers who use credit cards.

Advantages: Credit cards can be obtained even by start-up businesses that cannot get other types of credit. Credit cards are a good supplemental source of money for meeting unexpected expenses and making needed but unplanned emergency purchases. These cards are a good tool to use when you need to isolate and/or itemize in detail certain specific types of business expenses such as travel and office supplies.

Limitations: Credit cards are normally not a good tool for financing large amounts of debt. Financing business expenses with credit cards can be extremely costly if the debt incurred is not repaid promptly. Credit cards must be used responsibly (with restraint) by businesses and employees or serious financial problems may develop. Misuse of credit cards can seriously impair the credit rating of businesses and individuals.

Reference for Further Information: *Credit Crossroads is* a credit library with information on credit cards, credit reports, bankruptcy, and credit repair. For information on *Credit Crossroads*, contact by E-mail: **moester@perdue.cdu**, Telephone: 765-494-8718, Fax: 765-494-0869.

EXPORT-IMPORT (EX-IM) BANK

Description: The Export-Import (Ex-Im) Bank is responsible for assisting the export financing of U.S. goods and services through loan, guarantee programs. Two assistance priorities are sm all business and environmental exports. The Environmental Exports Program includes a short-term loan and guarantee programs. The Environmental Export Insurance Policy provides multi-buyer or single -buyer coverage. It protects the exporter against loss for up to 180 days with 95 percent commercial and 100 percent political coverage, no deductible, and a "hold-harmless" assignment of export receivables. Exports generally considered eligible include toxic material handling devices, effluent pollution control devices, effluent pollution control devices, and instruments to measure or monitor air or water quality. Loan repayment terms are the maximum permissible under Organization for Economic Cooperation and Development (OECD) guidelines. Generally, available financial assistance includes the Working Capital Guarantee Program, Export Credit Insurance, and Direct Loans and Guarantees. Working capital guarantees cover 90 percent of the principal and interest on commercial loans to creditworthy small and medium-size companies that need funds to buy or produce U.S. goods or services for export. Guarantees of commercial loans to foreign buyers of U.S. goods or services cover 100 percent of principal and interest against both political and commercial risks of nonpayment. Direct loans provide foreign buyers with competitive, fixed-rate financing for their purchases from the U.S.

Actual Use: Ex-Im Bank programs are used extensively to support U.S. exports to higher risk foreign markets, including nations where there are no political risks.

Potential Use: Ex-Im Bank programs can assist firms in exporting environmental goods and services by substantially reducing risks which might otherwise preclude their involvement in exporting.

Advantages: Encouraging and assisting environmental exporting, particularly by small firms, is an Ex-Im Bank priority.

Limitations: Ex-Im Bank generally will not assist exports of most military-related goods and services or insure export sales of goods with more than 50 percent foreign content. Only firms qualifying as small businesses under Small Business Administration guidelines are eligible for the short-term Environmental Export Insurance Policy.

Reference for Further Information: The Export-Import Bank has a U.S. toll-free number, 800- 565-3946, to provide information on the availability and use of working capital guarantees, export credit insurance, direct loans and guarantees, and other programs. The toll-free number can be used for fax retrieval by pressing 1, then 2, at the voice prompts. The mailing address is 811 Vermont Avenue, NW, Washington, DC 20571, and the Internet address is **www.exim.gov**. Regional offices are located in New York City, Miami, Chicago, Houston, and Long Beach.

FOUNDATIONS: PROGRAM-RELATED INVESTMENTS

Description: A program-related investment is a loan or other investments made by a foundation to a for-profit or non-profit organization for a project related to the foundation's stated purpose and interests. Foundations make program-related investments mainly to maximize the impact of their programs, provide an alternative form of financing when grant making is inappropriate or insufficient, and recycle dollars to increase funding availability. Program-related investment tools include loans, which are used most, and loan guarantees, equity investments, asset purchases, and linked deposits. Investments are often made from a revolving fund and may involve loan guarantees, purchases of stock or other kinds of financial support in addition to loans. The foundation generally expects to get its money back with limited, or below-market, interest, which will then provide additional funds for loans to other organizations. Half of program-related investment dollars are used to provide capital to intermediary organizations, such as loan funds and development banks, which in turn lend funds to development agencies and service providers. A small number of foundations use program-related investments to acquire or improve property held for charitable purposes. Less than 8 percent of program-related investment dollars go for environmental purposes; however, the share of support for the environmental doubled between 1990 and 1995.

Actual Use: Only about 250 foundations make program-related investments and the Ford Foundation is by far the largest player in the field, accounting for perhaps a third of the total. The next largest, the John D. and Catherine T. MacArthur Foundation, has loaned or invested less than a third of the Ford Foundation's amount. Other top program-related investors include the Met Life Foundation, Packard Foundation, Prudential Foundation, and George Gund Foundation.

Potential Use: Program-related investments can be a source of low cost debt or equity capital to support an organization's environmental projects. Although only about 15% of foundations making these investments have made equity investments, most provide cash flow or bridge financing.

Advantages: Program-related investments offer a technique for foundations to assist for-profit entities either directly or indirectly. Nearly a third of those making program-related investments have been involved in capitalizing and earned income venture.

Limitations: Program-related investments are not grants. Although profit on the investment is not the objective, foundations expect to get their principal back so it can be reused. The number of foundations making program-related investments in any one year is relatively small and fluctuates form year to year. Evidence indicates that investments increase when the stock market inflates foundations' asset values. The median investments tend to be around $250,000.

Reference for Further Information: Contact The Foundation Center, 79 Fifth Avenue, New York, NY 10003-3076, Telephone: 800-424-9836 or 212-620-4230, Internet: **www.fdncenter.org/**.

LEASING

Description: A lease is a rental contract covering a specific period of time during which the owner of an asset (lessor) allows another party (lessee) to use the asset according to set terms in return for a series of regular fixed payments. There are two general types of leases, operating leases and capital leases. The former is a short-term (five years or less) instrument offered by equipment manufacturers that can frequently be canceled by the lessee before the expiration of its term. Maintenance and insurance are typically included in the operating lease payments. A capital, or finance lease, generally extends over a longer term equal to the useful economic life of the asset and cannot be canceled by the lessee. In this second type of lease, the lessee is responsible for personal property taxes, maintenance, and insurance.

Actual Use: Leasing is used by many businesses and its popularity is growing. U.S. Department of Commerce figures for 1995 reveal that twenty-eight percent of the estimated $571.1 billion spent by businesses on productive assets, was used for leasing. Lease financing is available from banks, finance companies, specialized leasing companies, and equipment manufacturers or retailers.

Potential Use: Leasing could be used by any environmental and other business that has to make important investments, but does not want to tie up large amounts of money. It could be a very efficient way for high technology environmental firms to acquire and use equipment that may soon become obsolete. These firms must have a good enough cash flow to make the lease payments.

Advantages: Leasing does not require a large up-front cash outlay. It can protect a firm against equipment obsolescence and inflation. Lease approvals can be much faster than loan approvals. Leases terms can be very flexible and customized to specific situations. Lease payments can be deducted as an operating expense and written off faster than depreciation of owned equipment.

Limitations: Leasing can result in the loss of a substantial depreciation tax deduction over time. Leasing eliminates any salvage value for equipment that might be realized when purchased equipment is finally sold. Interest rates for leases can be very high. You cannot borrow money in the future against the value of the lease as you can against equipment that is owned. The asset may be repossessed if a lease payment is missed.

Reference for Further Information: Great Lakes Environmental Finance Center Draft Report (prepared for U.S. EPA), *An Inventory and Assessment of Pollution Control and Prevention Financing Programs*, December 1996. Great Lakes EFC, The Urban Center, Cleveland State University, UB 215, Cleveland, OH 44115, Telephone: 216-687-4590, Fax: 216-687-9277, World Wide Web site: **http://www.csuohio.edu/glefc/**.

MEZZANINE FINANCING

Description: Mezzanine financing is interim financing which fills the gap that often exists in small business finance between equity capital and conventional, secured lending by banks and other senior lenders. Since it is usually subordinated to debt owed to senior lenders, mezzanine finance can make a company with an otherwise weak balance sheet more attractive to banks and other sources of financing. Private placements of subordinated debt for non-investment grade companies generally require an internal rate of return to the lender based on the lender's costs of capital and perceived credit risk. This can be achieved by various structures. To compensate for the greater risk involved in their usually junior or unsecured status, mezzanine loans typically carry an interest rate one to three percentage points above senior, secured loans and often include an equity kicker such as stock warrants or convertibility.

Companies that have outgrown the start-up phase but are not yet large enough for traditional corporate finance are candidates for mezzanine financing if they have strong management, identifiable growth opportunities, and stable or growing cash flow. Mezzanine financing is not permanent, typically lasting five years, although subordinated debt may last seven to nine years. The minimum term may be as little as three years and the maximum is very rarely over twelve. The amount financed may be as much as $100 million.

Actual Use: Mezzanine financing is a common financial tool for rapid expansions, management buy-outs, spin-offs of subsidiaries, and bridges to initial public offerings. Some Small Business Investment Companies (SBIC's) specialize in mezzanine financing (see **Section 10.A., SBA: Small Business Investment Companies**). When used for leveraged acquisition financing it usually is accompanied by senior debt provided by banks or institutional investors, as well as the issuance of common or preferred stock. When used for growth capital it may be used exclusively or in conjunction with equity securities as a component of a more comprehensive debt restructuring.

Potential Use: Mezzanine finance can be an excellent source of long-term growth capital, in that it tends to be less restrictive than bank debt and less delusive and costly than equity capital.

Limitations: Mezzanine finance is essentially private placement of subordinated debt, although it may involve some rights to equity. The cost of debt financing increases as the proportion of debt in the capital structure increases.

Reference for Further Information: Contact the Small Business Administration Answer Desk at (800) 827-5722 for the location of the closest Small Business Development Center, which can provide information on the use of mezzanine financing.

MICRO-LOAN FUNDS

Description: Micro-loans are relatively small loans, generally below the size traditional business lenders have tended to make or even consider making because of their transaction costs and overhead burdens. Micro-loans funds have been established primarily by non-traditional financial intermediaries, such as community development corporations, to provide resources for loans in a range from a few hundred dollars to a few thousand dollars. These lenders tend to target their micro-loans to low-income communities. Their borrowers tend to be low-income entrepreneurs who do not have access to the credit resources typically used by their middle-income counterparts, who tend to take out second mortgages on their homes, run up their credit card balances, or borrow from friends and family members for similar sums. Micro-lending tends to be based on character rather than collateral. The sources of micro-loan funds include not only federal programs, but also program-related investments by foundations and equity equivalent investments and lines of credit from commercial banks, leveraged by state linked deposit programs and the Community Reinvestment Act (see **Section 9., Community Development Financial Institutions**; **Section 10.B., Community Development Financial Institutions Fund**; **Section 10.B., Section 7(m) Micro-loans**; and **Community Development Block Grant** topics in **Section 2.C.: Grants**).

Actual Use: Since the Ford, Rockefeller, and Charles Stewart Mott Foundations funded one in 1983, micro-loan funds have enjoyed increasing support. Over a hundred micro-loan funds have been set up specifically to serve low-income women. Most states now have numerous micro-lenders. For example, the Indiana Small Business Development Corporation uses four intermediaries for micro-loans.

Potential Use: Micro-loans have been enough to start service businesses such as environmental consulting. The also may be sufficient for some small pollution prevention projects needed to comply with federal or state requirements.

Advantages: Micro-loan funds provide a source of debt financing otherwise generally not available to low-income entrepreneurs.

Limitations: Micro-loans are debt which lenders expect to be repaid. Relatively small loans may prove to be sufficient, leaving the enterprise under-financed.

Reference for Further Information: National Congress for Community Economic Development, 11 Dupont Circle, NW, Suite 325, Washington, DC 20036, Telephone: 202-234-5009; Council for Urban Development, 1730 K Street, NW, Suite 700, Washington, DC 20006, Telephone: 202-223-4735, Fax: 202-223-4745, Internet: **www.cued.org**.

NATIONAL COOPERATIVE BANK

Description: The National Cooperative Bank (NCB) and its subsidiaries -- the NCB Development Corporation, Cooperative Funding Corporation and NCB Savings Bank FSB -- were set up to assist with the creation and support of cooperatives (see also **Section 5.A., Cooperatives**). NCB's programs for independent retailer-owned cooperatives provide loans at relatively attractive rates to the members of such cooperatives to enlarge or renovate their existing stores, buy new stores, and purchase equipment, inventory and fixtures. Loans can be used to acquire real estate as part of store acquisition or development. NCB's private placement program with SPP Hambro, an investment banking firm dedicated exclusively to the execution of private placements, sells cooperatives' debt security offerings directly to institutional investors. Offerings can be secured or unsecured senior long-term notes, mezzanine financing, or subordinated debt. The NCB Development Corporation (NCBDC) provides capital to start-up and existing member-owned businesses directly or via developers and intermediary organizations. NCBDC participates in the life cycle of development, offering business planning advances, short-term lines of credit, interim loans, and permanent financing. NCBDC provides technical assistance to community development organizations and serves as a financial intermediary. The Cooperative Funding Corporation is a limited-purpose, registered broker-dealer. It provides corporate financing advisory services with a primary focus on asset securitization. NCB Savings Bank FSB is a federally chartered thrift institution providing deposit and banking services to cooperatively-structured businesses.

Actual Use: NCB and its subsidiaries have provided significant financing and technical assistance to numerous business cooperatives.

Potential Use: Because they are owned by their members, cooperatives can help small businesses that form them to solve environmental, logistical, and marketing problems.

Advantages: Cooperatives can give small, independent businesses advantages of larger scale and market power in financing, risk management, advertising, and certain logistical functions.

Limitations: The NCB and its subsidiaries assist only cooperatives. However, other forms of business can establish a cooperative to meet their common needs.

Reference for Further Information: National Cooperative Bank, Washington, DC, Telephone: 800-266-7562. NCB Development Corporation, 1401 Eye St., NW, Suite 700, Washington, DC 20005, Telephone: 202-336-7680, Fax: 202-336-7804. Cooperative Funding Corporation, 1401 Eye Street, NW, Suite 700, Washington, DC 20005, Telephone: 202-336-7788, Fax: 202-336-7659. NCB Savings Bank FSB, 139 South High Street, Hillsboro, OH 45133, Telephone: 800-322-1251 or 937-393-4246, Fax: 937-393-4064, Internet: **www.ncb.com/**. SPP Capital Partners, LLC, 330 Madison Avenue, 28th Floor, NY, NY 10017, Telephone: 212-455-4500, Fax: 212-455-4545.

NATIONAL CREDIT UNION ADMINISTRATION COMMUNITY DEVELOPMENT REVOLVING LOANS

Description: The National Credit Union Administration (NCUA) has created an Office of Community Development Credit Unions to provide counseling to credit unions serving low-income residents of distressed and financially under-served areas and administer agency's loan and technical assistance programs. The NCUA may lend up to $300,000 at below-market interest rates to a designated low-income credit union and may make technical assistance grants and contract with outside providers to render technical assistance to both federal and state-chartered credit unions serving low-income communities. The purpose of the Community Development Revolving Loan Program for Credit Unions is to help credit unions serving low-income communities to provide needed financial services and stimulate the economy in the community served. Designated federal credit unions serving predominantly low-income members also may receive deposits, called shares, share drafts and share certificates, from nonmembers, such as foundations, state agencies and commercial banks.

Actual Use: There are over 11,200 credit unions with $351.2 billion in assets and approximately 1,500 of these are federally insured community development credit unions, about 350 of which have been designated as "low-income". In 1996 NCUA made 21 community development loans for $3 million and made 78 technical assistance grants for $151,746. Grants have been used to purchase office equipment, provide salary assistance to hire qualified managers, train staff and volunteers, and secure professional audits of financial records.

Potential Use: NCUA loans can bolster credit unions' abilities to meed loan demand. In turn, community development credit unions can assist their members in financing home improvements needed to meet environmental health standards and can provide business loans to members who have small, environmentally oriented businesses.

Advantages: Credit unions tend to charge lower fees than commercial or savings banks.

Limitations: Credit unions can lend only their members and there are legal restrictions on membership eligibility. Also, small credit unions have limited loan capacity and those serving low-income communities have difficulty maintaining professional management.

Reference for Further Information: National Credit Union Administration, Office of Community Development Credit Unions, 1775 Duke Street, Alexandria, VA 22314, Telephone: 703-518-6610, Fax: 703-518-6619, E-mail: cdcumail@ncua.gov, Internet: **www.ncua.gov/**. NCUA regional offices are located in Albany, NY.

RECEIVABLES FACTORING
(Accounts Receivable Financing)

Description: Receivables factoring is a type of financing common to some private industries in which items or payments receivable to the business are sold to a special lender, the factor. The business gets its money from the factor when it bills or invoices its customers. The factor buys the receivables at a discounted percentage of their face value, usually at somewhere between 75 and 90 per cent. The factor usually assumes the credit risks related to the receivables and takes responsibility for collection. The factor's primary concern is not with the creditworthiness of the business, but rather the creditworthiness of the receivables (those businesses owing money for the receivables).

Actual Use: Factors are common in businesses with substantial lag times between orders placed and receipt of payment. Examples of such businesses include the apparel/garment industry, retail firms, seasonal manufacturers, and any other business that is cyclical in nature and/or experiences unusual cash flow patterns. The *Guidebook* developers are not currently aware of any extensive use of this financing technique in the environmental goods and services industry, and would welcome information in that regard from readers.

Potential Use: Factoring may be a viable financing approach for environmental firms that have a hot product with numerous orders, but are experiencing temporary production difficulties. Its use would tend to be dictated by very industry- and company -specific considerations.

Advantages: Factors will finance start-up companies and companies with poor credit that have creditworthy customers. Factoring creates no official debt on the business balance sheet. Factoring can be self-financing in that the more a firm's sales grow, the more money there is available to finance the business. Factors usually provide credit and collection services, at which they are experts.

Limitations: Factoring is very expensive and significantly reduces profit margins. It generally cannot be used by businesses with low profit margins. Factors will not want to do business with firms whose customers are poor credit risks.

Reference for Further Information: Most factors can be found in the Yellow Pages of the local telephone book under "Factors" or "Finance." Banks should also have lists of local factors. There are numerous sources on the world wide web/Internet for information on factors/factoring and related terms such as accounts receivable financing. Log on and use one if the generic search engines such as *Lycos, Infoseek, Yahoo!, Excite,* etc. to locate sites under these terms. Blechman, Bruce Jan, and Levinson, Jay Conrad, *Guerrilla Financing: Alternative Techniques to Finance Any Business*, Houghton Mifflin Company, 2 Park Street, Boston, Massachusetts 02108, 11/91.

SURETY BONDS

Description: Surety bonds are a type of financial or credit guarantee underwritten by insurance and other companies. They are not insurance, but three party agreements where the surety provider agrees to stand in place of the principal (contractor), if the principal cannot meet its financial or performance obligations to a third party, the obligee (owner). The obligee is the one who requires a principal to obtain a surety bond before hiring it to undertake a project. In order to obtain a surety bond, the principal must prove to the surety company that it can meet the obligation in question. The surety company expects no losses and will seek reimbursement from the principal if a loss occurs.

Actual Use: Surety bonds are widely used in the United States for large construction-related projects. For federal public works projects, their use has been mandated for more than 100 years (since the Heard Act of 1894). The three most common types of sureties are bid bonds, performance bonds, and payment bonds. Each type provides guarantees, as appropriate, that contract obligations will be met, parties properly paid, and obligees will suffer no financial loss. Surety bonds are increasingly being used in environmentally-related areas as such as landfill closures, waste and tire hauling, mining reclamation, and remediation projects (petrochemicals, asbestos, lead, PCBs, etc.). While not generally used by start-up companies, surety bond use is growing with regard to small businesses. Industry records indicated there were 137 companies writing security bonds for small construction companies (sales of $2 million or less) in 1995, an increase of 25 from 1993.

Potential Use: The potential for growth in the use of surety bonds appears to be strong in environmental areas, particularly regarding remediation. Sureties may be very helpful in ensuring the successful assessment and cleanup of brownfields properties. There also appears to be room for continued growth in writing sureties for small construction businesses.

Advantages: Surety bonds guarantee project completion and protect obligees against loss. They remain in force for the entire life of the contract and provide 100 percent financial coverage. Surety bonds have little impact on the principal's credit rating as they are typically issued on an unsecured basis. Surety companies will monitor projects on a continuous and independent basis, and investigate any complaints as they occur.

Limitations: Surety bonds can be expensive. Principals requiring surety bonds must undergo a pre-qualification process in which all aspects of their businesses, particularly their financials, are examined in great detail. The surety business is risky and contract losses may be large.

Reference for Further Information: National Association of Surety Bond Producers, 5301 Wisconsin Avenue, NW, Washington, DC 20015-2015. Telephone: 202-686-3700. Fax: 202-686-3656, World Wide Web site: **http://www.nasbp.org/**.

DEPARTMENT OF THE TREASURY
COMMUNITY DEVELOPMENT FINANCIAL INSTITUTIONS FUND

Description: The Community Development Financial Institutions (CDFI) Fund, created by the Riegle Community Development Regulatory Improvement Act of 1994, promotes economic revitalization and community development by providing greater access to capital for communities that face serious social and economic problems. The Fund is a wholly-owned federal government corporation within the Treasury Department which may provide technical assistance and make equity investments, grants, loans, or deposits on a matching basis. All financial assistance must be matched on a t least a one-to-one basis with non-federal funds which are at least comparable in form and value.

Eligible community development financial institutions are private for-profit and non-profit financial institutions with community development as their primary mission (e.g., community development banks and credit unions, non-profit loan funds, micro-enterprise loan funds, and community development venture capital funds). CDFI Fund investments become part of the leveragible capital base of these institutions. The CDFI Fund also has a Bank Enterprise Award (BEA) Program intended to encourage insured depository institutions (banks and thrifts) to increase their lending and services in distressed communities and to invest in and support CDFI's.

Actual Use: In fiscal 1997 the CDFI Fund awarded $38.3 million in financial and technical assistance. In total, it has awarded $75 million to nearly eighty institutions.

Potential Use: With support from the CDFI Fund, community development financial institutions can increase financing for small businesses producing or marketing environmentally friendly goods or services.

Advantages: Community development financial institutions are particularly well suited for involvement in brownfields redevelopment.

Limitations: The CDFI Fund requires a one-to-one match, which means that applicants must have substantial non-federal support.

Reference for Further Information: U.S. Department of Treasury, Community Development Financial Institutions Fund, 601 Thirteenth Street, NW, Suite 200 South, Washington, DC 20005, Telephone: 202-622-8662, Fax: 202-622-7754, Internet: **http://www.treas.gov/cdfi/**.

OTHER

Description:

Actual Use:

Potential Use:

Advantages:

Limitations:

Reference for Further Information:

COMPARISON MATRIX FOR SMALL BUSINESSES AND EGSI - DEBT TOOLS

Criteria/ Debt Tool	Actual Use	Revenue Size	Administrative Ease	Equity	Financial Leveraging	Environmental Benefits
Agriculture: RB-CS Intermediary Relending Program	Low	Low	Mod.	Mod.	Mod.	High
***Bank/Insurance Financing**	High	High	Mod.	Mod.	Mod.	High
***Commerce: SBA Business Development Corporations**	Mod.	Mod.	Mod.-High	High	High	High
***Commerce: SBA LOWDOC & FA$TRAK Loans**	Mod.	Low-Mod.	High	Mod.-High	High	Mod.-High
Commerce: SBA Minority & Women's Prequalification Pilot Loans	Low	Low	High	High	High	Mod.
Commerce: SBA Sect. 504 Certified Development Companies	Low	Low	Mod.	Low-Mod.	High	Mod.
***Commerce: SBA Section 7(a) Loan Guarantees**	Mod.	High	Mod.	Mod.-High	High	Mod.-High

COMPARISON MATRIX continued

Criteria/ Debt Tool	Actual Use	Revenue Size	Administrative Ease	Equity	Financial Leveraging	Environmental Benefits
***Commerce: SBA Section 7(m) Microloans**	Mod.	Low-Mod.	High	Mod.-High	High	Mod.-High
Commerce: SBA Short-Term Loans & Revolving Lines of Credit	Mod.	Low	Mod.	Mod.-High	High	Mod.-High
Community Reinvestment Act	High	Mod.	Mod.	Low-Mod.	Mod.	Mod.
***Convertible Debt**	Mod.	Mod.	Low-Mod.	Mod.	Low-Mod..	Mod.-High
***Credit Analysis**	High	N.A.	High	High	Mod.	N.A.
Credit Cards	High	Low	High	Low	N.A.	Mod.
***Export-Import (EX-IM) Bank**	Mod.	Mod.-High	Mod.-High	Mod-High	High	Mod.
Foundations: Program-Related Investments	Mod.	Low	Mod.	High	Mod.	Mod.
***Leasing**	High	Low	High	Mod.	High	High
***Mezzanine Financing**	High	High	Low-Mod.	Low-Mod.	High	High
Micro-Loan Funds	Low-Mod.	Low-Mod.	Mod.	High	Mod.	Mod.

COMPARISON MATRIX continued

Criteria/ Debt Tool	Actual Use	Revenue Size	Administrative Ease	Equity	Financial Leveraging	Environmental Benefits
National Cooperative Bank	Mod.-High	Mod.	Mod.	Mod. - High	Mod.	Mod.
National Credit Union Administration: Community Development Revolving Loans	Mod.	Low - Mod.	High	Mod.	Mod.	Mod.
Receivables Factoring	Low	Low	Mod.	Low	Mod.	Mod.
***Surety Bonds**	Low	Low	Mod.	Mod.	High	Mod.-High
Treasury: Community Development Financial Institutions	Low-Mod.	Low-Mod.	Mod.	Mod.-High	High	Mod.

High - High use (majority of States/small businesses); average credit over $1 million per business; other criteria score high (e.g., creditors provide additional advice or assistance; easy to arrange; reasonable interest costs; highly leveraged and influences success/stability of small businesses)

Mod.- Moderate use (10-25 States/many small businesses); average credit $500,000 - $1 million per business; criteria score in medium range

Low- Low or rare use thus far; average credit under $500,000 per business; one or more major implementation problems exist

*Star indicates good mechanism for future use

April 1999

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- Rural Business-Cooperative Service, Intermediary Relending Program
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Value Analysis/Engineering/Management

A. PROPOSED TOOLS FOR THE NEXT *GUIDEBOOK*

This *Guidebook of Financial Tools* is intended as a basic reference document for public and private officials with environmental responsibilities. The editors want the *Guidebook* to remain a dynamic document – with revisions, refinements, and expansions taking place on a reoccurring basis (every two years or so). In the interim between *Guidebook* revisions, many new financing tools are being developed, tested, and implemented in the real-world by innovative officials in both the public and private sectors.

This Appendix provides users and readers during the time between *Guidebook* revisions some of those exciting new financing tools (and existing tools not included in this revision). The Appendix's primary function is to provide a site for the new tools in the electronic version of the *Guidebook* that is located on the World Wide Web/Internet at **http://www.epa.gov/efinpage/guidbk98/index.htm**

April 1999

BETTER AMERICA BONDS
(Tax Credit Bonds)

Description: Better America Bonds are a form of environmental tax credit bond. The term of these bonds would be fifteen years. They would be issued by State and local governments (including Indian tribal governments and U.S. possessions) to help address the problems created by urban sprawl. The holders of the bonds would receive annual tax credits in the place of interest payments. Because the tax credits compensate the bond holder for lending money, they would be taxed.

Actual Use: The proposed Better American Bonds program is part of the Clinton Administration's initiative to build livable American communities. The Administrator of the Environmental Protection Agency (EPA) would be authorized to oversee the program and to allocate $1.9 billion in tax credit authority each year for five years, beginning in the year 2000.

Potential Use: The proceeds from the bonds would be used to finance State and local programs which address problems such as traffic congestion, lost farmland, threatened water quality, shrinking parkland and abandoned industrial sites, or Brownfields. These bonds would give local communities increased flexibility and access to cheaper financing to help meet these environmental needs.

Advantages: This program would provide a significant financial incentive for State and local governments and other qualified parties to issue Better America Bonds, as well as incentives for investors to purchase the bonds. Issuers would pay no interest on the bonds and would not have to make principal payments for fifteen years. Purchasers of the bonds would receive an annual tax credit equivalent to the interest earned on taxable double AA corporate bonds and repayment of their principal.

Limitations: State and local governments and other eligible parties must apply to the EPA for authority to issue the bonds as part of an annual competition. The competition for these bonds could be intense and some communities would have advantages in terms of resources and knowledge of how to apply for federal programs. In some cases, the tax-credit bond financing might not provide a large enough subsidy to induce State and local governments to undertake beneficial environmental infrastructure projects. Finally, the program must be authorized by the Congress before it can be implemented.

Reference for Further Information: U.S. Environmental Protection Agency, Office of the Comptroller, Environmental Finance Program, 401 M Street, SW, Washington, DC 20460, Telephone: 202-564-4998, Fax: 202-565-2587, E-Mail: ames.george@epa.gov. For information purposes, U.S. EPA plans in the near future to set up a Better America Bonds site on its World Wide Web home page at **http://www.epa.gov**.

April 1999

ENVIRONMENTAL PROTECTION AGENCY
ENVIRONMENTAL BOND GUARANTEE FUND PROGRAM

Description: The Environmental Protection Agency (EPA) has proposed creating an Environmental Bond Guaranty Program (EBGP) to enhance the credit of municipal bonds issued for environmental infrastructure projects in nations worldwide. The proposal is modeled on the U.S. financial guaranty insurance industry and has been adapted to emerging bond markets. It envisions a program whose funds would be managed in the United States and invested in high grade securities. All of EBGP's assets would be pledged to each obligation guarantied. The EBGP would determine the optimum structure for its guaranties (i.e., credit insurance, financial guaranty insurance, letter of credit, direct guaranty, etc.) in each country in which it operates. Guaranties would provide for full and timely payment. Guaranties, once issued, would be irrevocable, unconditional and uncancelable.

Actual Use: The program remains a proposal under discussion at this time.

Potential Use: The EBGP would be capitalized with up to $100 million which would enable it to guaranty up to $3 billion of municipal bonds over a 10 year period. The EBGP would guaranty financial obligations undertaken by regional or local governments (or those acting on behalf of such governments) for capital projects to provide or improve environmental infrastructure which serves the general public. Projects could include works to provide drinking water purification or distribution, wastewater treatment or collection, the disposal of solid or hazardous waste, the efficient generation of energy, and the abatement of air pollution.

Advantages: The EBGP would help regional and municipal governments enter their own national credit markets, as well as the international financial market. It would do so by enhancing, not supplanting, the credit of these governments who would remain the primary obligors on all bonds guarantied. The interest savings on the bonds to the people of the countries involved could exceed $900 million. The EBGP would benefit more than the environment. It would: promote the export of U.S. environmental technology; bring fiscal discipline, transparency and openness to local government; and hasten the overall decentralization process. The program would promote investment in the environment, strong financial markets, and the rule of law.

Limitations: Governments must have enacted appropriate reforms and demonstrated the capability to manage their operations on a market basis in order to qualify for the EBGP's guaranty. To obtain the EBGP guaranty, issuers may also be required to make additional pledges of specific revenues payable to it by, or from it to, higher levels of government including the central government.

Reference for Further Information: U.S. EPA Office of International Activities, 401 M Street, SW, Washington, DC 20460, Mail Code: 2650R; 202-564-6406, Contact: William Freemen, E-mail:

April 1999

freeman.bill@epa.gov.

ENVIRONMENTAL PROTECTION AGENCY
CLEAN AIR PARTNERSHIP FUND

Description: The Clean Air Partnership Fund is a proposed grants program, and is part of the Fiscal Year 2000 EPA Budget. This Partnership Fund is a $200 million program that would provide financing for smart, multi-pollutant control strategies that will reduce air pollution as well as greenhouse gases. Funds would be available for projects demonstrating simultaneous reductions in smog, soot or air toxics. The program would give cities, States and tribes the opportunity to partner with the private sector, the federal government, and each other to provide healthy clean air to their residents. The fund would also extend its assistance projects involving electric utilities and the transportation sector.

Actual Use: The Clean Air Partnership Fund remains a proposal at this time.

Potential Use: Businesses and municipalities face significant cost-restraints which discourage them from investing in short-term single pollutant strategies. The Clean Air Partnership Fund would seek to encourage many industries to develop and demonstrate long-range comprehensive pollution reduction strategies. The Fund would financially support bringing the most creative ideas and innovations for cleaning the air to communities. It would provide communities across the nation with a cleaner environment and help to protect our health and climate.

Advantages: The Clean Air Partnership Fund would encourage the development of innovative, low-cost approaches to air pollution control. It would provide badly needed new assistance to State and local parties attempting to address the nation's significant air pollution challenges.

Limitations: The Partnership Fund has not yet received approval from the Congress. The environmental and financial needs of the eligible recipients in the area of air pollution control dwarf the amount of funding requested for the Fund.

Reference for Further Information: *Summary of the 2000 Budget*, U.S. EPA, Office of the Chief Financial Officer, January 1999. EPA 205-S-99-001. This document is also available on U.S. EPA's Web site at: **http://www.epa.gov/ocfo/budget.htm** U.S. EPA, Office of Air and Radiation, 401 M Street, SW, Washington, DC 20460, Mail Code: 6101, Telephone: 202-260-7400, Fax: 202-260-5155.

April 1999

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B. MORE INFORMATION ON THE ENVIRONMENTAL FINANCIAL ADVISORY BOARD (EFAB)

EFAB Advisory Committee Charter
EFAB Membership Roster
EFAB Publications and How To Order

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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
ADVISORY COMMITTEE CHARTER

ENVIRONMENTAL FINANCIAL ADVISORY BOARD

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1. **PURPOSE AND AUTHORITY**. This Charter renews the Environmental Financial Advisory Board, which was originally established on February 25, 1991, in accordance with the provisions of the Federal Advisory Committee Act, 5 U.S.C. App.2 §9 (c).

The purpose of the Advisory Board is to provide authoritative analysis and advice to the EPA Administrator regarding environmental finance issues to assist EPA in carrying out its environmental mandates. It is determined that this Board is in the public interest in connection with the performance of duties imposed on the Agency by law.

Environmentallegislation reauthorized or proposed by Congress in recent years has placed significant additionalresource requirements on all levels of government, increasing their infrastructure and administrative costs. At the same time, limited budgets and changes in Federal tax laws have constrained traditional sources of capital. Growing needs and expectations for environmental protection, as well as increasing demands in all municipal service areas, make it increasingly difficult for state and local governments to find the resources to meet their needs. The resulting strain on the public sector jeopardizes the quality and delivery of environmental services.

2. **OBJECTIVES AND SCOPE OF ACTIVITIES**. EFAB is assigned the role of providing advice on the critical environmental financing issues facing our nation, consistent with current Federal tax laws. Objectives consistent with this role:

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Identifying approaches specifically targeted to small community financing;

Assessing government strategies for implementing public-private partnerships, including privatization and operations and maintenance issues, and other alternative financing mechanisms; and

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The activities of EFAB will include analyzing problems, conducting meetings, presenting findings, and other activities necessary for the attainment of its objectives. Scope of activities include:

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Endeavoring to increase the total investment in environmental protection by facilitating greater leverage of public and private environmental resources to help ease the environmental financing challenge facing our nation.

Local governments must pay for the construction and operation of environmental facilities, such as wastewater treatment plants, solid waste facilities, and drinking water facilities. Their need for resources, both financial and technical, particularly in the face of the growing demand for increasingly expensive environmental services, calls for support from all levels of government and from the private and non-profit sectors. At the same time, Federal and state resources for environmental programs are expected to remain fairly constant relative to the growth in costs associated with new legislative and program requirements.

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Budgetary support for EFAB will be provided through the Office of the Comptroller. The estimated annual operating costs is approximately $133,900.00, which includes 1.55 work years of staff support.

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April 1999

C. MORE INFORMATION ON THE ENVIRONMENTAL FINANCE CENTER (EFC) NETWORK

EFC Network Contacts Directory
EFC 1998 Annual Report - Executive Summary

ENVIRONMENTAL FINANCE CENTER NETWORK
CONTACT DIRECTORY

1. **EFC/Syracuse University, The Maxwell School of Citizenship and Public Affairs.**
EPA Region 2, New York City EFC established in 1994

William J. Sullivan, Director, Midcareer and Executive Education Programs
206 Maxwell Hall wjsulliv@maxwell.syr.edu (315) 443-3759 fax (315) 443-5330

Kim Collins kjcoll01@maxwell.syr.edu (315) 443-9438 fax (315) 443-5330

EFC/Syracuse University, The Maxwell School, 219 Maxwell Hall,
Syracuse, New York 13244-1090

Website: **www.maxwell.syr.edu/exed/efc/**

Focus: Initially, the EFC dealt with risk and finance issues, including a survey of NY communities of varying size to determine how they factor risk assessment into their environmental funding decisions. The EFC sponsored and hosted a conference examining the issue of full cost pricing of environmental projects, and is conducting a year-long rate model demonstration and training program for local government officials. The Center conducted an extensive study of alternative financing strategies for water infrastructure for EPA's Office of Water.

Regional contact: Robert Gill (212) 637-3884 fax (212) 637-3772

EPA Headquarters lead: Timothy McProuty (202) 564-4996 fax (202) 565-2587
mcprouty.timothy@epa.gov

2. **EFC/University of Maryland, Coastal and Environmental Policy.**
EPA Region 3, Philadelphia EFC established in 1993

Dr. Jack Greer, Director, Coastal and Environmental Policy Program
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Jeremy Haas (301) 405-6384
jhass@mdsg.umd.edu

EFC/University of Maryland, Coastal and Environmental Policy

0112 Skinner Hall
College Park, Maryland 20742

Website: **http://www.mdsg.umd.edu/MDSG/EFC/index.html**

Focus: Charrettes as a technique to help communities on an individual basis to obtain information on the nature of finance issues facing communities in Region 3. Maryland's Governor recently selected the EFC to produce a report for the state blue ribbon commission on ways to pay for clean up of nonpoint source pollution.

Regional grant manager: Mindy Lemoine (215) 814-2736 fax (215) 814-2201

EPA Headquarters lead: Vera Hannigan (202) 564-5001 fax (202) 565-2587
hannigan.vera@epa.gov

3. **Great Lakes EFC/Cleveland State University, Urban Center**
EPA Region 5, Chicago EFC established in 1995

Don Iannone, Director (216) 687-4590 (assistant: Olga Lee (216) 687-6947)
d.i@wolf.csuohio.edu

Dr. Ziona Austrian, Assistant Director (216) 687-3988
ziona@urban.csuohio.edu

Kirstin Toth - Brownfields Outreach
(330) 528-3237
Adina Swirsky - Pollution Prevention
(216) 687-5489

Great Lakes EFC/Cleveland State University, Economic Development Program UB 215
Maxine Goodman Levin College of Urban affairs
Cleveland State University, Cleveland, Ohio 44115 fax (216) 687-9277

Website: **http://www.csuohio.edu/glefc/**

Focus: Brownfield site redevelopment and industrial pollution financing. The initial focus of this EFC is on financial issues affecting the availability of credit and financial tools and incentives to spur investment in abandoned commercial and industrial sites. The objective of the pollution prevention project is to build regional networks to stimulate additional pollution prevention activities by small and medium size manufacturers, and facilitate financing for these deals.

Regional contacts: Jennifer Manville (616) 922-4769 (tribal) fax (616) 922-4499
James VanderKloot (312) 353-3161 (brownfields) fax (312) 353-5541
Keary Cragan (312) 353-5669 (brownfields) fax (312) 353-5541

EPA Headquarters lead: Timothy McProuty (202) 564-4996 fax (202) 565-2587

mcprouty.timothy@.epa.gov

4. **EFC/University of New Mexico, New Mexico Engineering Research Institute (NMERI)**
EPA Region 6, Dallas — EFC established in 1992.

Heather Himmelberger, P.E., EFC Director (505) 272-7357 fax (505).272-7203
heatherh@unm.edu

Susan Butler, Program Manager [sbutler@unm.edu] (505) 272-7356 fax (505) 272-7203

Lorri Skeie-Campbell, Program Coordinator (505) 272-7356 fax (505) 272-7355
campbell@unm.edu

EFC/University of New Mexico/NUMERI
901 University Blvd., SE Suite 200
Albuquerque, NM 87106-4339
Website: **http://nmeri.unm.edu/efc/efc.htm**

Focus: technical assistance to federal, state, and local governments and public and private entities, specifically in capacity development in small water systems. The UNM-EFC has a particular commitment to identifying financing options and promoting low-cost, alternative, and appropriate technologies for projects that will encourage sustainable development, pollution prevention, and sources reduction -- at affordable and viable levels. Ongoing relationships with several bi-national agencies developed from previous border work have been maintained.

Regional Contact: Freda Wash (mc 6WQ-AT) (214) 665-8342 fax (214) 665-6490

EPA Headquarters lead: Timothy McProuty (202) 564-4996 fax (202) 565-2587
mcprouty.timothy@epa.gov

5. **EFC/California State University at Hayward, Urban Environmental Research and Education Center.**
EPA Region 9, San Francisco — EFC established in 1995

Sarah Diefendorf, Executive Director,
Environmental Finance Center IX
Building 7, Alameda Point
851 West Midway Avenue
Alameda, CA 94501
email: diefendorf@greenstart.org (510) 749-6867 fax (510) 749-6862

Web site: **http://www.greenstart.org/efc9**

Focus: Development of successful models for public-private partnerships financing environmental systems, emphasizing greater participation of small and medium size businesses. The EFC will implement a pilot green project to demonstrate a proposed partnership model.

Regional contacts: Anna Hachenbracht (415) 744-1634 fax (415) 744-2499
Cheryl Filart (mc PMD-7) (415) 744-1705 fax (415) 744-1678

EPA Project Officer: Vera Hannigan (202) 564-5001 fax (202) 565-2587
hannigan.vera@epa.gov

6. **EFC/ Boise State University, Idaho**
EPA Region 10, Seattle EFC established late 1995

Bill Jarocki, EFC Director
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bjarock@boisestate.edu

Carrie Applegate, Secretary
(208) 385-1567 cappleg@boisestate.edu

Environmental Finance Center at Boise State University
1910 University Drive, Boise State University, Boise, Idaho 83725

Website: **http://sspa.boisestate.edu/efc/index.html**

Focus: Coordinate analysis and training/outreach activities relative to the viability assessment of drinking water systems. The Idaho EFC will focus on developing and testing a variety of methods by which system viability can be determined.

Regional contacts: Clark Gaulding (206) 553-1849 fax (206) 553-8338
Jim Werntz (206) 553-2634 fax (206) 553-8338
Susan Morales (206) 553-8580 fax (206) 553-8338

EPA Headquarters lead: Vera Hannigan (202) 564-5001 fax (202) 565-2587
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7. EPA's Environmental Finance Website: **http://www.epa.gov/efinpage**

Current as of June 29, 2000

April 1999

Executive Summary
1998
Annual Report
of the
EFC Network

FOREWORD

It is our great pleasure to present the 1998 Annual Report of EPA's Environmental Finance Center Network, including the introduction of a new EFC in Region 4 for 1999. This report updates all principal activities of the University-based Environmental Finance Centers (EFCs) through 1998 and is a continuation of the information contained in the 1997, 1996 and 1995 Annual Reports. Copies of these earlier reports are available on EPA's Environmental Finance website at **www.epa.gov/efinpage/**.

The Environmental Protection Agency provided seed funding in 1992 for the first EFC at the New Mexico Engineering Research Institute of the University of New Mexico. Soon thereafter, Centers were established at the University of Maryland and Syracuse University. A fourth Center was added in 1994 at California State University at Hayward. Two more EFCs were added in 1995; one at Cleveland State University early in the year, and the other established later in the year at Boise State University in an alliance with the University of Idaho and Idaho State University. Finally, a new Center was established for 1999 in Region 4 at the University of North Carolina at Chapel Hill. With seven EFCs strategically located at major universities throughout the country, the Network has become a significant force to assist local governments and small businesses in meeting environmental standards. Indeed, the EFC Network was a semifinalist in the 1999 Innovations in American Government Awards Program sponsored by the Ford Foundation and Harvard University. Essentially, the EFCs provide finance training, educational, and analytical services designed around the "how to pay" issues of environmental compliance.

A central goal of the EFCs is to help create sustainable environmental systems in the public and private sectors. Sustainable systems have the financial, technical, and institutional resources and capability to

operate indefinitely in compliance with environmental requirements and in conformance with generally accepted environmental practices. Creating and maintaining sustainable systems is a formidable challenge facing smaller local governments and businesses. Costs of needed public and private purpose systems and improvements often outstrip available resources. Yet paying for environmental protection has been and will continue to be primarily a responsibility of local governments and the private sector.

For their part, the financial outreach services of the EFCs seek to help meet environmental needs by focusing on identifying ways of increasing efficiencies by avoiding costs, lowering costs, and shifting costs, as well as increasing private sector investment in environmental systems. The reader will find in the following pages many innovative and traditional activities the EFCs have undertaken in accomplishing these objectives. Their work, however, is an ongoing process, and the sum total of its benefits will make an important contribution to environmental progress in this country. Information on the Environmental Finance Center Network can also be found on our website on EPA's Environmental Finance Program homepage at **http://www.epa.gov/efinpage/.**

We welcome your comments and suggestions. Thank you

Michael W. S. Ryan, Comptroller, U. S. Environmental Protection Agency

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EFC Executive Summary Reports

EFC at Syracuse University, Region 2

Executive Overview

The United States Environmental Protection Agency's (EPA) Region 2 Environmental Finance Center (EFC) at Syracuse University's Maxwell School of Citizenship and Public Affairs was established in October, 1993. Since its establishment, the Maxwell EFC has aggressively undertaken a wide range of environmental financing projects and activities, and built a considerable record of accomplishment. The focus of the EFC has included full-cost pricing of environmental services, the value of intergovernmental cooperation in addressing environmental improvement projects, collaborative planning among public and private environmental service providers, and the coordination of technical assistance services available to rural communities. In each of these areas, the EFC has either provided customized assistance to communities or facilitated the coordination and delivery of services from public and private agencies. The EFC is making information available on the World Wide Web at **http://www.maxwell.syr.edu/exed.efc**

Summary of Accomplishments

During 1998 the EFC continued to assist communities with the use of an EPA supported windows-based computer software program for setting financially responsible water and wastewater rates. This computerized rate model was developed for use by local water and wastewater systems. Other presentations focused on topics of public finance, capacity development, capital budgeting, and topics relative to the broader area of environmental governance. The highlight of EFC activities in 1998 was the planning and execution of the EFC Network Forum, a two-day event that brought other EFC representatives to Syracuse for the purpose of demonstrating their areas of expertise and sharing expert advice with representatives from rural New York communities. The Forum was well-received and has resulted in numerous requests for a similar program to be conducted in the future. Furthermore, the Forum served as the impetus for additional Network collaborations to ensue. Currently, the Maxwell EFC is collaborating with EFC 10 and EFC 6 to assist the New York State Department of Health in developing a strategic plan to meet the capacity development requirements of the Safe Drinking Water Act.

The EFC continued to participate in and further establish collaborative relationships with other government-supported programs, public agencies, institutions of higher learning, and environmental technical service providers. These relationships have continuously fostered new and exciting opportunities for the EFC to enhance the strength of its program and the capacity is has to deliver much needed services to local governments. Rural communities have become a particular focus of the EFC, particularly since the relationship with the New York State Rural Development Council has developed into a dynamic partnership of great activity in the past year.

The EFC also collaborated with the City of Syracuse to plan a pollution prevention education program and participate in its planning for the redevelopment of area brownfields.

Currently, the EFC and its various partners are planning a network of projects that will prove to assist communities in planning environmental improvement and infrastructure activities. Syracuse University faculty and students have also begun participating in specific EFC projects. Faculty member Stuart Bretschneider, a world renowned expert in the forecasting field, is leading the planning of a survey project to assess the experiences of rural businesses with environmental regulations. It is anticipated that up to six agencies or organizations will fund the survey. Several faculty members, with expertise in international affairs and public finance, have assisted the EFC in the development of a proposal to provide environmental financial technical assistance training to government managers in the Newly Independent States, China, and other regions of the globe. The proposal is scheduled for submission to the EPA Office of International Activities in January, 1999. In May, 1998, six Master of Public Administration students from the Maxwell School dedicated three intense weeks to researching the criteria used to determine the eligibility of communities for environmental funding programs. The Rural Development Council and the New York State Department of State sponsored the research which will be built upon by a new set of students in May,

1999.

The EFC expects 1999 to be a year in which the efforts of all past and present activities will bear results that will serve to further stimulate partnerships and generate enduring programs and, thus, enhance the services it provides to EPA Region 2.

Summary of Activities

Conferences, Special Projects, and Presentations

December, 1997-December, 1998, prepared "Environmental Financial Technical Assistance Program" as a proposal for submission to the EPA Office of International Activities. The proposal involves the delivery of environment-related pubic finance training to government managers in countries seeking to pursue environmental remediation and infrastructure projects.

December, 1997-February, 1998 collaborated with economists and environmental experts from Cornell University and State University of New York College of Environmental Science and Forestry to prepare a proposal to provide assistance to five economically depressed counties in the Catskills Watershed region on New York.

In February, 1998, collaborated with the Water Industry Council and the New York State Conference of Mayors and Municipal Officials to conduct a survey of municipal decision-makers regarding their interest in privatization of water systems.

February-June, 1998, collaborated with the Rural Utility Service of the United States Department of Agriculture to assist a small township in developing plans to create a water district and build a new water system.

In March, 1998, in collaboration with the Water Resource Institute of Cornell University and the State University of New York at Buffalo, presented, "Critical Review of Water Resource Development Plans" to the Genesee County Legislature in Batavia, New York. The presentation was the result of a study undertaken by the three academic institutions to assess five separate approaches to build a new water system in western New York. The EFC portion of the study was presenting alternative strategies of cost recovery for each engineering approach.

In May, 1998, presented, "Environmental Resources for Rural Communities in New York: An Assessment of the Funding Process" to the New York State Department of State and the Rural Development Council.

The presentation was the research product of six Master of Public Administration students who studied the eligibility criteria of environmental improvement funding programs in New York State. Included in the study was an assessment of the extent to which municipalities meet the eligibility criteria and actually use the programs.

In June, 1998, planned and facilitated the EFC Network Forum, a dynamic two-day event that brought together four other EFCs to demonstrate their areas of expertise and to provide assistance to community leaders attending the forum.

In June, 1998, collaborated with the City of Syracuse Department of Community Development, Division of Neighborhood Planning to propose for funding, "Pollution Prevention Education Program", in response to an EPA Environmental Justice Program request for proposals.

In June, 1998, collaborated with State University of New York College of Environmental Science and Forestry, New York State Rural Water Association, Atlantic States Rural Water Association, and New Jersey Rural Water Association to prepare a proposal for a small water systems project.

In July, 1998, facilitated a discussion between City of Syracuse representatives and neighborhood leaders regarding the planning of a brownfields redevelopment project.

In August, 1998, responded to a request from the Bushwick Economic Development Corporation in Brooklyn, New York, to provide assistance in planning a brownfields redevelopment project.

In September, 1998, participated with technical service providers in a panel discussion about environmental programs serving communities throughout the country. The discussion was facilitated by the Maxwell Career and Alumni Services Department at Syracuse University.

In September, 1998, collaborated with the Environmental Facilities Corporation, the Tug Hill Commission, Rural Community Assistance Program, and the Rural Development Council to plan a program to coordinate environmental technical assistance providers in New York. A proposal for funding evolved and was submitted to the New York State Rural Planning Federation, with awards to be announced by the end of December.

In September, 1998, presented, "Water and Wastewater Rate Setting" and "Capital Budgeting" at two separate training conferences sponsored by the New York Rural Water Association.

In October, 1998, presented, "The EFC Network", to the National Securities Studies Program at Syracuse University. Students of the program were high-ranking military leaders and Senior Executive Officers of

the United States Department of Defense.

In October, 1998, facilitated "Economic Development and Community Partnerships", a segment of an environmental conference sponsored by the State University of New York College of Environmental Science and Forestry.

In November, 1998, presented, "Water and Wastewater Rate Setting" and "Capital Budgeting" at two separate training conferences sponsored by the New York Rural Water Association.

In November, 1998, demonstrated EPA-supported software used for water and wastewater rate setting to officials from the City of Batavia.

In December, 1998, facilitated the first Capacity Development Planning Committee meeting for the New York State Department of Health.

On-Going Programs and Projects

Attendance at professional association meetings and presentations on capital planning and financing; the concepts of water and wastewater rate setting; environmental governance; intergovernmental cooperation; collaborative planning; capacity development; sustainable community issues; and brownfields redevelopment.

Maintaining database of past EFC program attendees, prospective clients, and technical service providers.

Participating in planning prospective projects with the Rural Development Council (RDC). In 1997 the EFC facilitated the creation of physical space at the Maxwell School facilities for the RDC to locate its headquarters. The close proximity has resulted in a continuous flow of information exchanges, mutually beneficial professional consultation sessions, and the creation of prospective collaborative projects.

Supporting the New York State Department of Health in preparing a Strategic Plan for the capacity development component of the Safe Drinking Water Act. The EFC is committed to facilitating the process by hosting all meetings, conducting follow-up tasks, and ensuring that all interests are included and their input into the plan is elicited.

Collaborating with the Tug Hill Commission to develop projects that address issues of economic sustainability and capacity development within a 62 township area.

Collaborating with the United States Department of Agriculture's Rural Utility Services to provide assistance to rural communities seeking to address environmental problems.

Serving as a content provider to government and non-profit organizations that conduct workshops for municipal decision-makers.

Continued emphasis on collaborating with other universities and non-profit organizations to develop proposals addressing environmental concerns.

Continue to host and facilitate meetings and programs on behalf of the Infrastructure Working Group of the Rural Development Council.

Developing a scientific survey with public and private partners to assess the experiences rural businesses have with environmental regulations.

Syracuse EFC Organization

Management

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EFC at University of Maryland, Region 3

Executive Overview

The United States Environmental Protection Agency's (EPA) Region 3 Environmental Finance Center (EFC) at The University of Maryland Environmental Finance Center is now one of only eight Environmental Finance Centers in the Country. The EFC's efforts have focused on both point-source pollution issues, such as alternative methods for financing waste treatment facilities and innovative utility rate structures, as well as nonpoint-source pollution issues, such as storm water management, stream corridor buffers and agricultural best management practices. The EFC is making information available on the World Wide Web at **http://www.mdsg.umd.edu/MDSG/ EFC/index.html**

Facilities and Expertise

The challenge of environmental finance and management requires an integrated, interdisciplinary, and even

transdisciplinary approach. The University of Maryland's Coastal and Environmental Policy Program (CEPP) provides a powerful network for mounting such an approach. The CEPP is comprised of five units of the University System of Maryland: the Maryland Sea Grant College (home of the Environmental Finance Center), the School of Public Affairs, the Center for Environmental Studies, the College of Agriculture and the School of Law.

CEPP's investigation into environmental finance and the formation of the Environmental Finance Center (EFC) began in 1993 with support from the U.S. EPA. The University of Maryland Environmental Finance Center is now one of only eight Environmental Finance Centers in the Country. The EFC's efforts have focused on both point-source pollution issues, such as alternative methods for financing waste treatment facilities and innovative utility rate structures, as well as nonpoint-source pollution issues, such as storm water management, stream corridor buffers and agricultural best management practices.

Summary of Accomplishments

Charrettes

Part of the EFC's goal is to provide assistance and act in an advisory capacity to state and local governments on issues related to environmental finance. One way to achieve that goal is to advise local officials in a "charrette" format. The charrette process, pioneered by the University of Maryland EFC, employs an advisory panel of finance, planning and engineering experts as well as federal and state officials who provide local officials with solutions to their environmental finance problems. The charrettes provide a forum for frank discussions between local officials and experts about financing, planning and management challenges experienced by communities in meeting environmental and quality-of-life demands. The charrette process is a cost-effective way to address unfunded mandates and further the Agency's strategic initiative on Partnerships. In addition, it was one of EPA's key proposals for the National Program Review.

Since its establishment in 1992, the EFC has arranged charrettes that have expanded its understanding of issues related to nonpoint-source pollution, such as urban storm water runoff and agricultural nutrient runoff. Many charrette participants have been faced with the challenge of identifying cost-effective and equitable financing solutions to environmental concerns that will not impede economic development in their community. Indeed, the question of economic viability and environmental sustainability is a key focus of the EFC's work. One of the important challenges found during the charrettes is convincing businesses and homeowners to "pay now" rather than to "pay later," recognizing that paying later will certainly mean higher costs.

An important result of the charrettes is the renewed commitment by communities to dedicate additional time to their environmental finance problems. The EFC has found that, frequently, a charrette's highest and best purpose is to facilitate a meeting of the stakeholders of an environmental finance issue that might not

otherwise take place. The EFC receives many compliments about its ability to convene a meeting of disparate stakeholders, and we expect to continue to provide this vital service to local governments.

Charrette Examples

Starlit Ponds Homeowners Association, Fairfax County, Virginia

On January 29, the EFC planned and conducted a charrette with the Homeowners Association for the private community of Starlit Ponds. The charrette, held in Fairfax County, Virginia, addressed the needs of a small private community confronted with the challenges of deteriorating storm water ponds and the larger issue of failing ponds throughout Fairfax County.

Cuckold Creek Watershed, St. Mary's County, Maryland

On July 21, the EFC planned and conducted a charrette for the Cuckold Creek watershed in St. Mary's County, Maryland. Charrette participants discussed management techniques which could be used during the development process to reduce or eliminate the erosion and gullying of soils within the Cuckold Creek watershed.

Other Charrette Initiatives

In addition, during the year, the EFC continued to solicit interest in conducting charrettes with other local governments in the Bay watershed. As always, it is important to work closely with communities to ensure that a charrette is the right tool for a community during its policy-making and implementation process. Below is a summary of the local governments with which we are currently working.

Location: Northampton County, Virginia
Issue: Financing Phase II of a Sustainable Technologies Industrial Park

One of the most exciting and challenging initiatives undertaken by the citizens of the region is the construction and management of one of the nation's first "eco-industrial parks"—the Port of Cape Charles Sustainable Technologies Industrial Park. In 1994, the President's Council on Sustainable Development chose the county as the site for one of four model facilities to demonstrate the potential of energy-efficient, water conserving, and non-polluting industry.

In its attempt to address challenges such as poverty and unemployment while protecting sensitive natural resources, Northampton County representatives contacted the EFC more than a year ago. It has been the desire of the community to pursue many different yet interrelated issues surrounding economic revitalization and environmental sensitivity.

Location: Port Towns of Anacostia, Prince George's County, Maryland
Issue: Urban revitalization and environmental protection

The "Port Towns of Anacostia," Bladensburg, Colmar and Cottage City, have a rich history which has been overshadowed by decades of urban decay and neglect. In an effort to revitalize, the towns have completed a vision and action plan which includes a section on environmental and recreational opportunities which could be pursued. How to finance some of these activities is a pressing question which the county would like to address in a charrette.

After several exploratory meetings with the EFC, it has been suggested that the EFC could conduct a charrette focusing on ways in which to fund the design and construction of improvements within the Bladensburg Industrial area, creating an "eco-industrial park."

Location: Chesapeake City, Maryland
Issue: Environmental infrastructure financing and "smart growth" practices

Chesapeake City is bisected by the Chesapeake and Delaware canal, which provides an important shipping channel from the Delaware Bay to the Port of Baltimore. A consequence of the canal is that the city requires two separate sets of water and sewer infrastructure to serve regions on either side of the canal. This system has created inefficiencies, and now the southern section is reaching capacity. The southern section, however, is the historic downtown area and has recently been rezoned to prevent sprawl-type growth by accommodating concentrated growth in a traditional neighborhood development format. Adding to the city's infrastructure challenges is a burdensome debt and fears that without generating new revenue, the city will be unable to meet its contractual obligations to the private firm that operates the city's water and sewer systems. At the suggestion of the town manager, the water commission has requested that the EFC conduct a charrette to assess alternatives for finding solutions to the water problems. In addition, the City has expressed interest in rate-design assistance.

Location: Octotaro Lakes Community, Cecil County, Maryland.
Issue: Failing pond infrastructure and threat to freshwater rivers

In a situation resembling a previous charrette held for the Starlit Ponds community in Fairfax County, Virginia, the community of Octotaro Lakes, in Cecil County, Maryland, has been struggling to repair a dam on the community's signature 7.5 acre lake. The lakes were originally converted by the developer of the community from existing agricultural ponds, and according to state officials, the dam was improperly built. In 1995, however, a County Court ruled that the community's homeowners are responsible for the repair of the dam. The community then planned to use a low-interest loan from the state to cover the costs of repairs, at a cost of $1,500 per homeowner. Plans have been stalled because of mis-communication between the state, the homeowners association board and the residents. Now the problem is imminent

because a house has been built directly below the unsafe dam and, as a result, the state has ordered repairs to begin or it will drain the lakes.

Location: The Towns of Northern Caroline County, Maryland
Issue: Regional water and waste water management financing

The towns of Goldsboro, Henderson, Marydel and Templeville are located in northern Caroline County on Maryland's Eastern Shore, adjacent to the Delaware state line. All four towns have problems with their on-site, individual waste water disposal systems, and many of their wells are contaminated. Small lot sizes and high groundwater tables are the reasons for the failure of the septic systems and contamination of the wells. During 1997, Federal, state and local representatives met to explore the viability of approaching the waste water and drinking water needs in these four towns collectively and to seek a regional solution. In coordination with the Maryland Rural Development Corporation, the Maryland Environmental Service and others, the EFC has been invited to conduct a charrette with stakeholders to explore financing options for a regional solution.

Location: West Virginia charrette initiatives

In an attempt to expand our community assistance efforts to West Virginia, the EFC continues to discuss charrette opportunities with community representatives and public agency personnel. During the year, the EFC has held many discussions with officials and others in West Virginia about local government environmental financing issues.

The EFC will continue to discuss charrette opportunities with communities in West Virginia. Currently, there are a variety of sources that provide technical assistance to communities in West Virginia. For example, the West Virginia Infrastructure Council reviews proposed community infrastructure projects and offers advice on financing mechanisms. The EFC could partner with this organization in offering a financing charrette. Another possibility is that the EFC would partner with the Public Service Commission or Rural Water Association to provide technical assistance on financing mechanisms for local government environmental projects.

Charrette Partnering Opportunities: Countryside Stewardship Exchange Program

The International Countryside Stewardship Exchange Program (Exchange) brings experienced professionals from Europe and the United States to meet with local community leaders to address concerns about development, conservation and other related issues. The experts visit a community for one week then deliver a set of recommendations for the community to consider in their attempts to harmonize community growth and environmental protection. Since 1993 communities in the Chesapeake Bay region have been participating in the Exchange through the coordination of the Alliance for the Chesapeake Bay

(Alliance) and the Chesapeake Bay Program.

In 1996 the Exchange experts visited the Chesapeake Bay communities in the Spring Creek watershed in Pennsylvania and the Wicomico watershed in Maryland. As the communities within these watersheds attempt to implement the recommendations from the Exchange, they face challenges similar to those that the Environmental Finance Center has helped others address.
During the summer and fall, the EFC discussed with the Chesapeake Bay Program's Land Growth and Stewardship Subcommittee (LGSS) several opportunities to help the communities within the Spring Creek (PA) and the Wicomico (MD) watersheds implement the recommendations of the Exchange. Most of the recommendations fall into two groups: 1) "visioning" types where the community leaders decide on certain core paths to pursue in order to meet their goals; and 2) "concrete" steps to take to solve certain problems and threats. Both of these types of issues can be addressed through the charrette process. As part of the EFC's collaboration with the LGSS and the Alliance, the EFC has proposed several ideas, including:

Spring Creek, Pennsylvania:

Two concerns, which were raised by the community, included "which lands should be set aside for development," and "which lands should be set aside in order to preserve ecological biodiversity." If the watershed association has access to GIS information, the EFC hopes to work with them on options for preserving important parcels while directing development to appropriate areas.

Another recommendation generated by the Exchange experts was to reuse industrial water. Currently, the EFC is working with two communities about financing eco-industrial parks (e.g., Port Towns, MD and Northampton County, VA). The EFC's work has identified and analyzed funding ideas for this type of project, which might be applicable to the Spring Creek case.

Lastly, agricultural land preservation was a common theme in several recommendations, and the EFC may be able to assist in the establishment of a transfer-of-development-rights (TDR) program or other financing mechanisms that may be appropriate for preserving agricultural lands.

Wicomico River Watershed:

The Exchange experts recommendations initially revolve around a community visioning process, which the EFC may be able to help coordinate. In addition, there are a few specific areas where the EFC can provide assistance, including:

- Developing alternative transportation systems within the watershed to link communities and residential areas with job centers;

- Directing growth towards "village centers." The EFC may be able to assist the communities in selecting smart growth incentives, such as tax incentives, information about alternative septic systems, and other planning tools.

In addition, there was a recommendation to develop a plan for preserving forest and agricultural lands. The EFC may be able to conduct a charrette to identify funding ideas for land preservation.

The EFC continues to coordinate with the Alliance, the LGSS, and representatives from the communities to identify the most appropriate action. We anticipate a spring event for one of these communities.

List of Charrettes

Since 1993, the University of Maryland EFC has conducted sixteen charrettes addressing such issues as waste water and drinking water facility upgrades/expansions, determining sites for new landfills, storm water management, access to capital for investment in pollution prevention practices, urban revitalization and uses for revolving funds. The charrettes and their topics are listed below. The full text of the case studies drawn from these charrettes can be found in past EFC Annual Reports as well as on the University of Maryland EFC website at **www.mdsg.umd.edu/MDSG/EFC/** or at the Environmental Finance Branch website at www.epa.gov/efinpage

Charrette Video

Using the EFC's experience conducting twenty charrettes, the EFC is developing a handbook and accompanying video as an educational resource for communities and organizations interested in using the charrette process as a problem solving tool. There are many potential users of the handbook and video because the charrette process can be used to solve problems on many scales, from neighborhood-based issues to national issues. It is particularly effective when various groups of people in a community gather to resolve common problems, such as watershed-based issues, which can benefit from the assistance of outside experts.

Along with conducting charrettes, the EFC has conducted a participant survey from which it received important information from communities regarding the structure and usefulness of the charrettes. This information will also be incorporated into the handbook and video, which will
cover topics from the entire charrette process. The handbook and video, made available as a set, will be distributed to a wide audience through a marketing plan which will include the EFC web site and brochures, local government associations, university public education programs, citizen groups and business organizations.

Training, Technical Assistance and Education

Utility Rate Design Workshop: Rate setting and financial planning for water and wastewater utilities
As local governments continue to shoulder increased responsibility for everything from environmental infrastructure to environmental protection, budgets are stretched to capacity. To help ensure that clean water is available for both human consumption and wildlife habitat, these systems must not be a drain on local government budgets, but should be financially self-supporting. Utility rates are one way in which to capture most of the costs of operating and maintaining water and waste water systems. Knowledge of alternative financing mechanisms available to communities and an understanding of how these mechanisms can be used to pay for new system improvements is also important in the rate design process.

The EFC participated in the Pennsylvania Rural Water Association's Annual Conference. The EFC presented a session describing innovative utility rate structures to effectively manage water resources. The session also included a presentation by the director of our sister EFC at Boise State University, who has conducted similar presentations, as well as training workshops, throughout the country.

As a result of the success of our first Rate Design Workshop, the EFC has been invited by the Pennsylvania Rural Water Association to conduct future workshops throughout Pennsylvania, and to develop and moderate a session in the Association's upcoming spring Annual meeting.

In addition, and as a result of the first workshop, the EFC was invited by the Maryland Rural Water Association to design and develop a series of training seminars for water and wastewater systems in Maryland, which they conducted in two areas of the state, Frederick (serving central Maryland) and Fruitland (serving the Eastern Shore). The seminars presented basic financial management information, such as proper accounting techniques, important financial ratios to manage, and characteristics of responsible rate design. In addition, the seminars explored ways in which utilities could better communicate important information, which could help conserve water while maintaining their system's viability and health. As a follow-up to the seminars, the Maryland Rural Water Association has invited the EFC to develop and conduct a series of utility rate design workshops for the spring of 1999.

The EFC has also been in contact with the West Virginia Rural Water Association and the Virginia Rural Water Association about future workshops in their states.

Site Planning Demonstration Project

In order to change the direction of conventional design, pattern and density of development and its impacts on local quality of life and the environment, there must be on-the-ground examples of development techniques that local governments and the development community can embrace. As part of its ongoing involvement with the Center for Chesapeake Communities and in coordination with the Chesapeake Bay Program, the EFC has joined the *Site Demonstration Project,* which aims to demonstrate the benefits of smart growth and sustainable development in the Chesapeake Bay region.

Workshop: Identifying Solutions to Creating Sustainable Communities

The Maryland EFC participated in a series of workshops entitled *Identifying Solutions to Creating Sustainable Communities*. The workshop, organized by the Center for Chesapeake Communities and supported by the Alliance for the Chesapeake Bay, the Chesapeake Bay Program's Citizen Advisory Committee and the Local Government Advisory Committee, was the first in a series of six workshops held throughout the Bay watershed. The goals of the workshops are to identify the impediments and barriers, as well as the solutions, to promoting sustainable communities. The results of the workshops will be used to establish the agenda for a watershed-wide *Summit Toward a Sustainable Chesapeake* planned for March 1999.

Presentation of Tributary Strategies to School Teachers in the Patuxent Watershed

The Patuxent River is the largest river that is completely within Maryland. The river drains 930 square miles and parts of seven counties before entering the Chesapeake Bay. The river supports more than 100 species of fish and is an important commercial and recreational blue crab fishery. In addition, the watershed is used for nesting and overwintering by bald eagles. Because the watershed is one of the fastest growing areas in the state, part of the Bay tributary strategy includes how to accommodate growth while preserving watershed and community goals. Threats to water quality include air degradation and resultant water deposition, polluted storm water runoff, failing septic system groundwater infiltration and runoff, agricultural nutrient and pesticide runoff and loss of forests and wetlands.

In order to better integrate the concepts of watershed management into the lives of Bay-area citizens, the EFC is often invited to speak to citizen stakeholder groups. At the request of the Patuxent River Commission (a watershed association) the EFC gave a presentation to Maryland high school teachers that described the tributary strategy approach to watershed management. Issues addressed during the presentation included how the prevention of pollution can be incorporated into the everyday lives of citizens, especially its children. The presentation allowed teachers to understand the current Bay clean-up effort and encouraged them to involve Bay restoration and watershed management ideas in their classroom lessons.

Expansion of the State Revolving Fund (SRF)

As part of another effort entered into last year, the EFC helped pass legislation in the Maryland General Assembly to expand its State Revolving Loan program (SRF) to the private sector for nonpoint source pollution control activities.

Continuing our advisory work, the EFC worked with Maryland's Departments of Agriculture, Environment and Natural Resources to modify the State's SRF to allow for an innovative "linked deposit" program,

which encourages participation by private lending institutions to assume the lion's portion of administering the SRF's loans to private individuals, such as farmers interested in funding agricultural best management practices. These practices have demonstrated a marked reduction in nutrients running off farmland, and hold promise in improving water quality and stream corridor restoration. Maryland Senate Bill 0177, the Linked Deposit bill, passed, and is now in effect.

Publications

Stream Corridor Restoration Funding Matrix

The EFC occasionally takes the initiative in responding to an identified need by developing a new product. Such is the case with the Stream Corridor Restoration Funding Matrix. Developed over the last year, the matrix identifies over thirty-five Federal, state and local funding programs which could be used by public as well as private landowners interested in preserving water quality.

Community Solutions for Environmental Finance: Charrettes

The EFC printed a 40-page booklet *Community Solutions for Environmental Finance: Charrettes.* The booklet contains information for communities seeking solutions to their environmental finance problems, including a discussion of the charrette process and summaries of 16 charrettes held for communities in Delaware, Maryland, Pennsylvania and Virginia. The booklet presents recommendations implemented by charrette communities, as well as a discussion of the complexities faced by communities as they struggle to address conflicting demands. In addition, the booklet lists local and national governmental and nonprofit resources available for communities facing environmental finance challenges.

Issues in Environmental Finance: Highly Valued Lands

During the year, the EFC added another fact sheet to its *Issues in Environmental Finance* series. The fact sheet,*Highly Valued Lands,* describes alternative techniques for improving water quality by protecting and restoring highly valued lands, such as wetlands, forests, meadows and lands bordering water resources.

This fact sheet is a complement to the *Stream Corridor Restoration Funding Matrices* because these techniques can be used in conjunction with Federal and state assistance programs described in the matrix to help achieve water quality improvements. Because of the often high cost of removing pollution from water resources, it is often cheaper to prevent pollution in the first place. Thus, those techniques that strive to reduce the amount of pollution entering the waterways can be thought of as financing techniques.

Other Training Opportunities through Conference Forums and Sessions

Pennsylvania Rural Water Association's Annual Conference

The EFC participated in the Pennsylvania Rural Water Association's Annual Conference.. The EFC presented a session describing characteristics of good financial management and innovative utility rate structures to effectively manage water and waste water systems. The session was a collaborative effort between the Maryland EFC and the director of the EFC at Boise State University. Our plan is to generate interest in conducting a series of training workshops for local officials interested in the full-cost pricing of environmental services. Full-cost pricing of environmental services allows local governments to better manage environmental resources to protect habitat and human health.

As a result of this workshop, the Pennsylvania Rural Water Association invited the EFC to conduct a Utility Rate Design Workshop (described in a previous section of this report) for Pennsylvania utility operators.

Team Wetlands Conference

The EFC was invited to moderate a problem-solving roundtable entitled *Development and Wetlands: Making them Compatible,* at The Terrene Institute's Team Wetlands Conference, in Arlington, Virginia. The EFC presented the Starlit Ponds charrette as a case study addressing failing storm water ponds and the possibility of converting them to wetlands. After the presentation, the EFC Coordinator moderated a discussion for participants interested in options for retrofitting or converting ponds for enhanced water quality. Participants from Utah, Michigan and Maryland engaged in a lively discussion about pond functions beyond storm water management, such as community public space and wildlife habitat.

Best Management Practices (BMP) Selection for Urban Storm Water Management workshop

The EFC participated in a workshop, *BMP Selection for Urban Storm Water Management* in Dumfries, Virginia. The workshop was sponsored by the Chesapeake Bay Program Nutrient Subcommittee and was attended by over 100 people from the public and private sector. The Maryland EFC presented an exhibit highlighting financing alternatives for funding urban storm water BMPs through a mix of Federal, state and local program and non-regulatory initiatives such as recognition programs. The Funding Matrices and the Fact Sheet *Highly Valued Lands*, were used as the basis for the exhibit.

Conservation of Biological Diversity Conference

At the conference *Conservation of Biological Diversity* held in Annapolis, Maryland, the EFC was selected to present a poster titled "Funding for Water Quality: Stream Corridor Restoration Projects." The poster provided planners and other decision makers with tools or ideas to help them better manage stream corridors for water quality and wildlife habitat.

Maryland Municipal League Convention

At the 1998 Convention of the Maryland Municipal League), attended by 153 municipal governments and over 500 local government representatives, the EFC designed and presented an exhibit which outlined approaches to watershed-based financing techniques for environmental projects, in particular those involving water quality. The purpose of the convention is to allow municipal governments to exchange ideas and information. Our exhibit encouraged local government representatives to think about watershed-based approaches to solving environmental quality problems that cross jurisdictional borders.

Wetlands '98: Integrating Wetland / Floodplain Ecosystems in to Water Resources / Watershed Management

During the fall, the EFC was invited to speak at the conference *Wetlands '98: Integrating Wetland / Floodplain Ecosystems into Water Resources / Watershed Management*,. This national conference, held on September 21-24, 1998 in St. Louis, Missouri, was co-sponsored by the Institute for Wetlands Science and Public Policy and the Association of State Wetland Managers.

Urban Revitalization and Regional Prosperity: Opportunities for Partnership

The EFC was invited to develop a panel and moderate a session at the *12th Annual Conference of the National Council for Public Private Partnerships*, held in Atlanta. The subject of the panel was the challenge of re-integrating under-utilized and even abandoned properties into the economic web of a community, utilizing public-private partnerships.

Maryland Environmental Service/Maryland Department of the Environment Co-Sponsored Conference

The EFC co-sponsored, with Maryland Environmental Service and Maryland Department of the Environment, a conference *How to Make Dollars and Sense out of Federal and State Environmental Grants and Loans*. The EFC Coordinator opened the conference with a presentation, "Thinking Outside the Box: an Overview of Broad-based Funding Support." The presentation began by acknowledging that water and waste water systems and other environmental services go beyond providing communities with human health protection, but are primary providers of other benefits, including:

- Conservation, preservation and enhancement of water quality
- Protection and restoration of habitat including source water protection and wetlands management
- Aesthetics, recreation, cultural identity through management of water resources

Global Programme of Action Coalition for the Gulf of Maine

Although the EFC Network does not have a Center in Region 1 at this time, the Maryland EFC, supported by NOAA, has been collaborating with a Gulf of Maine initiative—the *Global Programme of Action for the Protection of the Marine Environment from Land Based Activities for the Gulf of Maine* (GPAC). In 1996 the Gulf of Maine (GOM) was chosen by the Commission for Environmental Cooperation (CEC) as the site of a pilot project to help North American countries implement an international program to protect their marine and coastal areas from land-based activities. CEC was created as a result of NAFTA negotiations to facilitate cooperation and public participation and to foster conservation, protection and enhancement of the North American environment. In the GOM region, the CEC has brought together a diverse group of individuals, known as GPAC, to develop a project of their own design. The EFC has played an important role in advising GPAC on environmental finance matters.

New Initiatives

Urban Environmental Quality and Public Health: An EFC Network Collaboration

The Maryland EFC's proposal to the USEPA, on urban environmental quality, has been accepted. Submitted on behalf of the Environmental Finance Center Network, the collaborative project will address the issue of sustainable urban growth and regional vitality.

Riparian Forest Buffers: Opportunity costs and opportunities lost

The Chesapeake Bay Program has compiled information about the effectiveness of riparian buffers and wetlands to protect surface water quality. This information is based on scientific research conducted within the Bay watershed and has been distributed in various forms to students, state agencies, policy makers and government officials. As a result, the Bay states, as signatories to the Chesapeake Bay Agreement, have pledged to increase riparian forest cover by the year 2010. To reach this goal, the states have developed draft implementation plans.

At the local level concerns have been raised by local officials, the development community and others, about limiting development in the riparian zones by taking high-priced streamside land out of the tax base. Of primary concern for local elected officials is preventing a decrease in revenue generation and resulting operating budget deficits. The fear of decreasing the local tax base is therefore hindering realization of the buffer goals of the Chesapeake Bay Agreement.
In order to address these concerns, the Environmental Finance Center will provide examples of ways to recoup costs associated with limiting development in the riparian zones. Along with the scientific results

from the Bay Program, this information will help local government officials persuade their constituents that preserving the stream buffer area will not negatively affect the local economy.

Land Trust Assistance: Creative Financing Of Sensitive Areas

Land trusts often acquire property with the goal of preserving a particular natural, historical or cultural feature. In the Chesapeake Bay region there are a large number of land trusts, with over 41 in Maryland alone (the largest concentration in the country). Some trusts function with full-time staff and a coordinated acquisition plan, but the majority of land trusts are small. In addition to the lack of an acquisition plan, many small land trusts lack the staff necessary to identify and secure funding necessary to meet their goals. Based on suggestions from the Chesapeake Bay Program, the Canaan Valley Institute (WV) and various land trusts in the region, the EFC will develop a collection of "tools" to assist land trusts in their efforts to preserve important lands.

Program for Community Partnership

The EFC has joined with a group of University System partners and State agency representatives to develop capacity at the local level to manage local challenges using a variety of techniques and resources. The initiative, called the *Program for Community Partnership* (PCP), is a collaborative effort between the University System of Maryland, the State of Maryland and the Fannie Mae Foundation, and is supported by Fannie Mae with a three-year $1.0 million grant. The plan is to identify three pilot communities, representing an inner city urban neighborhood, an aging suburb, and a rural community, and work with them over three-years to help them solve their most critical problems. The objective is to provide intensive exposure to techniques and skills for enhancing community problem-solving via innovative workshops, role-playing and other collaborative efforts.

Financing Coastal Watershed Efforts

An abstract from the EFC was selected for an oral presentation at the Coastal Zone '99 national conference in July, 1999. Over 600 submissions on topics of coastal zone management were reviewed. The EFC will discuss the "Community Quilt Concept of Environmental Financing," which stresses the use of multiple financing techniques, including local government initiatives, the use of grants and loans, and pollution prevention, when addressing environmental problems within a coastal watershed. The conference will be attended by hundreds of participants, and the Maryland EFC will seek to include the work of other EFCs in our presentation.

Utility Rate Design Workshops

The EFC has tentatively scheduled a series of utility rate design workshops in coordination with the

Maryland Rural Water Association. These workshops, scheduled for May and June, 1999, will introduce the concepts of good financial management as well as develop rate structures for utility system participants. Using RateMod Pro software developed with the support of USEPA, participants will create sample rate structures for their systems using their own data. In addition to a rate proposal, participants will finish the workshop with a better understanding of how rates should be set, and how to persuade elected officials and rate payers of the benefits of a self-supporting system.

The EFC is also coordinating with the Pennsylvania Rural Water Association and Maryland Environmental Service (a public agency charged with managing over 150 water and waste water systems in Maryland) to bring utility rate design workshops, and other financial management training, to clients and members.

Toward A Sustainable Chesapeake Summit

The EFC is part of an Advisory Team dedicated to developing an engaging agenda and bringing together exciting speakers and participants for a summit on sustainable communities in the Chesapeake region. The Summit, to be held in Baltimore on March 22 & 23, 1999, will address:

- Promoting innovative site planning
- Preparing watershed management plans
- Nurturing sustainable economic growth
- Building community capacity

Environmental Finance Center Public Outreach Brochure

To ensure that communities in the Chesapeake Bay Region understand how the EFC can assist them in finding ways to fund their environmental projects, the Center is developing an EFC marketing packet to be sent to local governments and others in the Chesapeake Bay Region. This brochure will highlight ways in which the Center can assist local governments, businesses, land trusts, nonprofit organizations and others. For example there will be a section describing how an EFC charrette gives small communities access to technical and financial experts from the public, private, and academic sectors to discuss their issue.

Development of a Web Page for the Environmental Finance Center

The EFC continues to update and revise its presence on the web with a series of pages which present some of our work, including charrette summaries and the Stream Corridor Restoration Funding Matrices (**http://www.mdsg.umd.edu/MDSG/EFC/index.html**).

Fact Sheets

The EFC continues to develop one-page, targeted fact sheets that address important environmental finance issues. In addition to the Stream Corridor Restoration Funding Matrices, which are expanded fact sheets, the *Issues in Environmental Finance* fact sheet series includes:

- Community Solutions: Charrettes As a Useful Tool in Public Policy
- Highly Valued Lands

Future fact sheets may include such issues as equitable and self-sustaining utility rate structures, user fees and their application, and non-regulatory techniques such as recognition and award programs. A fact sheet on land trust financing options for preserving lands in also being developed.

Network Collaborations

The Maryland EFC has cooperated with and benefitted from the other EFCs in the national network. Here are several highlights from those collaborations:

The Director of the EFC at Boise State has been extremely helpful in advising us on waste water and drinking water issues, especially rate-setting. He has already helped establish contacts between our EFC and other clients in our region (Region III), and he has served as instructor and advisor on several rate setting workshops. He has also traveled to the region to co-present at training seminars and conferences.

The Director of the Maryland EFC traveled to the EFC at Syracuse University to participate in a Network-wide forum. The Director moderated a charrette for the New York village of Long Eddy, which has resulted in the award of grant money for the community's waste water system upgrades.

The Maryland EFC facilitated a Network-wide discussion on urban and regional development patterns, which resulted in a Network-wide proposal to the USEPA. The proposal, discussed elsewhere in this report, has been funded and will begin in 1999.

In addition to specific collaborations, the Region III EFC is in constant contact with the other EFCs in the network, via monthly conference calls and numerous information-sharing activities.

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Great Lakes EFC at Cleveland State University, Region 5

Executive Overview

The Great Lakes Environmental Finance Center was established at Cleveland State University in 1994. The Center serves public and private sector clients in Federal Region 5, which includes the states of Ohio, Michigan, Indiana, Illinois, Wisconsin, and Minnesota. The GLEFC has a current focus in three environmental policy areas: 1) Brownfields cleanup and redevelopment; 2) Industrial pollution prevention; and 3) Sustainable development, especially in Native American communities. Future priorities will include providing water rate modeling services for smaller communities, and developing market-based solutions

to air quality management. The Center's brownfields work is expected to focus increasingly on urban sprawl and smart growth management in the future. The EFC is making information available on the World Wide Web at **http://www.csuohio.edu/glefc/**

Introduction

This annual report describes the major accomplishments of the Great Lakes Environmental Finance Center (GLEFC). The report also provides a perspective of future priorities for the Center's work in 1999 and beyond. The Great Lakes Environmental Finance Center was established at Cleveland State University in 1994. The Center serves public and private sector clients in Federal Region 5, which includes the states of Ohio, Michigan, Indiana, Illinois, Wisconsin, and Minnesota.

Expertise and Resources

GLEFC is housed within The Urban Center at Cleveland State University, which is a nationally recognized public policy research institute. The Urban Center is engaged in a wide range of research, technical assistance, and training activities related to urban and regional development. Over 30 fulltime staff professionals work in The Urban Center's ongoing programs in economic development, environmental management, housing and neighborhood development, public management and finance, urban design, and regional development policy.

The Urban Center serves as the research and outreach arm of the Maxine Goodman Levin College of Urban Affairs, rated in 1997 as one of the top ten public policy schools in the United States by *US News and World Reports Magazine*. The College of Urban Affairs offers advanced training in the fields of public administration, urban planning, urban studies, and environmental studies.

The GLEFC has a current focus in three environmental policy areas:

1. Brownfields cleanup and redevelopment;
2. Industrial pollution prevention; and
3. Sustainable development, especially in Native American communities.

Future priorities will include providing water rate modeling services for smaller communities, and developing market-based solutions to air quality management. The Center's brownfields work is expected to focus increasingly on urban sprawl and smart growth management in the future.

SUMMARY OF ACCOMPLISHMENTS

There are three parts to this section of GLEFC's annual report: 1) Brownfields Cleanup and Redevelopment; 2) Industrial Pollution Prevention; and 3) Native American Communities Initiative.

Brownfields Cleanup and Redevelopment

- Completed four community site visits, providing on-site assistance and consultation on brownfield redevelopment projects.
- General technical assistance and information related to brownfields redevelopment to Great Lakes communities and organizations.
- Prepared useful research and planning materials that helps communities solve brownfields redevelopment problems

Community Site Visits and Other Brownfields Outreach Activities

Kenosha, Wisconsin Community Technical Assistance Project

The Great Lakes EFC conducted a one-day intensive strategy-building workshop to address the redevelopment of the Harborpark site. Harborpark was once the home of the Simmons Box Company and later became a major automotive plant for Chrysler Corporation. The GLEFC facilitated a workshop to address specific redevelopment issues for discussion by local community stakeholders. Local developers, civic leaders and real estate professionals came together to more fully exchange ideas about the planning and redevelopment of the Harborpark site and to share the complexity of decision-making required of each stakeholder in order to complete the project. GLEFC's final report identified 6 action recommendations:

- Summarize the existing report into an easy-to-read public document, making environmental issues easier to understand.
- Engage the local community in more public education and information gathering.
- Investigate and benchmark similar redevelopment projects in other cities.
- Convene a private developers' roundtable to further explore developer interest in the site.
- Utilize environmental insurance only if warranted on parts of the site, if at all, and investigate feasibility.

- Select a qualified developer or partners before talking to lenders. Environmental issues are only one of many variables in the financing of a real estate development deal.

These and other recommendations were made as the result of a participatory process enjoyed by 18 community members in the workshop. The Harborpark site is now under final demolition and a site plan has been developed. The City is actively engaging developers in dialogues about the redevelopment plan and potential for a variety of projects on the site.

Cincinnati, Ohio Community Technical Assistance Project

The GLEFC conducted an intensive strategy-building session for the Port Authority for Brownfields Redevelopment in Cincinnati and Hamilton County. This newly re-created port authority sought to better define its mission and vision as a new entity established to focus specifically on brownfield redevelopment. Port Authority board members, the Brownfield Community Advisory Council and other civic and community leaders came together to participate in this workshop. Other organizational issues were addressed as well for this one-year old Port Authority, and one of the first in the country to be solely dedicated to brownfield redevelopment. The GLEFC's final report has been published and includes recommendations in the areas of organizational goal-setting, site prioritization and work planning, and strategy implementation.

Peoria, Illinois Community Technical Assistance Project

The Great Lakes Environmental Finance Center (GLEFC) conducted a consulting workshop for the City of Peoria, Illinois. The purpose of the workshop was to assist the City of Peoria in its efforts to develop actions leading to the successful redevelopment of the Darst Street site. Particular emphasis was placed on strategies pertinent to properties with a history of environmental contamination, often characterized as brownfields. Redevelopment of the site and the prospect for a variety of users was the major focus of the discussion and produced some enlightening and refreshing options for the City to consider. The key issues that the Advisory Team addressed were to: 1) determine the highest and best use of the site; and 2) identify and overcome barriers to redevelopment.

Cleveland, Ohio Community Technical Assistance Project

The GLEFC helped facilitate the kick-off meeting of the Cleveland West Side Economic Development Initiative. The GLEFC participation is part of a two-session consultation providing research and advisory services to WIRE-Net, a non-profit community development organization that is managing the national Brownfield Pilot project for the City of Cleveland.

The first meeting's purpose was to develop a complete and prioritized list of site selection criteria in order to decide from 20 sites which would be included in the final redevelopment design for the pilot. The goal was to devise six or seven criteria to apply to all of the possible sites. From this analysis, also largely provided in by the GLEFC, the ten-member Working Group will determine the final six to eight sites that will undergo Phase I and Phase II environmental assessments leading to final redevelopment planning. This second major step in the site prioritization process occurred at a strategy-building session facilitated by the GLEFC.

Pocatello and Boise, Idaho Community Technical Assistance Projects

Under the auspices of the Boise State University EFC, the GLEFC provided technical assistance and information to the cities of Pocatello and Boise, Idaho. GLEFC representatives traveled to the City of Pocatello and provided a national brownfield redevelopment perspective, and helped to facilitate a two-day strategy-building session for the City's public officials and community leaders. The Advisory Team of the Boise EFC and the GLEFC helped the City to determine approaches to tackling their brownfield properties. Specific attention was paid to developing implementation of redevelopment planning and a national brownfield pilot application for four sites: the Volkswagen "graveyard"; the Harrison-West site; First Street East; and Kraft Road.

For the City of Boise, the Boise State University EFC conducted a half-day conference on brownfield redevelopment for public and private officials in the City of Boise. The GLEFC presented a major overview of brownfield redevelopment activities in the US and the Great Lakes region, and answered numerous questions from the audience. The statewide *Idaho Statesman* newspaper covered the event and published an article about the GLEFC perspective and information

Other Brownfields Outreach and Assistance Projects

North Span Inc. (Duluth, MN): Major planning and assistance was provided to North Span Inc., in Duluth, MN, to prepare them for a strategy-building session on revolving loan fund administration for brownfields. North Span is working as the contractor for the City of Duluth and the Minnesota Pollution Control Agency (MNPCA) in administering a brownfields revolving loan fund grant awarded to the MNPCA.. Information and referrals were provided to North Span, as well as initial economic research that was complied in preparation for a workshop. The City of Duluth and North Span have postponed a session with the GLEFC pending administrative restructuring at the City as well as at the MNPCA's brownfield area.

Olney, Illinois: The county's development agency in Olney, Illinois was assisted by the GLEFC with information and referrals on environmental insurance.

Minnesota Pollution Control Agency: The Minnesota PCA received information and referrals for their Water Quality Funding Conference in December of 1997.

Brownfields Presentations

- The EFC Syracuse Forum held June 25-26, 1998: provided a major overview of brownfield redevelopment and research findings for New York state and city officials in addition to other EFC representatives. (Kirstin Toth)

- The National Council of Public-Private Partnerships October 15, 1998, Atlanta, GA. EFC was a Panelist and presenter.

- Region 5 EPA, Chicago: EFC provided major overview and findings of brownfield advisory service to EPA and state officials.

- Brownfield Finance Partnership, Ohio Water Development Authority, Columbus, Ohio. EFC presented the Cincinnati project and discussion.

- Brownfields 1998, Los Angeles, CA. EFC presented results of annual brownfields community benchmark survey, and other research results related to brownfields strategies at two sessions.

Brownfields Meeting Participation/Representation

Council of Infrastructure Financing Authorities/State Revolving Funds, Atlanta, GA:

- Ft. Wayne/USEPA Brownfields National Partnership Workshop.

- National Association of State Development Agencies, Washington, DC .

Brownfields Research and Resource Materials Development

Brownfields Financing and Redevelopment Planning Guidebook

GLEFC prepared a detailed resource guidebook to assist community and state officials in planning solutions to brownfield sites. The guidebook contains valuable information and spreadsheets on how to estimate the costs of cleanup and redevelopment of brownfields. Several case studies are included that illustrate the process associated with residential, commercial, and industrial properties.

Brownfields Community Benchmark Survey

This is the second year that GLEFC has surveyed 100 Midwestern communities to assess their progress in cleaning up and redeveloping brownfields. Over 60 communities responded to the 1998 survey, which examined clean up methods, costs, redevelopment performance measures, and a host of other key issues associated with local brownfields redevelopment efforts. The survey results are described in a summary report, and are available at GLEFC website.

Turning Brownfields Into Greenbacks Book

The EFC has prepared a new book on brownfields redevelopment for the Urban Land Institute in 1998. While the project was funded by ULI, and therefore is ULI property, the work is identified with GLEFC's brownfields activity. The book can be purchased from ULI in Washington, DC.

GLEFC Internet Website

This is the second year of operations for GLEFC website, which can be located at: http://www.csuohio.edu/glefc. The website receives about 75-100 visits per month on average from a wide cross-section of organizations and individuals. The site has been updated on a regular basis in 1998. Several new reports and report summaries are available for downloading at the site. At this point, the website is primarily a source of information about brownfields redevelopment, but the amount of information about Native American environmental issues, pollution prevention, and other issues is growing.

In 1998, GLEFC received more than 50 follow-up phone calls for information and assistance from those initially browsing the GLEFC website. Most were minor information requests.

New GLEFC Services Brochure

A new GLEFC services brochure was produced in 1998 to increase visibility of the center to Great Lakes and national clients. About 150 copies of the brochure were distributed at Brownfields 1998 in Los Angeles. Another 125 copies were distributed at the National Public-Private Partnership Conference in Atlanta in October 1998. A mailing to brochures to 100 environmental resource organizations is planned in early 1999.

Pollution Prevention Project

Introduction

The GLEFC completed its two-year pollution prevention project *Integrating Pollution Prevention with Community-Based Economic Development*. This project was funded by a grant from the U.S. EPA's Division of Pollution Prevention. During 1998, two industry-specific demonstration projects were held in the Cleveland and San Francisco areas. The Cleveland demonstration project, conducted by GLEFC, focused on the metal finishing industry in northeast Ohio. The San Francisco project, conducted by EFC9, concentrated on the dry cleaning industry in the San Francisco Bay area. The final report, issued to the U.S. EPA in December 1998, describes the achievements of these demonstration projects and the steps that would be taken beyond this grant.

Accomplishments

Pollution Prevention Project Highlights

The project's findings can be summarized in four areas: 1) conclusions from research undertaken during the first year of the grant, 2) key points from the Northeast Ohio demonstration project, 3) leading findings from the San Francisco demonstration projects, and 4) the project's contribution to economic development.

Findings

Small business access to capital in general and to banks' loans in particular is enhanced by the latest financial changes, such as loan standardization, credit scoring, and securitization that address many traditional barriers. Banks do not specialize in loans for pollution control or pollution prevention and most do not request details regarding the use of the funds being loaned.

The assessment of financing programs for pollution control and pollution prevention revealed that existing pollution control and/or prevention financing programs experience low demand relative to expectations and available funds. Interviews with many financing programs' directors, bankers, economic development programs, technical assistance programs, and others revealed that the lack of financing is not the main barrier preventing manufacturers from undertaking more pollution prevention investments. Moreover, it was suggested by many that pollution prevention is not a high priority for small businesses. Information gathered on Capital Access Programs (CAPs) led to the suggestion to extend the use of CAPs to address financing of pollution prevention investments.

Northeast Ohio Demonstration Project: Metal Finishers Industry

The Great Lakes Environmental Finance Center (GLEFC) decided to focus its demonstration on the local metal finishing industry, based on meetings with local stakeholders, conversations with others, and a mail survey. The GLEFC has been working with the Surface Finishers Committee as representatives of the

industry in Northeast Ohio. Working with the industry revealed that the main barrier to more pollution prevention (P2) activities is uncertainty regarding P2 technologies. As a result, GLEFC has focused its work with the industry on developing a technology verification project.

San Francisco Demonstration Project: Dry Cleaning Industry

According to a sub-contract with the GLEFC, the Environmental Financing Center of EPA Region 9 (EFC9) targeted a specific industry and produced a plan for stimulating more pollution prevention in that industry in the San Francisco Area. After consultation with EPA Region 9, the Bay Area Hazardous Waste Reduction Committee, and the GLEFC, EFC9 determined that the dry cleaning industry would make the most suitable industry. The main conclusion reached is that lack of adequate financing (as initially hypothesized) is not the primary barrier preventing dry cleaners from transitioning into alternative fabricare technologies. EFC9 identified the following barriers to alternative fabricare: dry cleaners do not believe that the traditional chemical used in dry cleaning (perchloroethylene, known as perc) is bad for their health; they believe that alternative forms of fabricare are not as financially and technically feasible as perc; they face an uncertain regulatory environment; and they are unsure about the market for wet cleaning.

Recommendations from the demonstration project call for the regulators to clarify the human health impacts of perc. It has been suggested that there is a need to show that alternative dry cleaning technologies work in a commercial setting and that they are financially feasible. EFC9 will continue to work on these issues, beyond this project. Especially, they will educate the dry cleaners and the public on the merits of alternatives to dry cleaning.

Contribution to Economic Development

The Cleveland demonstration project targeted, the metal finishing industry is part of an industrial cluster of metal working industries that was identified as one of seven clusters in which Northeast Ohio has competitive advantage. At present, the major economic development agencies in the area are working with these clusters to improve their regional competitiveness. The businesses and organizations that are part of a cluster are working together to identify barriers to continued growth and work jointly on developing new opportunities for increased business. The more profitable an industry is, the more it adds to the regional economic base. Thus, if pollution prevention is integrated into a firm's business plan, and it is economically feasible, or even profitable, stimulating pollution prevention could become not only a means of gaining a cleaner environment in the region, but also could contribute to the industry's efficiency and its ability to retain local jobs.

The dry cleaning industry chosen for the San Francisco demonstration project is a local service industry that exists in every region of the country. Many of the cleaners in the San Francisco East Bay area are small, independently operated, or franchise neighborhood cleaners. Although dry cleaning is not

characterized as a highly profitable business, it has relatively low start-up costs. It is attractive for those individuals with limited capital and a willingness to substitute labor for capital. There are many dry cleaner trade associations in the Bay Area with jurisdictions varying from local, regional, and ethnic to national and international. There are also governmental regulatory agencies as well as nonprofit organizations that promote pollution prevention.

Conclusions

The project overall concludes that *financing is not the main barrier preventing small- and medium-sized companies from undertaking pollution prevention projects.* This is a very significant issue, because the hypothesis going into this project was that the lack of financing is one of the main barriers to pollution prevention and that closing the financing gap would increase pollution prevention activities. This conclusion was reached three ways: in the assessment of selected environmental financing programs across the country that showed relatively low demand to these funds and in each of the two demonstration projects that identified other barriers as more critical than financing. The more important task became how to encourage small businesses to think about and consider pollution prevention investments in their facilities. The two demonstration projects focused on individual industries in their efforts to develop a plan for stimulating more pollution prevention.
Both Environmental Finance Centers (GLEFC and EFC9) are planning to continue to work with the industries they worked with in this project, to continue to advance technology verification for metal finishers in Northeast Ohio and contribute to the shift to wet cleaning in the San Francisco Bay Area.

Native American Sustainable Communities Building Project

Need

Tribes in the Great Lakes region are struggling with serious environmental degradation problems and other challenges that threaten the vitality and sustainability of their communities and the unique cultures found there. Many tribes are actively working to address these issues and needs. This project will help increase the tribes' success in building sustainable communities in the future. The restoration of ecological balance in these communities is essential to their preservation and future development.

Guiding Principles

This project will follow six guiding principles ensuring that appropriate outcomes are achieved through GLEFC's work with the tribes:

- All work will be done at the specific request of tribal officials.

- Work completed will be consistent with tribal values and culture.
- Tribal officials will lead all community planning project efforts.
- A desired outcome from this project will be to reconnect Native American communities with their surrounding natural environment and other resources that encourage sustainable community development.
- Balanced and integrated community solutions will be pursued.
- Work will be conducted in partnership with the tribes, EPA, and other appropriate resources.

Overall Goal

Assist tribal leaders to restore ecological balance in Native American communities in the Great Lakes region by assisting them in using culturally-appropriate comprehensive planning, sustainable development, and ecological design services. This project will expand local capacity within the tribes to develop more sustainable communities.

Accomplishments

1998 marked the initiation of the Native American Communities Project. Funding was received from USEPA to begin tribal assistance efforts in June 1998. GLEFC has made considerable progress in accomplishing Phase 1 activities. These accomplishments include:

- Participated in EPA's General Assistance Grant (GAP) training program in March 1998 for Great Lakes tribes. The GAP Meeting was held in Chicago at Region 5 EPA Offices. Made a presentation on GLEFC services and how these services could benefit tribes. Representatives from all 34 tribes were present at the presentation. GLEFC was present, along with the Idaho EFC (Region 10) and the New Mexico EFC (Region 6).
- Participated in the 4th Annual National Indian Environment Conference in Redwing, MN. Made a presentation on GLEFC services, and managed an exhibition booth on GLEFC and the EFC Network. Over 500 people attended the conference, which was held on the Prairie Island Indian Reservation, near Redwing.
- Presented a proposal to EPA for funding the Native American Communities Project, which was successfully funded by EPA's Region 5 Office over a three-year period. The Idaho and New Mexico EFCs were helpful to GLEFC during the proposal marketing process in the Spring 1998.

- Visited three reservations (Oneida, Menominee, and Mole Lake) conducted a day-long planning meeting with officials from six Wisconsin-based tribes. 15 tribal officials attended the meeting. Prepared a visit report outlying future assistance priorities with Wisconsin tribes in 1999.
- Visited two reservations (Grand Traverse Bay and Little Traverse Bay) and conducted a day-long planning meeting with officials from nine Michigan -based tribes. 19 tribal officials attended the meeting. Prepared a visit report laying out future assistance priorities with Michigan tribes in 1999.

- Visited two reservations (Bois Forte and Fond du Lac) and ran a day-long planning meeting with officials from ten Minnesota-based tribes. 29 tribal officials attended the meeting. Prepared a visit report outlying future assistance priorities with Minnesota tribes in 1999.

- Prepared a plan for three training workshops to be conducted for tribal officials in the Great Lakes region during the February-April 1999 time period. The workshops will address strategic issues identified through GLEFC's site visits and group meetings with tribes. Top priorities are: 1) housing improvement; 2) ecological design; 3) comprehensive community planning; 4) green business development; and 5) innovative financing for environmental and sustainable development projects.

- Prepared a first draft of a guidebook to be used in the three tribal workshops planned for early 1999. The guidebook focuses on the key issues discussed in the workshops, and it provides relevant resource material to aid future planning by tribal officials.

NEW INITIATIVES

Water Rate Model Assistance

GLEFC plans to initiate assistance efforts in the rate modeling arena in 1999. Bill Jarocki, Director of the Idaho EFC, visited GLEFC and provided initial training in model operation and use this past year. Smaller communities in the Great Lakes region are the target audience for these services.

Air Quality Emissions Trading

GLEFC hopes to contribute to the air quality arena in 1999. Because of the increased importance of permit trading, GLEFC hopes to help Great Lakes metropolitan areas to prepare for new developments in this area.

EFC NETWORK COLLABORATION

Pollution Prevention

The demonstration projects' phase of the pollution prevention project involved collaboration between GLEFC and the California EFC in Region 9. EFC9 was a subcontractor to GLEFC under the pollution prevention grant. Although each demonstration project was conducted independently, the goals and objectives guiding the projects were the same. Both worked with specific industries to understand the barriers to pollution prevention and plan on how to overcome these barriers.

Smart Growth Initiative Proposal

GLEFC helped the University of Maryland EFC prepare a network proposal to USEPA to encourage smart growth of US metropolitan areas. The proposal is pending a funding decision by USEPA.

Native American Communities Project

GLEFC collaborated with the EFC Network, especially the Idaho EFC and the New Mexico EFC, in preparing a GLEFC proposal to EPA Region 5 to establish the Native American Communities Project. The proposal was successful in producing funds for GLEFC assistance to the 34 Federally recognized tribes in the Great Lakes states.

1998 EFC Annual Meeting

GLEFC hosted the EFC Network Annual Meeting in September in Cleveland. The two new Region 4 Centers at the University of Louisville and North Carolina, Chapel Hill were represented. The meeting was productive in advancing the EFC Network Strategic Plan, and in discussing future organizational options for the Network.

Great Lakes EFC Organization

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EFC at University of New Mexico, Region 6

Mission Statement

To promote and facilitate effective and efficient environmental infrastructure through innovative financial and engineering techniques.

Executive Overview

Established as the first EFC in 1992 at the New Mexico Engineering Research Institute, the University of New Mexico Environmental Finance Center (EFC) promotes innovative environmental financing techniques by blending the disciplines of environmental engineering and finance. Serving USEPA Region 6, the EFC facilitates efficient environmental infrastructure through innovative and alternative engineering techniques and provides state and local officials with education and training, advisory services, publications, and analyses of financing trends and techniques. The EFC documents and disseminates information about innovative and cost-effective environmental financing alternatives and disseminates information on cost-effective management techniques, such as, public-private partnerships and internal optimization. The EFC initially began with an emphasis on the application of public-private partnerships, particularly public water and wastewater utility systems. With the anticipation of NAFTA, the EFC expanded its technical assistance to border communities on ways to reduce costs for basic sanitary and public health services. Additionally, the EFC researched financing alternatives for environmental infrastructure along the US-Mexico Border, which later served as a guide to feasible choices for public policy decision making. The EFC field-tested a water and wastewater rate model with several New Mexico communities during 1995. Training in the use of the rate model is a mainstay of the EFC's financial outreach program throughout Region 6 states. Current efforts primarily focus on assistance to state agencies with the capacity development requirements (technical, financial, and managerial) of the Safe Drinking Water Act, specifically as they relate to federal, state, tribal, and local governments and public and private small water systems. New efforts include assisting residents in northern New Mexico in developing a Unified Source Water Protection Plan, a pilot project initiative with EPA and USDA Rural Utilities Service. Identifying affordable and viable financing options and promoting low-cost, alternative, and appropriate technologies for system capacity projects is an ever present goal of the EFC. The EFC is making information available on the World Wide Web at http://nmeri.unm.edu/ta/efc.htm

EFC Expertise and Organizational Structure

Located at the University of New Mexico Research and Technology Park, the University of New Mexico Environmental Finance Center is a division of the New Mexico Engineering Research Institute (NMERI) and serves the US Environmental Protection Agency's Region 6 states. The EFC director is a registered Professional Engineer in the states of New Mexico and Pennsylvania and holds a master's degree in

environmental engineering. Educational backgrounds of the staff include master degrees in environmental engineering, water resources administration, and community planning / public administration. The EFC also employs five graduate students in the areas of engineering, planning, and business administration and one engineering undergraduate.

Since its inception in the 1960s, NMERI, a multi-disciplinary research and development extension of the UNM School of Engineering has continued its research, development, and education services both locally and abroad. Serving the needs of both the private and public sectors, NMERI focuses strategic research efforts in the areas of sustainable development; global environmental technology; fire science; and non-conventional energy systems. Additional capabilities and expertise are available to the EFC through close working relationships maintained with UNM faculty, staff, and graduate students from the Schools of Architecture and Planning, Engineering, Law, and Public Administration; the Institute for Public Policy, the Latin American Institute; the Bureau of Economic and Business Research; the Earth Data Analysis Center; and the Water Resources Administration Program.

COMPLETED INITIATIVES

Capacity Development - Increasing Drinking Water Viability

August 1996 - December 1998

The EFC has been involved in several projects in the last four years relating to assessing and increasing the capacity of small drinking water systems. In addition to capacity development projects, the EFC staff continues to serve as technical staff to the New Mexico Drinking Water Advisory Group.

The EFC completed a capacity development project, "Increasing Drinking Water Viability In New Mexico," which expanded from New Mexico to all the states within Region 6 during the its project duration. This Assistance Agreement had three main components:

- Section 1: New Mexico Capacity Development Strategy
- Section 2: Rate Model Workshops and Demonstrations
- Section 3: Meetings with Region 6 States (Clearinghouse and Outreach).

Section 1: New Mexico Capacity Development Strategy

The EFC worked closely with the New Mexico Environment Department (NMED) in support of the changes that resulted from the 1996 Amendments to the Safe Drinking Water Act (SDWA). The EFC hosted a public meeting for NMED on the New Mexico Safe Drinking Water Program and State Revolving Loan fund.

Section 2: Rate Model Workshops and Demonstrations

The EFC demonstrated the utility of and presented ways in which the EFC could assist agencies with RateMod Pro™, a water/wastewater utility rate setting software program, through several day-long training sessions. Strategic planning and an in-depth discussion regarding how the model can be used to meet the needs of the state regulatory and funding agencies was also part of the day's agenda. The use of the model was demonstrated on two levels: for water and wastewater utility operators, managers, and owners; and, for regulatory funding. For a more detailed description of rate setting using RateMod Pro, please refer to *Water Utility Rate Model Presentations and Training Demonstrations*.

Section 3: Capacity Development Clearinghouse and Outreach

One of the initial activities was a review of existing and on-going capacity development efforts in other states. Contact with other states was maintained throughout the duration of the project regarding capacity development efforts throughout the nation. This allowed the EFC to share information regarding those programs with Region 6 states and to present information regarding other successes and failures. The EFC still maintains this capacity development information to serve as a Clearinghouse for Region 6 states. In addition, the EFC attended meetings and conferences related to capacity development efforts in New Mexico, other states within EPA Region 6, other states outside of EPA Region 6, and national initiatives. This attendance has enhanced the EFC's ability to act as a resource for EPA Region 6 states and to EPA Region 6 itself.

The EFC director worked with EPA Region 6 representatives to develop a Capacity Development Assistance Program for Arkansas, Louisiana, and Oklahoma. The EFC met with agency representatives from these states to present the capacity development efforts of New Mexico and Texas. They discussed EPA requirements, requirements for EPA Region 6 approval of the strategy, and state flexibility in the strategy. Meetings were held for two days in each of the states. Discussions with individual states focused on their determinations and perceptions of the greatest need in the formulation of a Capacity Development Strategy.

Water Utility Rate Model Presentations and Training Demonstrations

Ongoing

Background

The model was developed in cooperation with the U.S. Environmental Protection Agency and the Environmental Finance Center Network to enhance the financial and managerial capacity of small to medium-size water and wastewater systems. The model incorporates EPA user fee guidelines and methods

recommended by the American Water Works Association and the Water Environment Federation. The model is designed to be flexible and easy to use while applying accepted rate setting guidelines and methodologies. It is capable of being customized for each utility system's unique design, customer, and financial characteristics, and accommodates a broad range of common accounting and budgeting practices. Small users may enter very limited data, select the model's defaults and obtain results with minimum effort. Alternatively, larger systems, and those requiring more advanced rate setting techniques, may input very detailed information in order to take advantage of all the model's features.

Model Use

The model is both a rate setting and a financial planning tool that has the ability to:

- perform a cost-of-service analysis;
- develop demand-based user rates; and
- prepare a six-year budget, rate, and financial forecast on a desktop personal computer.

The model is useful on two levels. The EFC demonstrated the utility of the model for both of the following levels:

- water and wastewater utility operators, managers, and owners; and
- regulatory and funding agencies to:
  - improve project underwriting;
  - determine necessary and appropriate amount of financial assistance;
  - assess repayment capacity of individual systems;
  - schedule capital improvements; and
  - evaluate financing alternatives.

New Mexico Finance Authority Request for Proposal Preparation

The New Mexico Finance Authority (NMFA) contracted with the EFC to prepare a Request for Proposal (RFP) for environmental reviews, engineering services, and construction services for the SDWA SRF loan program. Prior to the SRF program, the NMFA had not had a need for RFPs since it did not typically need these types of services.

Survey of Water System Operating Permits throughout United States

In the fall of 1998, the EFC staff conducted a telephone survey of all 50 states to find out which states issue operating permits for public drinking water systems. Specific states were questioned in depth to understand

how the operating permit system works in an effort to link permits to requirements under the Safe Drinking Water Act Amendments.

Survey and Database of GIS Usage in New Mexico

February 1998 - September 1998

Under the cooperative program between the University of New Mexico and the State of New Mexico General Services Department - Information Systems Division (GSD-ISD), the EFC staff conducted a telephone survey and mailing list compilation of geographic information system (GIS) specialists and administrators from New Mexico municipalities, counties, and regional economic development organizations. The same survey was conducted on state agencies, tribal chapters, and federal governments with local offices in New Mexico. The database will be used for the distribution of RGIS newsletters, information, and announcements about future RGIS-produced CD-ROMs.

Texas Capacity Development Strategy Implementation

As a follow-up to the Texas Capacity Development Strategy completed in August of 1997, the EFC assisted the Texas Natural Resource Conservation Commission with the implementation of the strategy. There are numerous steps and phases of the implementation process and full implementation may take up to three years due to the need for a revised computer database program and a revised sanitary survey deficiency score process.

CURRENT INITIATIVES

Small Water System Capacity Development

The EPA defines capacity as "*the ability of a water system to consistently provide quality service at an affordable cost.*" This encompasses the technical, financial, and managerial capability of a system to consistently comply with all state and federal regulations. Capacity can also be seen in a much broader context than merely regulating compliance; it can involve economic development, population growth, and the role of the government and private sector in providing public infrastructure.

Increasing system capacity is a two-step process. The first step is the assessment of overall system capacity, and the second step is the enhancement of system capacity through direct technical assistance. System capacity exists along a continuum and information about present and future needs of water systems must be incorporated in the process in order to encompass the long term requirements of a sustainable system.

The EFC devotes a majority of its time to capacity development endeavors. At present, capacity development work is performed under three separate USEPA contracts:

- Capacity Development for Native American Tribes and Pueblos
- Capacity Development: Assistance to States and Native American Tribes
  Subcontract Agreement with EFC-10
- Capacity Development Assistance to Region 6 States

Native American Capacity Development: EPA Region 6 Tribes and Pueblos

Sponsor: EPA Region 6

The Reauthorization of the Safe Drinking Water Act in August of 1996 included the establishment of the Native American Revolving Fund for Native American Tribes, Pueblos, and Alaskan Native Villages. The fund is administered by EPA Regional Offices and is similar to the state-administered revolving loan funds in that it was established to provide resources in the form of monetary and technical assistance to small and medium community drinking water systems. But in the case of the Native American Revolving Fund, the funds are in the form of grants rather than loans. The EFC is focusing its initial Native American efforts on adapting the concept of capacity development to fit within the institutional framework of the Tribes and Pueblos in New Mexico.

In addition, the EFC has established the Tribal Set-Aside Task Force. Because of the importance of stakeholder involvement in the process of developing and implementing a drinking water system capacity program, the Task Force includes people who represent a broad range of Tribal and Pueblo interests. Task Force meetings are held quarterly.

Capacity Development Strategies: Assistance to States and Native American Tribes

Sponsor: EPA Headquarters

This collaborative project with the Environmental Finance Center at Boise State University (EFC-10) is funded through a grant from the USEPA Office of Ground Water and Drinking Water. Although both Centers are doing equally proportionate work, the EFC-10 is the designated grantee while the EFC-6 is a subcontractor for the grant.

The EFC-6 is currently providing direct assistance to two states in Region 6 and one in Region 2, in addition to the Native American Tribes located in Region 6 to assist these entities in meeting capacity

development strategy requirements of the 1996 SDWA Amendments. The states involved include New Mexico and Texas in Region 6 and New York in Region 2. Four additional states will be selected based on interest and need.

New Mexico: Expanding the Effectiveness of a Capacity Development Strategy

The EFC is completing a study of past recipients of water system funding to determine if there is significant difference between the capability of a system prior to and after funding based on the type of funding. This project is designed to assist the State in expanding the role and effectiveness of the overall capacity development strategy described in further detail later in this section. The systems are being compared to themselves before and after funding to note any differences or improvements, to the extent feasible given the limited information that is currently kept for systems. In addition, similar size and type systems that completed similar projects are being compared based on funding type (grant, grant/loan, loan) to examine whether any of the systems requested additional funding during the selected time period.

The study of past grant and loan recipients ties into Section 1420(c)(2)(B) of the Safe Drinking Water Act. A major impairment to capacity development in New Mexico is the wide availability of "free" money, i.e., grants, and other sources of loan funds. If the capacity development strategy ties only to the DWSRF and not to these other funding sources, it will be very difficult for the State to improve overall viability of drinking water systems throughout the state. In fact, systems may intentionally avoid the DWSRF if they know they have to follow viability criteria verses other moneys that do not require a capacity review. Therefore, this study will be a component in the State's efforts to link all of the funding sources under the umbrella of the capacity development program. This linkage would be a tremendous enhancement to overall capacity development efforts within New Mexico.

Texas Capacity Development Strategy Implementation

The EFC assisted the Texas Natural Resource Conservation Commission (TNRCC) with the implementation of the capacity development strategy it developed for them during the summer of 1997. Implementation activities are listed under the Completed Initiatives section of this report.

Native American Tribes in Region 6: Capacity Development Assessment Tool

The EFC developed a capacity development assessment tool for Native American Tribes within Region 6 for use in evaluating the capacity of tribal water systems. Customized for tribal water systems, the tool was developed with input from tribal representatives based on ongoing dialogue the EFC maintains with

Tribal officials and task force members. The draft assessment tool is under revision and will be sent to EPA Region 6 and tribal task force members for comment early in 1999.

Capacity Development Strategy Assistance to Region 6 States

Sponsor: USEPA Region 6
1998 - Present

The overall goal of this assistance agreement is to assist the Region 6 states of Arkansas, Louisiana, New Mexico, and Oklahoma in the development of a capacity development strategy as required by the Safe Drinking Water Act Amendments of 1996. This project is intended to help states meet SDWA deadlines and to prevent them from having funds withheld from the SRF for a failure to do so.

The EFC is assisting Arkansas, Louisiana, Oklahoma, and New Mexico in preparing a Capacity Development Strategy as required under the 1996 Safe Drinking Water Act. The EFC does not propose to complete the entire capacity development strategy for each of the four states, but intends to assist each state in several tasks that will lead the state to the completion of a strategy.

Services Related to the Establishment of Reasonable Water Rates for Regulated Utilities

Sponsor: Texas Natural Resources Conservation Commission
1998 - Present

This project is divided into three sections: 1) Establishment of Reasonable Water Rates for Regulated Utilities, 2) Development of Characteristics of Well Run Water Systems, and 3) Affordability of Water Treatment Alternatives. For details, see 1998 Annual Report.

Unified Source Water Protection Plan Pilot Project

Sponsors: USEPA Headquarters and USDA Rural Utilities Service
1998 - Present

The objective of this project is to establish a Unified Source Water Protection Plan (USWPP) for communities located near the Village of Mora and within the Mora County portion of the North-Central New Mexico Enterprise Community (La Jicarita EC). This project will build upon applied research and projects conducted by the project team which includes the University of New Mexico Environmental Finance Center (UNM-EFC), the Rural Community Assistance Corporation (RCAC), and the La Jicarita EC. For details, see 1998 Annual Report.

Restoring Ecological Balance in Native American Communities through Comprehensive Community Planning, Sustainable Development, and Ecological Design

Sponsor: USEPA Region 6
1998 - Present

The objective of this project is to assist Native American communities in identifying ways to restore ecological balance through the appropriate use of comprehensive community planning and ecological design techniques. The intent is to assist six Native American communities over the next three years to help them define methods to redesign and redevelop themselves in greater harmony with their surrounding ecosystems and habitats. These six communities would then be used as role models to inform other Native American communities about how to accomplish similar sustainable community development goals.

This project exemplifies how the Environmental Finance Center Network; Native American tribal organizations; governmental entities; and other resource providers and experts can work as a team in helping Native American communities restore ecological balance through the appropriate use of comprehensive community planning, sustainable development, and ecological design techniques. All work efforts will be undertaken at the specific request of Tribal authorities within EPA Region 6. The work will be consistent with the Tribes' cultural values and governmental policies. The work will also be coordinated with other state and federal agencies involved in Tribal environmental issues, including, but not limited to, the EPA, the Indian Health Service, and the Bureau of Indian Affairs. The EFC will ensure that the efforts of this project will complement, not duplicate, efforts of these other agencies. For details, see 1998 Annual Report.

Cost-Effective Environmental Management

Ongoing

Public-Private Partnership Studies for the Environmental Financial Advisory Board: Cost-Effective Environmental Management Case Study Compendium

The Director of the EFC served as vice-chair of the Cost-Effective Environmental Management workgroup of the Environmental Financial Advisory Board. The Environmental Financial Advisory Board (EFAB) is a federal chartered advisory committee that consists of independent experts from all levels of government, including: elected officials; the finance, banking, and legal communities; business and industry; and national organizations who advise EPA on environmental finance issues.

PROPOSED INITIATIVES

Technical Assistance to Nizhnii Tagil, Vodokanal, Russia

Submitted to: Syracuse University Environmental Finance Center (EFC-2)
lead Center, for an EPA assistance agreement

This proposed effort entails implementation of a capacity development project for the Nizhnii Tagil Vodokanal in Nizhnii Tagil, Russia. The UNM-EFC proposes to complete two project components: managerial and financial strengthening; and technical strengthening. For details, see 1998 Annual Report.

Task 1. Managerial and Financial Strengthening – Study Tour and Capacity Development Workshop
The UNM-EFC proposes to arrange, organize and support a 13-day study tour in the United States for the Director of the Nizhnii Tagil Vodokanal and two additional people. This tour would include visits to Washington, DC; Dallas, Texas; Albuquerque, New Mexico; and Denver, Colorado.

Task 2. Technical Strengthening

The UNM-EFC proposes to order specific equipment and ship this equipment to Nizhnii Tagil, Russia. The equipment includes flow meters for water systems and laboratory equipment for water quality testing. The specific equipment list is based on discussions with USEPA.

Infrastructure Planning Conference for the Navajo Nation
Submitted to: The Navajo Nation Office of Engineering Services

The Navajo Nation approached the EFC to organize an infrastructure planning conference in Gallup, New Mexico for the Navajo Nation. The purpose of the conference is public education and awareness targeted to Chapter officials and to a grassroots level public audience. For details, see 1998 Annual Report.

Small Water System Capacity Development for Native American Tribes and Pueblos - Amendment

Sponsor: USEPA Region 6
In Support of: EPA Region 6 Native American Revolving Loan Fund for Drinking Water

Developing a capacity development program for the Native American communities, in conjunction with the Native American Revolving Fund, presents unique challenges. One factor is the governmental structure. Each Tribe and Pueblo has its own governmental structure and there is often rapid turnover in Tribal leaders, which may create a continuity problem in terms of program implementation. The Tribes and Pueblos have varying capacities in terms of environmental programs. Some have quite extensive programs with many employees and much expertise, while others are just beginning the process of establishing environmental agencies. Many of the water systems lack meters, which creates

difficulties in terms of establishing adequate rate structures or implementing water conservation programs. Many of the systems lack trained operators to run the systems. Traditionally, the clean water revolving funds set up by congress have not extended to the Native Americans, therefore, there is not a past history of implementing such a program in Native American communities as there is within the States.

With the additional funding, the EFC intends to add a third component - direct assistance to tribes in technical, managerial, and financial capacity development and direct assistance with Tribal SRF grant preparation. For details, see 1998 Annual Report.

North American Development Bank Assistance Work Plan: Financial Capacity Assistance along the US-Mexico Border Region

Submitted to: North American Development Bank and EPA Office of International Activities

One of the greatest problems along the U.S. Mexico Border in terms of financing water and wastewater infrastructure is the ability to set sustainable and equitable rates and the unwillingness of people in the communities to pay the necessary rates. Although this problem is not unique to the border area, it is particularly common and pronounced along both sides of the border. Part of this problem relates to a lack of understanding of how to set rates and what elements should be included in a sustainable and equitable rate. Another part of this problem is a lack of appreciation within the community regarding the need to pay for water or wastewater treatment.

This proposal is being submitted to provide a means to address some of these issues in border communities. Another component would be improving the financial capacity of communities along the border region by assisting the NADBank in its efforts to fund environmental infrastructure projects along the US-Mexico Border through assistance to the NADBank and directly to communities. To achieve this end, the EFC would partner with a Mexican partner and the EFC Network, as appropriate, to provide education in rate setting on both sides of the border.

Sustainable Urban Areas: Guiding Growth

Submitted to: EPA OAQPS as an EFC Network proposal

Urban sprawl comprises one aspect of a larger issue: regional patterns of development. Regional development frequently occurs in fragmented patterns, with little coordination between levels of government, between public and private sectors, or between different disciplines including economics, landscape ecology, and natural resource management. However, in reality, these issues are all interconnected: land use, brownfields redevelopment, transportation, and economic vitality are all

interrelated with habitat restoration, water and air quality, and natural resource protection. Feasible, more cost-effective solutions to ensure sustainable urban areas lie in a multi-governmental, multi-issue problem solving process. The challenge is how to integrate this process into local decision making. To address this challenge, the EFC Network proposes to conduct a series of charrettes, which would explore the long-term sustainability of urban areas through a process of "interconnectedness of issues" and between levels of government and the private sector. The charrettes would begin by recognizing the traditional ways in which policy makers approach local challenges. Each charrette would not only focus on issues of local concern, but also demonstrate how a single issue is connected to broader issues and broader geography.

The UNMEFC would concentrate on transportation issues and its effect on sprawl development, including consequences of new roads, land use decisions, and transportation choices by local and regional entities. Specifically, the UNMEFC charrette would examine proposed road construction of a new road through National Park land, which would facilitate growth on the west side of the park. The location of this type of road construction would be a national precedent.

EFC NETWORK COLLABORATIONS

Collaborative Projects

Capacity Development Strategies: Assistance to States and Native American Tribes

University of New Mexico EFC-6 working with:
Environmental Finance Center at Boise State University (EFC-10)

Water/Wastewater Utility Rate Model Demonstration for USEPA Region 6 Agencies

University of New Mexico EFC-6 working with:
Environmental Finance Center at Boise State University (EFC-10)

Restoring Ecological Balance

University of New Mexico EFC-6 working with:
Great Lakes Environmental Finance Center at Cleveland State University (EFC-5)
Environmental Finance Center at Boise State University (EFC-10)

Collaborative Proposals

Sustainable Urban Areas: Guiding Growth

University of New Mexico EFC-6 working with:
University of Maryland Environmental Finance Center (EFC-3), lead Center,
Environmental Finance Center Network

Capacity Development Assistance for the Nizhnii Tagil, Vodokanal, Russia

University of New Mexico EFC-6 working with:
Syracuse University Environmental Finance Center (EFC-2), lead Center

NADBank Assistance Work Plan: Financial Capacity Assistance along the US-Mexico Border Region

University of New Mexico EFC-6, lead Center, with:
Environmental Finance Center Network
Environmental Financial Advisory Board

Collaborative Meetings/Conferences/Workshops

Rate Model Workshops

March 1998 in Albuquerque, NM
University of New Mexico EFC-6 with:
Environmental Finance Center at Boise State University (EFC-10)

Meeting on Ecological Design in Tribal Settings

April, 1998 in Chicago, IL
University of New Mexico EFC-6 with:
Great Lakes Environmental Finance Center at Cleveland State University (EFC-5)
Environmental Finance Center at Boise State University (EFC-10)

Environmental Finance Center Network Forum

June, 1998 in Syracuse, NY
University of New Mexico EFC-6 with:
Syracuse University Environmental Finance Center (EFC-2) - host Center
Environmental Finance Center Network

Association of State Drinking Water Administrators National Conference

October 1998 in Keystone, CO
University of New Mexico EFC-6 with:
Environmental Finance Center at Boise State University (EFC-10)

TECHNICAL PRESENTATIONS-CONFERENCES, MEETINGS, and TRAINING

EFC Presentations - Conferences

Event	Date	Location	Description
Training for Tribes in EPA Region 5	4/1/98	Chicago, IL	Presentation at tribal training on capacity development Issues with EFC's 5 and 10
Workshop on Capacity Development Requirements for New Water Systems and State Revolving Loan Applicants for Arkansas Department of Health	5/12–13/98	Little Rock, AK	Training meeting facilitated by EFC and attended by 20 staff members of Arkansas Dept. of Health representatives from EPA Region 6
Meeting with Representatives from Angel Fire, New Mexico	8/25/98	Albuquerque, NM	Demonstration of Resource Geographic Information System
New Mexico Rural Water Association Training and Workshop for Water System Operators	9/24/98	Tucumcari, NM	EFC presentation and training on Utility Rate Setting and RateModPro
Meeting of New Mexico Municipal League Zoning Official	9/24/98	Taos, NM	EFC presentation on the use of Geographic Information Systems
Association of State Drinking Water Administrators Annual Conference:	10/5–8/98	Keystone, CO	Presentation and Exhibit Table
Middle Rio Grande Conservancy District Meeting	10/6/98	Albuquerque, NM	EFC presentation on Resource Geographic Information and GIS support
New Mexico Environmental Health Conference	10/13–15/98	Albuquerque, NM	Presentation on Texas Rate Study Project and Exhibit Table

E-911 Overview and NMGIC Meeting	10/15-16/98		
Meeting of Council of State Community Development Agencies	10/28-30/98	Portland, OR	Presentation on Blending Engineering and Financing to Assist Small Communities
Louisiana Regional AWWA Meeting	12/15-16/98	Alexandria and Baton Rouge, LA	Presentation on Blending Engineering and Financing to Assist Small Water Systems

EFC Meetings

Event	Date	Location	Description
Meeting with Representative from EPA Office of International Activities	1/8/98	Albuquerque, NM	Discussion of potential EFC assistance along US/Mexico Border
Meeting with Bohannan Houston and Lodestar Project Team	2/4/98	Albuquerque, NM	Discussion of water issues
Meeting with Texas Natural Resource and Conservation Commission	2/4-5/98	Austin, TX	Discussion of capacity development implementation
EFAB Meeting; EFC Directors Meeting	2/9–12/98	Washington, DC	
Meeting with Indian Health Service and other providers of infrastructure support	2/23/98	Santa Fe, NM	Discussion on capacity development for Tribes
Meeting with New Mexico Environment Department	2/26/98	Santa Fe, NM	Discussion of capacity development issues in New Mexico
Oklahoma Department of Environmental Quality, Stakeholders Meeting on Capacity Development	3/2/98	Oklahoma City, OK	Meeting facilitated by EFC. Attendees included representatives from various stakeholder groups, EPA, and Oklahoma DEQ
New Mexico Drinking Water Advisory Group Meeting	3/5/98	Santa Fe, NM	Discussion of capacity development issues for medium and large systems, and Source Water Protection Program

Meeting on Funding Tribal Drinking Water Infrastructure Improvements	3/17/98	Albuquerque, NM	Meeting sponsored by EPA Region 6 and facilitated by EFC
Meeting with New Mexico Environment Department	3/24/98	Santa Fe, NM	Discussion of capacity development issues in New Mexico
Meeting with Representatives from Nambe Pueblo	4/7/98	Albuquerque, NM	Discussion of Tribal Set-Aside Program
Meeting with New Mexico Environment Department	4/14/98	Santa Fe, NM	Discussion of capacity development issues in New Mexico
Meeting with EPA and Cadmus Group	4/16/98	Washington, DC	Discussion of coordination of assistance providers to states on capacity development issues
Meeting of New Mexico Geographic Information Council	4/17/98	Albuquerque, NM	
Tribal Drinking Water Set-AsideTask Force Meeting	4/28/98	Albuquerque, NM	Discussion of Tribal Set-Aside Program
New Mexico Drinking Water Advisory Group Meeting	5/14/98	Santa Fe, NM	Discussion of Safe Drinking Water Program and Operator Certification Program
Meeting with Texas Natural Resource Conservation Commission	6/10–12/98	Austin, TX	Discussion of capacity development implementation issues
New Mexico Drinking Water Advisory Group Meeting	6/11/98	Santa Fe, NM	Discussion of proposed application process for loans, upcoming public meetings and subcommittee meetings
Meeting with Representatives from Sandia National Laboratory and Navajo Nation	6/15/98	Albuquerque, NM	Discussion of potential use of Smart Sampling on Navajo Nation for hazardous waste cleanup
EFC Forum for Funding Agencies and Communities in New York	6/25-26/98	Syracuse, NY	
Meeting with EPA Region 6	7/6/98	Dallas, TX	Discussion of Tribal Set-Aside Task Force, priority list, ranking system, and date of availability of grant funds
The Third Annual New Mexico Infrastructure Finance Conference	7/12-14/98	Albuquerque, NM	EFC Exhibit Table

Meeting with Rural Community Assistance Corporation and La Jicarita	7/15/98	Mora, NM	Discussion of proposal development for Unified Source Water Protection Project in Mora County
New Mexico Drinking Water Advisory Group	7/29/98	Santa Fe, NM	Meeting of Capacity Development Subcommittee
Tribal Drinking Water Set-Aside Task Force Meeting	7/22/98	Santa Fe, NM	
Meeting with Texas Natural Resource Conservation Commission	8/ 3-6/98	Austin, Texas	Discussion of implementation of rate study
New Mexico Drinking Water Advisory Group	8/12/98	Santa Fe, NM	Capacity Development Subcommittee Meeting
EFC Network Director's Meeting	9/13–15/98	Cleveland, OH	
Meeting with New Mexico Environment Department, Drinking Water Bureau	9/17/98	Santa Fe, NM	Discussion of New Mexico Capacity Project
Meeting with Representatives from Nambe Pueblo	9/21/98	Albuquerque, NM	Discussion and Review of Capacity Development Assessment Form
Navajo Nation Infrastructure Planning Conference Meeting	9/24/98	Albuquerque, NM	Discussion of potential project to develop and facilitate conference on infrastructure planning and financing
New Mexico Drinking Water Advisory Group Meeting	9/29/98	Santa Fe, NM	
Meeting with Representatives from Zia Pueblo	10/2/98		Discussion of capacity development issues
Middle Rio Grande Conservancy District Meeting	10/6/98	Albuquerque, NM	EFC presentation on Resource Geographic Information and GIS support
Meeting with New Mexico Environment Department and EPA-6	11/9/98	Santa Fe, NM	Discussion of capacity development program in New Mexico
Meeting with EPA Region 6	11/10/98	Albuquerque, NM	Discussion of EFC activities
Meeting with Rural Community Assistance Corp	11/13/98	Santa Fe, NM	Discussion of Unified Source Water Protection Project in Mora County

Meeting with Louisiana Department of Health & Hospitals, Office of Public Health	11/16-17/98	Baton Rouge, LA	Discussion of capacity development program and business plan requirements for Louisiana
New Mexico Drinking Water Advisory Group Meeting	12/2/98	Santa Fe, NM	Discussion of state-wide needs survey of water systems and water conservation program
Meeting with Rural Community Assistance Corporation and La Jicarita	12/16/98	Mora, NM	Team Meeting for Unified Source Water Protection Project in Mora County
New Mexico Drinking Water Advisory Group	12/17/98	Santa Fe, NM	Source Water Protection Subcommittee
Meeting with Rural Community Assistance Corporation	12/18/98	Albuquerque, NM	Discussion of EFC participation in Tribal Conference in Reno, NV

EFC Training Workshops

Event	Date	Location	Description
EPA Region 4 and 6/States Training on Capacity Development	1/12-14/98	Dallas, TX	EFC presentation on different aspects of capacity for public drinking water systems
UNM Civil Engineering Graduate Seminar	1/29/98	Albuquerque, NM	Presentation on the role of engineering in capacity development
Colorado Rural Water Association Annual Conference	2/19/98	Colorado Springs, CO	EFC presentation and training on Utility Rate Setting and RateModPro
Workshop on Utility Rate Setting and RateModPro	3/23/98	Albuquerque, NM	Meeting with EFC Region 10 and presentation and training of representatives from water systems in Colorado
Workshop on Capacity Development Requirements for New Water Systems and State Revolving Loan Applicants for Louisiana Department of Health and Hospitals, Office of Public Health	4/22-23/98	New Orleans, LA	Workshop facilitated by EFC and attended by Louisiana Dept. of Health and Hospitals Staff and Representatives from EPA Region 6
Workshop on Capacity Development Requirements for New Water Systems and State Revolving Loan Applicants for Arkansas Department of Health	5/12–13/98	Little Rock, AK	Meeting facilitated by EFC and attended by 20 staff members of Arkansas Dept. of Health representatives from EPA Region 6

EFC Forum for Funding Agencies and Communities in New York	6/25-26/98	Syracuse, NY	
Landfill Bioreactors and Biogas Seminar hosted by City of Albuquerque	6/26/98	Albuquerque, NM	Attended seminar
ESRI Annual Conference and Training	7/27–30/98	San Diego, CA	Attended conference
Demonstration of RateModPro	8/11/98	Albuquerque, NM	EFC demonstration and training of El Dorado Water System
Meeting with representatives from Bloomfield, New Mexico	8/17/98	Albuquerque, NM	Demonstration of Resource Geographic Information System
New Mexico Rural Water Association Workshop and Training for Water System Operators	8/27/98	Socorro, NM	EFC Training on Utility Rate Setting and RateModPro
Technology Demonstration by National Laboratories and EPA	9/13-25/98	Albuquerque, NM	Hosted by NMERI/EFC
Introduction to Hydrology Course at Southwestern Indian Polytechnic Inst.	11/16-20/98	Albuquerque, NM	Taught Course
ArcView GIS Course	11/23-24/98	Albuquerque, NM	Taught Course

AVAILABLE PUBLICATIONS

- ☐ *Survey and Database Summary Report on GIS Usage in New Mexico,* September 1998
- ☐ *Evaluation of a Subsurface Flow Wetland and Evaporation Pond for a Single Family Dwelling in the East Mountain Are of Bernalillo County,* Final Report April 1998
- ☐ *Report on Issues in the Development of a County Utility Department: Final Report to Doña Ana County, New Mexico,* November 1997
- ☐ *Cost-Effective Environmental Management Case Studies,* October 1997
- ☐ *Ecological Baseline Model for the U.S.-Mexico Border,* Final Report September 1997
- ☐ *Capacity Development Strategy Report for Texas Natural Resource Conservation Commission,* Final Report August 1997

- ☐ *Civil Engineering Options Assessment for the Enchanted Skies Park,* Draft Report July 1997
- ☐ *Bioflotation Treatment Unit Demonstration Project*, Final Report July 1997
- ☐ *Examples of Capacity Development Assessment Tools & Business Plans from Various States,* July 1997
- ☐ *A Guidebook of Financial Tools, prepared by the EFAB and EFC Network*, June 1997
- ☐ *Environmental Finance Center Network 1996 Annual Report*, January 1997
- ☐ *Management and Financing Options for Small Community Water Systems on the US-Mexico Border Region: Final Report to Doña Ana County, New Mexico*, July 1996
- ☐ *A State Survey of Capacity Building Tools*, November 1996
- ☐ *A State Viability Survey*, August 1996
- ☐ *The Otero County Small Water System Restructuring Project,* November 1995
- ☐ *North Valley Wastewater Options Study: Final Report for Bernalillo County, New Mexico and Village of Los Ranchos de Albuquerque,* June 1995
- ☐ *Meeting Financial Responsibility Requirements on Tribal Lands,* October 1994
- ☐ *Public-Private Partnerships for Environmental Facilities: The Management Challenge for Local Governments,* October 1993
- ☐ *Water and Wastewater User Charge Guide for Small Municipalities,* September 1991

ADDITIONAL WORK

The EFC staff also performs contractual work under the Engineering and Environmental Finance Center Division of NMERI (New Mexico Engineering Research Institute). Most of this work consists of research-based projects under contract with state and local governments and other university departments.

New Mexico Resource Geographic Information System

On-going

The New Mexico Resource Geographic Information System (RGIS) Program is a cooperative program between the University of New Mexico and the State of New Mexico General Services Department. Representatives from three UNM public service and research units comprise the RGIS Team including the EFC director representing the New Mexico Engineering Research Institute, Earth Data Analysis Center, and the Bureau of Business and Economic research. Program components include the RGIS Clearinghouse --a publicly accessible resource, database development, technical

support, training, geographic information coordination, and project support for state agencies and local government.

RGIS facilitates the use of GIS in New Mexico in three ways: mapping, communicating, and educating. First, it provides counties and municipalities with public maps in a format appropriate for the most commonly used GIS software. Second, it assists state and local governments with interactive communication and cooperation in the use of GIS. Third, it educates public organizations about the advantages of GIS and trains them in its use. Thus, RGIS promotes statewide-use of GIS for planning and spatial analysis of current and historical trends throughout the state. For more information refer to the RGIS web page at http://rgis.unm.edu:8080.

LodeStar Project: Civil Engineering Options Assessment Report

The EFC provided ongoing civil engineering support services to the LodeStar Project's Enchanted Skies Park and Observatory, which will be a public access park dedicated principally to providing a balanced program of education, research, and public outreach. The *Civil Engineering Options Assessment Report* (August 1997) overviewed factors requiring consideration regarding water source, wastewater treatment and disposal, and other infrastructure decisions at the Enchanted Skies Park. Water usage rates were estimated based on the facility information and a survey of similar parks and monuments where low flow systems and other conservation measures have been implemented. Several different wastewater treatment options were considered and evaluated for engineering difficulties, construction costs, and maintenance costs. The report also included information on geology, hydrology, water supply, and wastewater treatment options. Other issues addressed in the report include legal rights, permitting requirements, construction considerations, facilities and exhibits considerations, and safety and emergency considerations.

ArcView GIS Certified Training Instruction

Ongoing

EFC staff completed the certification process to become an ESRI Authorized ArcView GIS (geographic information system) instructor. The Introduction to ArcView GIS course provides instruction in the basic skills needed to use the software's display editing, analysis, and presentation mapping functions. Classes are typically offered quarterly.

Visiting Faculty at the Southwest Indian Polytechnic Institute (SIPI)

Ongoing

EFC staff taught a five-day course at the Southwestern Indian Polytechnic Institute in Basic Hydrology. SIPI is a National Indian Community College located in Albuquerque, NM. The Basic Hydrology course supports the Environmental Science, Industrial Hygiene, and Water Technology Programs. The 5-day course covered introductory material, surface water processes, groundwater processes, well

design and construction, water quality, water pollution, and water management and legislation. The EFC team taught the water management section of the course.

New Mexico EFC Organization

Management

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EFC at California State University, Hayward, Region 9

Executive Overview

The Environmental Finance Center, Region 9 (EFC9), is a University-based Center providing expertise on environmental financing and economic issues. EFC9 is affiliated with California State University, Hayward (CSUH), and is supported by the U.S. Environmental Protection Agency (EPA). The Mission of EFC9 is to promote support and sustain the environmental goods and services industry through a variety of programs and services including but not limited to: small business outreach, environmental business directories, environmental industry Charrettes, environmental export assistance, pollution prevention assistance and Charrettes, technology transfer and an environmental business information clearinghouse. The EFC is making information available on the World Wide Web at **http://www.greenstart.org/efc9**

Summary Statement

EFC9's mission to help small business is derived from recent research revealing the poor performance of the environmental goods and services industry in the US. The current worldwide market for the environmental goods and services industry (EGSI) is about $450 billion (1997) and the largest national market, comprised primarily of small and medium-sized firms, is the United States, accounting for roughly 35 percent of the world trade. Nevertheless, the US industry is starting to mature in most sectors, and is expected to grow at a slower rate than the rest of the world market. In addition, the EGSI faces numerous barriers to future growth including uncertainty in the regulatory process, uneven enforcement, multiple testing requirements and lack of financing for technology commercialization and beyond.

Pollution prevention technology has been identified as the key to success for the EGSI. Pollution prevention technology is the fastest growing and most innovative sector in the environmental industry. Because it reduces or eliminates waste production, it is considered by most experts to be the future and natural path of the industry. However, like the environmental industry as a whole, there are several barriers to pollution prevention implementation, from a lack of equity capital to a lack of appropriate test sites for new technologies.

As a result, EFC9's mandate is threefold:

- Help small business,
- Advance the environmental industry, and
- Promote pollution prevention.

1998 In Review

EFC9 completed a series of tasks in 1998 including five workshops at the National Marketplace for the Environment Conference in Los Angeles, the San Francisco Pollution Prevention Demonstration Project which included two Charrettes focused on alternatives to dry cleaning, an expansion of the 1997 directory, *Financing Environmental Technology: A Funding Directory for the Environmental Entrepreneur*, and an environmental finance workshop held at the National Energy Conference on the Future of Alternative and Sustainable Technologies in Nevada. The following is an overview of the EFC's major accomplishments in the past year.

National Marketplace for the Environment Conference - Los Angeles:

May 6-8, 1998

On May 6 through 8, the Environmental Finance Center (EFC9) presented five Environmental Finance Workshops at the National Marketplace for the Environment Conference in Los Angeles. The three day Marketplace for the Environment Conference was a national conference hosted by Eco Expo and the Environmental Education Foundation, and included a number of informative sessions and workshops as well as an exhibit hall of over 100 innovative environmental technologies. The conference included seven theme tracks consisting of five sessions each. The conference themes included, 1) Transportation, 2) High Performance Buildings & Energy Efficiency, 3) Pollution Prevention: H2O/Air, 4) Green Purchasing, 5) Waste Management/Recycling, 6) The Hazards and Opportunities of De-Regulation, and 7) Environmental Financing. The Environmental Finance Center in Region 9 was a Charter Sponsor of the event.

The conference attracted over 1,000 participants and was an extremely high-profile event for the Environmental Finance Center. In addition to its workshops, EFC9 hosted its own booth on the exhibition hall floor where hundreds of small business owners, and local, state, federal and international agencies were provided with information on the Center and the EFC Network. Finally, EFC9 hosted the following workshops

Workshop #1: Wednesday, May 6 - Pulling Yourself Up: Bootstrapping And Beyond

Workshop 1 offered information on more creative, less known options for funding a small environmental business through private sourcing opportunities.

Workshop #2: Wednesday, May 6 - Getting Government Financing

Workshop 2 included a variety of state and local program representatives who presented public financing opportunities for small environmental businesses.

Workshop #3: Thursday, May 7 - Investment Opportunities in Energy and The Environment (Equity Financing, Venture Capital and Angels)

Workshop 3 provided information on a variety of equity options for the environmental entrepreneur.

Workshop #4: Thursday, May 7 - Small Business Hatcheries: Environmental Incubators

Workshop 4 allowed the audience to meet environmental incubator directors and their tenants.

Workshop #5: Friday, May 8 - Accessing Foreign Markets: Financing and Services for Export

Workshop 5 was designed to help the environmental entrepreneur find programs and funding opportunities to guide them into the export market.

San Francisco Pollution Prevention Demonstration Project C Dry Cleaning Charrettes

In the Fall of 1997, the Environmental Finance Center for EPA Region 9 (EFC9) received a grant from the Environmental Finance Center for EPA Region 5 (EFC5), in conjunction with the US EPA to target a specific industry and produce a plan for stimulating more Pollution Prevention (P2) activities in that San Francisco Bay Area industry. After consultation with EFC5, EPA Region 9 and the Bay Area Hazardous Waste Reduction Committee, EFC9 determined that the dry cleaning industry would make the most suitable target.

As a result, between December 1997 and October 1998, EFC9 conducted numerous informal interviews with regional, county and local government agencies including economic development agencies, small business organizations and representatives, community organizations, dry cleaners, environmental non-profit organizations, and industry insiders concerning the dry cleaning industry. In addition, EFC9 organized and held two Charrettes to identify future pollution prevention approaches and strategies to use with East Bay dry cleaners. The goal of these informal interviews and Charrettes, more specifically, was to solicit the help of dry cleaners, regulatory agencies, local governments and environmental non-profit organizations to determine effective ways to encourage dry cleaners to reduce perchloroethylene (perc) usage, a chlorinated hydrocarbon synthetic solvent, without reducing their profits.

Expanding The Environmental Finance Directory

In 1997, EFC9 completed research on a number of sources of debt and equity capital potentially available to environmental businesses in California. These results were compiled in a comprehensive Directory on financing for environmental technology development and commercialization. This Directory is entitled: *Financing Environmental Technology B A Funding Directory for the Environmental Entrepreneur.* Because of the ensuing popularity of the original volume, EFC9 prepared a 1998 *Directory Update* which

includes expansions and updates of old sections and several new sections including a review of funding sources throughout Region IX. The 1998 Directory has the following chapter headings:

- An Environmental Industry Overview
- General Funding Options
- Venture Capital Investment in the Environmental Industry
- Finding Angels
- Technology Incubators
- Private Funding Sources (including):
  - Online Networks
  - Forums and Fairs
  - Socially Responsible/Environmental Investment Funds
  - Environmental Investment Management Firms
  - Environmental Venture Capital
  - Socially Responsible Banks and Credit Unions
- Federal Government Programs
- Programs in California, Nevada, Hawaii and Arizona, and
- International Opportunities.

EFC9 Workshop: Global Energy Futures Exchange - National Energy Conference on the Future of Alternative and Sustainable Technologies

EFC9 conducted an environmental finance workshop at the Global Energy Futures Conference in Las Vegas on October 28. The conference, national in scope, was hosted by the Nevada Test Site Development Corporation, and was sponsored by numerous national organizations including:

- US Department of Energy,
- Lawrence Livermore National Laboratory,
- Los Alamos National Laboratory,
- Oak Ridge National Laboratory,
- Sandia National Laboratory, and

- President's Council on Sustainable Development,

The title of our workshop was "Renewables: From Concept to Commercialization" and the focus was finance for small environmental businesses from start-up phases to commercialization. The event was designed to provide information on opportunities for finance through little-known resources.

For full details, please see the 1998 Annual Report.

California State, Hayward EFC Organization

Management

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EFC at Boise State University, Region 10

Executive Overview

The Region 10 Environmental Finance Center at Boise State University was created in 1995 and first received funding in the fall of 1996. The EFC at BSU, Region 10, is contained within the Department of Public Policy and Administration of the College of Social Sciences and Public Affairs. It serves the communities in the Pacific Northwest and Intermountain states of Oregon, Washington, Idaho and Alaska. The mission of the Region 10 EFC is to help communities and the states with the "how to pay" issues of environmental protection. The BSU EFC is taking the lead nationally in designing and testing drinking water system capacity assessment methodologies required by the 1996 Amendments to the Safe Drinking Water Act. The Center at BSU is also assisting the states in improving institutional capacity and in formulating and implementing drinking water program capacity development strategies required by SDWA. Addressing the needs of public water systems and wastewater systems to improve financial and managerial capacity is also an important component of the Center's services. The EFC is making information available on the World Wide Web at **http://sspa.boisestate.edu/efc**

Summary Introduction:

The Environmental Finance Center at Boise State University concentrates its resources in performing the following tasks and activities:

- Developing and delivering educational programs including workshops, conferences, training seminars and formal education programs to improve the ability of public and private sector leaders and managers in addressing and resolving environmental finance dilemmas.
- Developing new tools to improve the financial management and management capabilities of small public, private and private not-for-profit water systems.
- Preparing and disseminating practical guides, handbooks and reports on financial and management issues relative to the public sector and environmental system needs.
- Assisting local and tribal governments and other public water and wastewater systems to increase their use of alternative and innovative approaches to financing environmental protection; particularly approaches that provide alternatives to traditional taxation methods.
- Offering training, education, facilitation and policy initiatives that will improve the ability of regional, state and local officials in meeting the challenges of the capacity development requirements relative to the SDWA Amendments of 1996.
- Providing federal and state policy makers with information about the particular needs of small communities for financing assistance and financial tools necessary for meeting regulatory compliance standards. The EFC informs the policy debate regarding the financing of environmental infrastructure projects and the utility of conventional infrastructure financing mechanisms. The EFC also tests and

then suggests new tools and assistance mechanisms that could be utilized at the local, state and federal government levels.

Summary of Core Activities

The Environmental Finance Center at Boise State University has focused on delivering tools to local government and other community water and wastewater system officials for creating sustainable environmental infrastructure operations.

In 1998 the EFC staff conducted six utility rate design workshops within Region 10. The workshops were organized based upon local demand for assistance. Fifty officials from communities in Oregon, Washington and Idaho participated in the EFC's full-day training sessions.

EFC staff also provided utility rate setting and financial management training at several workshops, conferences and training seminars during 1998.

Developing EFC Network Capabilities for Delivering Utility Rate Setting Training

One of the important side benefits of the EFC10's investment in utility rate design training has been the development of staff capability within the EFC network to share information about the use of this important tool. In 1998, EFC10's Director provided technical assistance and training to staff at three sister Environmental Finance Centers; EFC2 at Syracuse University, EFC3 at the University of Maryland and EFC5 at the University of New Mexico.

Safe Drinking Water Act Capacity Development

In 1996, S. 1316 amended Title XIV of the Public Health Service Act, commonly known as the Safe Drinking Water Act. In part, S. 1316 seeks to improve the capacity of regulated public water systems in meeting compliance standards and the general standards of operational efficiency and effectiveness.

A central goal of each of the EFCs is to help create sustainable environmental systems in the public and private sectors. Sustainable systems have the financial, managerial, and technical capabilities to operate in compliance with federal and state environmental protection and health protection requirements. Since 1992, the EFC network has provided training, educational, and analytical services designed to address the "how to pay" issues of environmental compliance.

In 1998, with significant financial support from the EPA Office of Ground Water and Drinking Water, the EFC10 joined the Environmental Finance Center at the University of New Mexico (EFC6) to continue

assisting state drinking water programs in USEPA Regions 2, 6, 7, 8, 9, and 10; and Native American Tribal Governments located within USEPA Region 6 in fashioning capacity development strategies required by the 1996 Safe Drinking Water Act (SDWA) Amendments [Section 1420(c)]. Through this work -- begun in the summer of 1997 -- the EFCs are adding capacity to either assist in the development of new capacity development strategies, or to make a major contribution to capacity development strategic work already under way.

To date, the EFC10 has assisted the states of Oregon and Idaho in facilitating the citizen/stakeholder process of presenting findings of fact that will contribute to establishing state capacity development strategies. The EFC has advised the State of Alaska in the formulation of rules setting technical, financial and management standards for new public water systems.

California's Drinking Water Program received assistance in developing a tool for assessing financial capability, as well as specific training for the program's field staff on financial and management capacity. Approximately two hundred officials attended a two-week series of training workshops in Sacramento, Berkeley, Santa Ana and Madera.

At the end of 1998, the EFC began assisting two states in Region 7; Missouri and Iowa. Both states requested the EFC's help in facilitating the citizen/stakeholder advisory processes. Missouri asked for additional help in drafting rules establishing technical, financial and management standards for new public water systems.

SDWA Capability Analysis and DWSRF Loan Application Technical Assistance

As mentioned earlier, significant amendments were made to the Safe Drinking Water Act (SDWA) in 1996; notably in regard to the responsibility of the primacy agencies to improve the capacity of public water systems (PWSs) to comply with safe drinking water standards. For the first time, Congress also ensured that states would receive financial resources in the form of capitalization grants for Drinking Water State Revolving Funds (DWSRFs). These funds are to be made available in the form of loans to public water systems, both privately and publicly owned, to both help assure long-term compliance with SDWA and provide safe drinking water to the public.

- Assistance to the State of Idaho: Since the establishment of the Drinking Water State Revolving Fund (DWSRF), the EFC10 has assisted the Idaho State Drinking Water Program in developing a capability screening mechanism for DWSRF loan applications as well as providing technical review of loan applications based on that screening mechanism.

- Assistance to the State of Alaska: The EFC at Boise State University provides ongoing assistance to DWSRF administrators in the State of Alaska on SRF issues. For example, the EFC produced a white paper on the issue of depreciation.

Region 10 Lower Boise River Water Pollution Trading Demonstration Project

In the fall of 1997, the State of Idaho was selected as the site of an experimental study on pollution trading by the Region 10 office of Innovation. Idaho's proposal to study the feasibility of pollution trading was selected from three state proposals offered by Region 10 states. The pollution trading feasibility project is focusing on the potential for water pollution trading among point and non-point sources in the lower Boise River watershed area. This project, directed by the Region 10 Office of Innovation and the Idaho Division of Environmental Quality will provide needed information to states and communities as they strive to meet water pollution control targets or total maximum daily loading limits (TMDLs) of critical waterways. TMDLs are usually set in order to meet beneficial use conditions for those waterways.

The examination of water pollution trading has created excellent opportunities for the EFC10 to participate in the policy discussions as well as the financial analysis necessary to determine least cost financing options for meeting pollution control targets.

SUMMARY OF NEW PROJECTS

Charrettes

In 1998 the EFC at Boise State University took its first steps in emulating the success of the EFC at the University of Maryland by conducting four charrette events. Based on this experience and the establishment of staff capabilities for conducting these events, it is expected that charrettes will be a standard service offering of the EFC in the future.

- Confederated Tribes of the Siletz Indians Charrette
- South Lake Water and Sewer District Charrette
- City of McCall Water System Financing Charrette
- City of Pocatello Brownfields Project Charrette

AWWA PNS Financial Management Practices Survey

In 1997, the Finance Committee of the Pacific Northwest Section of AWWA (AWWA PNS) collected data from a selected sample of member water systems in Oregon as part of a two-stage effort to develop detailed information regarding water system financial practices. AWWA PNS asked the EFC to submit a project proposal addressing the completion of the second stage of this survey research effort; a survey of AWWA

member water systems in Washington and Idaho. Additionally, this stage includes a compilation of the survey data and a detailed analysis and report of findings.

City of Eagle - Sewer Consolidation Study

In 1998 the City of Eagle, Idaho asked if the Environmental Finance Center at Boise State University could assist the City of Eagle in evaluating the feasibility of consolidating the services provided by the Eagle Sewer District under the City. The City identified the crucial question to be, "Would the citizens of Eagle be better served, politically and financially, if the sewer district were to go under the jurisdiction of the city of Eagle". A list of questions was provided to the EFC by the city of Eagle for consideration in development of a scope of work. The EFC agreed to conduct the study that will provide a list of advantages and disadvantages to consolidation for citizens of the city of Eagle, but will not recommend specifically a proposed action. The advantages and disadvantages will be described within the areas of finance, management and capacity.

Capital Improvement Planning and Financing Tool

The EFC, in cooperation with the BSU College of Engineering, began the development of capital improvement planning and financing tool for small water and wastewater utilities. The goal is to offer a tool that will help small utilities assess their capital facilities and on the basis of that assessment, prepare a multi-year financing plan. This financial information will greatly aid small water and wastewater systems in meeting the full-cost pricing needs of their operations. Beta testing of the tool is planned for the summer of 1999. Multi-state testing of the model should occur in late 1999.

EFC Network Collaborations

The EFC at Boise State University relies upon the partners in the EFC Network to offer assistance to communities, the states and the regional entities in Region 10 EPA. The following are some examples of collaborative efforts with EFC partners:

- Pocatello Brownfields Conference and Charrette. Great Lakes EFC's recognized expert in Brownfields redevelopment joined Boise State EFC staff in conducting two Brownfields mini-conferences and a charrette in Region 10.
- The BSU EFC joined its network partners in Syracuse for the first annual EFC Forum organized by the EFC at Syracuse University. EFC at BSU Director conducted two workshops on financial capacity building and participated in a charrette addressing the financing challenges of the Hamlet of Long Eddy, New York.
- The EFCs at BSU and the University of New Mexico are partners in delivering assistance to states in the area of drinking water system capacity building strategies.

- The Boise State University EFC is providing assistance to the Great Lakes EFC at Cleveland State University relative to their work with Tribal governments in the Midwest.
- EFC Director assisted the EFC at the University of Maryland in conducting financial management training workshops for officials in Pennsylvania and Maryland.

Boise State EFC Organization

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April 1999

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D. MORE INFORMATION ON EFIN

Accessing the EFIN Database

EFIN Search Form Instructions

EFIN Keyword Index

EFIN Abstracts - Publications and Case Studies

ENVIRONMENTAL FINANCING INFORMATION NETWORK

ACCESSING THE EFIN DATABASE

THROUGH THE EPA'S ONLINE LIBRARY SYSTEM WEB SITE:

The EFIN database is available via the OLS Web site. There are two access points:

1. Go to the OLS Web site at **http://www.epa.gov/natlibra/ols.htm** and click on Search OLS.

- Go to the list for Special Collections, click on the Environmental Financing Information Network.

2. Go directly to the EFIN Search page via the Web site at: **http://www.epa.gov/efinpage/efindata.htm**

For assistance searching the EFIN database, call the EFIN Infoline at (202) 564-4994.

The searching instructions and EFIN Keyword Index are also available via the above Web page. See also the OLS Help page for additional instructions.

For technical assistance, call EPA's National Computer Center at 1-800-334-2405 or (919) 541-7862 (outside the U.S.).

Ordering documents:

All of the records in the EFIN database include ordering information for the documents. The EFIN Center distributes EPA publications produced by:

* the Environmental Finance Program (EFP),
* the Environmental Financial Advisory Board (EFAB), and
* the Environmental Finance Centers (EFCs)

For those EPA documents that are not published by the above mentioned offices of EPA, the EFIN center will refer callers to the appropriate EPA source for the document. Note: The EPA Public Information Center (PIC) has been closed and incorporated in the Headquarters Information Resource Center. Those EFIN database records that feature publications produced by non-EPA sources provide directions for obtaining those publications from the appropriate source.

SEARCH FORM

The following are the primary search fields on the Search Form. There are boxes with options for each field. For Text Fields, the search engine has the options "all the words", "exact phrase" and "any words". The Record Number field has the options "equals" and "is not". The Year Published field includes the options "=", "less than" and "greater than".

Record Number:

Enter record number, if known.
Usually used when a record is cross-referenced.

Ex:123-EFIP

Keywords:

Enter keyword(s) to be searched. See the EFIN Keyword Index.
Ex: stormwater
Ex: wastewater treatment

Main Title:

Enter one or more words from the title excluding words like "a" or "the".

Ex: brownfields financing

Description:

Enter one or more words to be searched in the description of the document.

Ex: municipalities

Ex: financing mechanisms

Author:

Enter any known portion of the author's name.

This includes organizations or individuals.

Word order is not important.

Ex: EFAB

Ex: Environmental Financial Advisory Board

Publisher:

Enter the publishers name, must be specific. For example entering EPA gives a different number of results than entering Environmental Protection Agency.

Year Published:

Enter the year of publication or a range of years.

Ex: 1995

Ex: 1992:1995

Contact:

Enter any word or words from the name of the organization responsible for distributing the document.

Ex: Environmental Finance Program

Note: The OLS Web site also provides the records in a bibliographic format.

EFIN Keyword Index

ACCESS fees
ACCOUNTABILITY
regulatory ACTIVITIES
private ACTIVITY bonds
AGGRESSIVE leveraging
cooperative AGREEMENTS
AIR pollution
indoor AIR pollution
tax ALLOCATION bonds
ALTERNATIVE financing mechanisms
ALTERNATIVE funding
economic ANALYSIS
financial ANALYSIS
APPROPRIATIONS
ASBESTOS
environmental ASSESSMENT
credit ASSISTANCE
financial ASSISTANCE
state ASSISTANCE
technical ASSISTANCE

BANKRUPTCIES
bond BANKS
infrastructure BANKS
BENEFITS
BLOCK grants

BOND banks
BOND pools
BONDS
general obligation BONDS
industrial development BONDS
municipal BONDS
private activity BONDS
registered BONDS
revenue BONDS
tax allocation BONDS
tax exempt BONDS
BROWNFIELDS
BUDGETING
BUSINESS

volume CAP
financial CAPABILITY
state CAPACITY
CAPITAL funding
CAPITAL improvements
CAPITAL planning
CAPITALIZATION grants
CASE studies
CERTIFICATION fees
operator CERTIFICATION
user CHARGE systems
effluent CHARGES

user CHARGES
CHARRETTE
CHARRETTES
COASTAL resource protection
COMBINED sewer overflow
COMBINED sewers
rural COMMUNITIES
small COMMUNITIES
urban COMMUNITIES
COMMUNITY development
interjurisdictional COMPETITION
COMPLIANCE
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public CONFIDENCE
CONNECTION fees
CONSERVATION
CONSTRUCTION grants
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pesticide CONTROL
pollution CONTROL
COOPERATIVE agreements
public private partnerships COORDINATOR
regional COORDINATOR
COST effectiveness
COST recovery

COST reduction
COST sharing
COSTS
compliance COSTS
service COSTS
COVENANTS
CREATIVE financing
CREDIT assistance
tax CREDITS

environmental DATA
DEBT financing
DECISION making
DEDICATED tax
DEFAULTS
community DEVELOPMENT
DEVELOPMENT
industrial DEVELOPMENT bonds
DEVELOPMENT fees
federal DIRECT loans
DIRECTORY
solid waste DISPOSAL
DRINKING water
DRINKING water facilities

ECONOMIC analysis
ECONOMIC impact

cost EFFECTIVENESS
EFFICIENCY
energy EFFICIENCY
EFFLUENT charges
EFFLUENT tax
ENERGY efficiency
ENERGY technology
ENFORCEMENT
infrastructure ENHANCEMENT
ENTREPRENEURS
ENVIRONMENTAL assessment
ENVIRONMENTAL data
EROSION
EQUITY
ESTUARIES
EXACTIONS
tax EXEMPT bonds
tax EXEMPTIONS
EXCISE tax
sewer EXTENSIONS

drinking water FACILITIES
solid waste FACILITIES
wastewater FACILITIES
FACILITIES management
FEDERAL direct loans
FEDERAL funding
FEDERAL grants

FEDERAL programs
fiscal FEDERALISM
FEDERAL program
FEDERAL programs
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certification FEES
connection FEES
development FEES
impact FEES
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permit FEES
tipping FEES
user FEES
public FINANCE
public FINANCE survey
FINANCIAL analysis
FINANCIAL assistance
FINANCIAL capability
FINANCIAL incentives
FINANCIAL management
FINANCIAL planning
FINANCING
creative FINANCING

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infrastructure FINANCING
alternative FINANCING mechanisms
FINANCING strategies
FINES
FISCAL federalism
FISCAL impact
capital FUNDING
federal FUNDING
state FUNDING
FUNDING
alternative FUNDING
FUNDRAISING
state revolving FUNDS

GENERAL obligation bonds
GENERAL revenues
GOVERNMENT programs
local GOVERNMENTS

GRANTS
block GRANTS
capitalization GRANTS
construction GRANTS
federal GRANTS
supplemental GRANTS
GREEN lights
GROUNDWATER

loan GUARANTIES

HAZARDOUS waste
self HELP

economic IMPACT
fiscal IMPACT
IMPACT fees
capital IMPROVEMENTS
financial INCENTIVES
INCOME tax
INDOOR air pollution
INDUSTRIAL development bonds
INFORMATION management
INFRASTRUCTURE
INFRASTRUCTURE banks
INFRASTRUCTURE enhancement
INFRASTRUCTURE financing
public INFRASTRUCTURE
INTEREST rates
INTERGOVERNMENTAL organizations
INTERGOVERNMENTAL relations
INTERJURISDICTIONAL competition
legal ISSUES

LABORATORY fees

LANDFILLS

LEASE purchasing
LEGAL issues
LEVERAGING
aggressive LEVERAGING
LIABILITY
limited LIABILITY
LICENSE fees
LIMITED liability
green LIGHTS
LOAN guaranties
LOANS
federal direct LOANS
LOCAL governments
LOCAL programs

MAINTENANCE
MAINTENANCE fees
decision MAKING
MANAGEMENT
facilities MANAGEMENT
financial MANAGEMENT
information MANAGEMENT
solid waste MANAGEMENT
stormwater MANAGEMENT
MANDATES
MARINE waters
alternative financing MECHANISMS
MODELS

computer MODELS
MUNICIPAL bonds

NEEDS
NONPOINT source pollution
NONPOINT sources
NPDES permits

general OBLIGATION bonds
OCCUPANCY tax
OPERATING fees
OPERATIONS
OPERATOR certification
intergovernmental ORGANIZATIONS
OUTREACH
combined sewer OVERFLOW

public private PARTNERSHIPS
public private PARTNERSHIPS coordinator
tribal PARTNERSHIPS
PERMIT fees
npdes PERMITS
PESTICIDE control
PLANNING
capital PLANNING
financial PLANNING
POINT source pollution

air POLLUTION
indoor air POLLUTION
nonpoint source POLLUTION
point source POLLUTION
water POLLUTION
POLLUTION control
POLLUTION prevention
bond POOLS
pollution PREVENTION
waste PREVENTION
unit PRICING
PRIVATE activity bonds
public PRIVATE partnerships
public PRIVATE partnerships coordinator
PRIVATIZATION
federal PROGRAM
government PROGRAMS
local PROGRAMS
state PROGRAMS
voluntary PROGRAMS
research PROJECTS
resource recovery PROJECTS
PROPERTY tax
coastal resource PROTECTION
wellhead PROTECTION
PUBLIC confidence
PUBLIC finance

PUBLIC finance survey
PUBLIC infrastructure
PUBLIC private partnerships
PUBLIC private partnerships coordinator
PUBLIC services
PUBLIC works
lease PURCHASING

water QUALITY
water QUALITY fees

RADON
RATE structure
interest RATES
sewer RATES
wastewater RATES
water RATES
RECLAMATION
cost RECOVERY
resource RECOVERY projects
RECYCLING
urban REDEVELOPMENT
cost REDUCTION
source REDUCTION
tax REFORM
REGIONAL coordinators

REGISTERED bonds
REGULATORY activities
intergovernmental RELATIONS
site REMEDIATION
urban RENEWAL
RESEARCH projects
coastal RESOURCE protection
RESOURCE recovery projects
water RESOURCES
REVENUE bonds
REVENUE sharing
REVENUES
general REVENUES
state REVOLVING funds
RULES
RURAL communities

SALES tax
SELF help
SEPTIC systems
SERVICE costs
public SERVICES
SEWAGE treatment
combined SEWER overflow
SEWER extensions
SEWER rates
SEWER systems

combined SEWERS
cost SHARING
revenue SHARING
SITE remediation
SLUDGE treatment
SMALL communities
SMALL systems
SOLID waste
SOLID waste disposal
SOLID waste facilities
SOLID waste management
nonpoint SOURCE pollution
point SOURCE pollution
SOURCE reduction
nonpoint SOURCES
revenue SOURCES
STATE
STATE assistance
STATE capacity
STATE funding
STATE programs
STATE revolving funds
STATISTICS
STATUTES
underground STORAGE tanks
STORMWATER
STORMWATER management

financing STRATEGIES
rate STRUCTURE
case STUDIES
toxic SUBSTANCES
SUPERFUND
SUPPLEMENTAL grants
water SUPPLY
SURFACE water
public finance SURVEY
SURVEY
septic SYSTEMS
sewer SYSTEMS
small SYSTEMS
user charge SYSTEMS

underground storage TANKS
dedicated TAX
excise TAX
effluent TAX
income TAX
occupancy TAX
property TAX
sales TAX
TAX allocation bonds
TAX credits
TAX exempt bonds
TAX exemptions
TAX reform

TAXES
TECHNICAL assistance
energy TECHNOLOGY
TIPPING fees
TOXIC substances
TRAINING
sewage TREATMENT
sludge TREATMENT
wastewater TREATMENT
TRENDS
TRIBAL partnerships

UNDERGROUND storage tanks
UNIT pricing
URBAN communities
URBAN redevelopment
URBAN renewal
USER charge systems
USER charges
USER fees
UTILITIES
wastewater UTILITIES
water UTILITIES
UTILITY rehabilitation

VOLUME cap
VOLUNTARY programs

hazardous WASTE
solid WASTE
solid WASTE disposal
solid WASTE facilities
solid WASTE management
WASTE prevention
WASTEWATER facilities
WASTEWATER rates
WASTEWATER treatment
WASTEWATER utilities
WATER
drinking WATER
drinking WATER facilities
surface WATER
well WATER
WATER pollution
WATER quality
WATER rates
WATER resources
WATER supply
WATER utilities
marine WATERS
WATERSHEDS
WELL water
WELLHEAD protection
WETLANDS
public WORKS

NOTE: YOU MAY ALSO SEARCH BY STATE NAME

EFIN ABSTRACTS - Publications and Case Studies

These titles can be accessed on the Environmental Finance Program's World Wide Web site at **http://www.epa.gov/efinpage/titles.htm**

E. GLOSSARY

Accelerated Cost Recovery System (ACRS): The tax depreciation, or cost recovery, method for Internal Revenue Service (IRS) purposes, was introduced by the 1981 Economic Recovery Tax Act and was effective for all depreciable property placed in service after December 31, 1980 and before January 1, 1987. ACRS replaced the Asset Depreciation Range (ADR) system and was replaced by the Modified Accelerated Cost Recovery System (MACRS) of the 1986 Tax Reform Act.

Accelerated Depreciation: Any depreciation method that allows for greater deductions or charges in the earlier years of an assets depreciable life, with charges becoming progressively smaller in each successive period. Examples would include the double declining balance and sum-of-the-years digits methods.

Accountant's Equation: The equation which is the basis of a balance sheet. It is as follows: Assets= Liabilities + Owners' Equity.

Accounts Receivable: An asset account reflecting amounts owing on open account from private persons or organizations for goods and services furnished by a government (but not including amounts due from other funds of the same government). Although taxes and special assessments receivable, are covered by this term, they should be recorded and reported separately in Taxes Receivable and Special Assessments Receivable accounts respectively. Amounts due from other funds or from other governments should also be reported separately.

Accrual Accounting Method: A form of reporting profits or losses based on: the consummation of a transaction being accepted by form of contract or invoice without the realization of cash or an expense that has been incurred but has not yet been disbursed.

Accrual Basis: The practice of record keeping by which income is recorded when earned and expenses are recorded when incurred, even though the cash may be received or paid out until later.

Acid-Test Ratio: Also called the quick ratio, the ratio of current assets minus inventories, accruals, and prepaid items to current liabilities.

Administrative Feasibility: A measure of the difficulty of administering an alternative financing mechanism (AFM). Factors affecting administrative feasibility include whether the implementing government can take advantage of existing administrative structure, whether any data required are available (for example, for a commodity tax whether sales of the commodity are easy to track), and the number of employees required to administer the mechanism.

Ad Valorem Tax: A tax based on the assessed value of property. Counties, school districts, and municipalities usually are authorized to levy ad valorem taxes. Special districts can also be authorized to levy ad valorem taxes.

Advance Payments: Payments made by the Lessee at the inception of a leasing transaction.

Advance Refunding: The replacement of debt prior to the original call date via the issuance of refunding bonds.

Advance Refunding Bonds: Bonds issued to refund an outstanding bond issue prior to the date on which the outstanding bonds become due or callable. Proceeds of the advance refunding bonds are deposited in escrow with a fiduciary, invested in U.S. Treasury Bonds or other authorized securities, and used to redeem the underlying bonds at maturity of call date and to pay interest on the bonds being refunded or the advance refunding bonds.

AFM: See Alternative Financing Mechanism [also Financial Tools].

Alternative Financing Mechanism (AFM): Refers to any technique used to fund environmental programs or services, including both capital and operating costs, at the state and local level.

Amortization: A breakdown of periodic loan payments into two components - a principal portion and an interest portion. The gradual reduction of a debt by means of equal periodic payments sufficient to meet

current interest and liquidate the debt at maturity. When the debt involves real property, often the periodic payments include a sum sufficient to pay taxes and hazard insurance.

Angel: An individual who buys into a company at its very beginning.

Angel Lender: An individual who provides funds in the form of a loan to someone of which he is very close and generally does not require rules and restrictions of a formal lender. More commonly, an angel lender is friend, family member or close acquaintance of the borrower.

Annual Percentage Rate (APR): The nominal or effective rate of interest for a specified period (usually a year).

Annualization: The process of adjusting a utility company's annual historical information to reflect a full 12-month period for known changes reasonably expected to continue into the future. Annualization adjustments are routinely made in developing a utility company's total cost of service.

Annual Percentage Rate (APR): The effective rate taking into account compounding and other fees. The nominal rate of interest for a specific period (usually one year).

Appreciation: The increase in the value of an asset in excess of its depreciable cost which is due to economic and other conditions, as distinguished from increases in value due to improvements or additions make to it.

Arbitrage: The investment of low interest bond or note proceeds at higher interest rates. Arbitrage earnings are fully taxable with few exceptions. Municipal issuers are allowed to make arbitrage profits under certain restricted conditions, but Section 103© of the Internal Revenue Code prohibits the sale of tax-exempt bonds primarily for the purpose of making arbitrage profits.

Asset: Anything owned by an individual or a business, which has commercial or exchange value. Assets may consist of specific property or claims against others, in contrast to obligations due others. (See also Liabilities).

Asset Based Lending: A loan to an individual or company collateralized by a specific asset or group of assets. Typically asset based loans do not require real property as collateral.

Asset Sale: An asset sale is the transfer of ownership of government assets, commercial-type enterprises, or functions to the private sector. In general, the government has no role in the financial support, management, or oversight of a sold asset. However, if the asset is sold to a company in an industry with monopolistic characteristics, the government may regulate certain aspects of the business, such as utility rates.

Assurance/Performance Bonding: Performance or assurance bonding is a requirement that users of environmental resources place in an escrow account a sum of money adequate to cover potential future environmental damages.

Authority (Lease Revenue): A bond secured by the lease between the authority and another agency. The lease payments from the "city" to the agency are equal to the debt service.

Balance Sheet: A balance sheet is an itemized statement which lists the total assets and the total liabilities of a given business to portray its net worth at a given moment of time. The amounts shown on a balance sheet are generally the historic cost of items and not their current values.

Banking Program: See economic incentive programs.

Basis Point: One one-hundredth of a percent (.01%).

Basis Risk: The uncertainty about the basis at the time a hedge may be lifted. Hedging substitutes basis risk for price risk.

Beneficiary Pays Principle: See equity.

Business Plan: A written document that gives an overview of your company, its future and its financials.

Business Risk: The risk that the cash flow of an issuer will be impaired because of adverse economic conditions, making it difficult for the issuer to meet its operating expenses.

Betterment: An addition made to, or change made in, a fixed asset that is expected to prolong its life or to increase its efficiency over and above that arising from maintenance, and the cost of which is therefore added to the book value of the asset. The term is sometimes applied to sidewalks, sewers, and highways.

Bond: An interest-bearing certificate issued by governments and corporations when they borrow money. The issuer agrees to pay a fixed principal sum on a specified date (the maturity date) and at a specified rate of interest. In measuring municipal bond volume, a bond is a security maturing more than one year from issuance; shorter-term obligations are usually termed notes or commercial paper.

Bond Anticipation Note (BAN): A note issued by public agencies to secure temporary (often partial) financing for a project that will eventually be fully financed (and the BAN repaid) through the sale of bonds.

Bond Bank: A state-chartered organization that purchases the bonds of local governments and secures its own debt with the pool of local bonds. This arrangement cuts borrowing costs for the local issuers because the bond bank's debt usually carries higher ratings than that of the municipalities, whose issues are usually too small to be rated anyway. Credit enhancements, such as bond insurance, are also cheaper when purchased for larger issues. Localities' use of the bond bank is voluntary.

Bond Counsel: A lawyer who reviews the legal documents and writes an opinion on the security, tax-exempt status and issuance authority of a bond or note.

Bond Discount: The excess of the face value of a bond over the price for which it is acquired or sold. The price does not include accrued interest at the date of acquisition or sale.

Bond Election: The process by which voters approve or reject bond issues.

Bond-Equivalent Yield: The annualized yield to maturity computed by doubling the semiannual yield.

Bond Fund: A fund formerly used to account for the proceeds of general-obligation bond issues. Such proceeds are not accounted for in a capital-projects fund.

Bond Indenture: The contract that sets forth the promises of a corporate bond issuer and the rights of investors.

Bond Insurance: Insurance that can be purchased by an issuer for either an entire issue or specific maturities, which guarantees the payment of principal and/or interest. This security usually provides a higher credit rating and thus a lower borrowing cost for an issuer.

Bond Issued: Bond sold.

Bond Premium: The excess of the price at which a bond is acquired or sold over its face value. The price does not include accrued interest at the date of acquisition or sale.

Bond Proceeds: The money the issuer receives from its bond sale.

Bonded Debt: That portion of indebtedness represented by outstanding bonds.

Bonds Authorized and Unissued: Bonds that have been legally authorized but not issued and which can be issued and sold without further authorization. This term must not be confused with the terms "margin of borrowing power" or "legal debt margin," either one of which represents the difference between the legal debt limit of a government and the debt outstanding against it.

Bonds, Debenture: A form of long-term loan included in debt capital, which is secured by the general credit worthiness of the utility.

Bonds, Mortgage: A form of long-term loan, included in debt capital, which is secured by the utility's property.

Book Value: An accounting term, which usually refers to a business' historical cost of assets less liabilities. The book value of a stock is determined from a company's records by adding all assets (generally excluding such intangibles as goodwill), then deducting all debts and other liabilities, plus the liquidation price of any preferred stock issued. The sum arrived at is divided by the number of common shares outstanding and the result is the book value per common share. Book value of the assets of a company may have little or no significant relationship to market value.

Bridge Financing: A form of interim loan, generally made between a short term loan and a long term loan, when the borrower requires more time before taking on long term financing.

Bubble Program: See economic incentive programs.

Budget: A budget is an itemized listing of the amount of all estimated revenue which a given business anticipates receiving, along with a listing of the amount of all estimated costs and expenses that will be incurred in obtaining the above mentioned income during a given period of time. A budget is typically for one business cycle, such as a year, or for several cycles (such as a five year capital budget).

Callable Bond: A bond that can be redeemed by the issuer prior to its maturity. Usually a premium is paid to the bond owner when the bond is called.

Capacity Credit: A reservation of future capacity in a public facility purchased generally by private real estate developers prior to the construction of that facility. Typically, the revenue generated from selling capacity credits is used to finance facility construction. For example, some communities have built new wastewater treatment facilities by selling capacity credits.

Capital: Funds necessary to establish or operate a business.

Capitalization: Also called financial leverage ratios, ratios that compare debt to total capitalization and thus reflect the extent to which a corporation is trading on its equity. These ratios can be interpreted only in the context of the stability of industry and company earnings and cash flow.

Capital Budget: This is the estimated amount planned to be expended for capital items in a given fiscal period. Capital items are fixed assets such as facilities and equipment, the cost of which is normally written off over a number of fiscal periods. The capital budget, however, is limited to the expenditures which will be made within the fiscal year comparable to the related operating budgets.

Capital Costs: Expenditures that typically result in the acquisition or addition to fixed assets that have a useful life of over one year and a cost greater than a threshold value established by the owner. Capital costs include expenditures for replacements and major additions, but not for repairs.

Capital Lease: A lease that meets at least one of the following criteria, and therefore must be treated essentially as a loan for book accounting purposes: title passes automatically by the end of the lease term; lease contains a bargain purchase option; lease term is greater that 75% of estimated economic life of the equipment; present value of lease payments is greater than 90% of the equipment's fair market value.

Capital Outlay: Expenditures that result in the acquisition of or addition to fixed assets.

Capital-Projects Fund: A fund created to account for financial resources to be used for the acquisition or construction of major capital facilities (other than those financed by proprietary funds, special funds, and trust funds).

Cash Basis: The practice of recording income and expenses only when cash is actually received or paid out.

Cash Flow: This term may have different meanings depending upon who is using the term and in what context. Bankers usually define it as net profits plus all non cash expenses, but it can also be defined as the difference between cash receipts and disbursements over a specified period of time.

Cash Flow Loan: A loan that is made to an individual or a company over a short period of time, typically 12 months or less.

CERCLA: Comprehensive Environmental Response, Compensation and Liability Act.

Certificates of Participation (COP): Financing whereby an investor purchases a share of the lease revenues of a program rather than the bond being secured by those revenues. Usually issued by authorities through which capital is raised and lease payments are made. The authority usually uses the proceeds to construct a facility that is leased to the municipality, releasing the municipality form restrictions on the amount of debt that they can incur.

Collateral: Assets pledged as security against a loan in case of default. The intangible or tangible property given as security to the lender by the account credit for any obligations and indebtedness of account creditor.

Collateral Trust Bonds: A bond in which the issuer (often a holding company) grants investors a lien on stocks, notes, bonds, or other financial asset as security. Compare mortgage bond.

Commercial Loan: A loan from a privately-owned bank at market rates.

Common Stock: Capital stock, other than preferred, which is bought by utility shareholders and becomes part of a utility's equity. Its value is determined in the marketplace, and its return is not a contracted rate as with preferred stock.

Community Water System: A water system which supplies drinking water to 25 or more of the same people year-round in their residences.

Conditional Sale Lease: See tax-exempt lease.

Connection Fee: A charge assessed to new users of a utility system to cover the costs of constructing capacity for their use.

Contracting Out: Contracting out is the hiring of private-sector firms or non-profit organizations to provide goods or service for the government. Under this approach, the government remains the financier and has management and policy control over the type and quality of goods or services to be provided. Thus, the government can replace contractors that do not perform well.

Conventional Mortgage: A loan neither insured by the FHA nor guaranteed by the VA.

Cost of Capital: The weighted-average cost of funds that a firm secures from both debt and equity sources in order to fund its assets. The use of a firm's cost of capital is essential in making accurate capital budgeting and project investment decisions.

Cost of Equity: The return of an investment required by the equity holders of a firm. Cost of equity can be calculated using any number of different theoretical approaches and must take into consideration the current and long-term yield requirements of a firm's cost of capital is essential in making accurate capital budgeting and project investment decisions.

Counterparty Risk: The risk that the other party to an agreement will default. In an options contract, the risk to the option buyer that the option writer will not buy or sell the underlying as agreed.

Coupon Rate: The interest rate specified on interest coupons attached to a bond. The term is synonymous with nominal interest rate.

Covenant: A written agreement or restriction on the use of land or promising certain acts. Homeowner Associations often enforce restrictive covenants governing architectural controls and maintenance responsibilities. However, land could be subject to restrictive covenants even if there is no homeowner's association.

Coverage: The ratio of not revenue available for debt service to the average annual debt service requirements of an issue of revenue bonds.

Credit Enhancement: Credit enhancements enable a state or local government to improve its credit rating and/or acquire capital by providing additional assurance of repayment. Some forms of credit enhancement are subsidized, such as the Rural Development Administration's loan guarantees. Others, such as commercial bond insurance, require the debtor government to pay a fee for the credit enhancement.

Credit Guaranty: A form of guarantying a debt from the debtor in the event of debtor insolvency.

Credit Risk: The risk of default on a bond or a loan.

Current Assets: current assets are those assets of a company which are reasonable expected to be realized in cash or sold, or consumed during the normal operating cycle of the business (usually one year). Such assets include cash, accounts receivable and money due usually within one year, short-term investments, US government bonds, inventories, and prepaid expenses.

Current liabilities: Liabilities to be paid within one year of the balance sheet date.

CWA: Clean Water Act.

Debenture Bonds: See Bonds, Debenture.

Debt: An obligation resulting from the borrowing of money or from the purchase of goods and services. Debts of governments include bonds, time warrants, and floating debt.

Debt to Equity Ratio: A return on investment; an investment created by a form of debt, i.e., bank loan, investor funds, etc. of which is converted to profit than retained in earnings which is referred to as "owner" or "stockholder" equity.

Debt Financing: Raising funds for a business by borrowing, often in the form of bank loans.

Debt Limit (Ceiling: The legal maximum debt-incurring power of a State or locality. Debt limits are often imposed by constitutional, statutory, or local charter provisions.

Debt, Long-term: Debt that is payable more than one year from the date it was incurred.

Debt Per Capita: Bonds divided by population. When compared with other jurisdictions, this statistic serves as an indicator of the use of public debt capacity in the area in question.

Debt Ratio: The ratio of an issuer's debt outstanding to a measure of property value.

Debt Service: The amount of money necessary to pay interest and principal charges on an outstanding debt.

Debt Service Fund: A fund created by a bond indenture and held by the trustee, usually amounting to principal and interest payment for one year, and used only if normal revenues are not sufficient to pay debt service.

Debt Service Fund Requirements: The amount of revenue that must be provided for a debt service fund so that all principal and interest payments can be made in full on schedule.

Debt Service Requirements: The amount of money required to pay interest on outstanding debt, serial maturities of principal for serial bonds, and required contributions to accumulate monies for future retirement of term bonds.

Debt Service Reserve Fund: A fund created by a bond indenture and held by the trustee, usually amounting to principal and interest payment for one year, and used only if normal revenues are not sufficient to pay debt service.

Debt, Short-term: Debt that falls due in a period of under a year.

Declining balance method: An accelerated method to depreciate property. The General Depreciation System (GDS) of MACRS uses the 150% and 200% declining balance methods for certain types of property. A depreciation rate (percentage) is determined by dividing the declining balance percentage by the recovery period for the property.

Default: The failure to make timely payment of interest or principal on a debt instrument; or the occurrence of an event as stipulated in the indenture of trust resulting in an abrogation of that agreement. An issuer does not default until it fails to make a payment.

Depreciation: The amount of expense charged against earnings by a company to write off the cost of a plant or machine over its useful live, giving consideration to wear and tear, obsolescence, and salvage value. If the expense is assumed to be incurred in equal amounts in each business period over the life of the asset, the depreciation method used is straight line (SL). If the expense is assumed to be incurred in decreasing amounts in each business period over the life of the asset, the method used is said to be accelerated. Two commonly used variations of the accelerated method of depreciating an asset are the sum-of-years digits (SYD) and the double-declining balance (DDB) methods. Frequently, accelerated depreciation is chosen for a businesses' tax expense but straight line is chosen for its financial reporting purposes.

Direct Cost: A cost that can be economically traced to a single cost object.

Direct Net Debt: Gross direct debt less debt that is self-supporting (revenue bonds) and double-barrel bonds (general-obligation bonds secured by earmarked revenues that flow outside the general fund).

Discount Rate: The time value of money or the rate of interest a company wants to earn on its investments.

Divestiture: Divestiture involves the sale of government-owned assets or commercial-type functions or enterprises. After divestiture, the government generally has no role in the financial support, management, regulation, or oversight of the divested activity.

Double-Barreled Bond: A bond with two pledged sources of revenue, generally earmarked monies from a specific enterprise or aid payments and the general obligation taxing power of the issuer.

Due Diligence: Process undertaken by venture capitalists, investment bankers or others to investigate a company before financing it; required by law before securities are offered for sale.

EA: See Environmental Assessment.

Easement: In most states, an easement is a legal restriction contained within a deed that prohibits certain land uses in perpetuity. For example, an easement might prohibit development of more than one house on

twenty acres of oceanfront property. Private landowners who place easements on their property for natural resources protection can take a tax write-off representing the value lost on the property due to the deed restrictions.

Earmarking: Statutory or constitutional dedication of revenues to specific government projects or programs.

Economic Impact: Refers to the effects of AFM implementation on state and local economies. Some AFMs could have a disproportionate impact on a particular area or population. For example, a tax on watercraft sales might affect the competitiveness of a particular state's shipbuilding industry. Other AFMs can have a diffuse economic impact on a large population. For example, a motor vehicle license fee may have a small impact on a large population.

Economic Incentive Programs: Economic incentive programs use market-based tools to encourage reduction in polluting behavior. The programs can be structured in a variety of ways. "Bubble" programs treat multiple pollution sources as if they were included in an imaginary bubble, allowing existing sources to adjust pollutant levels within the bubble as long as an aggregate limit is not exceeded. "Offset" programs allow new sources to obtain credits from existing sources to offset pollutant emissions, while "netting" programs allow sources within a single plant undergoing modifications to avoid new source review processes if plant-wide emissions are reduced. "Banking" programs allow sources to store pollution reduction credits for future use or sale.

Economic Life of Leased Property: The estimated period during which the property is expected to be economically usable by one or more users, with normal repairs and maintenance for the purpose for which it was intended at the inception of the lease.

Elasticity: Elasticity is an economic measure of consumer response to price changes. A product or service has an elastic demand if the demand for the product will decrease very quickly as the price increases. Concert tickets typically have an elastic demand -- as prices increase, fewer consumers buy tickets. A product or service has an inelastic demand if the demand for the product is not sensitive to price change. Alcohol and tobacco typically have inelastic demands; consumers will be less sensitive to price changes on these products and are more likely to continue buying them. When considering implementing taxes or fees on products that will be sold, state and local governments need to consider the

elasticity of demand, in order to determine whether the tax or fee will reduce sales, and thereby reduce revenues.

Electronic Bulletin Board: An information service operated from a central computer that allows information to be transmitted electronically to multiple users who dial in with a computer modem.

Emissions: Pollution discharged into the atmosphere from smokestacks, other vents, and surface areas of commercial or industrial facilities; from residential chimneys; and from motor vehicle, locomotive, or aircraft exhausts.

Emissions Trading Programs: Emissions trading programs allow sources of air pollutants to trade pollutants in some fashion, either geographically, over time, or among other sources. See economic incentive programs.

Encumbrances: A lien or any form of indebtedness owed against real or personal property. An encumbrance is also recognized as an unearned equity.

Environmental Assessment: A written environmental analysis that is prepared pursuant to the National Environmental Policy Act (NEPA) to determine whether Federal action would significantly affect the environment and thus require preparation of a more detailed Environmental Impact Statement (EIS).

Environmental Cost Accounting: The addition of environmental cost information into existing cost accounting procedures and/or recognizing embedded environmental costs and allocating them to appropriate products and processes.

EPA: Environmental Protection Agency.

EPCRA: Emergency Planning and Community Right-to-Know Act.

Estimated Useful Life: The period in which an asset is expected to be useful in trade or business.

Estoppel: The act of being prevented from denying or asserting something on the ground that to do so contradicts what has already been admitted or denied either in works or by actions.

Eurodollar Bonds: Eurobonds denominated in U.S. dollars.

Exactions: Exactions are money, land, or construction services and materials provided by a developer or property owner to a public jurisdiction. Also known as proffers, exactions are sometimes required in order for developers or homeowners to gain public approval for building. Local governments can use exactions to require developers to extend wastewater treatment, solid waste management, and other environmental services to new areas.

External/Societal/Social Costs: Costs resulting from impacts on the environment and society for which firms are not held financially responsible. These can include environmental degradation and adverse health impacts. Such costs are intangible in nature and need to be valued by nontraditional methods. Some private costs can also be less tangible.

Equity: Equity reflects the fairness of the distribution of the funding burden for an AFM among individuals. Equity can be approached from two directions – those who create or contribute to environmental problems should bear the funding burden (the "polluter" pays), or those who benefit from program activities should bear the funding burden (the "beneficiary" pays.)

Equipment leasing: Contracting to pay monthly fees to use equipment, instead of buying it.

Factor: Factors buy current receivables at a discount rate, typically 10% to 25%.

Factoring: The outright purchase of accounts receivable.

Fair market value (FMV): The price for which a wiling seller will sell, and a willing buyer will buy, in an arm's length transaction when neither is under compulsion to sell or buy and both have reasonable knowledge of relevant facts.

Fair market value lease: A lease which includes an option for the lessee to renew the lease at a fair market value at the end of the lease term. Though often referred to as tax leases, not all so qualify.

Fee: A fee is generally a charge for services rendered. Although laws vary widely, many states require that fees be set at rates that will cover only the costs of the services provided.

Finance Lease: A lease used to finance the purchase of equipment; not a true lease. Finance leases are generally considered to be capital leases from an accounting perspective and non-tax leases from a tax perspective.

Financial Statement: Written account of the financial condition of your company; includes a balance sheet and income statement.

Fines and Penalties: Fines and penalties require offenders to pay monetary damages for violating government laws or regulations.

Fixed assets: Those assets of a permanent nature required for the normal conduct of a business, and which will not normally be converted into cash during the ensuring fiscal period. For example, furniture, fixtures, land, and buildings are all fixed assets. However, accounts receivable and inventory are not.

Fixed cost: Fixed costs are operating expenses that are incurred to provide facilities and organization which are kept in readiness to do business without regard to actual volumes of production and sales. Fixed costs remain relatively constant until changed by managerial decision. Within general limits they do not vary with business volume. Examples of fixed costs consist of rent, property taxes, and interest expense.

Franchising of External Services: Under the franchising of external services, the government grants a concession or privilege to a private sector entity to conduct business in a particular market or geographical area–for example, operating concession stands, hotels, and other services provided in certain national parks. The government may regulate the service level or price, but users of the service pay the provider directly.

Franchising of Internal Services: Under the franchising of internal services, government agencies provide administrative services to other government agencies on a reimbursable basis. Franchising gives agencies the opportunity to obtain administrative services from another governmental entity instead of providing them for themselves. In the federal government, these arrangements are often called inter-service support agreements (ISSA).

Full Cost Accounting: A method of financial and management accounting that allocates all direct and indirect historical costs to a product or process.

Full Cost Recovery: Full cost recovery means charging fees to completely cover costs incurred by a particular activity or service. Some state and local governments, as well as local utilities, are beginning to practice full cost recovery by legislatively requiring that fees be set to cover the complete cost of services rendered.

Full Faith and Credit: The pledge of the general taxing power of a government to pay its debt obligations.

Full Payout Lease: A lease in which the total of the lease payments pay back to the lessor the entire cost of the equipment including financing, overhead, and a reasonable rate of return, with little or no dependence on a residual value.

Fund: A fiscal and accounting entity with a self-balancing set of accounts recording cash and other financial resources, together with all related liabilities and residual equities or balances, and changes therein, which are segregated for the purpose of carrying on specific activities or attaining certain objectives in accordance with special regulations, restrictions, or limitations.

Fungible commodity: A commodity of a nature that one part may be used in place of another part.

General Obligation Bond: A security backed by the full faith and credit of a state or locality. In the event of default, the holders of general obligation bonds have the right to compel a tax levy or legislative appropriation in order to satisfy the debt obligation.

Government-Sponsored Enterprises (GSE): GSE's are federally established, privately owned corporations designed to increase the flow of credit to specific economic sectors. GSE's typically receive their financing from private investment, and the credit markets perceive that GSE's have implied federal financial backing. GSE's issue capital stock and short-and long-term debt instruments, issue mortgage-backed securities, fund designated activities, and collect fees for guarantees and other services. GSE's generally do not receive government appropriations.

Grant: A monetary sum awarded to a State or local government or non-profit organization that does not need to be repaid. Typically, grants are awarded by the federal government to State or local governments, or by States to local governments, to finance a particular activity or facility.

Grant Anticipation Notes (GAN): Notes issued by public agencies to secure temporary financing for projects awaiting the receipt of permanent funding through governmental grants. The GAN is repaid from grant proceeds.

Greenhouse Effect: The theory that continued burning of fossil fuels will increase concentrations of carbon thereby trapping dioxide in the atmosphere, adding heat and moisture. Some scientists theorize that in time this could create a hothouse effect, raising the temperature of the earth, causing glaciers to melt and the sea level to rise. In 1983, estimates for carbon emissions in millions of tons were: United States and Canada 1,245; Western Europe 753; USSR and Eastern Europe, 1,279 developing nations of Asia, Latin America and Africa, 738; China and Central Asia, 482; and Central Japan and Australia, 287.

Gross Direct Debt: The total amount of bonded debt of a government (general obligation bonds plus revenue bonds).

Guarantee, loan: Promise to take responsibility for payment of part or all of a debt if the person borrowing the money fails to pay off the loan.

Guaranty or Guaranty Agreement: The agreement of a third party to pay debt service on a debt in the event of default by the issuer.

Hazardous Waste: A subset of solid waste, which can create a risk to the safety or health of people or the environment. Any solid waste that is ignitable, explosive, reactive or toxic and which may pose a

substantial or potential hazard to human health and safety or to the environment when improperly managed. Reactive refers to the ability to enter into a violent chemical reaction that may involve explosion or fumes. (Use of this term is often highly imprecise).

Home Equity: The difference between the market value of the property and the homeowners mortgage debt.

Impact Fee: A fee assessed against private developers in compensation for the new capacity requirements their projects impose upon public facilities.

Incubator: Building or complex housing start-up or young businesses, where an entity, often the government, subsidizes rent, utilities and other overhead costs.

Industrial-Revenue Bonds: Bonds issued by governments, the proceeds of which are used to construct facilities for a private business enterprise. Lease payments made by the business enterprise to the government are used to service the bonds. Such bonds may be in the form of general-obligation bonds, combination bonds, or revenue bonds.

Income Taxes: A tax charged against individual or corporate income.

Initial Public Offering: The first time a company's stock is sold to the general public (other than by a limited offering) through the stock market or over-the-counter sales.

Installment Sale: Selling property and receiving the sales price over a series of payments, instead of all at once at the close of the sale, is an installment sale. Unless you elect out, you will report the gain on that transaction as you receive it through the series of payments.

Institutional Investor: An organization that buys and sells large volumes of securities, such as a mutual fund, pension fund or bank.

Insured Bond: A municipal bond backed both by the credit of the municipal issuer and by commercial insurance policies.

Interest: The charge or cost of borrowing money, measured in terms of a percentage per annum of the principal amount.

Internal Rate of Return: A return on an investment greater than the amount described in a contract or any other investment instrument. The internal rate-of-return is measured by the ability of the investor to reduce internal expenses during the course of managing the investment; which means the investor actually makes more than what is outlined in the contract or other investment instrument.

Investment Banker: The firm that acts as an intermediary between a company issuing securities and the public; an underwriter or agent who also advises the company issuing the stock.

IPO: Initial Public offering.

Issuance Costs: The costs incurred by bond issuers in connection with bond offerings. These include underwriter spread, feasibility studies, and various professional fees.

Junk Bond: A bond with a speculative credit rating of BB or lower is a junk bond. Such bonds offer investors higher yields than bonds of financially sound companies. Two agencies, Standard & Poor's and Moody's investor Services, provide the rating systems for companies' credit.

Land Trusts: Land trusts are trust funds that can actively acquire, manage, and protect natural lands and resources on behalf of a state or local government. Land trusts can be financed by a variety of revenue sources, although many localities choose to dedicate land-related taxes, such as land transfer taxes, to this purpose.

Lease: A contract through which an owner of equipment (the lessor) conveys the right to use its equipment to another party (the lessee) for a specified period of time (the lease term) for specified periodic payments.

Lease Purchase: Full payout, net leases structured with a term equal to the equipment's estimated useful life. Because many Lease Purchases include a bargain purchase option for the lessee to purchase the equipment for one dollar at the expiration of the lease, these leases are often referred to as dollar buyout or buck-out-leases. Lease purchases are generally considered to be Capital Leases from an accounting perspective and non-tax leases from a tax perspective due to their bargain purchase option and length of lease term.

Lease Rental Bonds: Bonds for which the principal and interest are payable exclusively from rental payments from a lessee. Rental payments are often derived from earnings of an enterprise that may be run by the lessee or the lessor. Rental payments may also come from taxes levied by the lessee.

Lease Schedule: A schedule to a Master Lease agreement describing the leased equipment, rentals and other terms applicable to the equipment.

Lessee: The party to a lease agreement who is obligated to pay the rentals to the lessor and is entitled to use and possess the leased equipment during the lease term.

Lessor: The party to a lease agreement who has legal or tax title to the equipment (in the case of a true tax lease), grants the lessee the right to use the equipment for the lease term and is entitled to receive the rental payments.

Letter of Credit: A contractual obligation by a bank to pay principal and interest in the event of an issuer default.

Leverage: Debt in relation to equity.

Leveraging: The use of grant or loan funds as reserve funds for the issuance of debt. Leveraging is used by several states participating in the Water Pollution Control State Revolving Fund program to increase the amount of funds available for loans.

Liability: Claim on the assets of a company.

Liability Assignment: Liability assigned through common law or statute, whereby individuals or companies may be held financially responsible for environmental damage resulting from their activities.

Lien: An attachment, voluntary or involuntary. A lender will apply a lien to encumber real or personal property. The lien can be granted by an abstract judgment rendered by a court of law.

Life Cycle Costing (LCC): A systematic process of evaluating the life-cycle costs of a product, product line, process, system, or facility by identifying life-cycle consequences and assigning monetary values to those consequences. Also called Life Cycle Cost Assessment (LCCA).

Life-cycle Assessment/Analysis (LCA): A holistic approach to identifying the environmental consequences of a product, process, or activity through its entire life cycle and to identifying opportunities for achieving environmental improvements. EPA specifies four major stages in a life-cycle of a product, process, or activity: raw materials acquisition, manufacturing, consumer use/reuse maintenance, and recycle/waste management. LCA focuses on environmental impacts not costs.

Limited-tax general obligation bond: A general obligation bond that is limited as to revenue sources.

Line of Credit: Lines of credit assure potential lenders that a debtor government will be able to draw on a specified sum of money from another source in the event of default. Unlike letters of credit, lines of credit can be used for any purpose, so debt holders have no guarantee that the debtor will not use the line of credit for other purposes. Availability of funds by the lender based on the account debtor's ability to pay.

Long-Term Debt: Debt that is payable more than one year from the date it was incurred.

Managed Competition: Under managed competition, a public-sector agency competes with private-sector functions or services under a controlled or managed process. This process clearly defines the steps to be taken by government employees in preparing their own approach to performing an activity. The agency's proposal for providing the service, which includes a bid proposal for cost-estimation purposes, is useful in competing directly with private-sector bids.

Mandate Bond (MIFs): A new category of tax-exempt bonds known as Mandated Infrastructure Facility(MIF) Bonds. Under a proposal by the Government Finance Officers Association (GFOA), the bonds could be issued to finance facility construction, acquisition, renovation, or rehabilitation required by federal statutes or regulations. The proposal would essentially allow more private participation in such projects than is currently allowed for tax-exempt bonds.

Market Timing Costs: Costs that arise from price movement of the stock during the time of the transaction which is attributed to other activity in the stock.

Master Lease: A continuing lease arrangement whereby additional equipment can be added from time to time merely by describing that equipment in a new lease schedule executed by the parties. The original lease contract terms and conditions apply to all subsequent schedules. In contrast to a lease contract for a single transaction involving a specific unit of equipment, a Master Lease is essentially a line of credit to draw from over time in order to purchase equipment.

Moral Obligation Bond: A state or municipal bond that is not backed by the full faith and credit of the issuer. The issuer of a moral obligation bond asserts the intent of the legislative body to make appropriations sufficient to cure any deficiency in monies required to meet debt service, but the issuer has no legally enforceable obligation to do so.

Mortgage Bonds: See Bonds, Mortgage.

Municipal Bond: A debt obligation issued by a state, state agency or authority, or a political subdivision,, such as county, city, town or village. They may be issue for general governmental needs or special projects. Issuance must be approved by referendum or by an electoral body.

Municipal bond insurance: Insurance policies that protect investors if a municipal bond should default–the bonds will be purchased from investors at par. The insurance may either be purchased by the issuer or the investor. Two major insurers of municipal bonds are the Ambac Indemnity Corporation and the Municipal Bond insurance Association (MBIA). Insured municipal bonds usually have the highest ratings. Subsequently, the bond's marketability increases, which lowers the costs to their issuers. However, the yield on an insured bond is usually lower than similarly rated uninsured bonds–the cost of the insurance is passed on to the investor. To obtain the extra degree of safety, many investors do not care if the yields are slightly lower.

Municipal Improvement Certificates: Certificates issued in lieu of bonds for the financing of special improvements. As a result, these certificates are placed in the contractor's hands for collection from the special assessment payers.

Municipal lease: A lease designed to meet the special needs of state and local governments. The lease contains a non-appropriation clause which states that the only condition under which the entity may be released from its payment obligations is when the legislature or funding authority fails to appropriate funds. Since the lessee is a municipality or an organization supporting the government, it is exempt from paying federal income taxes. For this reason, the IRS does not charge the lessor income taxes on leases to these customers.

National Pollutant Discharge Eliminating System (NPDES): A provision of the CWA, which prohibits discharge of pollutants into the waters of the United States unless a special permit is issued by EPA, a state, or (where delegated) a tribal government on an Indian reservation.

Municipal Securities Rulemaking Board (MSRB): A self-regulatory organization of the municipal securities industry that was created in 1975 under an amendment to the Securities Exchange Act of 1934. Its primary responsibility is to develop rules and regulations to govern the activities of municipal securities dealers, and to provide arbitration facilities to broker-dealers and bank dealers in municipal securities.

Net Financing Costs: Also called the cost of carry or , simply, carry, the difference between the cost of financing the purchases of an asset and the asset's cash yield. Positive carry means that the yield earned is greater than the financing cost; negative carry means that the financing cost exceeds the yield earned.

Net Present Value: The total discounted value of all cash inflows and outflows from a project or investment.

Netting Program: See economic incentive programs.

Non-Point-Source Pollution: Pollutants emanating from an unconfined or unchannelled source, including agricultural runoff, drainage or seepage and air contamination from landfills or surface impoundments.

Non-Recourse: Generally, accounts purchased by the lender remains with the lender. The lender accepts full credit risk for any and all accounts for which it purchases.

Non-Transient, Non-Community Water System: A water system which supplies water to 25 or more of the same people at least six months per year in places other than their residences. Some examples are schools, factories, office buildings, and hospitals which have their own water systems.

Notes: Interest-bearing certificates of governments or corporations that come due in a shorter time than bonds.

Off Balance Sheet Financing: A lease that qualifies as an Operating Lease for the lessee's financial accounting purposes. They are referred to as off-balance sheet financing due to exclusion from the balance sheet asset and debt presentation, except for the portion of payments due in the current fiscal period. Full disclosure of transactions is usually made in the auditor's notes to the financial statements. Periodic payments are recorded as expense items on the lessee's income statement.

Offset Program: See economic incentive programs.

Operating Costs: Costs that are directly related to rendering of services, sale of merchandise, production and disposition of commodities, collection of revenues, and other ongoing activities.

Operating Lease: A lease which is treated as a true lease (as opposed to a loan) for book accounting purposes. As defined in FASB 13, an operating lease must have all of the following characteristics.

- lease term is less than 75% of estimated economic life of the equipment
- present value of lease payment is less than 90% of the equipment's fair market value
- lease cannot contain a bargain purchase option (i.e., less than the fair market value)

- ownership is retained by the lessor during and after the lease term.

An operating lease is accounted for by the lessee without showing an asset (for the equipment) or a liability (for the lease payment obligations) on his balance sheet. Periodic payments are accounted for by the lessee as operating expenses of the period.

Opportunity Costs: The difference in the performance of an actual investment and a desired investment adjusted for fixed costs and execution costs. The performance differential is a consequence of not being able to implement all desired trades.

Original Issue Discount (OID): When a long-term debt instrument is issued at a price that is lower than its stated redemption value, the difference is called Original Issue Discount (OID).

Partnership: A partnership is an unincorporated business that has more than one owner. It is different from a sole proprietorship in that a sole proprietorship can have only one owner.

Payment-in-kind (PIK) Bond: A bond that gives the issuer an option (during an initial period) either to make coupon payments in cash or to give the bondholder a similar bond.

Performance Bonding: See Assurance Bonding.

Performance Guaranty: An "assurance" that if the duties prescribed by a contract are not performed the guarantor assumes said responsibility for the contract's completion.

Personal Loan: A loan from someone you know.

Point-Source Pollution: Any pollution from a confined and discrete conveyance such as a pipe, ditch, channel tunnel, well, fissure, container, rolling stock, concentrated animal-feeding operation or vessel or other floating craft. The return flow from irrigated agriculture is generally not considered point-source pollution.

Point Source/Non Point Source Trading: Point sources discharge pollutants in a well-defined geographic location. Municipal and industrial outfalls (pipes) that discharge into lakes and rivers are examples of point sources. Non-point source pollution is diffuse, and results from a variety of human activities that take place over a wide geographic area. For example, fertilizer or other agricultural chemicals that are washed into rivers are classified as non-point source pollution sources. Point source/non-point source trading in principle involves point sources financing reductions in non-point source pollution in lieu of undertaking more expensive point source pollution reduction.

Polluter Pays Principle: See equity.

Pollution: Contamination of air, water, land or other natural resources that will or is Rely to create a nuisance or render such resources harmful to public health or which is harmful to domestic, municipal, commercial, industrial, agricultural, recreational or other legitimate beneficial uses, or to livestock, wild animals, birds, fish or other life.

Pooled Collateral: A form of security provided to a lender for the purpose of a short term or long term loan. Assets are grouped together and pledged to the lender for a single loan.

Potentially Hidden Costs: Costs that are obscured in overhead accounts or overlooked in business decision-making, including costs of up-front, operational, and back-end activities undertaken to comply with environmental laws.

Present Value: The discounted value of a payment or stream of payments to be received in the future, taking into consideration of specific interest or discount rate. Present Value represents a series of future cash flows expressed in today's dollars.

Prime Rate: The interest rate banks charge their best customers.

Priority Lien: First position; the senior lender in a transaction.

Privatization (Public-Private Partnership): Under a public-private partnership, sometimes referred to as a joint venture, a contractual arrangement is firmed between public and private-sector partners that can include a variety of activities that involve the private sector in the development, financing, ownership, and operation of a public facility or service. It typically includes infrastructure projects and/or facilities. In such a partnership, public and private resources are pooled and responsibilities divided so that the partners' efforts complement one another. Typically, each partner shares in income resulting from the partnership in direct proportion to the contracting in that the parivate-sector partner usually makes a substantial cash, at-risk, equity investment in the project, and the public sector gains access to new revenue or service delivery capacity without having to pay the private-sector partner. Leasing arrangements can be used to facilitate public-private partnerships.

Private Placement: The sale of stock in a company directly to a pre-selected buyer, often an institutional investor.

Property Tax: A tax levied on both real and personal property.

Public Offering: The offering of a company's shares to the general public.

Public-Private Partnership: These partnerships involve a variety of techniques and activities to promote more sector involvement in providing traditional government services. They can include involving a private partner in construction, financing, operation, and/or ownership of a facility.

Public Water System (PWS): Any water system which provides water to at least 25 people for at least 60 days annually. There are more than 170,000 PWS's providing water from wells, rivers and other sources to about 250 million Americans. The others drink water from private wells. There are differing standards for PWS's of different sizes and types.

Purchase Option: An option given to the lessee to purchase the equipment from the lessor, usually as of a specified date.

Ratings: Credit quality evaluation of bonds and notes made by independent rating services and brokerage firm analysts. Generally, a higher bond rating lowers the interest rate expected by debtors for

repayment, and therefore overall capital costs. State and local governments can improve their bond ratings by using credit enhancement mechanisms.

RCRA: Resource Conservation and Recovery Act.

Real Estate: Land and anything permanently affixed to it, and those things attached to the building.

Real Estate Investment Trusts (REIT): A method of investing in real estate in a group, with certain tax advantages.

Real Property: Real estate collateral that can only be perfected by a note and a Deed of Trust.

Receivables: Money owed for goods or services already rendered.

Recourse: A type of borrowing in which the borrower (as a lessor funding a lease) is full at risk to the lender for repayment of the obligation. The recourse borrower (lessor) is required to make payments to the lender whether or not the lessee fulfills its obligation under the lease agreement.

Recovery period: The number of years over which the basis (cost) of an item of property is recovered.

Refunded Bonds: Also called a prerefunded bond, one that originally may have been issued as a general obligation or revenue bond but that is now secured buy an "escrow fund" consisting entirely of direct U.S. Government obligations that are sufficient for paying the bondholders.

Return on Assets (ROA): A common measure of profitability based upon the amount of assets invested; ROA is equal to the ratio of either 1) net income to total assets or 2) net income available to common stockholders to total assets.

Return on Equity (ROE): A measure of profitability related to the amount of invested equity; ROE is equal to the ratio of either 1) net income to owner's equity or 2) net income available to common stockholders to common equity.

Revenue Anticipation Notes (RANs): Notes issued in anticipation of non-tax revenues, generally from other governmental entities (i.e., state aid to a school district).

Revenue Base: The revenue base is the value of the product, income, property, or the number of population against which a fee or tax is charged. For example, the revenue base for a state tax per ton of fertilizer sold would be the tons of fertilizer sold in the state, while the revenue base for a motor vehicle license fee would be the number of vehicles licensed in the state. The size and characteristics of the revenue base, along with the rate of the fee or tax, determine the revenue potential of fee and tax programs.

Revenue Bonds: Bonds whose principal and interest are payable exclusively from earnings of a public enterprise.

Revenue Potential: A measure of the amount of money that can be raised by a particular financing mechanism. For fee and tax programs, revenue potential is a function of the rate of the fee or tax and the size of the revenue base. State and local governments need to consider the revenue potential of an AFM in their jurisdiction in order to determine if it meets their financing needs.

Revenue Stability: Revenue stability refers to the pattern of revenues from a particular revenue source. Some sources provide revenues in stable amounts annually. Other revenue sources are unstable, providing only one-time or erratic revenues from year to year. State and local governments should match ongoing program costs to stable revenue sources, while non-recurring costs can be matched to less stable revenue sources.

Revolving Fund: A revolving loan fund program may consist of several accounts or revolving funds that make loans or other types of assistance available for various projects. Typically, the fund is initially capitalized by appropriations, grants, or other monies. After the initial loans are made, future loans are supported by repayments, making the fund "revolving."

Risk:

Basis Risk: The uncertainty about the basis at the time a hedge may be lifted. Hedging substitutes basis risk for price risk.

Business Risk: The risk that the cash flow of an issuer will be impaired because of adverse economic conditions, making it difficult for the issuer to meet its operating expenses.

Counterparty Risk: The risk that the other party to an agreement will default. In an options contract, the risk to the option buyer that the option writer will not buy or sell the underlying as agreed.

Default Risk: Also referred to as ***credit risk*** (as gauged by commercial rating companies), the risk that an issuer of a bond may be unable to make timely principal and interest payments.

Event Risk: The risk that the ability of an issuer to make interest and principal payments will change because of (1) a natural or industrial accident or some regulatory change or (2) a takeover or corporate restructuring.

Exchange Rate Risk: Also called ***currency risk***, the risk of an investments value changing because of currency exchange rates.

Financial Risk: The risk that the cash flow of an issuer will not be adequate to meet its financial obligations.

Inflation Risk: Also called purchasing-power risk, the risk that changes in the real return the investor will realize after adjusting for inflation will be negative.

Interest Rate Risk: For a bond, the risk that a rise in interest rates will decrease the bond's price. For a depository institution, also called funding risk, the risk that spread income will suffer because of a change in interest rates.

Liquidity Risk: The risk that arises from the difficulty of selling an asset. It can be thought of as the difference between the " true value" of the asset and the likely price, less commissions.

Price Risk: The risk that the value of a security (or a portfolio) will decline - in the future.

Regulatory Pricing Risk: Risk that arises when regulators restrict the premium rates that insurance companies can charge.

Reinvestment Risk: The risk that proceeds received in the future will have to be reinvested at a lower potential interest rate.

Risk Assessment: The qualitative and quantitative evaluation performed in an effort to define the risk posed to human health and/or the environment by the presence or potential presence and/or use of specific pollutants.

Risk Indexes: Categories of risk used to calculate fundamental beta, including (1) market variability, (2) earnings variability, (3) low valuation and unsuccess, (4) immaturity and smallness, (5) growth orientation, and (6) financial risk.

Systematic Risk: Also called ***undiversifiable risk*** or ***market risk***, the minimum level risk that can be obtained for a portfolio by means of diversification across a large number of randomly chosen assets. ***Related: Unsystematic Risk***

Unsystematic Risk: Also called the ***diversifiable risk,*** residual risk, or company-specific risk, the risk that is unique to a company such as a strike, the outcome of unfavorable litigation, or a natural catastrophe.

Sale/Leaseback: A lease in which a company sells an asset to another entity in exchange for cash, then leases back the same asset.

SARA: Superfund Amendments and Reauthorization Act.

SBA: Small Business Administration.

SBIC: Small Business Investment Company.

SEC: Securities and Exchange Commission.

Serial Bonds: Bonds whose principle is repaid in periodic installments over the life of the issue.

Corporate bonds arranged so that specified principle amounts become due on specified dates. **Related:** Term Bonds.

7(a): The name for the biggest category of SBA-backed loans.

Service Shedding: Divestiture through service shedding occurs when the government reduces the level of service provided or stops providing a service altogether. Private-sector businesses or non-profit organizations may then step in to provide the service if there is a market demand.

Severance Taxes: Severance taxes are charged for the extraction of natural resources from the land or waters of a state. Examples of severance taxes include water and groundwater withdrawal taxes, oyster and shellfish taxes, timber taxes, and fuel and mineral taxes.

Shareholder: An owner of shares in a corporation.

Short-Term Debt: Debt that falls due in a period of under a year.

Small Business Administration: The federal agency that aims to assist small businesses with advice, financing, and other business development aid. The SBA itself does not make loans, but guarantees repayment of loans made by a bank or finance company.

Small Business Investment Company: Companies, affiliated with the SBA, that channel private investors' money, combined with some government money, to small, fast-growing companies.

Sole Proprietorship: A sole proprietorship is a form of business organization. The distinguishing characteristics of this form are only one owner for the business and the business is unincorporated.

Special Annuity Bonds: Serial bonds in which annual installments of bond principal are arranged so that the combined payments for principal and interest are approximately the same each year.

Special Assessment: A charge imposed against certain properties to defray part or all of the cost of a specific improvement or service deemed to primarily benefit those properties.

Special Assessment Bonds: Bonds payable from the proceeds of assessments imposed against properties which have been specially benefitted by the construction of public improvements.

Special Assessment Fund: A fund used to account for the financing of public improvements or services deemed to benefit primarily the properties against which special assessments are levied.

Special Districts: An independent unit of local government organized to perform a single governmental function or a limited number of related functions. A single purpose or local taxing district can be organized for a special purpose such as a road, sewer, irrigation or fire district. Special districts usually have the power to incur debt and levy taxes.

Special District Bonds: Bonds issued by a special district.

Special Tax Bond: A bond that is secured by a special tax, such as a liquor tax.

Step-up Bond: A bond that pays a lower coupon rate for an initial period which then increases to a higher coupon rate. **Related:** Deferred-Interest Bond, Payment-In-Kind Bond.

Straight line method: A way to figure depreciation for property that ratably deducts the same amount for each year in the recovery period. The rate (in percentage terms) is determined by dividing 1 by the number of years in the recovery period.

Strategic Partner: An agreement with another company to undertake business endeavors together on each other's behalf.

Subordinate: To assign one's collateral position whether in full or in part to another to exchange one's security interest over another.

Subordinated Debenture Bond: An unsecured bond that ranks after secured debt, after debenture bonds, and often after some general creditors in it claim on assets and earnings. **Related:** Debenture Bond, Mortgage Bond, Collateral Trust Bonds.

Superfund: The program operated under the legislative authority of CERCLA and SARA that funds and carries out the EPA solid waste emergency and long-term removal activities. These activities include establishing the National Priorities List (N.L.), investigating sites for inclusion in the list, determining the priority level on the list, and conducting and/or supervising the ultimately determined cleanup and other remedial actions.

Superior Lien: A lien issued by a Federal Court; generally the Federal Court issues superior lien rights to lenders during the course of post bankruptcy petition financing. If approved, the Federal Court will place the lender in front of all other creditors with the intent to benefit all the creditors.

Sustainable Development: The concept of using resources in an ecologically sound manner so that they will be sustainable over the long term. Put another way, by the Executive Secretary of the U.N. Economic and Social Commission for Asia and the Pacific, it is "an approach to progress that meets the needs of the present without compromising the ability of future generations to meet their needs".

Tax: A tax is generally a charge against sales, income or property. Unlike fees, most jurisdictions do not require that there be a direct relationship between a tax and the use of funds.

Tax Anticipation Notes (TANs): Short-term debt that will be retired with taxes to be collected at a later date.

Tax Base: See revenue base.

Tax Credit: A special provision of the law that results in a dollar-for-dollar reduction in tax liabilities that would otherwise be due.

Tax-Exempt Lease: A lease in which the lessee has the option of applying lease payments to the purchase of a facility for a reduced price. The lessee is owner for tax purposes. Also known as a conditional sale lease.

Tax Lease: A generic term for a lease in which the lessor takes the risk of ownership (as determined by the IRS) and, as the owner, is entitled to the benefits of ownership, including tax benefits.

Tax Increment Financing: The dedication of incremental increases in real estate taxes to repay an original investment in improved public facilities that created increased real estate values.

Tax Limit: The maximum rate of taxation which a local government may levy.

Tax Rider: A tax rider allows a locality to "piggy-back" on an existing state tax by charging an additional levy. State laws vary, but most states require the authorization of the state legislature before a locality is permitted to enact a rider on a state tax.

Tax Surcharge: An increased percentage or dollar amount charged by a taxing authority on an existing tax. Temporary surcharges can be a good method for financing non-recurring needs.

Term Bonds: Often referred to as bullet-maturity bonds or simply bullet bonds, bonds whose principal is payable at maturity. **Related:** Serial Bonds.

Term interest: A life interest in property, an interest in property for a term of years, or an income interest in a trust. It generally refers to a present or future interest in income from property or the right to use property which terminates or fails upon the lapse of time, the occurrence of an event or the failure of an event to occur.

Term Loan: A loan made to an individual or a company for over 12 months or more.

The Three C's of Banking: Credit, Capacity and Character. These are the three primary areas on which a bank focuses before lending to its borrower.

Total Cost Accounting: A hybrid term sometimes used as a synonym for either of the definitions given to "full cost accounting," or "Total Cost Assessment".

Transferable Development Rights (TDR) Programs: These programs let owners of rural or undeveloped land sell an set number of development rights to developers at a mutually-agreeable price. The developers can then use the rights purchased to exceed height and density limitations in other, already-developed areas. Ideally, a TDR program is intended to preserve rural and undeveloped land while allowing landowners to reap the full value for their property.

Transient, Non-Community Water System: A system which provides water in a place such as a gas station or campground where people do not remain for long time periods. These systems do not have to test or treat their water for contaminants which pose long-term health risks because fewer than 25 people drink the water over a long period. They still must test for microbes and several chemicals.

Trust Fund: Funds created by State and local governments to receive revenues generated by a tax or other mechanism, and disburse funds for the purposes for which the revenues are collected.

TSCA: Toxic Substances Control Act.

Turnkey Arrangement: A public-private partnership in which a public agency contracts with a private vendor to build a complete facility with specified performance standards agreed to between the agency and the vendor. Since ownership remains with the private partner until construction is complete, generally the private partner will not be bound by public procurement regulations, which often enables the facility to be completed in significantly less time and for less cost than could be accomplished under traditional construction techniques.

Unadjusted depreciable basis: The basis of an item of property for purposes of figuring gain on a sale without taking into account any depreciation taken in earlier years but with adjustments for amortization, the section 179 deduction, any deduction claimed for clean-fuel vehicles or clean-fuel vehicle refueling property, and any electric vehicle credit.

USACE: United States Army Corps of Engineers.

Useful life: An estimate of how long an item of property can be expected to be usable in trade or business or to produce income. Under MACRS, you recover the cost of property over a set period. The recovery period is based on your property's property class. Your property's class is usually determined by its class life. The class life for most property is set and listed in IRS Appendix B.

User Fees: User fees require those who use a government service to pay some or all of the cost of the service, rather than having the government pay for it through revenues generated by taxes. The fees charged for entry into public parks are an example of a user fee.

Value: A term which defines the worth of a thing. Value is usually preceded by a word(s), such as Fair or Fair Market, and defined in the document where found. Not all value for an item is the same.

Venture Capital: Money invested in new enterprises.

Venture Capitalist: An individual or firm who invests money in new enterprises.

V.C.: Volatile organic compound.

Volunteer Activities: Volunteer activities are performed via a formal agency volunteer program or a private non-profit organization. An activity in which volunteers provide all or part of a service and are organized and directed by a government entity can also be considered a form of outsourcing.

Warrant: A security entitling the holder to buy a proportionate amount of stock at some specified future date at a specified price, usually one higher than current market. This "warrant" is then traded as a

security, the price of which reflects the value of the underlying stock. Warrants are usually issued as a "sweetener" bundled with another class of security to enhance the marketability of the latter. Warrants are like call options, but with much longer time spans – sometimes years.

Water Pollution: The introduction of substances that make water impure compared with undisturbed water. Usually this comes from soil erosion, introduction of poisonous chemicals from industries and spills and introduction of domestic sewage or industrial and agricultural wastes.

Watershed: The land area from which water drains into a stream, river, or reservoir.

Wetlands Mitigation Banking: Wetlands mitigation banking programs allow developers to purchase credits in a publicly-owned and managed wetlands site that has been enhanced, restored, or created by a public agency. The developers may use these credits to fulfil wetlands mitigation requirement for impacts in other locations, generally within the same watershed or habitat area.

Working Capital: The cash available to a company for the on-going operations of the business.

Workload Analysis: A workload analysis details the cost of carrying out particular programs or activities. An analysis generally includes estimates of the time required to perform such activities as permit processing and review, compliance inspections, and enforcement activities. Workload analyses help state and local governments estimate costs for program implementation.

Zero-Coupon Bonds: Zero-coupon bonds are bonds priced at a large discount from face value. The bonds mature at full face value so the difference between the original issue price and the face value represents interest income. The issuer of the zero coupon bond saves on cash flow since the interest isn't paid out until the end of the bond holding period.

F. REQUEST FOR COMMENTS AND SUGGESTIONS

This *Guidebook of Financing Tools* is intended as a basic reference document for public and private officials with environmental responsibilities. It provides a compendium of information on more than 340 financing tools that federal, State, and local governments and the private sector can and do use to pay for environmental programs, systems, and activities. The *Guidebook* is divided into ten major sections ranging from traditional financing concepts such as raising capital and enhancing credit to important USEPA priorities such as pollution prevention and community-based environmental protection. Within this arrangement, each financing tool has a one-page write-up that includes a description of the tool, current and potential uses, advantages and limitations, and information sources. The *Guidebook* does not recommend the use of any particular tool -- leaving that decision to the responsible officials familiar with their particular circumstances.

We welcome and encourage comments and suggestions regarding the *Guidebook* and the financing tools themselves. We are particularly interested in receiving suggestions for new tools and completed one-page write-ups of new tools in the *Guidebook* format. To encourage and facilitate that end, we have provided blank one-page write-up forms for suggested new tools at the back of each major section and sub-section. We have also included ten blank one-page write-up forms in this Appendix immediately following this page. All completed write-ups submitted for consideration will be reviewed, edited for format consistency and accuracy, and included in the next update of the *Guidebook*, as appropriate. Editorial corrections of current write-ups will be handled in the same way.

Thank You.

NAME OF TOOL:

Description:

Actual Use:

Potential Use:

Advantages:

Limitations:

Reference for Further Information:

NAME OF TOOL:

Description:

Actual Use:

Potential Use:

Advantages:

Limitations:

Reference for Further Information:

NAME OF TOOL:

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Voluntary Reporting of Greenhouse Gases 2003

February 2005

Energy Information Administration
Office of Integrated Analysis and Forecasting
U.S. Department of Energy
Washington, DC 20585

This publication is on the WEB at:
www.eia.doe.gov/oiaf/1605/vrrpt/index.html.

This report was prepared by the Energy Information Administration, the independent statistical and analytical agency within the Department of Energy. The information contained herein should be attributed to the Energy Information Administration and should not be construed as advocating or reflecting any policy position of the Department of Energy or of any other organization.

For More Information

Individuals or members of organizations wishing to report reductions in emissions of greenhouse gases under the auspices of the Voluntary Reporting of Greenhouse Gases Program can contact the Energy Information Administration (EIA) at:

Voluntary Reporting of Greenhouse Gases
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EI-81, Room 2F-081
1000 Independence Avenue, SW
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Telephone: 1-800-803-5182 or 202-586-0688
FAX: 202-586-3045
e-mail: infoghg@eia.doe.gov

For reporting purposes, EIA has both a long form (EIA-1605) and a short form (EIA-1605EZ) available, as well as an electronic version of the form. They are available upon request or on EIA's web site at *www.eia.doe.gov/oiaf/1605/forms.html*.

The reports submitted to EIA are compiled into a database that can be obtained on CD-ROM by contacting the Voluntary Reporting of Greenhouse Gases Program Communications Center at 1-800-803-5182 or can be downloaded from EIA's web site at *www.eia.doe.gov/oiaf/1605/database.html*.

General or specific technical information concerning the contents of this report may also be obtained by contacting the Voluntary Reporting of Greenhouse Gases Program.

Preface

Title XVI, Section 1605(b) of the Energy Policy Act of 1992 (EPACT) directed the Energy Information Administration (EIA) to establish a mechanism for "the voluntary collection and reporting of information on . . . annual reductions of greenhouse gas emissions and carbon fixation achieved through any measures, including fuel switching, forest management practices, tree planting, use of renewable energy, manufacture or use of vehicles with reduced greenhouse gas emissions, appliance efficiency, methane recovery, cogeneration, chlorofluorocarbon capture and replacement, and power plant heat rate improvement . . . ."

The legislation further instructed EIA to create forms for the reporting of greenhouse gas emissions and reductions, and to establish a database of the information voluntarily reported under this subsection of EPACT. The reporting Forms EIA-1605 and EIA-1605EZ, "Voluntary Reporting of Greenhouse Gases," were first made available to the public in July 1995, providing a vehicle for voluntary reporting on activities that occurred before and during 1994. This publication summarizes data reported for 2003, the tenth year of data collection for the Voluntary Reporting of Greenhouse Gases Program.

The data reported to the Program are available through several media. All nonconfidential reports received by the Program are compiled into a Public Use Database, available on CD-ROM or by download from the Internet. The software is interactive and modular by design, allowing the user to select, view, or print the reports filed by the voluntary reporters, for each year of their participation. The user can also connect to and query the database with Microsoft Access 97 (or later versions) or other software that supports 32-bit open database connectivity (ODBC).

The Public Use Database and the current reporting software are also available at the Program's FTP (File Transfer Protocol) site on the Internet at *http://www.eia.doe.gov/oiaf/1605/database.html*. Interested parties are encouraged to visit the Program's home page at *http://www.eia.doe.gov/oiaf/1605/frntvrgg.html* for more information and background on the Program. Software, additional copies of this report, paper reporting forms, and technical support information can be downloaded from that web site or obtained from the Voluntary Reporting of Greenhouse Gases Communications Center by e-mail at *infoghg@eia.doe.gov*, toll-free at 1-800-803-5182, or locally at 202-586-0688.

This report was prepared under the guidance of John Conti, Director of EIA's Office of Integrated Analysis and Forecasting. Significant contributions to the Program, the current software, and the preparation of this report have been made by Paul McArdle, Stephen Calopedis, Matthew Aberant, Keith Forbes, Kristin Franks, Laura Gehlin, Sarah Goldstein, William LaPerch, Michael Mondshine, Dick Richards, Charles L. Smith, and Peggy Wells.

EIA would like to express special thanks to the voluntary reporters, without whom this program would not be possible.

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Executive Summary

Introduction

The Voluntary Reporting of Greenhouse Gases Program, required by Section 1605(b) of the Energy Policy Act of 1992, records the results of voluntary measures to reduce, avoid, or sequester greenhouse gas emissions. For the 2003 reporting year, 234 U.S. companies and other organizations reported to the Energy Information Administration (EIA) that they had undertaken 2,188 projects to reduce or sequester greenhouse gases in 2003. The reported greenhouse gas emission reductions for the projects reported included 268 million metric tons carbon dioxide equivalent of direct reductions, 81 million metric tons of indirect reductions, 7 million metric tons of reductions from carbon sequestration, and 16 million metric tons of unspecified reductions (Table ES1). Total U.S. greenhouse gas emissions in 2003 are estimated at 6,936 million metric tons carbon dioxide equivalent.[1]

For definitional purposes, direct reductions are emission reductions from sources owned or leased by the reporting entity; indirect reductions are emission reductions from sources not owned or leased by the reporting entity but that occur as a result of the entity's activities; carbon sequestration reductions represent the removal of atmospheric carbon to a carbon sink; and unspecified reductions represent emission reductions reported on Form

Table ES1. Reporting Indicators for the Voluntary Reporting of Greenhouse Gases Program, Data Years 1994-2003

Indicator	1994	1995	1996	1997	1998	1999	2000	2001	2002(R)	2003
Number of Entities Reporting	108	142	150	162	207	207	236	232	234	234
Number of Projects Reported	634	960	1,040	1,288	1,549	1,722	2,089	1,897	2,055	2,188
Number of Entity-Level Reports Received	40	51	56	60	76	83	108	114	119	126
Project-Level Reductions Reported (Million Metric Tons Carbon Dioxide Equivalent)										
Direct[a]	63	88	90	95	148	155	211	247	265	268
Modified Reference Case[b]	59	76	75	88	127	126	176	209	257	261
Basic Reference Case[c]	4	13	15	7	21	29	35	38	8	7
Indirect[d]	5	52	53	38	43	57	62	72	80	81
Modified Reference Case[b]	5	52	51	36	38	51	57	61	78	75
Basic Reference Case[c]	0	1	3	2	5	6	5	11	2	6
Sequestration[e]	1	1	9	10	12	10	9	8	7	8
Unspecified[f]	4	6	6	9	19	13	12	15	17	16

[a]"Direct" emission reductions are reductions in releases of greenhouse gases "on site." For the purpose of completing Form EIA-1605, "on site" is defined as any source owned (wholly or in part) or leased by the reporting entity.

[b]In a "modified reference case," actual emissions (or sequestration) are compared to an estimate of what emissions (or sequestration) would have been in the absence of the project.

[c]In a "basic reference case," actual emissions (or sequestration) are compared with an estimate of historical emissions (or sequestration) in a particular base year or an average of up to 4 years.

[d]"Indirect" emission reductions are reductions in emissions from sources not owned or leased by the reporting entity but that occur, wholly or in part, as a result of the entity's activities (for example, an automobile manufacturer's investment in increased automotive fuel economy can result in decreased emissions from vehicles owned by individuals or managed fleets).

[e]"Sequestration" is the fixation of atmospheric carbon dioxide in a carbon sink through biological or physical processes, such as photosynthesis.

[f]"Unspecified" emission reductions represent quantities reported on the short form (Form EIA-1605EZ) for which the reporting entity did not specify whether the emission reduction or carbon sequestration was direct or indirect.

(R) = revised.

Notes: 2002 data have been revised to include reports that were submitted after the filing deadline. It is expected that the 2003 data will also be revised upward in next year's report with the inclusion of late 2003 reports. Totals for direct and indirect reductions may not equal sum of components due to independent rounding.

Source: Energy Information Administration, Forms EIA-1605 and EIA-1605EZ.

[1]Energy Information Administration, *Emissions of Greenhouse Gases in the United States 2003*, DOE/EIA-0573(2003) (Washington, DC, December 2004), web site www.eia.doe.gov/oiaf/1605/ggrpt.

EIA-1605EZ, on which the reporting entity cannot specify whether the emission reduction was a direct or indirect reduction.

To calculate reported emission reductions, reporters are allowed to use a "basic" reference case or a "modified" reference case. A reference case is an emissions or sequestration level against which actual emissions are compared in order to estimate emission reductions. In a "basic" reference case, actual historical emissions (or sequestration) in a specific year, or an average of a range of years, are used. In a "modified" reference case, an estimate is made of what emissions or sequestration would have been in the absence of the project.

Generally, as illustrated in Table ES1, most reductions are reported relative to a modified reference case. For 2003, 261 million metric tons, or 97 percent, of the total 268 million metric tons carbon dioxide equivalent of reported direct reductions was based on modified reference cases. Similarly, for reported indirect reductions, 75 million metric tons, or 92 percent, of the total 81 million metric tons carbon dioxide equivalent of reported indirect reductions was based on modified reference cases.

The number of entities (234) reporting to the Voluntary Reporting Program for 2003 is the same as the number that reported for 2002; however, the number of reporters for 2002 has been revised upward to include 6 additional entities that filed late reports, after the 2002 database was closed. EIA also expects a similar upward revision of the number of 2003 reporters in next year's report, to reflect late reporters in the 2003 reporting cycle. As of February 7, 2005, EIA had received 6 additional 2003 reports and 1 additional 2002 report since the 2003 database was closed for preparation of this 2003 annual report.[2]

The number of entities reporting to the program has grown by 117 percent from its inception in 1994, when 108 entities reported. The number of projects reported has grown at a more rapid rate than the number of reporters, because the number of projects reported by repeat reporters has increased. The 2,188 projects reported for 2003 represent an increase of 245 percent over the 634 projects reported in 1994 and a 7-percent increase from the final tally of 2,055 projects reported for 2002.

Of the 234 organizations reporting for 2003, 126 provided entity-level reports, which include estimates of emissions and/or emission reductions for their entire organizations—7 more than the number (119) that submitted entity-level reports in 2002. In addition, 89 of the reporters for 2003 recorded commitments to take action to reduce emissions, mostly during the 2000 to 2005 time frame.

Of the 126 organizations reporting at the entity level, 120 calculated their 2003 entity-level greenhouse gas emissions. These entities reported direct greenhouse gas emissions of 889 million metric tons carbon dioxide equivalent, equal to about 14 percent of total U.S. greenhouse gas emissions in 2003.[3] Also reported by these organizations was 105 million metric tons carbon dioxide equivalent of indirect emissions, equal to 2 percent of total U.S. greenhouse gas emissions in 2003. Of the 126 entity-level reporters, 117 also reported emission reductions, including 214 million metric tons carbon dioxide equivalent of direct emission reductions, 42 million metric tons carbon dioxide equivalent of indirect emission reductions, and 7 million metric tons carbon dioxide equivalent of emission reductions resulting from carbon sequestration projects.

Reports for 2003 were received from participants in 27 different industries or services, as compared with the 29 different industries or services for 2002. The number of different industries represented continues to be higher than it was in the first year of the program (1994 data year), when the 108 reports received included participants in 9 different industries or services (Table ES2). In the early years of the program, reporting was dominated by the electric power sector. In the first reporting year, the 95 submissions from electric power producers represented 88 percent of the 108 reports received (Figure ES1). Since then, the program has seen an influx of new participants from outside the electric power sector, representing a diverse set of other industries. In addition, several mergers and acquisitions involving reporters to the Program have accompanied the ongoing restructuring of the electric power industry. Many of these merged entities have submitted single, consolidated reports, thus reducing the number of reports received from electricity producers. As a result, only 42 percent of the organizations reporting to the Program for 2003 (98 firms) were from the electric power sector.

Although the number of reporters from other individual industries remains relatively small, in many cases, reports were received from key companies in those other industries: for example, DaimlerChrysler Corporation, General Motors, the Ford Motor Company, and

[2]The deadline for submitting reports to EIA for inclusion in each annual edition of the Public Use Database is June 1. EIA typically grants reporters extensions to the deadline, usually until early July, before closing the database to new reports to allow analysis of the information for the annual report. EIA includes reports received after the database has been closed in the next annual edition of the Public Use Database and revises the data for that reporting year in the corresponding annual report, to reflect the addition of late reports.

[3]Based on total emissions from Energy Information Administration, *Emissions of Greenhouse Gases in the United States 2003*, DOE/EIA-0573(2003) (Washington, DC, December 2004), web site www.eia.doe.gov/oiaf/1605/ggrpt.

Table ES2. Forms Filed by Standard Industrial Classification, Data Years 1994-2003 (Number of Reports)

SIC Code	Description	Data Year									
		1994	1995	1996	1997	1998	1999(R)	2000(R)	2001(R)	2002(R)	2003
01	Agricultural Production: Crops	—	—	—	—	1	—	—	1	—	—
08	Forestry	1	2	1	1	3	3	1	—	1	2
12	Coal Mining	1	2	2	1	4	3	4	6	7	4
13	Oil and Gas Extraction	—	—	—	—	—	1	1	1	1	1
14	Nonmetallic Minerals, Except Fuels	—	—	—	—	1	1	—	—	—	—
20	Food and Kindred Products	—	—	—	—	1	2	6	4	4	4
22	Textile Mill Products	—	—	—	—	—	1	5	11	12	14
23	Apparel and Other Textile Products	—	—	—	—	—	—	1	1	2	2
24	Lumber and Wood Products	—	—	—	—	—	—	1	—	—	—
25	Furniture and Fixtures	—	—	—	—	—	—	1	1	1	—
26	Paper and Allied Products	—	—	—	—	—	1	1	—	—	—
27	Printing and Publishing	—	1	—	1	—	1	1	—	—	—
28	Chemical and Allied Products	1	3	2	3	8	5	11	9	11	11
29	Petroleum Refining and Other Related Industries	—	—	2	3	8	8	7	6	6	5
30	Rubber and Miscellaneous Plastic Products	—	—	—	—	—	—	2	2	2	2
32	Stone, Clay, Glass, and Concrete Products	—	—	1	4	12	13	7	5	5	5
33	Primary Metals Industries	2	2	4	4	5	5	5	11	11	11
34	Fabricated Metal Products, Except Machinery and Transportation Equipment	—	2	1	1	3	1	1	1	1	1
35	Industrial and Commercial Equipment and Components	—	—	—	—	—	—	1	1	1	2
36	Electronic and Other Electrical Equipment	1	1	2	4	4	4	9	9	8	6
37	Transportation Equipment	1	1	1	2	3	5	6	7	9	10
38	Instruments and Related Products	—	—	—	—	2	—	1	1	1	1
39	Miscellaneous Manufacturing Industries	—	1	1	—	2	2	1	1	1	1
40	Railroad Transportation	—	—	—	—	—	—	—	—	—	1
48	Communications	—	—	—	—	—	1	—	—	1	1
49	Electric, Gas, and Sanitary Services	95	121	125	129	138	135	151	145	138	141
57	Furniture and Home Furnishings Stores	—	—	—	—	2	1	1	—	1	1
63	Insurance Carriers	—	—	—	—	—	—	—	—	—	1
65	Real Estate	—	1	1	1	1	1	1	1	1	—
67	Holding and Other Investment Offices	—	—	1	1	1	1	1	1	2	2
72	Personal Services	—	—	—	—	—	—	1	1	1	1
80	Health Services	—	—	—	—	1	—	—	—	—	—
82	Educational Services	1	2	2	2	—	2	—	—	—	—
86	Membership Organizations	—	—	—	1	1	1	1	—	1	—
87	Engineering and Management Services	—	—	2	2	2	1	—	1	—	—
88	Private Households	2	1	1	1	1	1	1	1	1	1
89	Services Not Elsewhere Classified	—	—	—	1	1	3	2	1	1	1
91	Executive, Legislative, and General	—	—	—	—	1	2	2	2	1	1
97	National Security and International Affairs	—	—	—	—	—	—	1	—	—	—
99	Nonclassifiable Establishments	—	—	—	—	—	—	—	—	1	—
Total Number of Reporters[a]		**108**	**142**	**150**	**162**	**207**	**207**	**236**	**232**	**234[b]**	**234**
Number of 2-Digit SIC Codes Represented		**9**	**13**	**16**	**18**	**24**	**27**	**31**	**27**	**29[b]**	**27**

[a]Totals may be greater than the sum of reporters in each SIC code, because confidential reporters are excluded from the latter.

[b]Includes 6 late reports for the 2002 data year. The 2003 total will also be revised upward in next year's report with the inclusion of late 2003 reports. As of February 22, 2005, EIA had received 6 late 2003 reports, which are not included in this report's 2003 database.

(R) = Revised.

Source: Energy Information Administration, Forms EIA-1605 and EIA-1605EZ.

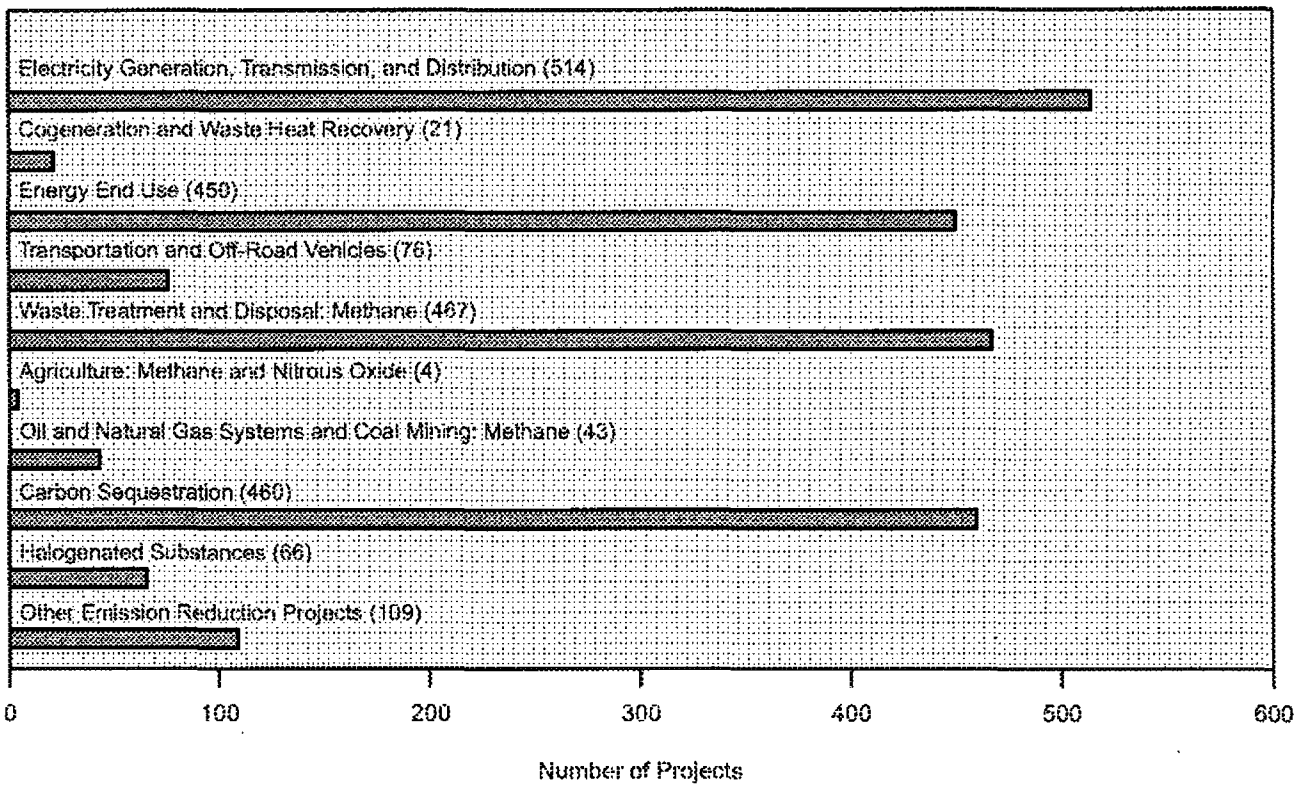
Toyota North America in the automotive products industry; Noranda and an operating division of Alcan's Primary Products in the metals industry; Sunoco, Inc., ChevronTexaco Corporation, and BP America in the petroleum industry; Johnson & Johnson and The Dow Chemical Company in the chemicals industry; Rolls Royce in the aerospace industry; Bristol-Myers Squibb Company and Pfizer Pharmaceuticals, LLC, in the pharmaceuticals industry; and Advanced Micro Devices, Inc., and IBM in the electronic equipment industry.[4]

Projects Reported

Electric power sector reporters (including independent power producers) accounted for 1,485 (68 percent) of the projects reported for 2003. Also reporting were alternative energy providers (446 projects), industrial concerns (245 projects), and agriculture and forestry organizations (3 projects). Organizations in other sectors (government, commercial, and residential) submitted reports on 9 projects.

Most of the projects reported for 2003 affected energy supply or use. The electric power sector reported 514 projects that were related to the generation, transmission, or distribution of electricity (Figure ES1). Another 450 were related to energy end use, 76 were transportation projects, and 21 were cogeneration projects. Other projects reduced emissions of methane from waste treatment and disposal facilities (467 projects), from oil and natural gas systems and coal mines (43 projects, many of which included the displacement of fossil fuels through the use of methane as a fuel), and from agricultural activities (4 projects). Other projects (109) included the reuse of fly ash in concrete and materials recycling, which reduce emissions in part by reducing energy consumption. The largest reductions were reported for projects that improved the performance of nuclear power plants. The non-energy-related projects reported fell into two major categories: sequestration of carbon, usually in forests (460 projects); and recycling, reuse, or destruction of halogenated substances, such as hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6) (44 projects).

Figure ES1. Number of Projects Reported to the Voluntary Reporting of Greenhouse Gases Program by Project Type, Data Year 2003



Source: Energy Information Administration, Forms EIA-1605 and EIA-1605EZ.

[4]A complete listing of all 2003 reporters will be provided in Appendix B, Table B1 of the full report, *Voluntary Reporting of Greenhouse Gases 2003*, DOE/EIA-0608(2003) (Washington, DC, February 2005), which will be available from web site www.eia.doe.gov/oiaf/1605/vrrpt. Table B8 in Appendix B of the report lists reporters by sector and Standard Industrial Classification (SIC) code.

Reductions Reported

Electric Power

For 2003, 485 electric power and cogeneration projects were reported on Form EIA-1605.[5] Total emission reductions from electric power and cogeneration projects reported on Form EIA-1605 (the long form) included 158 million metric tons carbon dioxide equivalent from direct sources and 18 million metric tons from indirect sources. A total of 257 projects that reduced the carbon content of fuels used to generate electricity were reported, with emission reductions totaling 147 million metric tons carbon dioxide equivalent from direct sources and 13 million metric tons from indirect sources. Reported emission reductions for projects increasing energy efficiency in generation, transmission, and distribution included 16 million metric tons carbon dioxide equivalent from direct sources and 4 million metric tons from indirect sources. Another 50 electric power and cogeneration projects were reported on Form EIA-1605EZ for 2003, with reported emission reductions from unspecified sources that totaled 11 million metric tons carbon dioxide equivalent.[6]

Energy End Use and Transportation

For 2003, 375 energy end use and transportation projects were reported on Form EIA-1605, with total reported emission reductions of 25 million metric tons carbon dioxide equivalent from direct sources and 10 million metric tons from indirect sources. Nearly all (93 percent) of the energy end-use reductions were reported for stationary-source applications, such as building shell improvements, lighting and lighting control, appliance improvement or replacement, and heating, ventilation and air conditioning (HVAC) improvements. Much smaller reductions were reported for the 66 transportation projects reported on the long form, including 2.5 million metric tons carbon dioxide equivalent from direct sources and 0.1 million metric tons from indirect sources. Another 86 energy end-use and transportation projects were reported for 2003 on Form EIA-1605EZ, with total emission reductions of 0.4 million metric tons carbon dioxide equivalent.

Carbon Sequestration

There were 446 carbon sequestration[7] projects submitted on Form EIA-1605 for 2003, with total reported sequestration of 8 million metric tons carbon dioxide equivalent. Most of the reported reductions resulted from afforestation, reforestation, urban forestry, forest management, and forest preservation efforts. Another 14 carbon sequestration projects were reported on Form EIA-1605EZ, for which about 29,000 metric tons carbon dioxide equivalent of sequestered carbon was reported.

Methane and Nitrous Oxide Emissions

Emission reductions for the 470 methane and nitrous oxide abatement projects reported for 2003 on Form EIA-1605 included 69 million tons carbon dioxide equivalent from direct sources and 40 million metric tons from indirect sources. The three most frequently reported sources of methane reductions were municipal waste landfills (412 projects), natural gas systems (28 projects), and coal mines (13 projects). In addition to reducing methane emissions, projects that involved the recovery and use of methane for energy also reduced carbon dioxide emissions by displacing fossil fuels, such as oil and coal, that have higher carbon contents and thus produce more carbon dioxide when burned. Another 44 methane or nitrous oxide reduction projects were reported on Form EIA-1605EZ for 2003, with reported reductions of methane or nitrous oxide emissions that totaled 4 million metric tons carbon dioxide equivalent.

Hydrofluorocarbons, Perfluorocarbons, and Sulfur Hexafluoride

A total of 66 projects were submitted on Form EIA-1605 for 2003 that reported reductions in emissions of HFCs, PFCs, and SF_6. Reductions reported for these projects included 6.1 million metric tons carbon dioxide equivalent from direct sources and 2.4 million metric tons from indirect sources. The largest reported reductions were direct reductions of perfluoromethane (a type of PFC) (3.0 million metric tons carbon dioxide equivalent), SF_6 (2.6 million metric tons carbon dioxide equivalent), and perfluoroethane (a type of PFC) (0.6 million metric tons carbon dioxide equivalent). Reductions of PFCs and SF_6 totaling 29 thousand metric tons carbon dioxide equivalent were reported for one project on Form EIA-1605EZ.

[5]The Voluntary Reporting of Greenhouse Gases Program allows reporting on two forms: EIA-1605 and EIA-1605EZ. EIA-1605, the long form, allows reporters to create an in-depth, multi-year, public record of emission reduction efforts for an entire organization and/or for individual projects, including information on activities conducted outside the United States and commitments to reduce greenhouse gas emissions in the future. EIA-1605EZ, the short form, allows reporters only to provide brief summaries of greenhouse gas projects for the current reporting year; it does not allow reporting of activities outside the United States or of future emission reduction commitments.

[6]The emission reductions reported on Form EIA-1605EZ are unspecified, because the form does not ask the reporter to distinguish between direct and indirect reductions.

[7]Carbon sequestration is the fixation of atmospheric carbon dioxide in a carbon sink through biological or physical processes.

1. Voluntary Reporting 2003: An Overview

Introduction

The Energy Policy Act of 1992 (EPACT) directed the U.S. Department of Energy (DOE), with the Energy Information Administration (EIA) as the implementing agency, to develop a program to document voluntary actions that reduce emissions of greenhouse gases or remove greenhouse gases from the atmosphere (see box on page 2).[1] DOE's Office of Policy and International Affairs developed the Guidelines to the Voluntary Reporting of Greenhouse Gases Program[2] in consultation with the U.S. Environmental Protection Agency (EPA) and other Federal agencies, as well as through a public comment process. In addition to providing recognition for entities that reduce greenhouse gas emissions or sequester carbon voluntarily, the program serves to identify innovative and effective ways of reducing emissions.

This report presents information on the tenth reporting cycle of the Voluntary Reporting Program, including reported information on emissions, emission reductions, and carbon sequestration activities through 2003. The report is divided into eight chapters. This chapter provides an overview of participation in the Voluntary Reporting Program, a perspective on the composition of activities reported, and a review of some key issues in interpreting and evaluating achievements associated with reported emission mitigation initiatives.

Chapters 2 through 6 provide a more detailed review of project-level emission reduction initiatives reported to the Program. Chapter 2 examines projects in the electricity sector that reduce carbon dioxide emissions through thermal efficiency improvements or switching to lower emitting fossil fuels. Chapter 3 considers improvements in end-use efficiency and fuel switching in the residential, commercial, industrial, and transportation sectors. Activities to improve or expand carbon sinks through such activities as reforestation, afforestation, and forest preservation are the subject of Chapter 4. Emission reduction initiatives associated with methane and halogenated substances are examined in Chapters 5 and 6, respectively.

Chapter 7 reviews emissions reports from participants who provided data on aggregate entity emissions. Chapter 8 summarizes information on emission reductions and carbon sequestration projects reported in brief on the short form (Form EIA-1605EZ). Appendixes (available on web site *www.eia.doe.gov/oiaf/1605/orrpt*) provide information on the development and structure of the data collection instrument, a discussion of issues in the interpretation of the data, and tabular summaries of the participating reporters and the information they reported.

The reports submitted to EIA are compiled into a database that can be obtained on CD-ROM by contacting the Voluntary Reporting of Greenhouse Gases Program Communications Center at 1-800-803-5182 or downloaded from EIA's web site at *www.eia.doe.gov/oiaf/1605/databases.html.*

Benefits of the Voluntary Reporting Program

The Voluntary Reporting Program is unique among the many voluntary programs initiated during the early 1990s in its diversity of project types, participation, and approaches. The Voluntary Reporting Program's database provides abundant examples of the types of concrete actions that organizations can undertake to reduce greenhouse gas emissions. Some of the most important societal benefits of the Voluntary Reporting Program are:[3]

- The program has served to teach staff at many of the largest corporations in the United States how to estimate greenhouse gas emissions and has educated them on a range of possible measures to limit emissions.

[1] Title XVI of the Energy Policy Act, Public Law 102-486 (October 24, 1992), in Section 1605(a) called for an annual report on national aggregate emissions of greenhouse gases. EIA has issued the report—*Emissions of Greenhouse Gases in the United States*—every year since 1993. Section 1605(b) called for the establishment of a database of annual emissions and reductions of emissions reported on a voluntary basis.

[2] See U.S. Department of Energy, *General Guidelines to the Voluntary Reporting of Greenhouse Gases Program*, and, *Sector-Specific Issues and Reporting Methodologies Supporting the General Guidelines for the Voluntary Reporting of Greenhouse Gases* (Washington, DC 1994), web site www.eia.doe.gov/oiaf/1605/guidelns.html.

[3] Testimony of Jay Hakes, former EIA Administrator, on March 30, 2000, before the Senate Committee on Energy and Natural Resources on Senate Bills S. 882 and S. 1776 and their potential impacts on EIA's Programs. The full text of the testimony is available on EIA's web site at www.eia.doe.gov/neic/speeches/hrtest3-30-00/testimony3.htm.

- The program has helped to provide concrete evidence for the evaluation of activities reported to the many government voluntary programs launched since 1993.
- Reporters have been able to learn about innovative emission reduction activities from the experiences of their peers.
- The program has created a "test" database of approaches to emission reductions that can be used to evaluate future policy instruments aimed at limiting emissions.
- The program has helped to illuminate many of the poorly appreciated emissions accounting issues that must be addressed in designing any future approaches to emission limitations.

Who Reported?

Reports for the 2003 data year were received from 234 participants in 27 different industries or services (defined by the two-digit Standard Industrial Classification code), a decrease from the 29 different industries represented among 2002 reporters. In comparison, reports for the 1994 data year—the first year of the program—were received from 108 participants in 9 different industries or services (Table 1).

In the early years of the program, reporting was dominated by the electric power sector. In the first reporting year (data year 1994), the 95 submissions from electric power producers represented 88 percent of the 108 reports received (Figure 1). Since then, the program has seen an influx of new participants from outside the

The Energy Policy Act of 1992, Sections 1605(b) and (c)

(b) Voluntary Reporting.—

(1) ISSUANCE OF GUIDELINES.—Not later than 18 months after the date of the enactment of this Act, the Secretary shall, after opportunity for public comment, issue guidelines for the voluntary collection and reporting of information on sources of greenhouse gases. Such guidelines shall establish procedures for the accurate voluntary reporting of information on—

(A) greenhouse gas emissions—

(i) for the baseline period of 1987 through 1990; and

(ii) for subsequent calendar years on an annual basis;

(B) annual reductions of greenhouse gas emissions and carbon fixation achieved through any measures, including fuel switching, forest management practices, tree planting, use of renewable energy, manufacture or use of vehicles with reduced greenhouse gas emissions, appliance efficiency, methane recovery, cogeneration, chlorofluorocarbon capture and replacement, and power plant heat rate improvement;

(C) reductions in greenhouse gas emissions achieved as a result of—

(i) voluntary reductions;

(ii) plant or facility closings; and

(iii) State or Federal requirements; and

(D) an aggregate calculation of greenhouse gas emissions by each reporting entity.

Such guidelines shall also establish procedures for taking into account the differential radiative activity and atmospheric lifetimes of each greenhouse gas.

(2) REPORTING PROCEDURES.—The Administrator of the Energy Information Administration shall develop forms for voluntary reporting under the guidelines established under paragraph (1), and shall make such forms available to entities wishing to report such information. Persons reporting under this subsection shall certify the accuracy of the information reported.

(3) CONFIDENTIALITY.—Trade secret and commercial or financial information that is privileged or confidential shall be protected as provided in section 552(b)(4) of title 5, United States Code.

(4) ESTABLISHMENT OF DATA BASE.—Not later than 18 months after the date of the enactment of this Act, the Secretary through the Administrator of the Energy Information Administration shall establish a data base comprised of information voluntarily reported under this subsection. Such information may be used by the reporting entity to demonstrate achieved reductions of greenhouse gases.

(c) Consultation.—

In carrying out this section, the Secretary shall consult, as appropriate, with the Administrator of the Environmental Protection Agency.

Table 1. Forms Filed by Standard Industrial Classification, Data Years 1994-2003
(Number of Reports)

SIC Code[a]	Description	Data Year 1994	1995	1996	1997	1998	1999	2000(R)	2001(R)	2002(R)	2003
01	Agricultural Production: Crops	0	0	0	0	1	0	0	1	0	0
08	Forestry	1	2	1	1	3	3	1	0	1	2
12	Coal Mining	1	2	2	1	4	4	4	6	7	4
13	Oil and Gas Extraction	0	0	0	0	0	1	1	1	1	1
14	Nonmetallic Minerals, Except Fuels	0	0	0	0	1	1	0	0	0	0
20	Food and Kindred Products	0	0	0	0	1	2	6	4	4	4
22	Textile Mill Products	0	0	0	0	0	1	5	11	12	14
23	Apparel and Other Textile Products	0	0	0	0	0	0	1	1	2	2
24	Lumber and Wood Products	0	0	0	0	0	0	1	1	0	0
25	Furniture and Fixtures	0	0	0	0	0	0	1	1	1	0
26	Paper and Allied Products	0	0	0	0	0	1	1	0	0	0
27	Printing and Publishing	0	1	0	1	0	1	1	0	0	0
28	Chemicals and Allied Products	1	3	2	3	8	5	11	9	11	11
29	Petroleum Refining and Other Related Industries	0	0	2	3	8	8	7	6	6	5
30	Rubber and Miscellaneous Plastic Products	0	0	0	0	0	0	2	2	2	2
32	Stone, Clay, Glass, and Concrete Products	0	0	2	4	12	13	7	5	5	5
33	Primary Metals Industries	2	2	4	4	5	5	5	11	11	11
34	Fabricated Metal Products, Except Machinery and Transportation Equipment	0	2	1	1	4	2	2	1	1	1
35	Industrial and Commercial Equipment and Components	0	0	0	0	0	0	1	1	1	2
36	Electronic and Other Electrical Equipment	1	1	2	4	4	4	9	9	8	6
37	Transportation Equipment	1	1	1	2	3	5	6	7	9	10
38	Instruments and Related Products	0	0	0	0	2	0	1	1	1	1
39	Miscellaneous Manufacturing Industries		1	1	0	2	2	1	1	1	1
40	Railroad Transportation	0	0	0	0	0	0	0	0	0	1
48	Communications	0	0	0	0	0	1	0	0	1	1
49	Electric, Gas, and Sanitary Services	98	123	125	129	138	135	151	145	138	141
57	Furniture and Home Furnishings Stores	0	0	0	0	2	1	1	0	1	1
63	Insurance Carriers	0	0	0	0	0	0	0	0	0	1
65	Real Estate	0	1	1	1	1	1	1	1	1	0
67	Holding and Other Investment Offices	0	0	1	1	1	1	1	1	2	2
72	Personal Services	0	0	0	0	0	0	1	1	1	1
80	Health Services	0	0	0	0	1	0	0	0	0	0
82	Educational Services	1	2	2	2	0	2	0	0	0	0
86	Membership Organizations	0	0	0	1	1	1	1	0	1	0
87	Engineering and Management Services	0	0	2	2	2	1	0	1	0	0
88	Private Households	2	1	1	1	1	1	1	1	1	1
89	Services Not Elsewhere Classified	0	0	0	1	1	3	2	1	1	1
91	Executive, Legislative, and General	0	0	0	0	1	2	2	2	1	1
97	National Security and International Affairs	0	0	0	0	0	0	1	0	0	0
99	Nonclassifiable Establishments	0	0	0	0	0	0	0	0	1	0
Total Number of Reporters[b]		**108**	**142**	**150**	**162**	**207**	**207**	**236**	**232**	**234[c]**	**234**
Number of 2-Digit SIC Codes Represented		**9**	**13**	**16**	**18**	**24**	**27**	**31**	**27**	**29[c]**	**27**

[a]The Voluntary Reporting of Greenhouse Gases database was designed in 1994-1995, when the Standard Industrial Classification (SIC) system was still in use.

[b]Totals may be greater than the sum of reporters in each SIC code, because confidential reporters are excluded from the latter.

[c]Includes 6 late reports for the 2002 data year. The 2003 total will also be revised upward in next year's report with the inclusion of late 2003 reports. As of February 22, 2005, EIA had received 6 late 2003 reports, which are not included in this report's 2003 database.

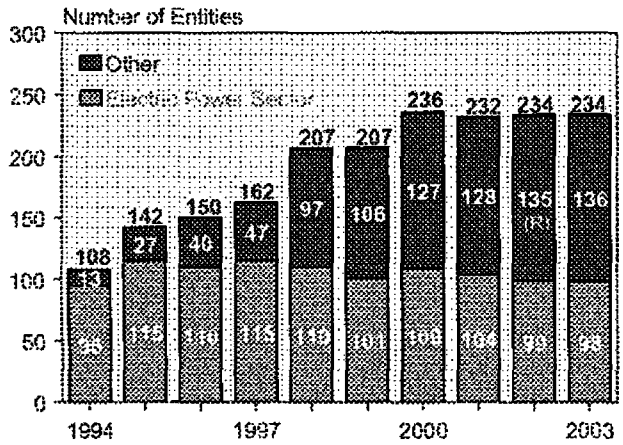
(R) = Revised.

Source: Energy Information Administration, Forms EIA-1605 and EIA-1605EZ.

electric power sector, representing a diverse set of industries. In addition, several mergers and acquisitions involving reporters to the program have reduced the number of reports received from electricity producers. As a result, only 42 percent of the organizations reporting to the program for data year 2003 were from the electric power sector.

Although the number of reporters from other individual industries remained relatively small, in many cases, reports were received from key companies in those other industries: for example, General Motors, Ford Motor Company, DaimlerChrysler Corporation, Nissan North America, Inc., and Toyota Motor North America, Inc., in the automotive products industry; Noranda and an operating division of Alcan in the metals industry; BP America, Sunoco, Inc., and ChevronTexaco Corporation in the petroleum industry; Johnson & Johnson and The Dow Chemical Company in the chemicals industry; Rolls Royce in the aerospace industry; Bristol-Myers Squibb Company and Pfizer Pharmaceuticals, LLC, in the pharmaceuticals industry; and Advanced Micro Devices, Inc., and IBM in the electronic equipment industry. A complete listing of all 2003 reporters is provided in Appendix B, Table B1.[4]

Figure 1. Electric Power Sector and Other Entities Submitting Reports to the Voluntary Reporting of Greenhouse Gases Program, Data Years 1994-2003



(R) = revised.

Notes: Electric power sector includes electric utilities and independent power producers. 2002 data year includes 6 late reports that were not included in the totals presented in last year's annual report and database.

Source: Energy Information Administration, Forms EIA-1605 and EIA-1605EZ.

Most reporters indicated that their projects were affiliated with one or more government-sponsored voluntary programs. Of the 2,188 projects reported for 2003, 1,066 were affiliated with the DOE's Climate Challenge Program, 381 with the EPA's Landfill Methane Outreach Program, 94 with the various DOE/EPA ENERGY STAR[5] programs (including ENERGY STAR Buildings, ENERGY STAR Computers, and ENERGY STAR Transformers), 50 with the EPA's Climate Wise Recognition Program, 39 with the U.S. Initiative on Joint Implementation, 23 with the EPA's Natural Gas STAR Program, 16 with the EPA's Green Lights Program, 11 with the EPA's Sulfur Hexafluoride Emissions Reduction Partnership, 9 with the EPA's WasteWise, 7 with DOE's Compressed Air Challenge, and 6 with the EPA's Coalbed Methane Outreach Program. Other voluntary programs cited included the EPA's Voluntary Aluminum Industrial Partnership and DOE's Motor Challenge, Rebuild America, and Cool Communities Program. Not all participants in the various voluntary programs provided information to the Voluntary Reporting Program.

What Was Reported?

The Voluntary Reporting Program permits three distinct types of reporting:

- Project-level reporting, defined as the reporting on the emission reductions or carbon sequestration achieved as a result of a specific action or group of actions
- Entity-level reporting, defined as the reporting on emissions, emission reductions, and carbon sequestration for of an entire organization, usually defined as a corporation
- Commitments to take action to reduce emissions in the future.

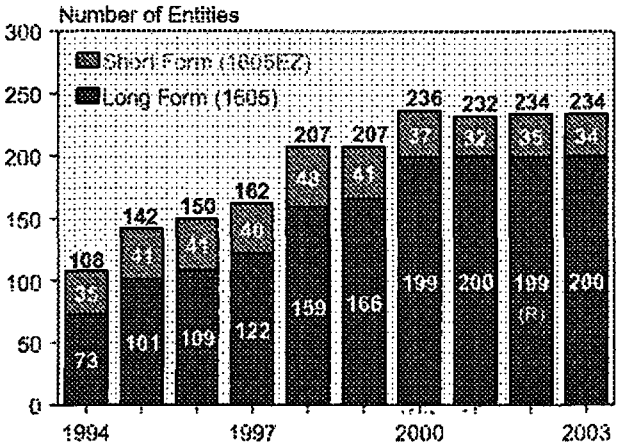
Of the 234 reports received for 2003, 200 (85 percent) were submitted on Form EIA-1605 (the long form) (Figure 2). The long form allows reporters to create an in-depth, multi-year, public record of emission reduction efforts for an entire organization and/or at the project level, including information on activities conducted outside the United States and commitments to reduce future greenhouse gas emissions. The remaining reports were submitted on Form EIA-1605EZ (the short form), which allows reporters only to provide brief summaries of greenhouse gas projects for the current reporting year and does not allow the reporting of activities outside the United States or of future emission reduction commitments. The proportion of reporters using the short form

[4]Appendixes for this report will be available in the near future from web site www.eia.doe.gov/oiaf/1605/vrrpt.

[5]ENERGY STAR is a joint program of the U.S. Department of Energy and the U.S. Environmental Protection Agency. See web site www.energystar.gov.

has declined from 32 percent in the first year of the program (1994 data year) to 15 percent in the 2003 data reporting cycle. EIA believes that reporters are choosing the long form in order to document their emission reductions more thoroughly. Also, for the same reason, several voluntary programs (such as the Landfill Methane Outreach Program) encourage participants to use the long form.

Figure 2. Number of Reports Received by Form Type, Data Years 1994-2003



(R) = revised.

Notes: Electric power sector includes electric utilities and independent power producers. 2002 data year includes 6 late reports that were not included in the totals presented in last year's annual report and database.

Source: Energy Information Administration, Forms EIA-1605 and EIA-1605EZ.

For the 2003 reporting year, 177 program participants (76 percent of the total) reported project-level reductions, and 126 reported entity-level emissions and/or reductions: 70 reported at both the entity and project levels, 107 submitted only project-level reports, and 57 reported only entity-level information. In addition, 89 reporters provided information on their commitments to reduce emissions or increase sequestration in the future, including one program participant that reported only commitments without reporting on past activities.

Sources of greenhouse gas emissions and emission reductions reported to the Voluntary Reporting Program are characterized as direct, indirect, sequestration, or unspecified. The unspecified category includes all reductions and sequestration reported on the short form because the short form does not allow a reporting entity to specify whether an emission reduction is direct or indirect. Because of concern about possible double counting of emissions and reductions, particularly between direct and indirect emissions, EIA does not aggregate reported emissions or emission reductions across these four categories.

Project Level

Reporters provided information on a total of 2,188 projects for 2003 (Table 2). Most (1,969 or 90 percent) were

Table 2. Distribution of Projects by Reduction Objective, Project Type, and Form Type, Data Year 2003

Reduction Objective and Project Type	Number of Projects			Number of Reporters		
	Long Form	Short Form	Total	Long Form	Short Form	Total
Reducing Carbon Dioxide Emissions	**925**	**136**	**1,061**	**93**	**29**	**122**
Electricity Generation, Transmission, and Distribution	464	50	514	68	23	91
Cogeneration and Waste Heat Recovery	21	0	21	13	0	13
Energy End Use	374	76	450	67	20	87
Transportation and Offroad Vehicles	66	10	76	35	6	41
Reducing Methane and Nitrous Oxide Emissions	**470**	**44**	**514**	**71**	**6**	**77**
Waste Treatment and Disposal (Methane)	425	42	467	54	5	59
Agriculture (Methane and Nitrous Oxide)	4	0	4	3	0	3
Oil and Natural Gas Systems and Coal Mining (Methane)	41	2	43	22	2	24
Carbon Sequestration	**446**	**14**	**460**	**51**	**12**	**63**
Halogenated Substances	**43**	**1**	**44**	**29**	**1**	**30**
Other Emission Reduction Projects	**85**	**24**	**109**	**46**	**10**	**56**
Entity-Level Reporting Only (No Projects)	**NA**	**NA**	**NA**	**57**	**NA**	**57**
Commitment Reporting Only (No Projects or Entity-Level Data)	**NA**	**NA**	**NA**	**0**	**NA**	**0**
Total	**1,969**	**219**	**2,188**	**200**	**34**	**234**

NA = not applicable.

Notes: The total number of reporters is smaller than the sum of the number of reporters for each project type, because most reporters provided information on more than one project. Table excludes projects submitted in confidential reports.

Source: Energy Information Administration, Forms EIA-1605 and EIA-1605EZ.

reported on the long form. The total number of projects reported increased by 133, or 6 percent, compared with the previous reporting cycle.[6] Most of the 2,188 projects reported for 2003 were also among the 2,055 projects reported for 2002, because they continued to yield emission reductions in 2003. Projects often yield emission reductions over an extended period; for example, an availability improvement project at a nuclear power plant typically involves the adoption of new maintenance and refueling programs that, once in place, are followed over a multi-year period. Likewise, the reforestation of an area in one year can result in the sequestration of carbon in many subsequent years, even if no additional trees are planted. Reporters continue to report the annual emission reductions and carbon sequestration achieved by such long-lived projects on a yearly basis.

The principal objective of the majority of projects (1,061 or 48 percent) reported for 2003 was to reduce carbon dioxide emissions (Table 2). Most reduced carbon dioxide either by reducing fossil fuel consumption or by switching to lower emitting sources of energy. Many also achieved small reductions in emissions of other gases. Other project objectives cited included reducing methane and nitrous oxide emissions (514 or 23 percent), increasing carbon sequestration (460 or 21 percent), and reducing emissions of halogenated substances (44 or 2 percent). Projects that also primarily reduced carbon dioxide emissions included the 109 "other" emission reduction projects, most of which involved either the reuse of fly ash as a cement substitute in concrete or the recycling of waste materials.

Most projects involve actions within the United States; however, some are conducted in foreign countries, designed to test various concepts of joint implementation with other nations (Table 3). Of the 94 foreign projects reported for 2003, 60 represented shares in two forestry programs in Belize and Malaysia sponsored by the electric power industry.

Total project-level emission reductions reported included 268.3 million metric tons carbon dioxide equivalent in direct reductions, 81.1 million metric tons carbon dioxide equivalent in indirect reductions, 7.7 million metric tons carbon dioxide equivalent in carbon sequestration, and 16.4 million metric tons carbon dioxide equivalent in unspecified reductions (Table 4). EIA uses global warming potentials (GWPs) from the Third Assessment Report of the Intergovernmental Panel on Climate Change (IPCC) to calculate carbon dioxide equivalents (see box on page 7).

Projects whose reduction objective was to reduce carbon dioxide emissions reported direct reductions of 193.1 million metric tons carbon dioxide equivalent, indirect reductions of 39.0 million metric tons carbon dioxide equivalent, and unspecified reductions of 12.4 million metric tons carbon dioxide equivalent. The vast majority of the reported emission reductions were carbon dioxide reductions.

A variety of efforts to reduce emissions of gases with high GWPs were also reported, including 514 projects with the objective of reducing methane and nitrous oxide emissions. These projects focused on waste

Table 3. Geographic Scope of Reports Received and Location of Emission Reduction Projects, Data Years 1994-2003

	Reports Received					Projects Reported[b]			
	U.S. Only					U.S. Only			
Year	Long Form	Short Form	Foreign Only	Both U.S. and Foreign	Total[a]	Long Form	Short Form	Foreign Only	Total[a]
1994	65	34	2	4	**108**	500	125	9	**634**
1995	82	40	2	16	**142**	760	164	36	**960**
1996	83	41	1	24	**150**	828	179	33	**1,040**
1997	90	40	1	31	**162**	1,017	201	70	**1,288**
1998	118	47	1	40	**207**	1,212	252	85	**1,549**
1999	125	39	4	37	**207**	1,397	237	87	**1,721**
2000	153	36	1	45	**236**	1,761	229	99	**2,089**
2001	155	32	1	43	**232**	1,596	210	91	**1,897**
2002(R) ...	156	35	3	39	**234**	1,708	253	94	**2,055**
2003	157	34	2	40	**234**	1,873	219	96	**2,188**

[a]Totals are greater than the sum of the components because the latter exclude information from confidential reports.
[b]Excludes projects submitted in confidential reports.
(R) = revised.
Notes: The number of reports received for 2002 was revised to reflect the receipt of 6 reports after the finalization of the Public Use Database for last year's annual report. The number of projects reported for 2002 has also been revised to reflect the projects included in those reports.
Source: Energy Information Administration, Forms EIA-1605 and EIA-1605EZ.

[6]The total number of projects reported for 2002 has increased from 2,027 to 2,055 with the receipt of 6 additional reports after the database used to prepare the annual report and Public Use Database for 2002 was finalized. See note to Table 3.

management systems, animal husbandry operations, oil and gas systems, or coal mines. Reported net direct emission reductions from these projects totaled 68.6 million metric tons carbon dioxide equivalent, which represents 26 percent of the total direct reductions reported for 2003. The estimate of net reductions includes 76.6 million metric tons carbon dioxide equivalent in direct reductions of methane emissions along with 8.0 million metric tons carbon dioxide equivalent in carbon dioxide and nitrous oxide emissions increases. Indirect reductions reported for projects that reduced methane and nitrous oxide emissions totaled 39.8 million metric tons carbon dioxide equivalent. Unspecified reductions reported on the short form totaled 3.9 million metric tons carbon dioxide equivalent.

Almost all of the 460 carbon sequestration projects reported on either the long form or the short form increased the amount of carbon stored in sinks through various forestry measures, including afforestation, reforestation, urban forestry, forest preservation, and modified forest management techniques. These activities accounted for 21 percent of the projects reported for 2003; however, 284 of the reported carbon sequestration projects represented shares in 10 projects conducted by the UtiliTree Carbon Company, which were reported by 28 participating electric utilities. Carbon sequestration projects reported on the long form for 2003 totaled 7.7 million metric tons carbon dioxide equivalent in carbon sequestration achieved.

Projects with the objective of reducing emissions of halogenated substances—including perfluorocarbons (PFCs), sulfur hexafluoride (SF_6), and hydrofluorocarbons (HFCs)—reported direct reductions of 6.1 million metric tons carbon dioxide equivalent for 2003, which included 3.5 million metric tons carbon dioxide equivalent of PFC emissions and 2.6 million metric tons carbon dioxide equivalent of SF_6 emissions, as well as indirect reductions of 2.2 million metric tons carbon dioxide equivalent, the vast majority of which was SF_6.

Global Warming Potentials Used to Calculate Carbon Dioxide Equivalent Emissions

Global warming potentials (GWPs) are used to compare the abilities of different greenhouse gases to trap heat in the atmosphere. GWPs are based on the radiative efficiency (heat-absorbing ability) of each gas relative to that of carbon dioxide (CO_2), as well as the decay rate of each gas (the amount removed from the atmosphere over a given number of years) relative to that of CO_2. The GWP provides a construct for converting emissions of various gases into a common measure, which allows climate analysts to aggregate the radiative impacts of various greenhouse gases into a uniform measure denominated in carbon or carbon dioxide equivalents. The table at the right presents the GWPs published in the Third Assessment Report of the Intergovernmental Panel on Climate Change (IPCC).

In analyzing greenhouse gas emissions and emission reductions reported to the Voluntary Reporting of Greenhouse Gases Program, EIA attempts to employ the most current data sources. For that reason, and because the IPCC is generally considered the authoritative source for GWPs, EIA uses the IPCC's most recent GWP values, from the Third Assessment Report, to convert reported greenhouse gas emissions to the carbon dioxide equivalent units used in this report. It is important to point out, however, that countries reporting to the United Nations Framework Convention on Climate Change (UNFCCC), including the United States, have been compiling estimates based on the GWPs from the IPCC's Second Assessment Report. The UNFCCC Guidelines on Reporting and Review, adopted before the publication of the Third Assessment Report, require emission estimates to be based on the GWPs in the IPCC Second Assessment Report. This will probably continue in the short term, until the UNFCCC reporting rules are changed.

100-Year GWP Estimates from the IPCC's Third (2001) Assessment Reports

Gas	2001 IPCC GWP[a]
Methane	23
Nitrous Oxide	296
HFC-23	12,000
HFC-32	550
HFC-125	3,400
HFC-134a	1,300
HFC-143a	4,300
HFC-152a	120
HFC-227ea	3,500
HFC-236fa	9,400
Perfluoromethane (CF_4)	5,700
Perfluoroethane (C_2F_6)	11,900
Perfluoropropane (C_3F_8)	11,900
Sulfur Hexafluoride (SF_6)	22,200

[a]Intergovernmental Panel on Climate Change, *Climate Change 2001: The Scientific Basis. Summary for Policymakers* (Cambridge, UK: Cambridge University Press, 2001).

Table 4. Summary of Reported Project-Level Emission Reductions and Carbon Sequestration by Reduction Objective and Gas, Data Year 2003
(Metric Tons Carbon Dioxide Equivalent)

Gas	Reductions by Project Objective				Total Reductions
	Reduce Carbon Dioxide Emissions	Reduce Methane and Nitrous Oxide Emissions	Increase Carbon Sequestration	Reduce Emissions of Halogenated Substances	
Direct					
Carbon Dioxide	193,113,253	-7,975,336[a]	1,932	—	185,139,849
Methane	347,122	76,645,627	—	—	76,992,749
Nitrous Oxide	32,778	-23,899[a]	—	—	8,879
HFCs	—	—	—	—	0
PFCs	25,536	—	—	3,524,969	3,550,504
SF_6	—	—	—	2,611,910	2,611,910
Total Direct	**193,518,689**	**68,646,392**	**1,932**	**6,136,879**	**268,303,892**
Indirect					
Carbon Dioxide	38,461,582	16,977,303	—	—	55,438,884
Methane	264,381	22,737,072	—	—	23,001,453
Nitrous Oxide	56,049	121,374	—	—	177,423
HFCs	—	—	—	38,702	38,702
PFCs	236,823	—	—	567	237,390
SF_6	—	—	—	2,184,750	2,184,750
Total Indirect	**39,018,835**	**39,835,749**	**—**	**2,224,018**	**81,078,602**
Sequestration					
Carbon Dioxide	—	—	7,730,969	—	7,730,969
Methane	—	—	—	—	—
Nitrous Oxide	—	—	—	—	—
HFCs	—	—	—	—	—
PFCs	—	—	—	—	—
SF_6	—	—	—	—	—
Total Sequestration	**—**	**—**	**7,730,969**	**—**	**7,730,969**
Unspecified[b]					
Carbon Dioxide	12,427,175	39,057	28,576	—	12,494,809
Methane	21,456	3,813,915	—	—	3,835,371
Nitrous Oxide	—	—	—	—	—
HFCs	—	—	—	—	—
PFCs	1,910	—	—	—	1,910
SF_6	22,154	—	—	6,495	28,649
Total Unspecified	**12,472,694**	**3,852,972**	**28,576**	**6,495**	**16,360,738**

[a]Negative reductions represent increases in emissions.

[b]Unspecified emission reductions represent quantities reported on the short form (Form EIA-1605EZ), where reporters are not asked to specify whether the emission reduction or sequestration is direct or indirect.

Notes: CFCs, HCFCs, and methyl chloroform are not included in the totals because of the uncertainty associated with estimates of net global warming potential for these gases. Their direct warming effects (radiative forcing) are offset by indirect cooling effects (destruction of stratospheric ozone, another greenhouse gas). Direct, indirect, and unspecified emission reductions and sequestration have not been totaled to avoid double counting of reductions or sequestration that have been reported by more than one entity.

Source: Energy Information Administration, Forms EIA-1605 and EIA-1605EZ.

Total direct emission reductions reported for 2003 increased by 1 percent over the reductions reported for 2002, to 268.3 million metric tons carbon dioxide equivalent (Table 5), and have quadrupled since the first year of the program (data year 1994). Reported direct reductions of carbon dioxide emission increased by 6.7 million metric tons, while direct reductions of methane emissions decreased by 3.1 million metric tons.

Indirect emission reductions reported for 2003, at 81 million metric tons carbon dioxide equivalent, were 1.0 million metric tons carbon dioxide equivalent (1.2 percent) higher than those reported for 2002. Largely responsible for the increase was a new reporter, Xenon Specialty Gas, which reported indirect reductions of SF_6 emissions equal to 2.2 million metric tons carbon dioxide equivalent.

Reported sequestration, after peaking at 12.5 million metric tons carbon dioxide equivalent for 1998, has fallen below 10 million metric tons carbon dioxide for the past 5 years. This decline was caused by the decline in, or nonrecurrence of, sequestration reported for several large forest preservation projects. Also, American Forests, which reported sequestration for 164 reforestation projects for 2000, has not reported for subsequent years. Unspecified reductions reported for 2003, which include reductions and sequestration reported on the short form, totaled 16.4 million metric tons carbon dioxide equivalent, a decrease of 5.2 percent from 2002.

Project-Level Reference Cases

Beginning with the 2000 annual report, EIA began dividing project-level data according to the reference case employed in calculating reported project-specific emission reductions. A "reference case" is an emissions or sequestration level against which actual emissions are compared to estimate emission reductions. In a "basic" reference case, actual historical emissions (or sequestration) in a specific year, or an average of a range of years, are used as the reference case. In a "modified" reference case, an estimate is made of what emissions or sequestration would have been in the absence of the project, and that estimate serves as the reference case.

Of the projects reported for 2003 on Form EIA-1605, 95 percent used modified reference cases (Table 6). A modified reference case is generally preferred for project-level analysis, because this approach attempts to isolate the effect of the action taken by the reporter from other factors that may have affected the reporter's emissions since the action was taken. The use of basic reference cases for 2003 was greatest for projects that reported reducing emissions of halogenated substances (42 percent of those projects), because the techniques for evaluating reductions for the projects are particularly suited to the use of a basic reference case. Emissions are determined using inventory management data, with emissions of a particular substance being equal to the amount purchased during the year to replace quantities emitted. Annual reductions can be calculated by subtracting the emissions in the years after emission abatement measures have been instituted from the emissions in the year before the measures were instituted.

In terms of emission reductions and sequestration reported for 2003, 261 million metric tons carbon dioxide equivalent in direct reductions (97 percent of total direct reductions), 74.8 million metric tons carbon dioxide equivalent in indirect reductions (92 percent of total indirect reductions), and 7.8 million metric tons carbon dioxide equivalent in sequestration (94 percent of total sequestration) were reported as having been estimated using modified reference cases (Table 7). The halogenated substance category was the only project category for which a significant proportion (92 percent or 5.6 million metric tons carbon dioxide equivalent) of the reported direct reductions was estimated using a basic reference case.

Entity Level

Most of the 126 reporters providing entity-level information included data on emissions as well as emission reductions or sequestration. In addition, 9 reporters provided entity-level data on emissions only, and 6 reporters provided entity-level data on emission reductions or sequestration only.

Total entity-level direct emissions reported for 2003 were 888.8 million metric tons, representing a 0.1-percent decrease from the direct emissions reported for 2002 (Table 8). Total entity-level indirect emissions reported for 2003 were 6 percent lower than those reported for 2002, at 104.7 million metric tons carbon dioxide equivalent. Total direct emission reductions reported at the entity level for 2003 (214.2 million metric tons carbon dioxide equivalent) were 8 percent lower than those reported for 2002 (231.6 million metric tons carbon dioxide equivalent). For 2003, 182.4 million metric tons carbon dioxide equivalent (85 percent) of the reported direct reductions were estimated using modified reference cases, and 31.8 million metric tons carbon dioxide equivalent (15 percent) were estimated with basic reference cases.

Reported entity-level indirect emission reductions for 2003 totaled 42.6 million metric tons carbon dioxide equivalent, 19 percent higher than the total reported for 2002. Reported indirect reductions of 45.6 million metric tons carbon dioxide equivalent calculated with modified reference cases were offset by -3.2 million metric tons carbon dioxide equivalent of indirect reductions (i.e., a net increase in emissions) calculated with basic reference cases. Entity-level sequestration reported for 2003

Table 5. Summary of Reported Project-Level Emission Reductions and Carbon Sequestration by Gas, Data Years 1994-2003
(Metric Tons Carbon Dioxide Equivalent)

Year	Carbon Dioxide	Methane	Nitrous Oxide	HFCs	PFCs	Sulfur Hexafluoride	Total
Direct							
1994	58,413,709	576,808	339,485	-29	3,199,649	83,579	**62,613,201**
1995	85,419,479	194,350	-438,673	-43	2,962,416	186,382	**88,323,910**
1996	77,601,577	9,411,042	-423,599	15,193	3,345,811	-69,985	**89,880,039**
1997	82,269,887	8,705,355	86,294	-42	3,318,600	516,732	**94,896,824**
1998	112,038,605	31,720,732	109,560	-1,738	3,504,380	624,786	**147,996,326**
1999	115,366,719	35,994,030	62,111	-1,738	3,425,480	595,379	**155,441,981**
2000	144,096,233	61,945,794	114,198	—	3,233,612	1,407,347	**210,797,186**
2001	159,129,312	81,569,042	711,633	—	3,606,813	2,475,144	**247,491,944**
2002(R) . .	178,393,155	80,073,702	-4,713	—	3,562,893	3,043,682	**265,068,719**
2003	165,139,849	76,992,749	8,879	—	3,550,504	2,611,910	**268,303,892**
Indirect							
1994	2,994,405	2,360,734	2,243	—	—	—	**5,357,381**
1995	27,063,660	24,777,246	630,358	—	—	7,653	**52,478,917**
1996	26,207,709	26,612,114	616,075	—	—	—	**53,435,898**
1997	25,848,951	11,630,239	102,639	—	3,631	81	**37,585,541**
1998	27,968,865	15,152,664	105,598	—	6,068	81	**43,233,274**
1999	37,233,635	19,027,769	270,531	—	5,856	81	**56,537,872**
2000	41,276,444	20,641,700	115,689	—	35,459	81	**62,069,372**
2001	48,255,932	23,216,197	154,566	—	34,319	81	**71,661,094**
2002(R) . .	55,347,688	24,555,786	164,214	47	36,705	81	**80,104,520**
2003	55,438,884	23,001,453	177,423	38,702	237,390	2,184,750	**81,078,602**
Sequestration							
1994	746,545	—	—	—	—	—	**746,545**
1995	1,190,754	—	—	—	—	—	**1,190,754**
1996	8,676,591	—	—	—	—	—	**8,676,591**
1997	9,849,807	—	—	—	—	—	**9,849,807**
1998	12,490,927	—	—	—	—	—	**12,490,927**
1999	9,623,599	—	—	—	—	—	**9,623,599**
2000	9,011,117	—	—	—	—	—	**9,011,117**
2001	7,956,823	—	—	—	—	—	**7,956,823**
2002(R) . .	7,296,516	—	—	—	—	—	**7,296,516**
2003	7,730,969	—	—	—	—	—	**7,730,969**
Unspecified[a]							
1994	3,721,047	564,022	—	—	—	—	**4,285,069**
1995	4,959,366	1,162,752	—	—	—	—	**6,112,117**
1996	4,436,523	1,232,174	—	—	—	—	**5,668,697**
1997	6,688,175	1,825,383	—	—	123,049	—	**8,636,607**
1998	16,499,427	2,918,818	—	—	—	—	**19,418,245**
1999	9,607,428	3,273,878	—	—	—	4,783	**12,886,089**
2000	9,125,506	3,127,762	—	—	—	20,744	**12,274,012**
2001	10,855,046	3,960,348	—	—	4,046	20,261	**14,839,701**
2002(R) . .	12,820,322	4,295,112	—	—	130,930	10,201	**17,256,565**
2003	12,494,809	3,835,371	—	—	1910	28,649	**16,360,738**

(R) = revised.

[a]Unspecified emission reductions represent quantities reported on the short form (Form EIA-1605EZ), which does not distinguish between direct and indirect emission reductions or sequestration.

Notes: Reductions of CFCs, HCFCs, and methyl chloroform are not included in the totals because of the uncertainty associated with estimates of their net global warming potential. Their direct warming effects (positive radiative forcing) are offset by indirect cooling effects (destruction of stratospheric ozone, another greenhouse gas). Totals may not equal sum of components due to independent rounding. Direct, indirect, and unspecified emission reductions and sequestration have not been totaled, in order to avoid double counting of reductions or sequestration that have may been reported by more than one entity. Negative reductions represent increases in emissions.

Source: Energy Information Administration, Forms EIA-1605 and EIA-1605EZ.

totaled 6.9 million metric tons carbon dioxide equivalent, 1 percent more than was reported for 2002.

Commitments

For 2003, formal commitments to reduce emissions, take specific action to reduce emissions, or provide financial support for activities related to greenhouse gas reductions were reported by 89 entities,[7] nearly one-third (30 percent) of which were electricity generators participating in DOE's Climate Challenge Program (Figure 3). Other voluntary programs represented among the commitments reported for 2003 included the EPA's Climate Wise, the EPA's Voluntary Aluminum Industrial Program, the U.S. Initiative on Joint Implementation, the EPA's Green Lights Program, the EPA's Landfill Methane Outreach Program, DOE's Motor Challenge, the EPA's Sulfur Hexafluoride Emissions Reduction Partnership for Electric Power Systems, DOE's Cool Communities Program, DOE/EPA ENERGY STAR Buildings, EPA's Natural Gas Star, and DOE's Renewable Energy Commercialization Program.[8]

There are three forms of future commitment in the Voluntary Reporting Program: entity commitments, financial commitments, and project commitments. Entity and project commitments roughly parallel the entity and project aspects of emissions reporting: an entity commitment is a commitment to reduce the emissions of an entire organization; a project commitment is a commitment to take a particular action that will have the effect of reducing the reporter's emissions through a specific project. A financial commitment is a pledge to spend a particular sum of money on activities related to emission reductions, without a specific promise as to the emissions consequences of the expenditure.

For 2003, 55 firms made 60 specific promises to reduce, avoid, or sequester future emissions at the entity level. Some of those entity-level commitments were to reduce emissions below a specific baseline, others to limit the growth of emissions per unit of output, and others to limit emissions by a specific amount relative to a baseline emissions growth trend. In their reports for 2003, companies reported commitments to reduce entity-level emissions by a total of 86 million metric tons carbon dioxide equivalent, including 14 commitments, representing 68 million metric tons carbon dioxide equivalent or 79 percent of the emission reductions promised, that

Table 6. Number of Projects Reported on Form EIA-1605 by Reduction Objective, Project Type, and Reference Case Employed, Data Year 2003
(Number of Projects)

Reduction Objective and Project Type	Type of Reference Case: Modified, Number of Projects	Modified, Percent	Basic, Number of Projects	Basic, Percent	Total Number of Projects
Reducing Carbon Dioxide Emissions	**867**	**94**	**56**	**6**	**923**
Electricity Generation, Transmission, and Distribution	458	99	4	1	462
Cogeneration and Waste Heat Recovery	19	90	2	10	21
Energy End Use	328	88	46	12	374
Transportation and Offroad Vehicles	62	94	4	6	66
Reducing Methane and Nitrous Oxide Emissions	**463**	**99**	**7**	**1**	**470**
Waste Treatment and Disposal (Methane)	421	99	4	1	425
Agriculture (Methane and Nitrous Oxide)	4	100	0	0	4
Oil and Natural Gas Systems and Coal Mining (Methane)	38	93	3	7	41
Carbon Sequestration	**429**	**96**	**17**	**4**	**446**
Halogenated Substances	**25**	**58**	**18**	**42**	**43**
Other Emission Reduction Projects	**74**	**88**	**10**	**12**	**84**
Total	**1,858**	**95**	**108**	**5**	**1,966**

Notes: Excludes projects reported on the short form (Form EIA-1605EZ), which does not collect information on the reference case employed. Excludes two projects reported on the long form (Form EIA-1605) for which no reference case was specified because reductions were not estimated. Table excludes projects submitted in confidential reports.
Source: Energy Information Administration, Forms EIA-1605.

[7]Formal commitments in one or more of the entity-level, project-level, or financial categories accommodated by Form EIA-1605 were reported by 81 companies. Descriptions of future activities were provided by 8 companies in the Additional Information section of Schedule IV.

[8]In 2001, the Climate Wise and Green Lights voluntary programs were incorporated into ENERGY STAR, a joint program of the U.S. Department of Energy and the U.S. Environmental Protection Agency.

were to be fulfilled by 2003 or earlier. The 12 other entity-level commitments, which promised reductions totaling 18 million metric tons carbon dioxide equivalent, were to be fulfilled by 2004 or later.

Commitments to undertake 116 individual emission reduction projects were reported by 22 companies. Some of the commitments were linked to results from projects already underway and forming part of the reporters' submissions. Others were for projects not yet begun. Reporters indicated that the projects were expected to reduce future emissions or increase carbon sequestration by 73 million metric tons carbon dioxide equivalent. In addition, 20 firms made 40 financial commitments. The total amount of funds promised was $50 million, of which $4 million was spent in 2003.

Table 7. Reported Emission Reductions and Sequestration for Projects Reported on Form EIA-1605 by Reduction Objective, Project Type, Source, and Reference Case Employed, Data Year 2003
(Million Metric Tons Carbon Dioxide Equivalent)

Reduction Objective and Project Type	Direct Reductions		Indirect Reductions		Sequestration	
	Modified	Basic	Modified	Basic	Modified	Basic
Reducing Carbon Dioxide Emissions	**184.4**	**1.3**	**27.8**	**0.1**	**NA**	**NA**
Electricity Generation, Transmission, and Distribution	157.2	0.6	14.7	*	NA	NA
Cogeneration and Waste Heat Recovery	0.1	*	3.1	*	NA	NA
Energy End Use	24.7	0.6	9.9	0.1	NA	NA
Transportation and Offroad Vehicles	2.5	*	0.1	*	NA	NA
Reducing Methane and Nitrous Oxide Emissions	**68.2**	**0.4**	**38.6**	**1.2**	**NA**	**NA**
Waste Treatment and Disposal (Methane)	47.6	0.4	38.6	1.2	NA	NA
Agriculture (Methane and Nitrous Oxide)	*	NA	*	NA	NA	NA
Oil and Natural Gas Systems and Coal Mining (Methane)	20.6	*	*	NA	NA	NA
Carbon Sequestration	**0.0**	**NA**	**NA**	**NA**	**7.3**	**0.5**
Halogenated Substances	**0.5**	**5.6**	**2.2**	**NA**	**NA**	**NA**
Other Emission Reduction Projects	**7.8**	**NA**	**6.1**	**5.0**	**NA**	**NA**
Total	**261.0**	**7.3**	**74.8**	**6.3**	**7.3**	**0.1**

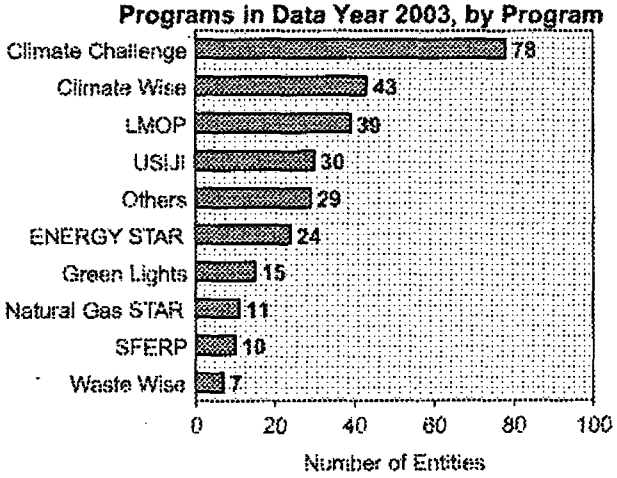
Note: Excludes reductions and sequestration for projects reported on the short form (Form EIA-1605EZ), which does not collect information on the reference case employed. Excludes projects submitted in confidential reports.
Source: Energy Information Administration, Form EIA-1605.

Table 8. Number of Entities Reporting at the Entity Level, Reported Emissions by Source, Emission Reductions by Source and Type of Reference Case Employed, and Sequestration, Data Years 1994-2003
(Million Metric Tons Carbon Dioxide Equivalent)

Year	Number of Entities Reporting	Emissions		Emission Reductions by Type of Reference Case						Sequestration
				Direct			Indirect			
		Direct	Indirect	Modified	Basic	Total	Modified	Basic	Total	
1994	39	752.7	494.9	38.2	22.6	60.8	1.6	1.2	2.8	0.5
1995	50	875.8	499.6	56.0	39.3	95.3	46.0	2.7	48.6	0.8
1996	55	1,183.1	461.5	65.4	44.6	110.0	42.9	5.7	48.6	7.9
1997	60	1,006.6	525.8	73.7	20.3	94.0	24.8	3.4	28.2	7.1
1998	76	1,110.7	473.5	105.8	22.6	128.4	28.3	13.2	41.6	11.2
1999	83	967.9	481.0	114.7	35.3	150.0	30.3	8.4	38.7	8.4
2000	109	1,068.2	111.7	123.6	83.0	206.7	34.8	-7.8	27.0	7.5
2001(R)	113	799.6	111.5	121.4	90.4	211.9	38.9	-6.7	32.2	7.5
2002(R)	119	889.3	111.2	148.4	83.3	231.6	44.2	-8.3	35.9	6.8
2003	126	888.8	104.7	182.4	31.8	214.2	45.6	-3.0	42.6	6.9

(R) = revised.
Notes: 2002 data year includes late reports that were not received in time to be included in last year's annual report and database. Negative reductions represent increases in emissions.
Source: Energy Information Administration, Form EIA-1605.

Figure 3. Number of Entities Reporting Commitments Associated with Voluntary Programs in Data Year 2003, by Program



Notes: LMOP = Landfill Methane Outreach Program, USIJI = United States Initiative on Joint Implementation, SFERP = Sulfur Hexafluoride Emissions Reduction Partnership. Others include Coalbed Methane Outreach Program, Cool Communities Program, Motor Challenge Program, and Voluntary Aluminum Industry Partnership. The sum of entities reporting commitments associated with each program exceeds the total number of entities reporting commitments because several entities reported commitments associated with more than one program.

Source: Energy Information Administration, Form EIA-1605.

Status of Policy Initiatives

In 2004, the Bush Administration continued to develop components of its Global Climate Change Initiative, which is expected to include enhancements to the Voluntary Reporting of Greenhouse Gases Program (see boxes on pages 14 and 15). In addition, some States and other organizations continued progress toward the development of greenhouse gas registry and trading programs; and the U.S. Congress considered, but did not pass, legislation relevant to greenhouse gas reporting. These developments, which occurred in 2003, would not have affected the reported emissions and emission reductions data for activities in 2003 discussed in this report, even if they had been formalized in laws or policies; however, they may affect the future of the Voluntary Reporting Program, future reporting of reductions or commitments, or both.

Enhanced 1605(b) Voluntary Emissions Reduction Registry

Pursuant to a key objective of the Global Climate Change Initiative, DOE is working to improve and expand the 1605(b) Voluntary Reporting of Greenhouse Gases Program. The primary goal of this effort is to create a credible and transparent program to report real reductions that support the national greenhouse gas intensity goal laid out in the Global Climate Change Initiative. In addition, a goal of the enhanced 1605(b) Program is to allow businesses and individuals to record their reductions and ensure that reporters are not penalized under a future climate policy. The objective of improving the registry is to help motivate firms to take cost-effective, voluntary actions to reduce greenhouse gas emissions, which would, in part, aid in the achievement of the Initiative's greenhouse gas intensity goal.

An interagency working group has undertaken several actions to improve the Voluntary Reporting Program, including outreach efforts, solicitation of public comments, and review of the existing program. On July 8, 2002, the Secretary of Energy, joined by the Secretary of Commerce, the Secretary of Agriculture, and the EPA Administrator, submitted recommendations to the White House to guide the process for improving and expanding the Voluntary Reporting Program.

In 2004, DOE continued to collaborate with the Department of Agriculture, the EPA, and other Federal agencies in developing revised Guidelines for the Voluntary Reporting of Greenhouse Gases Program. In November 2003, DOE released proposed revisions to the General Guidelines, which outline the principles that would govern the revised program, and also held a public workshop on the subject in Washington, DC, on January 12, 2004. The Technical Guidelines will specify the methods and factors to be used in measuring and estimating greenhouse gas emissions, emission reductions, and carbon sequestration under the revised Program.

Other U.S., State, and International Greenhouse Gas Initiatives and Registry Programs

In addition to activity on revisions to the Voluntary Reporting Program, a number of other efforts at the Federal, State, and international levels to reduce greenhouse gas emissions are being actively pursued. Some of those efforts are summarized below.

Climate VISION. Climate VISION—Voluntary Innovative Sector Initiatives: Opportunities Now—is a Presidential public-private partnership initiative launched by DOE on February 12, 2003, to contribute to the President's goal of reducing U.S. greenhouse gas emissions intensity—the ratio of emissions to economic output by American industry—by 18 percent over the next 10 years without sacrificing economic growth. Other agencies participating in Climate VISION include the EPA, Department of Transportation, Department of Agriculture, and Department of the Interior.

Business associations representing 12 industry sectors and the Business Roundtable have become program

partners with the Federal Government and have issued letters of intent to meet specific targets for reducing greenhouse gas emissions intensity. These Climate VISION partners, which include some of the largest companies in America, represent a broad range of industry sectors: oil and gas production, transportation, and refining; electricity generation; coal and mineral production and mining; manufacturing (automobiles, cement, iron and steel, magnesium, aluminum, chemicals, and semiconductors); railroads; and forest products. In December 2004, as part of its Climate VISION commitment, the electric power industry pledged to reduce collectively the power sector's greenhouse gas emissions intensity by the equivalent of 3 to 5 percent (measured as carbon emissions per unit of electricity produced) below 2000-2002 baseline levels, measured over the 2010-2012 period.

Climate Leaders. Climate Leaders is a voluntary industry-government partnership that encourages companies to establish and meet clear greenhouse gas emission reduction targets. EPA established Climate Leaders in February 2002 and has recruited 62 partners, 27 of which have established greenhouse gas reduction goals. By joining Climate Leaders, the partners commit themselves to documenting their emissions of the six major

The Global Climate Change Initiative

On February 14, 2002, President George W. Bush announced the Administration's Global Climate Change Initiative, which includes new emission intensity reduction goals, incentives for clean technology development, added support for scientific research, expanded collaboration with foreign governments on climate change, and the development of a framework for the enhancement of the Voluntary Reporting of Greenhouse Gases Program.

A primary goal of the Global Climate Change Initiative is to slow the growth rate of greenhouse gas emissions while sustaining economic growth, using market mechanisms and energy technology development. In the proposal, the President established a national goal of reducing the greenhouse gas intensity of the U.S. economy by 18 percent between 2002 and 2012. Emissions intensity is a measure of the ratio of greenhouse gas emissions to economic output (gross domestic product). To achieve the goal, the Initiative focuses on fossil fuel energy conservation, methane recovery, and carbon sequestration in the short term and development of advanced energy technologies in the longer term.

Key domestic and international elements of the Global Climate Change Initiative include:

- Domestic climate change initiatives:
  - Enhancement of the 1605(b) Voluntary Reporting of Greenhouse Gases Program
  - Significantly expanded funding for basic scientific research and advanced technology development
  - Tax incentives, such as credits for renewable energy, cogeneration, and new technology
  - Challenges for business to undertake voluntary initiatives and commit to greenhouse gas intensity goals, such as through recent agreements with the semiconductor and aluminum industries
  - Transportation programs, including technology research and development and fuel economy standards
  - Carbon sequestration programs, which include increased funding for U.S. Department of Agriculture conservation programs under the Farm Bill to enhance the natural storage of carbon, promote the development of targeted incentives for forestry and agriculture projects to increase carbon sequestration, and establish accounting rules and guidelines for crediting sequestration projects
- International climate change initiatives:
  - Investments in climate observation systems in developing countries
  - Funding for "debt-for-nature" forest conservation programs
  - Use of economic incentives to encourage developing countries to participate in climate change initiatives
  - Expanding technology transfer and capacity building in the developing world
  - Joint research with Japan, Italy, and Central America.

The Global Climate Change Initiative includes a future progress check: the U.S. Government, in 2012, will evaluate whether its greenhouse gas emissions reduction progress is sufficient and whether scientific understanding at that time will justify further action. If further action is deemed necessary, the Initiative proposes to accelerate technology development and deployment using additional market-based mechanisms, voluntary measures, and incentive programs.

greenhouse gases (carbon dioxide, methane, nitrous oxide, HFCs, PFCs, and SF_6) on a company-wide, facility-level basis (including, at a minimum, all their domestic facilities). Partners are required to develop an Inventory Management Plan (IMP) and report their annual corporate level emissions by emission source type to the EPA, using the EPA's Annual GHG Inventory Summary and Goal Tracking Form.[9]

In October 2004, the EPA issued updated guidance for corporate greenhouse gas inventories based on the existing protocol developed by the World Resources Institute (WRI) and the World Business Council for Sustainable Development (WBCSD), described below. The EPA has finalized guidance covering design principles and cross-sector core guidance covering direct emissions from stationary combustion, indirect emissions from sales and purchases of electricity and steam, direct emissions from mobile sources, and direct emissions of HFCs and PFCs from refrigeration and air conditioning systems. The EPA has also completed draft sector-specific guidance for core emissions from the following industries: cement, manufacture of refrigeration and air conditioning equipment (HFC and PFC emissions), iron and steel, and municipal solid waste landfilling. The EPA is currently developing sector-specific guidance for aluminum production, pulp and paper production, semiconductor manufacturing, and SF_6 from electricity distribution.

California. The California Climate Action Registry (CCAR), established by the California Legislature in 2000, is a voluntary program for reporting and registering greenhouse gas emissions that occur inside or outside the State of California. CCAR issued reporting protocols and began enrolling members in October 2002 and, in December 2003, released an online reporting tool, the California Action Registry Reporting On-line Tool (CARROT), in order to simplify the inventorying and reporting of greenhouse gas emissions by program participants. CCAR requires third-party verification of reported emissions and has pledged to protect participants' reported reductions under possible future regulatory programs. As of November 2004, CCAR had enrolled 43 organizations and companies.[10] In October 2004, CCAR released a protocol for the accounting of carbon emissions and reductions associated with forest conservation, improved management practices, and reforestation and issued revised guidance for calculating greenhouse gas emissions from electric power generation.

Wisconsin. Wisconsin has developed a registry for recording reductions in emissions of greenhouse gases

Recommendations for Improving the Voluntary Reporting of Greenhouse Gases Program

The Secretaries of Energy, Commerce, and Agriculture and the EPA Administrator on July 8, 2002, submitted to the White House the following recommendations for improving and expanding the Voluntary Reporting of Greenhouse Gases Program:

- Develop fair, objective, and practical methods for reporting baselines, reporting boundaries, calculating real results, and awarding transferable credits for actions that lead to real reductions
- Standardize widely accepted, transparent accounting methods
- Support independent verification of registry reports
- Encourage reporters to report greenhouse gas intensity (emissions per unit of output) as well as emissions or emission reductions
- Encourage corporate or entity-wide reporting
- Provide credits for actions to remove carbon dioxide from the atmosphere (e.g., sequestration activities) as well as for actions to reduce emissions
- Develop a process for evaluating the extent to which past reductions may qualify for credits
- Ensure that the Voluntary Reporting Program will be an effective tool to assist in reaching the goal of an 18-percent reduction in greenhouse gas intensity
- Factor in international strategies as well as State-level efforts
- Minimize transactions costs for reporters and administrative costs for the Government, where possible, without compromising the recommendations above.

[9]U.S. Environmental Protection Agency, Climate Leaders Program, "Annual GHG Inventory Summary and Goal Tracking Form," web site www.epa.gov/climateleaders/summaryform.xls. For information on Climate Leaders Program reporting requirements, see web site www.epa.gov/climateleaders/reportreq.html.

[10]See web site www.climateregistry.org/members. Seven of the organizations have at one time or another submitted reports to the Voluntary Reporting Program, including the following reporters for 2003: BP America, Los Angeles Department of Water and Power, PG&E Corporation, Sacramento Municipal Utility District, and Southern California Edison.

and other pollutants. To date, 7 organizations have registered emission reductions, 3 of which include reductions of carbon dioxide totaling over 310,000 metric tons.

Northeastern States. The six New England States and the Eastern Canadian Provinces (New Brunswick, Newfoundland and Labrador, Nova Scotia, Prince Edward Island, and Quebec) are engaged in a joint effort to develop a regional greenhouse gas registry, as specified in the New England Governors and Eastern Canadian Premiers (NEG/ECP) Climate Change Action Plan, which was issued in 2001. In the United States, the Northeast States for Coordinated Air Use Management (NESCAUM), an interstate association of air quality control divisions from the New England States, New York, and New Jersey, has spearheaded this effort.[11]

In October 2003, as part of a New England States' NEG/ECP Climate Action Plan commitment, NESCAUM launched the Regional Greenhouse Gas Registry (RGGR), which has adopted the emissions accounting and reporting protocols developed by WRI/WBCSD and is collaborating with the California Climate Action Registry to ensure that the registries will be compatible.[12] In May 2004, the Connecticut legislature passed a bill that requires any entity that reports other air emissions to report direct greenhouse gas emissions to the RGGR beginning in July 2006. All entities whose direct and indirect emissions of greenhouse gases exceed 10,000 metric tons carbon dioxide equivalent will be required to report those emissions to the RGGR beginning in July 2008.[13] NESCAUM is also initiating Phase II of the Greenhouse Gas Emissions Trading Demonstration Project, which will include further examination of baseline scenarios and multi-pollutant caps and a comprehensive assessment of early actions to reduce greenhouse gas emissions reported to the Voluntary Reporting of Greenhouse Gases Program.[14]

West Coast States. In September 2003, the governors of Washington, Oregon, and California announced a joint initiative to address climate change by developing policy recommendations on a range of issues that require regional cooperation, including the development of protocols and standard accounting methods for greenhouse gas emissions reporting.[15] In November 2004, the governors approved a series of recommendations stemming from this initiative. The recommendations identified a market-based carbon allowance program as an area holding significant promise for achieving regional greenhouse gas reductions. The governors have directed their State agencies to continue the initiative in 2005.[16]

Georgia. In May 2004, the Georgia legislature enacted the Georgia Carbon Sequestration Registry Act, which establishes a voluntary registry for carbon sequestration projects that offset greenhouse gas emissions. The State Forestry Commission is responsible for developing the rules for the program, and the Georgia Superior Court Clerks' Cooperative Authority will administer the registry, which will include a State-wide uniform automated electronic information system.[17]

Other States. Other States, including Illinois, Iowa, Maine, and Texas, have taken initial steps toward the development of State-level registries of greenhouse gas emissions.

WRI/WBCSD Greenhouse Gas Protocol Initiative. The WRI/WBCSD Greenhouse Gas Protocol initiative is an international program for developing accounting and reporting standards for greenhouse gas emissions and reductions that can be adopted by other reporting programs and registries. WRI/WBCSD has developed a corporate protocol for entity-level reporting, which was revised in 2004, and several calculation tools to support the preparation of corporate greenhouse gas inventories.[18] WRI/WBCSD continued to develop a project module in 2004.[19]

World Economic Forum Global Greenhouse Gas Register. In December 2003, the World Economic Forum

[11]Conference of New England Governors and Eastern Canadian Premiers, *Report to the New England Governors and Eastern Canadian Premiers on Climate Change Projects* (August 2003), web site www.cap-cpma.ca/images/pdf/eng/2003ReportClimate.pdf.

[12]Regional Greenhouse Gas Registry, "About the Project," web site www.rggr.us.

[13]State of Connecticut, "An Act Concerning Climate Change," Public Act No. 04-252, web site www.cga.ct.gov/2004/act/Pa/2004PA-00252-R00SB-00595-PA.htm.

[14]Northeast States for Coordinated Air Use Management, "Overview of the NESCAUM Greenhouse Gas Emissions Trading Demonstration Project: Phase II," web site www.nescaum.org/Greenhouse.

[15]"Statement of the Governors of California, Oregon and Washington on Regional Action tTo Address Global Warming" (September 22, 2003), web site www.climatesolutions.org/pubs/pdfs/Governors Statement.pdf.

[16]West Coast Governors' Climate Change Initiative, "West Coast States Strengthen Joint Climate Protection Strategy," Joint News Release (November 18, 2004), web site www.energy.ca.gov/global_climate_change/westcoastgov/releases/2004-11-18_JOINT_RELEASE.PDF.

[17]Georgia General Assembly, SB 356, "Georgia Carbon Sequestration Registry Act," web site www.legis.state.ga.us/legis/2003_04/versions/sb356_LC_25_3622S_hss_7.htm.

[18]World Business Council for Sustainable Development and World Resources Institute, *Greenhouse Gas Protocol Initiative Newsletter*, No. 11 (April 2004), web site www.ghgprotocol.org/docs/GHG_Protocol_Newsletter_No_11.pdf.

[19]World Business Council for Sustainable Development and World Resources Institute, *Greenhouse Gas Protocol Initiative Newsletter*, No. 13 (November 2004), web site www.ghgprotocol.org/docs/GHG_Protocol_Newsletter_No_13.pdf.

announced the creation of a Global Greenhouse Gas Register to provide a transparent, internationally consistent framework for companies to report emissions inventories and reduction targets. In 2004, 5 more companies (Alcan, Alcoa, Holcim, Santos, and Vitro) committed to participation in the registry,[20] joining the 8 founding members (Anglo American, Cemex, Hewlett-Packard, Lafarge, RAO Unified UESR, RWE, ScottishPower, and Vattenfall).[21] The Global Greenhouse Gas Register intended to begin accepting reports in January 2004, using reporting software based on CCAR's CARROT software.[22] As of November 2004, two participants (Cemex and Hewlett-Packard) had submitted annual emissions summary reports.[23]

Federal Legislation on Voluntary Greenhouse Gas Reporting

The second session of the 108th Congress, which convened in January 2004, produced little new action on legislation addressing the reporting of greenhouse gas emissions, emission reductions, and carbon sequestration by individual entities. The major exception was the introduction of the Climate Stewardship Act of 2004 (H.R. 4067) in the House of Representatives by Rep. Wayne Gilchrest (R-MD) and 19 cosponsors. The bill is a slightly revised version of the McCain-Lieberman Climate Stewardship Act of 2003 (S. 139), which was rejected by the Senate in a 45-53 floor vote in October 2003.[24]

H.R. 4067 would require covered entities (those with annual greenhouse gas emissions of more than 10,000 metric tons carbon dioxide equivalent) to submit an inventory of their emissions for the preceding year, beginning in 2008. The bill would limit greenhouse gas emissions by establishing a system of tradable emissions allowances, similar to the cap-and-trade system that has been used to limit sulfur dioxide emissions from electric power plants. Beginning in 2010, covered entities would be required to submit to the EPA allowances for emissions of greenhouse gases from stationary sources. Producers and importers of HFCs, PFCs, and SF_6 and producers and importers of fossil fuels used for transportation would also be required to submit to the EPA allowances for the products they sell that result in emissions of greenhouse gases. The objective of the legislation is to reduce emissions by the covered entities to 2000 levels by 2010. The bill also includes provisions for voluntary reporting of greenhouse gas emission reductions achieved between 1990 and 2010. Allowance allocation credits would be awarded to the reporters of emission reductions.

[20]World Economic Forum, "Greenhouse Gas Register," web site www.weforum.org/site/homepublic.nsf/Content/Global+Greenhouse+Gas+Register%5CParticipants+%26+Partners.

[21]World Economic Forum, "Global Greenhouse Gas Register Launched" (Press Release, January 12, 2004), web site www.weforum.org/site/homepublic.nsf/Content/Global+Greenhouse+Gas+Register+Launched.

[22]California Climate Action Registry, "CA Registry's Online Tool To Serve as Foundation for Global Greenhouse Gas Register" (Press Release, December 9, 2003), web site www.climateregistry.org/docs/PRESS/GHGRegister120903.pdf.

[23]World Economic Forum, "Public Annual Emission Summary Report," web site www.ghgr.org/public/PublicAnnualSummaryReport.aspx.

[24]"Senate Defeats Climate Bill, But Proponents See Silver Lining," *New York Times* (October 31, 2003).

2. Reducing Emissions from Electric Power

Electric Power Industry

The electric power industry emitted approximately 2,279.3 million metric tons of carbon dioxide in 2003, 38.8 percent of total U.S. carbon dioxide emissions.[25] Carbon dioxide emissions result from the combustion of fossil fuels—coal, oil, and natural gas—during electricity generation. For example, coal, which accounted for 83.5 percent of electric power industry carbon dioxide emissions in 2003, is the primary energy source for U.S. electricity generation (providing 51 percent of total generation in 2003) and has the highest rate of carbon dioxide emissions per unit of energy used among fossil fuels.[26]

Since 1990, carbon dioxide emissions from the electric power industry have increased by 491.4 million metric tons or 27.5 percent, a trend that reflects U.S. economic growth (gross domestic product grew by about 46 percent between 1990 and 2003) and corresponding increases in fossil energy consumption in the electric power sector. From 2002 to 2003, carbon dioxide emissions from the electric power industry increased by 1.0 percent. Contributing to the increase in emissions in 2003 were a 0.6-percent increase in total electricity generation and a 1.8-percent increase in emissions from coal-fired generation.

Projects Reported

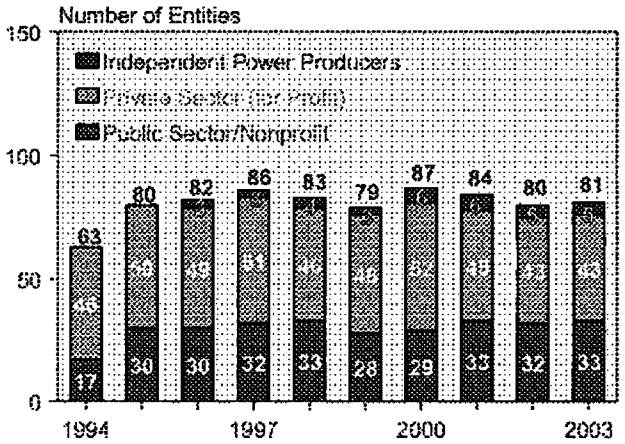
For the 2003 reporting year, 81 electric power providers reported to the Voluntary Reporting Program on Form EIA-1605 (Figure 4)—a decrease from the peak of 87 electric power providers reporting on the long form in 2000 but a 29-percent increase from the 63 reporters for the first reporting year, 1994. Since 1997, merger activity in the electric power industry has reduced the pool of electric utilities able to report to the Voluntary Reporting Program.[27]

Electric power providers made up 46 percent of the total 178 project-level reporters for data year 2003. Of the 81 electric power industry reporters, 48 were private-sector organizations, including 43 investor-owned utilities (IOUs) and 5 independent power producers (IPPs); and 33 were public-sector or nonprofit organizations, including electric cooperatives, municipal utilities, and other public-sector entities, such as the Tennessee Valley Authority (TVA).

The 485 electric power projects reported for 2003 (Figure 5) represent a 16-percent increase from the 2002 reporting year total of 417 and a 155-percent increase from the 190 projects reported for 1994. Electric power projects were the most numerous project type reported to the Voluntary Reporting Program, accounting for 25 percent of all projects reported on Form EIA-1605 for 2003.

Electric power projects are reported in two categories: (1) carbon content reduction; and (2) increasing energy efficiency in generation, transmission, and distribution. Carbon content reduction projects include availability improvements, fuel switching; and increases in lower emitting capacity. Increased efficiency through generation, transmission, and distribution projects includes

Figure 4. Number of Electric Power Providers Reporting on Form EIA-1605, by Entity Type, Data Years 1994-2003



Source: Energy Information Administration, Form EIA-1605.

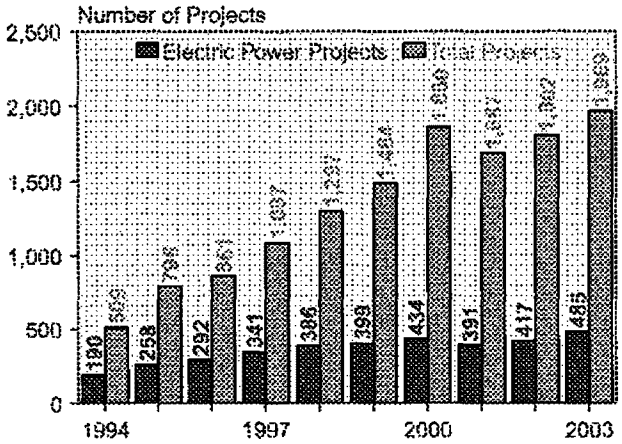
[25] Energy Information Administration, *Emissions of Greenhouse Gases in the United States 2003*, DOE/EIA-0573(2003) (Washington, DC, December 2004), web site www.eia.doe.gov/oiaf/1605/ggrpt.

[26] Energy Information Administration, *Voluntary Reporting of Greenhouse Gases, Instructions for Form EIA-1605*, DOE/EIA-1605(2004) (Washington, DC, April 2004), Appendix B, web site ftp://ftp.eia.doe.gov/pub/oiaf/1605/cdrom/pdf/FormEIA-1605_2003_Instructions.pdf.

[27] There were 141 operating electric utilities in the United States in 2000, compared with 172 in 1992. See Energy Information Administration, *The Changing Structure of the Electric Power Industry 2000: An Update*, DOE/EIA-0562(00) (Washington, DC, October 2000), web site www.eia.doe.gov/cneaf/electricity/chg_stru_update/update2000.html.

such activities as heat rate improvements, cogeneration and waste heat recovery, high-efficiency transformers, and reductions in line losses associated with electricity transmission and distribution. In 2003, 257 carbon content reduction projects were reported, and 255 projects for increased energy efficiency in generation, transmission, and distribution were reported.[28]

Figure 5. Electric Power Projects and Total Projects Reported on Form EIA-1605, Data Years 1994-2003



Source: Energy Information Administration, Form EIA-1605.

Reductions Reported

Total reported emission reductions from the 485 electric power projects reported for data year 2003 (Table 9) included 158.0 million metric tons carbon dioxide equivalent from direct sources and 17.8 million metric tons from indirect sources. The 257 projects in the category "reducing carbon content" reported emission reductions of 146.9 million metric tons carbon dioxide equivalent from direct sources and 13.5 million metric tons from indirect sources. The 255 projects included in the category "increasing energy efficiency in generation, transmission, and distribution" reported emission reductions of 15.5 million metric tons carbon dioxide equivalent from direct sources and 4.1 million metric tons from indirect sources.

Many of the largest projects reported to the Voluntary Reporting Program are electric power projects. In 2003, 27 electric power projects reported direct reductions of 1 million metric tons carbon dioxide equivalent or more, representing 55 percent of all the projects that reported direct emission reductions exceeding 1 million metric tons carbon dioxide equivalent. About three-fourths of those reported electric power projects were related to nuclear power.

Table 9. Number of Electric Power Projects and Emission Reductions Reported on Form EIA-1605 by Project Type and Reduction Type, Data Year 2003

Reduction Objective and Project Type	Number of Projects Reported	Emission Reductions Reported (Metric Tons Carbon Dioxide Equivalent)	
		Direct	Indirect
Reducing Carbon Content	**257**	**146,857,049**	**13,482,222**
Availability Improvements	44	70,235,626	7,407,809
Fuel Switching	47	17,665,099	14,605
Increases in Lower Emitting Capacity	115	62,051,111	6,756,833
Other Carbon Reductions	65	29,134,810	1,016,534
Increasing Energy Efficiency	**255**	**15,532,986**	**4,099,254**
Generation	*191*	*11,383,129*	*3,817,029*
Efficiency Improvements	170	11,219,307	657,944
Cogeneration and Waste Heat Recovery	21	163,821	3,159,085
Transmission and Distribution	*65*	*4,160,221*	*282,225*
High-Efficiency Transformers	31	1,811,477	247,990
Reconductoring	27	1,847,515	240,686
Distribution Voltage Upgrades	28	2,645,519	189,695
Other Transmission and Distribution	15	1,740,398	72,550
Total Electric Power Projects	**485**	**158,007,281**	**17,825,248**

Note: Project totals may not equal sum of components because some projects may be counted in more than one category.
Source: Energy Information Administration, Form EIA-1605.

[28]More than one project type may be assigned to a single project; therefore, the sums of projects and reductions by project type category may exceed the total numbers of projects and the total reductions reported.

Reducing the Carbon Content of Energy Sources

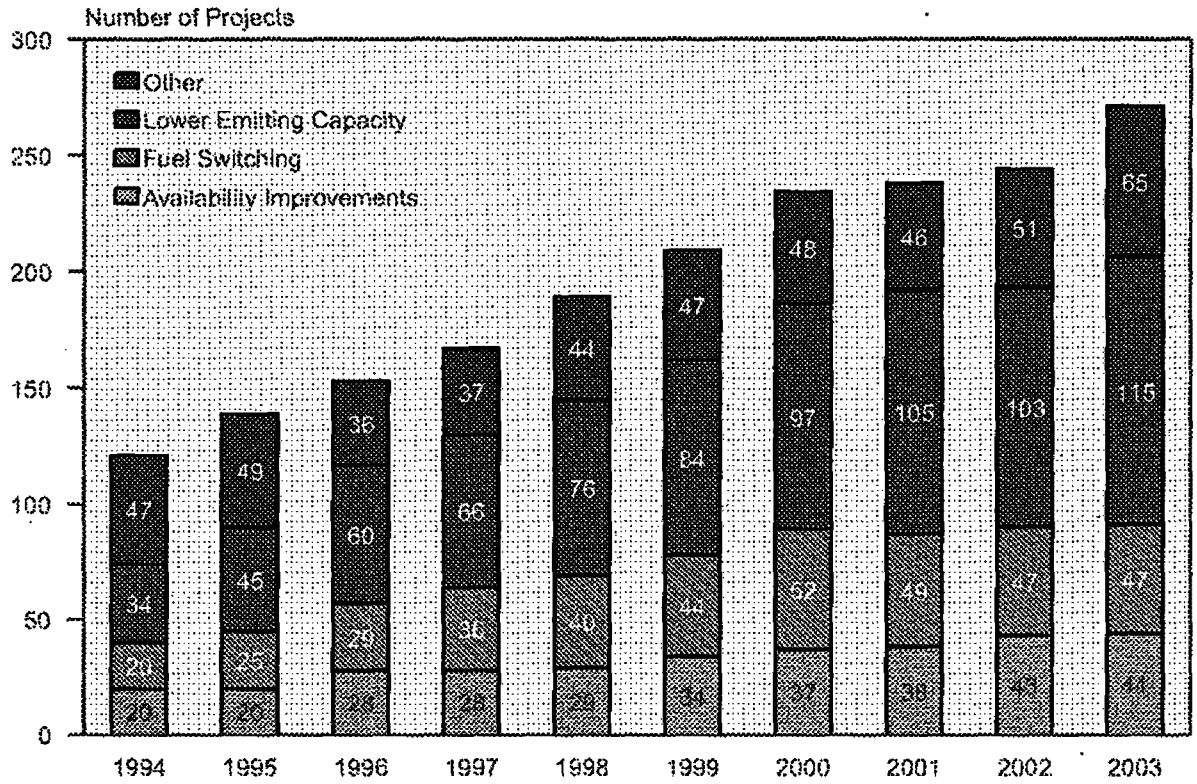
Projects involving fuel switching, power plant availability improvements for lower than average carbon-emitting plants, increases in low- or zero-emitting generation capacity, and other similar activities typically reduce the amount of carbon consumed to generate a unit of electricity. For 2003, 257 such projects were reported, including some of the largest projects reported to the Voluntary Reporting Program (Figure 6). The emission reductions reported for "carbon content reduction" electric power projects in 2003 totaled 146.9 million metric tons carbon dioxide equivalent from direct sources and 13.5 million metric tons from indirect sources. Some carbon content reduction projects are in fact "hybrids," combining efficiency improvements with measures such as availability improvements or increases in lower emitting capacity (see box on page 23).

Availability Improvements

There were 44 availability improvement projects reported for data year 2003—1 more than the 43 reported for 2002 and 24 more than the 20 reported for 1994. Availability improvement projects accounted for emission reductions of 70.2 million metric tons carbon dioxide equivalent from direct sources and 7.4 million metric tons from indirect sources in 2003. Of the 44 availability improvement projects reported, 33 involved nuclear power plants. As in previous reporting years, availability improvement projects, especially those undertaken at nuclear facilities, produced some of the largest reported reductions in carbon dioxide emissions. Mainly through significant advances in operating, maintenance, and refueling procedures, capacity factors at some nuclear plants have increased and, thus, have displaced some fossil-fuel-based power generation that would have been used in the absence of the availability improvements.

Because nuclear power plants are invariably large baseload facilities, even a fairly small improvement in plant availability can lead to a sizable reduction in carbon dioxide emissions through the displacement of fossil-fueled generation. For example, the Southern Company is committed to the continued enhancement of operational performance and efficiency improvements at Plant Vogtle. These improvements are targeted

Figure 6. Electric Power Projects Reported on Form EIA-1605 Reducing the Carbon Content of Energy Sources, by Project Type, Data Years 1994-2003



Note: The sum of projects in many project categories exceeds the total number of projects reported, because more than one project type may be assigned to a single project.

Source: Energy Information Administration, Form EIA-1605.

to safely reducing costs and increasing capacity factors by reducing outage lengths and forced outages. To achieve these improvements, a complex strategy consisting of many operational, maintenance, and outage-related activities continues to be implemented at the plants. Steam generator instrumentation upgrades at Southern Company's nuclear plants have minimized incidents in which a unit is automatically taken out of service. The results have been dramatic at the Vogtle plant, where megawatthours generated have increased and outage lengths have decreased since the 1990 baseline year of the project.

Several major performance records have been set in the nuclear industry in recent years, and major progress has been made in reducing the length of scheduled refueling outages. Factors that have contributed to the decrease in outage durations include: (1) online maintenance, with some activities that previously were performed during refueling outages now being performed while the unit is online, if it can be done safely; (2) optimum scheduling; and (3) use of robotic inspection equipment for steam generator and reactor inspection activities. Since 1991, total annual generation at the Vogtle plant has risen by approximately 20 percent. For 2003, Southern Company reported that 1,705,088 megawatthours of generation that would have come from fossil fuels was instead generated from nuclear power because of the project, reducing the company's emissions by 1,572,753 metric tons carbon dioxide equivalent. Southern Company has performed similar availability improvements at other nuclear power plants, with similar results.

Fuel Switching

A total of 47 fuel-switching projects were reported for 2003, the same number reported for 2002 and 27 more than the 20 reported for 1994. Switching from coal or oil to natural gas lowers carbon dioxide emissions because of the lower carbon content of natural gas relative to other fossil fuels. For example, switching from bituminous coal to natural gas can reduce carbon dioxide emissions per unit of energy consumed by approximately 43 percent. Although other reported actions, such as switching from oil to gas, may not lead to reductions of the same magnitude, they also reduce greenhouse gas emissions. The fuel-switching projects reported for 2003 accounted for emission reductions totaling 17.7 million metric tons carbon dioxide equivalent from direct sources and 0.01 million metric tons from indirect sources.

National Energy & Gas Transmission (NEGT), reported a fuel-switching program that added the ability to use natural gas as a boiler fuel for startup and co-firing to three coal-fired units at its Brayton Point Station in Somerset Massachusetts.[29] The plant's Unit No. 1 first used natural gas in June 1994, Unit No. 2 in November 1994, and Unit No. 3 in April 1995. Natural gas is used as a startup fuel (ignition and warmup) and is co-fired with coal to help control emissions of nitrogen oxides from the units. In 2003, the project decreased the plant's coal use by more than 150,000 million British thermal units (Btu) and residual fuel oil use by more than 53,000 million Btu. The fuel switching resulted in a reported reduction in emissions of 7,394 metric tons carbon dioxide equivalent in 2003.

Increases in Lower Carbon Emitting Capacity

Projects involving the construction of new, lower emitting power plants or increases in the capacity of existing lower emitting plants were among the most numerous electricity supply projects reported. For 2003, 115 such projects were reported, up from 103 reported for 2002. Most of the projects reported for 2003 involved increases in nuclear (23 projects), hydropower (18 projects), photovoltaic (21 projects), natural gas (13 projects), and wind capacity (36 projects). Emission reductions reported for increases in lower emitting capacity projects in 2003 totaled 62.1 million metric tons carbon dioxide equivalent from direct sources and 6.8 million metric tons from indirect sources.

For 2003, Exelon Corporation reported on a new project that entails an increase in lower emitting capacity. ComEd (a subsidiary of Exelon), the City of Chicago, the Illinois Department of Commerce and Economic Opportunity, the International Brotherhood of Electrical Workers, Chicago Public Schools, and Spire Solar Chicago have pooled funding and expertise to create the Chicago Solar Partnership to develop solar resources and to help increase the development of solar generation in Chicago. The increase in zero emitting generation will help to offset grid electricity generated from higher emitting sources. The project had 5 major photovoltaic installations in 2001, 8 in 2002, and 8 in 2003, for a total capacity around the city of 524 kilowatts, which translates to 386,849 kilowatthours of generation annually. In 2003, Exelon reported on 41 percent of this project, which equated to reported emission reductions of 287 metric tons carbon dioxide equivalent.

[29] This project was originally sponsored by New England Power Company and reported by its parent, New England Electric System (NEES) Company. In August 1998, USGen New England, Inc. (USGenNE) completed the acquisition of NEES Company's hydroelectric and fossil power generation business previously operated by New England Power. As part of the acquisition, the rights to the emission reductions and carbon sequestration achieved by this and other projects were transferred to USGenNE. For 2000 through 2002, the activities previously reported by USGenNE were incorporated into the report submitted by its parent, PG&E Corporation. For 2003, this project was included in a separate report submitted by NEGT, formerly known as PG&E National Energy Group, a subsidiary of PG&E Corporation.

Other Carbon Reduction Projects

Sixty-five "other carbon reduction" projects were reported for 2003, 14 more than reported for 2002 and 18 more than reported for 1994. The category of "other" projects includes projects that decrease higher emitting capacity, make dispatching changes only, or increase power purchases from lower or zero emitting capacity. In 2003, 34 projects used low or zero emitting power purchases to reduce emissions. This category was added to the Voluntary Reporting Program for the 1999 data year to classify electric power producer/supplier purchases of power from low or zero emitting generation sources for resale, replacing generation or purchases of power from more carbon-intensive generation sources. Another 4 projects reported for 2003 involved decreases in higher emitting capacity, and 2 involved changes in the dispatching of power plants. Changes in dispatch order can reduce carbon dioxide emissions if lower emitting plants are used more frequently. For 2003, reported emission reductions from "other carbon reduction" projects totaled 29.1 million metric tons carbon dioxide equivalent from direct sources. An emission reduction of 1.0 million metric tons carbon dioxide equivalent was reported from indirect sources.

Xcel Energy reported a new project in 2003 to reduce emissions in the Denver metropolitan area through a decrease in high emitting capacity. Units 1 and 2 of the Arapahoe plant were voluntarily retired at the end of December 2002. Their retirement was part of the Xcel Energy commitment to the Denver Metropolitan Emission Reduction Program (MERP), a program established through the Colorado Department of Public Health and Environment. Between 1999 and 2002, the average net generation of Units 1 and 2 was 365,272 megawatthours. Xcel reported a reduction of 607,814 metric tons carbon dioxide equivalent with the removal of these two high emitting generation units.

There were only two projects reported in 2003 that fell into the "dispatching changes only" category. One is the "Merger Dispatch Savings" project reported by Cinergy. The other is the "Renewable Energy Purchases – Small Hydro" project reported by Southern California Edison Company. Southern California Edison's project changed the dispatch order to increase the use of hydroelectric power over natural-gas-fired generation, leading to a reported direct reduction of 1,270 metric tons carbon dioxide equivalent in 2003.

Emission reductions were achieved from Cinergy's project through the economic dispatch of Cinergy's generating facilities. Before the merger of the Cincinnati Gas & Electric Company and PSI Energy, the same generating facilities were dispatched according to the demands of each operating company. After the merger, the units from both operating companies were operated and dispatched in coordination with each other. This method of operation and economic dispatch is estimated to provide a 1-percent efficiency gain in the operation of

Electricity Supply Carbon Reduction Projects: Definitions and Terminology

The combustion of fossil fuels to produce heat for electricity generation causes greenhouse gas emissions. In addition to substantial releases of carbon dioxide, fossil fuel combustion also emits other effluents, including small quantities of methane and nitrous oxide. Carbon content reduction projects typically reduce greenhouse gas emissions by replacing fuels with relatively high carbon dioxide emissions (such as coal) with fuels that have lower carbon dioxide emissions (such as natural gas) or no net carbon dioxide emissions (such as nuclear power or renewables).

Availability Improvements. By reducing the frequency and length of planned and unplanned power plant outages, availability improvement projects can result in increased use of a power plant. Emissions reductions occur when increasing generation from a lower carbon emitting plant displaces generation from a higher carbon emitting plant. Power plant utilization is measured by the plant's *capacity factor*, defined as the ratio of the average load on the plant over a given period to its total capacity. For example, if a 200-megawatt plant operates (on average) at 75 percent of its rated capacity (i.e., at a load of 150 megawatts) over a period of a year, the plant's capacity factor is 75 percent for that year. Hence, there is a reduction in carbon dioxide emissions when there is an improvement in the capacity factor of a lower than average carbon emitting plant that results in a reduction in generation of a higher than average carbon emitting plant.

Fuel Switching. The amount of carbon contained in fossil fuels and released in the form of carbon dioxide during combustion varies, depending on the type of fuel. Thus, switching from a higher carbon content fuel (such as coal) to a lower carbon content fuel (such as natural gas), results in reduced carbon dioxide emissions.

Increases in Generating Capacity With Low or No Net Carbon Dioxide Emissions. By increasing the capacity of an existing generating unit that produces relatively low emissions or no net emissions (e.g., a hydroelectric plant), or by constructing a new unit with low or no net carbon dioxide emissions (e.g., a wind turbine), a power supplier can reduce or avoid reliance on higher emitting plants, thus reducing the combined greenhouse gas emissions from all plants.

the system. The efficiency gain is realized because the more recently built generating units, which are the most efficient units, are the first dispatched to meet customer demands for electricity. Therefore, the most efficient generating units are operating more than the older, less efficient units. In 2003, Cinergy reported a decrease in consumption of 279,165 short tons of bituminous coal and direct emission reductions of 601,736 metric tons carbon dioxide equivalent.

Alliant Energy reported three new "low or zero emitting power purchase" projects in 2003. Although all three of these projects began in 1998, Alliant began reporting them for data year 2003. In two of the projects, Alliant purchased hydroelectric energy and transmitted it to Iowa and Wisconsin. Total hydroelectric power purchased for these two projects was 90,691 megawatthours. In the third project, Alliant purchased power produced from biomass by BFC Gas & Electric in Cedar Rapids, Iowa, which converts industrial, agricultural, and construction waste into renewable energy. The facility recycles the biomass materials into a low-Btu biogas through gasification. Some of the materials recycled include sawmill waste; light paper mill rejects; construction demolition wood; energy crops, such as switchgrass, sweet sorghum, and poplar trees; crop residues such as corn stalks, corncobs, and seed cord; and unrecyclable low-grade paper. Total electricity purchased from this biomass source in 2003 was 22,576 megawatthours, and total direct reductions for the three "low or zero emitting power purchase" projects were 88,702 metric tons carbon dioxide equivalent.

Increasing Energy Efficiency in Electricity Production and Distribution

Projects involving improvements in the efficiency of electricity generation, transmission, and distribution reported for 2003 produced much smaller emission reductions on average than projects reducing carbon content. Efficiency improvement tends to be an ongoing effort by electricity suppliers, yielding a continuous stream of small, incremental improvements rather than one-time dramatic increases in efficiency. For example, heat rate improvement projects often are undertaken in response to normal plant deterioration. As power plants age, efficiency tends to erode gradually. Operators seek to maintain heat rates by replacing or refurbishing old, worn-out equipment. Similarly, new energy-efficient transformers are often installed gradually over a period of years, as old transformers fail.

For 2003, 255 "increasing energy efficiency" projects were reported, including some hybrid projects that combined efficiency improvements with measures such as availability improvements. The efficiency improvement projects fall into two main categories: (1) generation, involving efficiency improvements in the conversion of fossil fuels and other energy sources into electricity; and (2) transmission and distribution, involving reduced losses in the delivery of electricity from the power plant to the end user (see box on page 25).

Generation Projects

Efficiency Improvements. Improvements in generating efficiency were the most numerous type of efficiency project reported for 2003. There were 170 such projects undertaken in 2003. Heat rate improvements at coal-fired power plants are a commonly reported means of increasing efficiency and reducing carbon dioxide emissions. There are numerous opportunities for improving efficiency at existing power plants, but the efficiency gains, and hence reductions in fuel consumption and emissions, are limited by technology and tend to be marginal. Emission reductions reported for generation efficiency improvement projects in 2003 totaled 11.2 million metric tons carbon dioxide equivalent from direct sources and 0.7 million metric tons from indirect sources.

For 2003, Entergy Services Inc. reported 30 new efficiency improvement projects. The projects included equipment replacement or control system improvements on 14 different units at 7 different facilities. The equipment replacements included air preheater and bypass seal replacements, condenser vacuum pump replacements, neural net installations, cold-end preheater basket replacements, installation of newly designed condenser tube plugs, drip pump and bypass line replacements, and more. Control systems affected by the improvements included burner management systems, temperature control systems, boiler feedwater control systems, RheoVac air in-leakage monitoring systems, and condensate filtration systems. Each improvement was reported as a separate project, for a total of 30 efficiency improvements in all. The projects produced a combined total reduction of 427,695 metric tons carbon dioxide equivalent in 2003.

Cogeneration and Waste Heat Recovery. A total of 21 cogeneration and waste heat recovery projects were reported for 2003, 2 more than the 19 reported in 2002. Emission reductions reported for cogeneration and waste heat recovery projects in 2003 were, on average, larger than those reported for the other types of efficiency improvement projects but less than the average for carbon content reduction projects. Reported end uses of the thermal energy included electricity generation, process heat applications, space heating and cooling, humidification, and cooking. The emission reductions reported for cogeneration and waste heat recovery projects in 2003 totaled 163,821 metric tons carbon dioxide equivalent from direct sources and 3.2 million metric tons from indirect sources.

The direct reductions reported for cogeneration projects are low, because the City of Klamath Falls, Oregon, reported a negative direct reduction (or increase) in emissions of more than 2.3 million metric tons carbon dioxide equivalwent. The increase was attributed to carbon dioxide released during the combustion of natural

Efficiency Projects: Definitions and Terminology

Generation Projects

It is neither theoretically nor practically possible to convert all the thermal or other energy produced in, or consumed by, a power plant into electrical energy or useful heat. In fact, much of the energy is lost rather than converted. Typically, U.S. steam-electric generating plants operate at efficiencies of about 33 percent, meaning that two-thirds of the thermal energy produced is lost. Some more advanced power plants have higher efficiencies, but even new combined-cycle plants (in which the waste heat from a gas turbine is recovered to produce steam to drive a turbine) typically have efficiencies of only 50 to 60 percent. Generation projects seek to improve power plant efficiencies either by reducing the amount of energy lost during the conversion process or by recovering the lost energy for subsequent application.

Efficiency Improvements. By increasing the efficiency of the generation process, efficiency improvement projects at fossil-fuel-fired power plants reduce the plants' *heat rate*, defined as the amount of fossil energy (measured in Btu) needed to produce each kilowatthour of electricity. The result is a reduction in the amount of fuel that must be burned to meet generation requirements, and hence a reduction in carbon dioxide (and other greenhouse gas) emissions. Efficiency improvements at nonfossil (e.g., hydroelectric) power plants can also reduce greenhouse gas emissions. Emission reductions occur if the efficiency improvement leads to an increase in the amount of electricity generated by the affected plant, with a consequent reduction in the amount of electricity that must be generated by other (fossil fuel) plants to meet demand.

Cogeneration. Only a portion of the heat generated during the combustion of fossil fuels can be converted into electrical energy; the remainder is generally lost. Cogeneration involves the recovery of thermal energy for use in subsequent applications. Cogeneration facilities typically employ either topping or bottoming cycles. In a *topping cycle*, thermal energy is first used to produce electricity and then recovered for subsequent applications. Topping cycles are widely used in industry as well as at electric power plants that sell electricity and steam to customers. In a *bottoming cycle*, the thermal energy is first used to provide process heat, from which waste heat is subsequently recovered to generate electricity. Bottoming cycle applications are less common, usually associated with high-temperature industrial processes. Because cogeneration involves the recovery and use of thermal energy that would otherwise be wasted, it reduces the amount of fossil fuel that must be burned to meet electrical and thermal energy requirements, hence reducing greenhouse gas emissions.

Transmission and Distribution Projects

The purpose of the electricity transmission and distribution system is to deliver electrical energy from the power plant to the end user. Resistance to the flow of electrical current in cables, transformers, and other components of the transmission and distribution system causes a portion of the energy (typically about 7 percent) to be lost in the form of heat. Improving the efficiency of the various system components can decrease such line losses, reducing the amount of generation required to meet end-use demand and, thus, power plant fossil fuel consumption and greenhouse gas emissions.

High-Efficiency Transformers. Transformers, used to change the voltage between different segments of the transmission and distribution system, are a source of system losses. Transformer losses occur as a result of impedance to the flow of current in the transformer windings and because of hysteresis and eddy currents in the steel core of the transformer. When existing transformers are replaced with high-efficiency transformers (including improved silicon steel transformers and amorphous core transformers), losses are reduced.

Reconductoring. Like transformers, conductors (including feeders and transmission lines) are a source of transmission and distribution system losses. In general, the smaller the diameter of the conductor, the greater its resistance to the flow of electric current and the greater the consequent line losses due to heating. Reconductoring involves the replacement of existing conductors with larger diameter conductors or reduced resistance materials (i.e., superconductive materials), which not only reduces line losses but also allows for an increase in transmission capacity.

Distribution Voltage Upgrades. Line losses are dependent, in part, on the voltage at which the various segments of the transmission and distribution system operate. Upgrading the voltage of any segment can reduce line losses.

gas in the city's cogeneration plant. Emissions from higher carbon emitting generation sources usually offset these combustion-related emissions; however, according to the City of Klamath Falls, the electricity produced by the plant displaced other natural-gas-fired generation with an equivalent emissions rate. The project still resulted in a net reduction in emissions, because the cogeneration plant also produced steam that reduced indirect emissions by displacing fossil-fired steam production at the steam customer's facility. Without this project, direct reductions associated with the cogeneration projects reported for 2003 would be about 2.5 million metric tons carbon dioxide equivalent.

The Southern Company reported an example of a cogeneration project for a new cogeneration facility that its subsidiary, the Alabama Power Company, began operating in 2000 in Theodore, Alabama. The facility fires only natural gas to produce electricity, for INEOS Phenol, and process steam for Degussa, AG. The cogeneration facility consists of a 170-megawatt combustion turbine with a supplementally fired (duct burner) heat recovery steam generator, a 40-megawatt steam turbine, and two package boilers. The package boilers did not replace any existing boilers. Degussa produces its own steam and supplements it with steam from the Theodore cogeneration facility. The heat rate for the cogeneration facility improved from 7.083 million Btu per megawatthour in 2002 to 6.882 million Btu per megawatthour in 2003, leading to a total direct reduction of 669,857 metric tons carbon dioxide equivalent. In addition, a small indirect reduction probably was also achieved, because the steam supplied to Degussa was produced with newer and more efficient boilers than the older Degussa boiler; however, details about the Degussa boiler are not known.

Another example of a cogeneration project is a turbine-generator owned by Minnesota Power (MP) but located at the SAPPI Ltd paper mill in Cloquet, Minnesota. The MP unit, with 23 megawatts net capacity, was placed in a process steam line where steam previously had been throttled to lower pressure for process use. Consequently, electricity is produced with an overall process efficiency of 83 percent using steam produced from boilers fueled with 50 percent natural gas and 50 percent wood waste (biomass) from mill processes. MP estimates that the cogeneration application heat rate is 4,112 Btu per net kilowatthour of electricity generation. Through 2002, MP assumed that its generator displaced generation that would otherwise have been produced from conventional subbituminous coal. For 2003, MP assumed that the unit displaced generation that would have come from the Mid-Continent Area Power Pool (MAPP). Therefore, a MAPP number of 0.92 metric tons carbon dioxide per megawatthour was used to calculate carbon dioxide reductions. The 0.92 value was provided by the Minnesota Pollution Control Agency. This project was responsible for a direct emission reduction of 87,187 metric tons carbon dioxide equivalent.

Transmission and Distribution Projects

Transmission and distribution projects, although not as numerous as generation projects, were nonetheless reported in significant numbers. For 2003, 65 transmission and distribution projects were reported. Unlike generation projects, which typically have discrete start and completion dates, efforts such as upgrading conductors and replacing transformers are ongoing activities by electric power producers. Consequently, most of the transmission and distribution efficiency improvements reported for 2003 were reported as continuations of long-standing projects rather than as new projects.

The national average energy loss from transmission and distribution is about 7 percent of generation. In terms of average emission reductions, transmission and distribution projects typically are somewhat smaller than generation projects; however, reductions can still be significant. There are numerous opportunities for improving efficiencies in the delivery of electricity, but the efficiency gains generally are smaller than those from generation projects.

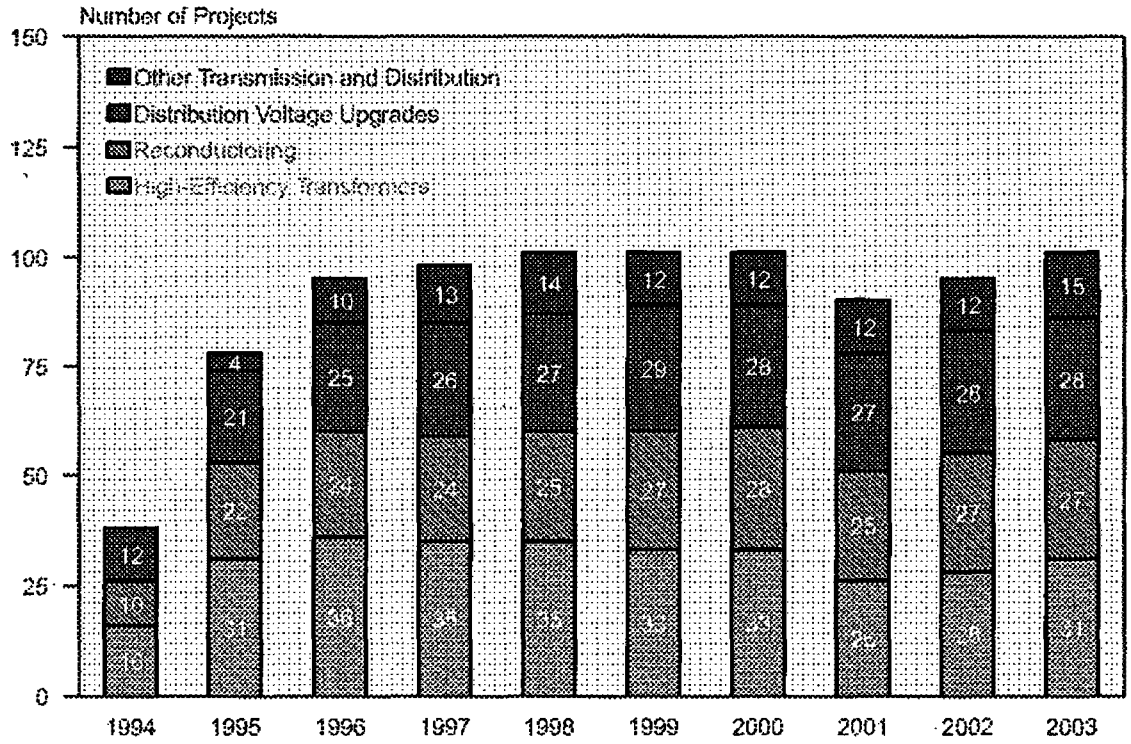
For 2003, the most frequently reported types of transmission and distribution projects (Figure 7) were high-efficiency transformers (including improved silicon steel and amorphous core transformers); reconductoring (replacing existing conductors with large-diameter conductors to reduce line losses); and distribution voltage upgrades (increasing the voltage at which the various segments of the system operate to reduce line losses). The other transmission and distribution project category includes projects that involve more than one type of activity, as well as such activities as transmission line improvements and capacitor installations. In 2003, 31 high-efficiency transformer projects were reported, 3 more than the 28 reported for 2002 and 15 more than the 16 reported for 1994. Many of the reported projects were "hybrids," combining high-efficiency transformer installation with one or more other transmission and distribution activities (e.g., reconductoring).

Another 27 projects involving reconductoring and 28 projects involving distribution voltage upgrades (again, often in combination with other activities) were reported for 2003—the same numbers that were reported in those categories for 2002. The reporters classified 15 projects as "general" or "other" transmission and distribution, 3 more than reported for 2002. Emission reductions reported for transmission and distribution projects in 2003 totaled 4.2 million metric tons carbon dioxide equivalent from direct sources and 0.3 million metric tons from indirect sources.

Xcel Energy reported a new high-efficiency transformer project in 2003. Effective November 1, 2003, Public Service Company of Colorado, a subsidiary of Xcel Energy, reduced transformer losses by 3.5 megawatts when a new transformer configuration was implemented at the Denver Zuni Terminal Substation. With the new configuration in full operation for 2 months of 2003, 5,124 megawatthours of energy was saved, leading to reductions in emissions of carbon dioxide, methane, and nitrous oxide that totaled 4,497 metric tons carbon dioxide equivalent.

American Electric Power, Inc. reported on a continuing project that fits into both the reconductoring and distribution voltage upgrade categories. Typical operation of the American Electric Power distribution system requires that improvements be made on a continuing basis for the purpose of rehabilitation and reinforcement to distribute power efficiently and reliably to customers. Improvements to the distribution system, which increase peak capacity and reduce line losses, include: voltage conversion of stations and circuits; circuit voltage conversions; primary line reconductoring; load transfers between phases to balance circuit loading; primary line additions and multiphasing; installation of more efficient distribution system devices; and installation of shunt capacitors on distribution circuits. For 2003, American Electric Power reported reduced electricity demand of 1,042,179 megawatthours and emission reductions of 835,020 metric tons carbon dioxide equivalent.

Figure 7. Reported Transmission and Distribution Projects Reported on Form EIA-1605 by Type, Data Years 1994-2003



Note: The sum of projects in a project category may exceed the total number of projects reported, because more than one project type may be assigned to a single project.

Source: Energy Information Administration, Form EIA-1605.

3. Reducing Emissions from Energy End Use

Introduction

Greenhouse gas emissions from energy end use include emissions from both stationary and mobile sources.[30] In 2003, the industrial, commercial, and residential sectors combined to emit 3,907 million metric tons carbon dioxide (68 percent of total U.S. carbon dioxide emissions)—nearly all from stationary sources (Figure 8). Emissions from stationary sources are produced both directly by the combustion of fossil fuels (e.g., natural gas consumption for home heating) and indirectly from the consumption of electricity (e.g., for commercial lighting). In 2003, the transportation sector accounted for 1,875 million metric tons carbon dioxide, nearly all from mobile sources, and represented approximately 32 percent of U.S. carbon dioxide emissions.

Reducing Emissions from Stationary Sources

Emissions from stationary sources in 2003 included 2,276 million metric tons carbon dioxide from the generation of electricity that was ultimately consumed in the industrial, commercial, and residential sectors. Industry was responsible for the largest share of total stationary-source emissions at 43 percent, followed by the residential sector at 31 percent and the commercial sector at 26 percent.

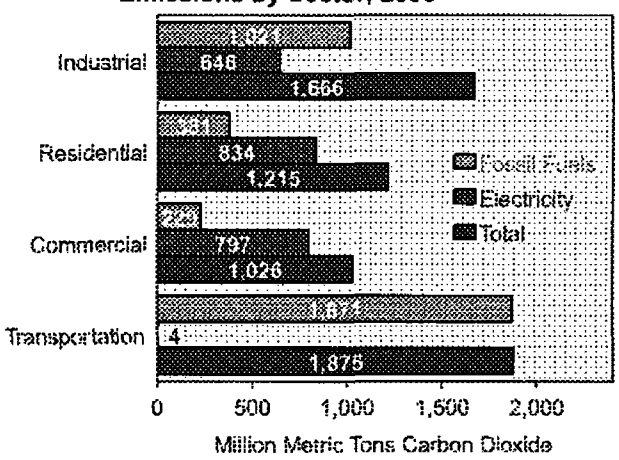
Between 1990 and 2003, carbon dioxide emissions associated with industrial, commercial, and residential energy use increased by 14.5 percent. Of the stationary sources, the commercial sector has the fastest-growing emissions, registering a 32.0-percent increase in emissions between 1990 and 2003. Emissions from the residential sector increased by 27.9 percent over the same period, and industrial sector emissions declined by 1.0 percent.[31]

Projects Reported

Reported emission reduction projects affecting stationary sources include fuel switching (e.g., from fuel oil to natural gas); light bulb replacement (e.g., substituting compact fluorescent bulbs for incandescents); heating, ventilation, and air conditioning (HVAC) system upgrades (e.g., maintenance or replacement with more efficient units); appliance replacement (e.g., retiring old appliances for ENERGY STAR[32] products); motor and motor drive upgrades; and industrial power system improvements. For 2003, 67 entities reported 374 energy end-use projects on Form EIA-1605 (Table 10). These 374 projects accounted for 19 percent of all the projects reported on the long form.

For the 2003 reporting year, the number of entities reporting energy end-use projects, the number of energy end-use projects reported, and the total reported direct and indirect emission reductions resulting from energy end-use projects all were higher than for the 2002 reporting year (Table 10). Energy end-use reporters increased from 65 in 2002 to 67 in 2003, the number of projects reported rose from 339 to 374, reported direct reductions increased from 24.7 million metric tons to 25.2 million

Figure 8. Sources of U.S. Carbon Dioxide Emissions by Sector, 2003



Note: The industrial sector includes agriculture; the residential and commercial sectors exclude transportation.

Source: Energy Information Administration, *Emissions of Greenhouse Gases in the United States 2003*, DOE/EIA-0573(2003) (Washington, DC, December 2004).

[30]Stationary sources include emission sources at fixed locations, such as power plants, factories, refineries, mines, and heating plants or waste conversion facilities, among others. Mobile sources include transportation sector emissions from non-fixed locations, such as motor vehicles, aircraft, trains, and ships, among others.

[31]Energy Information Administration, *Emissions of Greenhouse Gases in the United States 2003*, DOE/EIA-0573(2003) (Washington, DC, December 2004), web site www.eia.doe.gov/oiaf/1605/ggrpt.

[32]ENERGY STAR is a joint program of the U.S. Department of Energy and the U.S. Environmental Protection Agency helping businesses and individuals protect the environment through increased energy efficiency. See web site www.energystar.gov.

metric tons carbon dioxide equivalent, and reported indirect reductions increased from 9.1 million metric tons to 10.0 million metric tons carbon dioxide equivalent.

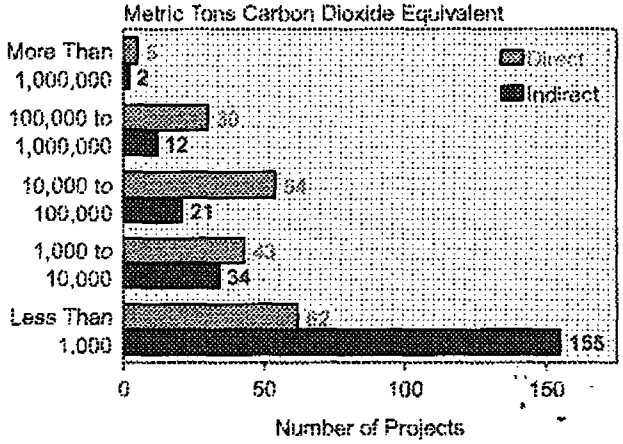
Among the 67 entities that reported energy end-use projects for 2003 on Form EIA-1605, 46 (69 percent) were electric utilities, of which 19 were publicly owned, 26 were privately owned, and 1 was an independent power producer. Companies in the industrial energy end-use sector, comprising 11 percent of all reporters for 2003, included 6 automobile and other transportation equipment manufacturers (9 percent), 5 cement companies (7 percent), 3 pharmaceutical and health care product companies, 2 electronic companies, 2 holding and other investment companies, 1 flood and kindred products company, 1 communications company and 1 oil company.

Emission reductions reported for individual energy end-use projects ranged from less than 1 metric ton to almost 4.2 million metric tons carbon dioxide equivalent, because some reporters included information on each individual end-use initiative separately, whereas others aggregated information on a range of activities into single projects. For example, an electric power distributor may report on a demand-side management (DSM) project that achieves direct emission reductions through multiple supplemental approaches, such as encouraging their residential, commercial, and industrial customers to change light bulbs, temporally shift electric loads, implement urban forestry projects, and upgrade appliances, building shells, and HVAC systems.

Among projects for which direct emission reductions were reported for 2003, 82 percent had reductions of less than 100,000 metric tons carbon dioxide equivalent (Figure 9). Similarly, among projects for which indirect emission reductions were reported, 94 percent had reductions of less than 100,000 metric tons carbon dioxide equivalent. Only seven energy end-use projects reported emission reductions greater than 1 million metric tons each for 2003, which was one less than for 2002.

In terms of emission reductions achieved in 2003, 5 of the 6 largest projects reported were aggregated electric company DSM programs. DSM projects may focus on one or

Figure 9. Energy End-Use Projects Reported on Form EIA-1605 by Size and Type of Emission Reduction, Data Year 2003



Source: Energy Information Administration, Form EIA-1605.

Table 10. Number of Energy End-Use Reporters, Projects, and Emission Reductions Reported on Form EIA-1605, Data Years 1994-2003

Data Year	Number of Reporters	Number of Projects Reported	Emission Reductions Reported (Metric Tons Carbon Dioxide Equivalent)	
			Direct	Indirect
1994	51	160	9,103,753	1,318,092
1995	63	221	12,450,879	1,591,590
1996	62	214	15,288,497	1,538,196
1997	67	249	16,685,010	3,798,030
1998	79	308	18,282,751	5,026,424
1999	80	330	16,047,912	6,786,832
2000	77	382	19,663,333	8,155,193
2001[R]	68	338	19,550,862	7,668,988
2002[R]	65	339	24,707,214	9,061,773
2003	67	374	25,232,544	9,955,603

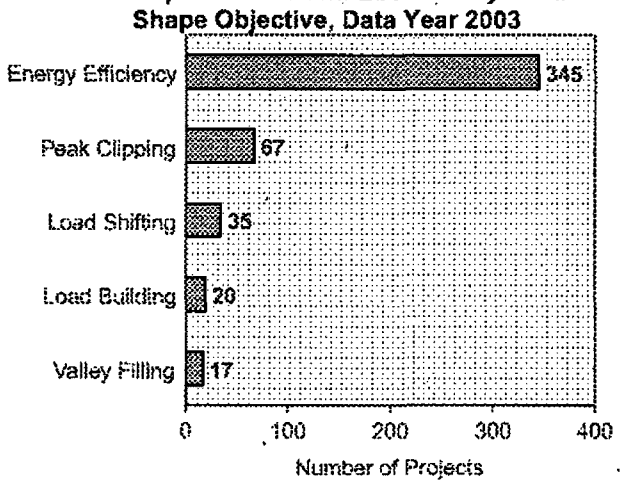
[R] Revised data.

Notes: More than one project type may be assigned to a single project; therefore, the sums of the projects and reductions in each project type category may exceed the total numbers of projects and reductions in the totals and subtotals. Table excludes data from confidential reports.

Source: Energy Information Administration, Form EIA-1605.

more load shape objectives (see box on page 32). Although the most common load shape objective of reported DSM projects for 2003 was increased energy efficiency (345 projects), electric utilities also attempted to balance their load profiles with various other load shape objectives, including peak clipping (67 projects), load shifting (35 projects), valley filling (17 projects), and load building (20 projects) (Figure 10).

Figure 10. Demand-Side Management Projects Reported on Form EIA-1605 by Load Shape Objective, Data Year 2003



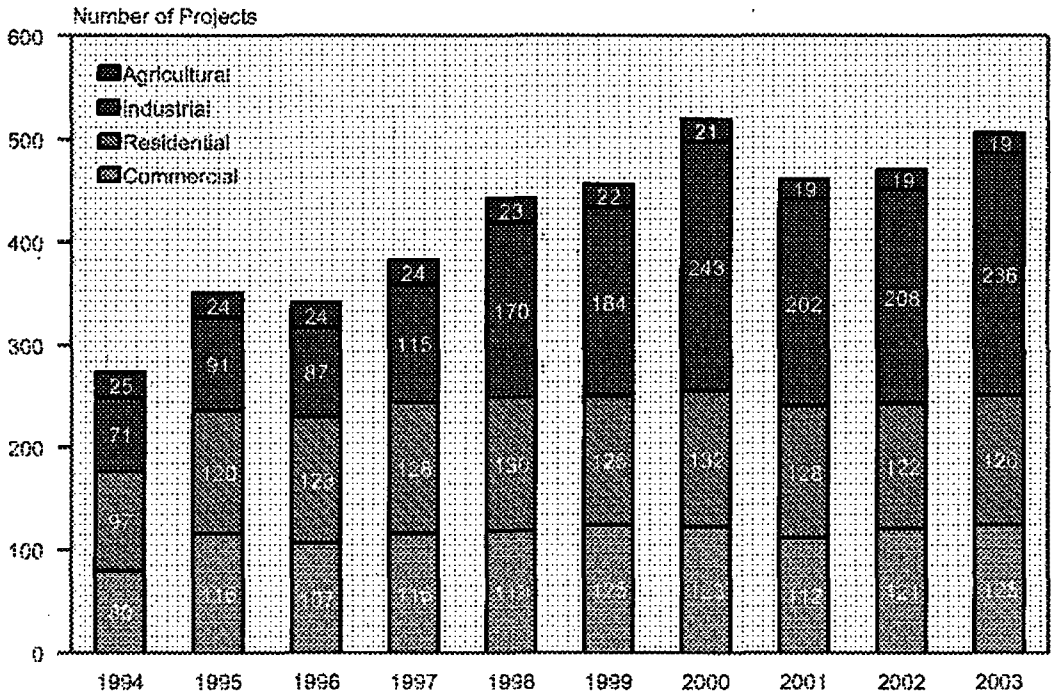
Notes: Some projects may be counted in more than one category. Figure excludes data from confidential reports.
Source: Energy Information Administration, Form EIA-1605.

Energy end-use projects can be carried out anywhere energy is consumed. Reporters indicate whether their energy end-use projects affect emissions in the industrial, commercial, residential, or agricultural sector. For 2003, 236 projects were reported to have reduced emissions in the industrial sector, 126 in the residential sector, 125 in the commercial sector, and 19 in the agricultural sector. More end-use projects were reported for each sector for 2003 than were reported for 2002, except for the agricultural sector. The total number of end-use projects reported was 10 percent above the total for 2002 (Figure 11). It should be noted that many projects—particularly electric company DSM programs—affect more than one end-use sector and are included in each applicable sector for the purposes of counting types of projects reported.

Project Types

None of the 16 new reporters to the 1605b program in 2003 reported energy end-use projects; however, many of the repeat reporters to the program did report new energy end-use projects along with their ongoing projects. Of the 374 energy end-use projects reported, 32 percent (120 projects) involved two or more project types. The most frequently reported type of energy

Figure 11. Energy End-Use Projects Reported on Form EIA-1605 by Sector, Data Years 1994-2003



Notes: Some projects target more than one sector and may be counted in multiple categories. Figure excludes data from confidential reports.
Source: Energy Information Administration, Form EIA-1605.

end-use project for 2003 was equipment and appliance replacement/improvements (157 projects), followed by lighting and lighting controls (153 projects) and HVAC (120 projects) (Table 11). Because of the varied levels of data aggregation in reports by different entities, it is not possible to calculate average emission reductions by project type or to draw conclusions about the most effective energy end-use project types in terms of total emission reductions achieved.

Equipment and Appliances

Replacements of equipment and appliances with more energy-efficient units (e.g., ENERGY STAR products) to reduce greenhouse gas emissions are frequently

Table 11. Number of Projects and Emission Reductions Reported on Form EIA-1605 for Energy End-Use Projects by Project Type, Data Year 2003

Project Type	Number of Projects Reported	Number of Projects Reporting Emission Reductions			Emission Reductions Reported (Million Metric Tons Carbon Dioxide Equivalent)	
		Direct	Indirect	Both Direct and Indirect	Direct	Indirect
Equipment/Appliances	157	85	94	22	16.9	8.1
Lighting/Lighting Controls	153	78	85	10	20.1	7.8
HVAC	120	69	62	12	19.7	6.1
Load Control	64	40	34	10	14.4	3.6
Building Shell	63	41	29	7	15.7	5.8
Motor/Motor Drive	58	36	31	9	14.4	4.7
Other[a]	31	20	17	6	2.0	0.5
Fuel Switching	26	17	13	4	6.7	1.6
Energy Effects of Urban Forestry	8	8	2	2	4.9	*
Industrial Power Systems	4	3	1	0	0.6	0.0
Total	**374**	**194**	**224**	**46**	**25.2**	**10.0**

[a]*Includes all projects that cannot meaningfully be included in any of the specific project type categories.*

*Less than 0.05 million metric tons.

Note: Project totals and emission reductions do not equal sum of components, because some projects are counted in more than one category.

Source: Energy Information Administration, Form EIA-1605.

Load Shape Effects: Definitions and Terminology

Energy Efficiency. Projects that improve the energy efficiency of specific end-use devices and systems. Such projects usually reduce overall energy consumption, often without regard for the timing of project-induced savings. Generally, energy savings are achieved through the substitution of technically more efficient measures (i.e., equipment, systems, or operating procedures) to produce the same level of end-use service (e.g., lighting or warmth) with less energy use.

Load Building. Projects that increase energy consumption, generally without regard to the timing of the increase. Promotion of residential electric space heating systems and promotion of new industrial electrotechnologies are examples of electricity load-building projects.

Load Shifting. Projects that move energy consumption from one time to another (usually during a single day). For example, water-heater timers typically turn off the units during the daytime (when an electric company experiences peak demands) and allow the units to operate at night (during the company's off-peak period).

Peak Clipping. Projects that reduce energy demand at certain critical times, typically when the electric system experiences peaks. These projects generally have only small effects on overall energy use but focus sharply on reducing energy use at critical times. Load-shifting and peak-clipping differ because the former shifts much of the energy use from one time to another, whereas the latter eliminates a load without shifting it to another time period.

Valley Filling. Projects that increase off-peak energy consumption (without necessarily reducing on-peak demands). Replacement of an oil-fired furnace with an electric heat pump is an example of valley filling. Such projects can aim to fill daily or seasonal valleys.

reported energy end-use projects. For 2003, no new reporters to the Voluntary Reporting Program submitted reports on equipment and appliance projects; however, a number of repeat reporters submitted reports on new equipment and appliance projects. Exelon Corporation reported 2 new projects for 2003 that increased its efforts to reduce residential energy consumption. Exelon's Low Income Usage Reduction Program has provided $1.3 million to establish the installation of 150 solar water-heating systems for low-income residential customers with the potential for additional savings on their energy costs. The pilot was extended to allow for an additional 60 installations. The company also incorporated an education component to promote participation, as well as addressing any concern associated with the technology. This project, originally started in 1999, was reported for the first time in 2003. Annual savings for each household are projected to be 82.5 kilowatthours, for a total savings of 17.3 megawatthours of electricity consumption and total emission reductions of 4.4 metric tons carbon dioxide equivalent.

From April 15 through July 15, 2003, Exelon's Clothes Washer Rebate Program offered customer incentives, along with manufacturer's rebates, for a total of $100 off the purchase of an ENERGY STAR qualified clothes washer. The program, coordinated by the Midwest Energy Efficiency Alliance (MEEA), granted 1,100 rebates to ComEd customers at 110 participating retailers. A typical household does nearly 400 loads of laundry per year, using about 40 gallons of water per full load with a conventional washer. In contrast, a full-sized ENERGY STAR qualified clothes washer uses 18 to 25 gallons per load. ENERGY STAR clothes washers use up to 40 percent less energy and up to 50 percent less water than standard-efficiency washers. They are projected to save as much as 238 kilowatthours and 16 therms[33] of natural gas per year when used with an electric dryer and a gas water heater. Potential water savings are estimated at up to 7,000 gallons annually. The projected savings from these 1,100 energy- and water-efficient clothes washers over their expected 12-year lifespan are 371.9 megawatthours of electricity, 36,087 therms of natural gas, and 11.1 million gallons of water. Estimated emission reductions from this project in 2003 totaled 13 metric tons carbon dioxide equivalent.

Lighting and Lighting Controls

Lighting and lighting control projects, such as installing compact fluorescent bulbs and occupancy sensor lighting controls, have consistently been popular projects in the Voluntary Reporting Program. The U.S. Environmental Protection Agency (EPA) Green Lights Utility Ally Program promotes cooperation between utilities and the EPA in publicizing the environmental, economic, and quality benefits of energy-efficient lighting technologies. Allergan, Inc., has reported to the Voluntary Reporting of Greenhouse Gases Program on its participation in the Green Lights Utility Ally Program. In an ongoing project, existing fluorescent lighting has been upgraded at several Allergan facilities, including 40-watt tubes being replaced with energy-efficient 32-watt tubes, and conventional ballasts being replaced with energy-efficient and/or electronic ballasts. These upgrades are generally conducted in areas undergoing renovation or incorporated into new building designs. This project reportedly reduced the company's overall electricity consumption by 250 megawatthours in 2003, resulting in total emission reductions of 193 metric tons carbon dioxide equivalent.

For 2003, the Estee Lauder Company reported 4 new lighting projects and also, for the first time, reported 11 lighting and lighting control projects that commenced in 2002. Three of the four new projects reported for 2003 involved the installation of new Octron lighting fixtures, consisting of Octron fluorescent lamps, electronic ballasts, and specular reflectors, in place of T-12 fluorescent lamps. The final project was an upgrade from metal halide lights to pulse-start ion metal halide lights. The 4 new projects reportedly reduced the company's 2003 energy consumption by 1,654.9 megawatthours, leading to a reduction in indirect emissions from purchased power of 948 metric tons carbon dioxide equivalent.

Heating, Ventilation, and Air Conditioning (HVAC)

HVAC projects involve the reduced use or upgrade of HVAC systems in homes, businesses, offices, or industrial plants. Although there were no new reporters in the HVAC category, a number of new projects were reported for 2003. The majority of the new projects were not specifically HVAC projects but had HVAC components included in larger DSM efforts.

Both Allergan and the Estee Lauder Company reported new projects that were strictly HVAC. Allergan reported on 5 projects that included upgrades to HVAC system equipment, including a water pump, a cooling water pump, an air handler fan, hot water pumps, and a high-efficiency chiller. These improvements accounted for a total indirect emissions reduction of 667 metric tons carbon dioxide equivalent. The Estee Lauder Company reported on a project that incorporated solar panels into the HVAC system at its Aveda facility. A 1,270-square-foot solar wall system was installed on the high bay south wall, which extends above the lower roof of the office. Fresh air is drawn in through the cladding into a heat pump and distributed in the building though ducting. The preheated ventilation has lead to a better standard of indoor air quality and a reduction in energy

[33] A therm is equivalent to 100,000 British thermal units (Btu) of energy.

consumption. This project reportedly reduced natural gas consumption by 757.5 million Btu and electricity use by 14.1 megawatthours, leading to total indirect and direct emission reductions of 51 metric tons carbon dioxide equivalent.

Building Shell

Building shell projects improve the energy efficiency of buildings through upgrades to ceilings, walls, floors, windows, or doors (e.g., insulation, air sealing, or efficient materials). A large share of the projects reported in the building shell category for 2003 involved DSM programs by electric power providers. The Platte River Power Authority, a joint action public power utility owned by four Colorado cities (Estes Park, Fort Collins, Longmont, and Loveland) offered Fort Collins a design assistance program. Under this program, Platte River Power Authority paid for a portion of the additional design costs of a high-performance building, based on the recognition that constructing a highly energy-efficient building takes more up-front design time and cost. Daylighting and/or energy-efficiency consultants are often hired to assist in the design process. Customers receiving assistance are expected to achieve at least a 25-percent improvement in energy efficiency relative to a building that meets the current Fort Collins building code.

The methodology used to estimate energy and greenhouse gas savings from building shell projects uses computer models to compare different building designs. In the design phase, computer models are developed to establish a "base" building, which is compliant with the Fort Collins building code, and an "actual" building, which is representative of the high-performance building constructed. Model results were used to estimate the energy use and greenhouse gas emission savings of the new building design relative to the base building, based on actual electric company bills. In 2003, the program led to a reported reduction in electricity use of 508.6 megawatthours and a reduction in indirect emissions of 215 metric tons carbon dioxide equivalent.

Load Controls

Load controls are energy management techniques for minimizing—either overall or at specific times of the day—the load demands on electric power providers. Power companies themselves can use load management options and, through DSM programs, encourage their customers to apply load controls. Independently, power consumers can employ load controls to reduce their energy consumption, shift their demand to non-peak hours, reduce their consumption during peak hours, and reduce energy costs. Load control options include energy efficiency projects, load building, load shifting, peak clipping, and valley filling (see box on page 32).

For 2003, Cinergy Corporation reported a load control project, the Thermal Energy (Cool) Storage Project. Thermal Energy Storage (TES) is designed to reduce summer peak electric loads for space and process cooling applications by shifting those loads to off-peak periods, and to reduce energy use through off-peak system operations. Cooling energy is stored in cooled water, eutectic salts, or ice systems by the operation of electric chillers during off-peak periods and then used during on-peak periods, resulting in a reduction of on-peak electricity demand. Application of off-peak cooling systems can also reduce energy consumption by rejecting heat at lower ambient temperatures.

Cinergy's target market for its TES program includes schools, churches, and commercial or industrial office buildings, encompassing both new construction and retrofits of buildings that have relatively large cooling needs and operating hours that are conducive to ice-making during off-peak hours. Industrial process applications represent additional market potential for the TES system. The Cinergy program is designed to stimulate the market and help facility owners over the obstacles typically associated with new technologies: cost premiums over conventional HVAC systems; perception that the technology is new and/or complex; and reliability relative to existing systems. In 2003, this project reportedly reduced electricity consumption by 15.8 megawatthours, leading to a direct emissions reduction of 14,272 metric tons carbon dioxide equivalent.

Motor and Motor Drive

High- or ultra-high-efficiency motors and variable-speed or variable-frequency motor drives are more energy efficient than regular motors and motor drives. In addition, controls can be used to reduce electricity consumption by adjusting motor speeds or turning off motors when appropriate. Motor and motor drive projects are generally reported in the commercial and industrial categories, and often they are components of DSM programs, as is the case for all the new motor and motor drive projects reported for 2003.

Allegheny Energy, Inc., reported a motor and motor drive project in 2003 that has been an ongoing effort. Adjustable-speed drives (ASDs) on electric motors have the potential to save energy and demand where motor load is not constant. Allegheny, through its former operating company in Virginia, Potomac Edison, conducted a cooperative research project with an industrial customer and the Electric Power Research Institute (EPRI) to evaluate the use of ASDs on plastic injection molding machines. ASDs were installed on 18 motors for 7 different molding machines. Measured savings were 38 percent for total electrical motor load and 23 percent for total molding machine load. This project represents a good example of DSM activities aimed at industrial

customers. Electricity savings from the project were reported to be 689 megawatthours, resulting in a total emissions reduction of 705 metric tons carbon dioxide equivalent.

Fuel Switching

Switching from high-carbon to low-carbon fuels reduces carbon dioxide emissions generated during combustion. There were no new reporters in the fuel switching energy end-use category for 2003. Minnesota Power continued to report in 2003 on an ongoing project that expanded the use of renewable biomass as a fuel. Minnesota Power operates the M.L. Hibbard / Duluth Steam District No. 2 steam plant for the City of Duluth. The facility provides process steam to a paper mill and a recycled fiber plant. Acceptable fuels at the facility include coal, natural gas, and wood waste. The plant has sought to maximize use of renewable waste wood as a fuel since 1991 and will continue the effort to the extent that appropriate fuel is economically available. When natural gas is economically available, natural gas is also used to reduce consumption of subbituminous coal. Net carbon dioxide emissions from burning wood waste are significantly less than those from burning coal, because the wood waste would otherwise be placed in landfills or left to rot in the field. Hence, Minnesota Power assumes that net carbon dioxide emissions from burning waste wood in this application are zero. Indirect emissions are also significantly reduced, because waste wood can form methane gas under moist, anaerobic landfill conditions (however, avoided methane production from waste wood decay was not reported for 2003).

An additional benefit from the use of wood waste in the M.L. Hibbard / Duluth Steam District No. 2 boilers is that the ash formed during combustion of the wood waste is an agriculturally beneficial product. Potassium and alkalinity in the wood ash make it useful as a fertilizer on farmers' fields. In this manner, most of the Hibbard facility ash produced while burning wood waste is "disposed of" as a substitute for agricultural chemicals. (Again, avoided indirect emissions from this agricultural application of boiler ash were not reported for 2003.)

Minnesota Power also generates electricity at the M.L. Hibbard facility. The high proportion of wood waste burned at the facility results in lower carbon dioxide emissions from Hibbard generation compared to many coal-fired generation alternatives. Minnesota Power sells renewable biomass sourced electricity to Wisconsin Electric Power Company for use in its "Energy for Tomorrow" program. Wisconsin Electric is presuming a net zero carbon dioxide emissions base from its Hibbard renewable biomass energy purchases. In reporting its expanded use of renewable biomass, Minnesota Power increases the heat input from wood waste by the portion used to generate power for Wisconsin Electric. Minnesota Power , claims no benefit for this renewable generation, allowing Wisconsin Electric to claim the benefit based on avoided emissions from its other power supply resources. For 2003, this project was reported to have reduced coal usage by 812,072 million Btu and direct carbon dioxide emissions by 76,252 metric tons.

Energy Effects of Urban Forestry

Urban forestry is the planting and maintenance of individual trees within a city or community. Urban forestry projects can reduce both carbon dioxide emissions and energy expenditures for urban heating and cooling requirements. General examples of such projects include the planting of shade trees to reduce cooling requirements and windbreaks to reduce heating requirements. Urban forestry projects can also sequester carbon, as discussed in Chapter 4.

There were no new urban forestry projects reported in 2003, although all 8 of the urban forestry projects reported in 2002 continued to be reported, including Pacificorp's Salt Lake City Urban Forestry Project, which has been responsible for the planting of trees in residential areas that will provide shade to buildings and reduce energy use for cooling. Approximately 900 large trees and 400 small trees were planted throughout the project. At maturity, the trees will be between 45 and 75 feet tall. In total, 112 trees were planted around single-family homes with 2 trees per home, 962 trees were planted around single-family homes with 1 tree per home, and 170 trees were planted around multi-family dwellings and a school. The energy savings from this urban forestry program probably would not have occurred in the absence of the program. Although many homeowners plant trees on their own, it is unlikely that they would plant trees to optimize energy savings. For 2003, Pacificorp reported that the project produced direct emission reductions of 106 metric tons carbon dioxide equivalent.

Industrial Power Systems

Industrial power system projects are designed to reduce emissions from industrial power systems through efficiency improvements such as boiler system upgrades and replacements and turbine optimization. There were no new reporters or projects in the industrial power system category for 2003.

Other

There was one new project in the other project type category for the 2003 reporting year. The other project category captures the effects of energy end-use projects that cannot be meaningfully included in another category. Lehigh Cement Company (formerly Lehigh Portland Cement Company) reported a new project that involved the modernization and reconfiguration of its kilns. Two

long-dry kilns were converted to two one-stage preheater kilns, which produce more heat and are more energy efficient. This project was reported to have reduced coal use by 376,260 million Btu and direct emissions by 22,854 metric tons carbon dioxide equivalent.

Another project in the "other" category is an investment project reported by Ameren Corporation. The EnviroTech Investment Fund was created to support development and disbursement of energy-efficient technologies. Advent International Corporation manages EnviroTech in cooperation with the Edison Electric Institute. Advent International evaluates and underwrites the development of promising energy efficiency technologies. Union Electric (an Ameren Corporation company) has committed to invest up to $5 million in this program, which is currently 15.9 percent of the total investments in the EnviroTech Investment Fund. The remaining 84.1 percent of the Fund's capitalization comes from other participating investor-owned electric utilities. Ameren Corporation reports that it intends to make additional investments in the Fund over the next several years. Sufficient information is not available to describe each type of activity supported by EnviroTech that results in emission reductions.

Reducing Emissions from Transportation

The transportation sector is the largest contributing end-use sector to total U.S. energy-related carbon dioxide emissions, accounting for 32 percent of emissions in 2003. Direct use of petroleum fuels in mobile source applications accounts for 98 percent of transportation sector carbon dioxide emissions, and most of the remaining 2 percent results from the consumption of natural gas. Indirect emissions resulting from the use of purchased electricity account for about 0.2 percent of transportation sector emissions. Carbon dioxide emissions from the transportation sector increased by 19 percent between 1990 and 2003, from 1,570 million metric to 1,875 million metric tons carbon dioxide.[34] The increase was caused by increases in both the average number of miles driven per vehicle and the total number of vehicles on the road. The average number of miles driven by passenger cars increased by 13 percent between 1990 and 2001,[35] and the number of vehicles on the road increased by 22 percent between 1990 and 2001.[36] Emissions growth was moderated somewhat by an increase in average U.S. vehicle fleet fuel efficiency from 16.4 miles per gallon to 17.0 miles per gallon between 1990 and 2002.[37]

For 2003, 66 transportation projects were reported on Form EIA-1605 by 35 entities. All but 5 of the reporters were electric generation companies. One of the non-generators was CLE Resources, a subsidiary of an energy services company; the others were AT&T (telecommunications), The Burlington Northern and Santa Fe Railway Co. (transportation), Blue Source, LLC (emissions offset brokerage), and Arizona Portland Cement. Of the 66 transportation projects reported on Form EIA-1605 for 2003, 61 have been reported in previous years. Five new projects were reported for 2003:

- The Burlington Northern and Santa Fe Railway Co. reported on fuel efficiency improvements, including replacing old, inefficient locomotives, using newer roller bearing technology on rail cars, positioning trailers on intermodal trains to reduce drag, adjusting train speeds to optimize delivery schedules and fuel efficiency, and using friction reducers on the wheel-to-rail interface.
- Blue Source, LLC, an emissions offset broker, reported on the following three transportation actions for which it owns title to the associated greenhouse gas reductions:
  - An empty-mile reduction project conducted by J.B. Hunt Transport Services, Inc.[38]
  - An idling reduction program initiated by a major trucking company to reduce emissions from unnecessary fuel consumption.
  - An intermodal freight transport project that combines the most efficient aspects of truck and rail modes to carry cargo over long distances. The goal of the project is to expand the transportation of freight by trains, which are more than three times as efficient as trucks on a ton-mile basis.

[34]Energy Information Administration, *Emissions of Greenhouse Gases in the United States 2003*, DOE/EIA-0573(2003) (Washington, DC, December 2004), web site www.eia.doe.gov/oiaf/1605/ggrpt.

[35]Energy Information Administration, *Annual Energy Review 2003*, DOE/EIA-0384(2002) (Washington, DC, September 2004), p. 57, web site www.eia.doe.gov/aer.

[36]U.S. Department of Transportation, Bureau of Transportation Statistics, *National Transportation Statistics 2003* (Washington, DC, March 2004), Table 1-11, web site www.bts.gov/publications/national_transportation_statistics/2003/html/table_01_11.html.

[37]Energy Information Administration, *Annual Energy Review 2003*, DOE/EIA-0384(2003) (Washington, DC, September 2004), p. 57, web site www.eia.doe.gov/aer.

[38]Empty miles are the miles traveled by a vehicle without cargo between dropoff and pickup locations.

- Consolidated Edison reported on the use of B20, a mixture of 80 percent petroleum diesel fuel and 20 percent biodiesel,[39] by at least 122 fleet vehicles.

Of the 66 transportation projects reported for 2003, 35 (53 percent) were affiliated with the Department of Energy's Climate Challenge program.

Tables 12 and 13 show historical trends in the reporting of transportation projects to the Voluntary Reporting Program. The projects reported for 2003 fall into three broad categories:[40]

- Alternative fuel use, 31 projects (47 percent)
- Travel reduction, 26 projects (39 percent)
- Vehicle efficiency improvements, 9 projects (14 percent).

Table 12. Number of Projects and Emission Reductions Reported on Form EIA-1605 for Transportation Projects by Project and Reduction Type, Data Years 1994-2003

	Number of Projects				Emission Reductions (Metric Tons Carbon Dioxide Equivalent)	
Year	Vehicle Efficiency	Travel Reduction	Alternative Fuels	Total	Direct	Indirect
1994	3	6	18	**26**	4,203	6,346
1995	6	14	21	**40**	22,660	54,061
1996	7	15	26	**47**	28,813	54,043
1997	9	20	27	**55**	32,283	95,782
1998	9	23	28	**58**	25,085	89,174
1999	10	25	30	**62**	43,499	282,257
2000	9	25	32	**64**	22,611	134,519
2001	5	21	28	**53**	44,996	88,023
2002	5	26	30	**60**	41,966	161,156
2003	9	26	31	**66**	2,459,095	134,867

Notes: Project totals do not equal sum of components, because some projects are counted in more than one category. Table excludes data from confidential reports.
Source: Energy Information Administration, Form EIA-1605.

Table 13. Emission Reductions Reported on Form EIA-1605 for Transportation Projects by Project and Reduction Type, Data Years 1994-2003
(Metric Tons Carbon Dioxide Equivalent)

	Vehicle Efficiency		Travel Reduction		Alternative Fuels	
Year	Direct	Indirect	Direct	Indirect	Direct	Indirect
1994	1,244	5,651	1,170	—	1,956	695
1995	18,148	36,137	2,179	16,461	2,463	1,495
1996	18,647	38,602	5,427	13,903	4,847	1,546
1997	20,989	48,213	8,753	45,227	2,582	2,352
1998	18,436	70,527	3,110	15,923	3,632	2,746
1999	14,671	174,553	6,077	106,841	22,866	2,148
2000	53	66,324	8,549	67,404	14,021	2,306
2001	-1,109	51,905	13,059	34,050	33,053	2,068
2002	15	48,160	10,920	108,912	31,030	4,085
2003	2,387,335	49,543	38,951	83,156	32,810	2,168

Notes: Table excludes data from confidential reports.
Source: Energy Information Administration, Form EIA-1605.

[39]Biodiesel is any liquid biofuel suitable as a diesel fuel substitute or diesel fuel additive or extender. Biodiesel fuels are typically made from oils such as soybeans, rapeseed, or sunflowers, or from animal tallow. Biodiesel can also be made from hydrocarbons derived from agricultural products such as rice hulls.

[40]The sum of projects in each category exceeds the total number of projects, because some projects are counted in more than one category.

The primary effect of the transportation projects reported was to reduce emissions of carbon dioxide. Reductions in emissions of nitrous oxide or methane were also reported for 7 projects. For 18 of the 66 projects reported, either reductions did not occur in 2003 or they were not estimated.[41]

Direct reductions totaling 2.5 million metric tons carbon dioxide equivalent were reported for 30 transportation projects in 2003 (Table 12). This represents a significant increase from the 41,916 metric tons carbon dioxide equivalent in direct reductions reported for 2003. The Burlington Northern and Santa Fe Railway Co. (1.0 million metric tons carbon dioxide) and Blue Source, LLC (1.4 million metric tons carbon dioxide equivalent) reported four new projects that were responsible for the increase.

Indirect emission reductions in 2003 totaling 134,867 metric tons carbon dioxide equivalent were also reported for 24 transportation projects. The sources of the reduced emissions included "fuel cycle" emissions associated with production, refining, transportation, and distribution of fossil fuels; conventional vehicles displaced by customer-owned natural gas vehicles refueled by natural gas distribution companies; employee vehicles affected by reporter-sponsored travel reduction programs, such as carpooling; and railroad-owned locomotives hauling coal in lightweight aluminum rail cars owned by electric utilities. Indirect reductions for 2003 were 16 percent lower than those reported for 2002, due primarily to fewer reductions reported for three projects: an AT&T telecommunication project, a Public Service Enterprise Group employee trip reduction effort, and a TXU carpool program.

Using Alternative Fuels

Of the transportation projects reported for 2003, 47 percent involved alternative-fuel vehicles (AFVs). These projects, however, accounted for only 1 percent of the direct reductions and 2 percent of the indirect reductions reported for transportation projects. In general, the reported reductions for AFV projects were small, with reductions in excess of 1,000 metric tons carbon dioxide equivalent being reported for only one project.

AFV projects involved a variety of fuels, including natural gas, electricity, propane, B20, E85 (a blend of 85 percent ethanol and 15 percent gasoline), and M85 (a blend of 85 percent methanol and 15 percent gasoline). Electricity was the alternative fuel included in 11 project reports. Southern California Edison's electric vehicles reportedly logged 1.8 million miles in 2003, more than 10 times the 174,000 miles reported for 1996. The Los Angeles Department of Water and Power (LADWP) reported operating 258 electric vehicles in 2003, up from 204 in 2001 and 18 in 1996. Southern Company reported operating a fleet of 190 electric vehicles in 2003, including cars, trucks, neighborhood electric vehicles, and buses; however, the current size of Southern Company's electric fleet is less than one-half the 484 vehicles it operated in 2000. Operation of compressed natural gas (CNG) vehicles was reported for 15 projects, and 3 utilities reported operating fleets of more than 100 CNG or dual-fuel CNG/gasoline vehicles[42] in 2003: PG&E Corporation (6,010 vehicles), We Energies (654 vehicles), and NiSource (458 vehicles).

Eight AFV projects reported for 2003 involved fuels other than natural gas and electricity. Activity in 2003 was reported for four of those projects.[43] Exelon Corporation reported continued use of E85, propane, and B20. Cinergy reported continued use of E85 and B20 in 2003, but it has stopped using propane in company vehicles. Conectiv Delmarva Generation reported using a B20 fuel that included soy-based biodiesel in its fleet vehicles in 2003.

Reducing Vehicle Travel

Travel reduction, which includes such activities as carpooling and vanpooling, mass transit, telecommuting, and service efficiency improvements, was reported for 26 projects for 2003—accounting for 2 percent of the direct reductions and 62 percent of the indirect reductions reported for transportation projects in 2003. The 38,951 metric tons carbon dioxide equivalent of direct reductions reported for 2003 was more than 3 times the 10,920 metric tons reported for 2002. This increase in direct emission reductions was largely attributable to the new project reported by Blue Source, LLC, involving reduction in empty miles traveled by a trucking company. In contrast, indirect emission reductions reported for travel reduction projects for 2003 were 24 percent (25,756 metric tons) lower than those reported for 2002, primarily due to lower reductions being reported for AT&T's telecommuting program.

Of the 26 projects reported in the travel reduction category, 12 involved carpooling or vanpooling, 9 increased mass transit ridership, 5 reduced employee

[41] In some cases, reductions for the project may have been reported for years before 2003. In other cases, the reductions were not estimated due to the lack of data or other difficulties in quantifying the effects of the project. Entities may elect to report projects without reporting reductions to make a public record of the fact that they have conducted an activity in fulfillment of a commitment made under a voluntary program such as Climate Challenge.

[42] CNG dual-fuel vehicles are capable of operating on natural gas or gasoline.

[43] Two other reporters continued to submit information on projects that involved consumption of propane and M85 in previous years; however, the projects were inactive in 2003.

vehicle use through telecommuting, 4 increased service efficiency for freight or service vehicles, and 9 involved other actions, such as work week compression, video-conferencing, use of bicycles for electric or gas meter reading, promotion of employee commuting by bicycle or walking, and automation of electric or gas meter reading in areas of low population density.[44]

AT&T reported the largest travel reduction project, a telecommuting program that reportedly reduced indirect emissions by 48,988 metric tons carbon dioxide equivalent. Reductions of more than 5,000 metric tons carbon dioxide equivalent in 2003 were also reported for the following travel reduction projects:

- The Blue Source, LLC, empty miles reduction program reduced direct emissions by a reported 26, 649 metric tons carbon dioxide equivalent.
- LADWP reported on its employee carpooling and vanpooling program (8,167 metric tons carbon dioxide equivalent indirect emission reductions).
- Southern Company reported on its carpooling and mass transit programs (6,040 metric tons carbon dioxide equivalent indirect emission reductions).
- TXU reported efforts to reduce fleet and employee vehicle use (6,556 metric tons carbon dioxide equivalent direct emission reductions and 8,658 metric tons carbon dioxide equivalent indirect emission reductions).
- AT&T reported on its fleet cost reduction program (5,715 metric tons carbon dioxide equivalent direct emission reductions).
- CLE Resources reported its investment, through the Edison Electric Institute's EnviroTech investment fund, in McHugh Software, a company that developed software to improve routing for service vehicles (6,582 metric tons indirect carbon dioxide emission reductions from foreign and domestic sources).

Improving Vehicle Efficiency

Emission reductions were reported for 7 of the 9 vehicle efficiency projects reported for 2003. Indirect reductions were reported for 2 projects, both of which involved the use of light-weight aluminum railroad cars to transport coal. These projects, which were reported by electric utilities, resulted in indirect emission reductions because the locomotives using less fuel were owned by the railroads. Ameren Corporation reported reducing emissions by 21,576 metric tons carbon dioxide equivalent, and Kansas City Power & Light Company reported reducing emissions by 27,967 metric tons carbon dioxide equivalent.

CLE Resources, a subsidiary of Cleco Corporation, continued to report its investment (through the EnviroTech fund established by the Edison Electric Institute) in a company that developed and commercialized a device for monitoring and adjusting tire pressure on trucks to achieve optimal fuel efficiency. CLE Resources did not report emission reductions for this project, due to the unavailability of reliable data on the number of devices sold.

[44]The total number of travel reduction projects is less than the sum of the projects in each subcategory, because some projects include activities in more than one subcategory.

4. Carbon Sequestration

Background

Carbon sequestration plays an important role in the global carbon cycle. Green plants remove (sequester) carbon from the atmosphere through photosynthesis, extracting carbon dioxide from the air, separating the carbon atom from the oxygen atoms, returning oxygen to the atmosphere, and using the carbon to make biomass in the form of roots, stems, and foliage.

Globally, a very large amount of carbon dioxide—on the order of 120 billion metric tons of carbon—is sequestered in biomass.[45] At the same time, carbon is released to the atmosphere from vegetative respiration, combustion of wood as fuel, degradation of manufactured wood products, consumption of biomass for food by animals, and the natural decay of expired vegetation. The net numerical difference, or flux, between carbon sequestration and release can be viewed as a measure of the relative contribution of biomass to the carbon cycle. World flux associated with Earth's living matter is difficult to measure, but biomass is thought to provide a net "sink" equivalent to about 5.1 billion metric tons carbon dioxide per year.[46]

Forests can play an important role in offsetting human-produced carbon dioxide emissions. On average, trees are approximately 50 percent carbon by weight (oven-dry basis, excluding water).[47] The amount of carbon a plant can sequester depends on a number of variables, including species, health of vegetation, and age, but can be quite large. For example, one large sugar maple tree is capable of removing more than 450 pounds of carbon dioxide from the atmosphere in a year. At that rate, preserving approximately 31 trees per operating automobile in the United States would offset all U.S. automobile-related carbon dioxide emissions.[48]

Carbon sequestration on a national scale is substantial. The U.S. Environmental Protection Agency, relying heavily on the work of the U.S. Department of Agriculture's U.S. Forest Service, estimates annual U.S. carbon sequestration (generally defined according to the guidelines of the Intergovernmental Panel on Climate Change) at 691 million metric tons carbon equivalent,[49] which offsets approximately 10 percent of annual U.S. anthropogenic emissions of greenhouse gases.[50]

Projects Reported

For the 2003 reporting year, 51 entities reported projects on Form EIA-1605 that involved forestry or natural resources that sequestered carbon or reduced emissions (Table 14). The reporters included 48 electric companies, a private service organization providing reforestation services to corporate clients, a petroleum company, and a cement company. A total of 446 carbon sequestration projects were reported for 2003, an increase of 8 percent from 2002. Carbon sequestration projects were the third most numerous type reported on the long form, representing 23 percent of the projects reported for 2003. Methane reduction (470) and electricity generation (464) projects outnumbered carbon sequestration projects. The reported carbon sequestration projects were dispersed over a wide geographic area, including 33 States and 8 foreign countries. A total of 377 domestic and 69 international forestry projects were reported; 33 of the foreign projects represent individual equity shares in a single forest preservation project, the Rio Bravo Carbon Sequestration Pilot Project, in Belize.

[45] Intergovernmental Panel on Climate Change, *Climate Change 2001: The Scientific Basis* (Cambridge, UK: Cambridge University Press, 2001), p. 188.

[46] Intergovernmental Panel on Climate Change, *Climate Change 2001: The Scientific Basis* (Cambridge, UK: Cambridge University Press, 2001), p. 39.

[47] R.A. Birdsey, *Carbon Storage and Accumulation in United States Forest Ecosystems* (Washington, DC: USDA Forest Service, 1992), p. 12.

[48] Average mileage and fuel consumption for passenger cars from Energy Information Administration, *Annual Energy Review 2003*, DOE/EIA-0384(2003) (Washington, DC, September 2004), p. 57, web site www.eia.doe.gov/aer. Carbon dioxide emissions per mile driven and gallon of motor fuel from U.S. Department of Energy, *Sector-Specific Issues and Reporting Methodologies Supporting the General Guidelines for the Voluntary Reporting of Greenhouse Gases Under Section 1605(b) of the Energy Policy Act of 1992*, DOE/PO-0028 (Washington, DC, October 1994), Vol. 2, p. 4.19.

[49] U.S. Environmental Protection Agency, *Inventory of U.S. Greenhouse Gas Emissions and Sinks 1990-2002*, EPA-430-R-04-003 (Washington, DC, April 2004), p. 206, web site http://yosemite.epa.gov/oar/globalwarming.nsf/content/ResourceCenterPublicationsGHGEmissionsUSEmissionsInventory2004.html.

[50] U.S. anthropogenic greenhouse gases emissions were 6,936 million metric tons carbon dioxide equivalent in 2003. Energy Information Administration, *Emissions of Greenhouse Gases in the United States 2003*, DOE/EIA-0573(2003) (Washington, DC, December 2004), p. ix, web site www.eia.doe.gov/oiaf/1605/ggrpt.

Carbon sequestration reported on Form EIA-1605 remained about the same in 2003 as it was in 2002, at 7.7 million metric tons carbon dioxide equivalent (Table 14). Of the 446 sequestration projects reported for 2003, most (354 or 79 percent) involved some kind of tree planting, which included afforestation, reforestation, urban forestry, and woody biomass production or agroforestry (Table 15).[51] These projects accounted for 15 percent of the sequestration (and related direct emission reductions) reported for 2003. Although only 39 forest preservation projects were reported, they accounted for 88 percent of the sequestration reported for 2003 (Table 16). Of the total sequestration for 2003, 89 percent was reported on behalf of foreign projects, including some very large forest preservation initiatives.

Urban forestry projects, involving the planting of trees in urban and suburban areas, accounted for 8 percent (34 projects) of the sequestration projects reported for 2003. Urban forestry projects are typically much smaller than forestry projects undertaken in rural or wilderness areas. The average carbon dioxide sequestration

Table 14. Number of Projects, Carbon Sequestered, and Net Reductions Reported on Form EIA-1605 for Sequestration Projects, Data Years 1994-2003

Data Year	Number of Reporters	Number of Projects	Sequestration (Metric Tons Carbon Dioxide Equivalent)	Net Emission Reductions (Metric Tons Carbon Dioxide Equivalent)	
				Direct	Indirect
1994	23	58	746,545	189	23,127
1995	44	175	1,190,754	378	48,730
1996	51	175	8,676,591	1,291	32,215
1997	56	279	9,849,807	6,160	—
1998	57	321	12,490,927	716	—
1999	53	401	9,623,599	3,406	—
2000	53	468	9,011,117	1,041	—
2001	51	369	7,956,823	1,114	—
2002[R]	51	413	7,296,516	1,875	—
2003	51	446	7,730,969	1,860	—

[R] Revised data.

Source: Energy Information Administration, Form EIA-1605.

Table 15. Number of Sequestration Projects Reported on Form EIA-1605 by Project Type, Data Years 1994-2003

Data Year	1994	1995	1996	1997	1998	1999	2000	2001	2002[R]	2003
Tree Planting										
Afforestation and Reforestation	36	113	111	175	205	288	344	251	289	320
Urban Forestry	8	17	21	23	28	28	31	33	33	34
Woody Biomass Production and Other Agroforestry	8	14	2	3	3	3	3	3	3	2
Unspecified	—	2	1	—	1	—	—	—	—	—
Subtotal	44	131	133	199	235	318	376	285	323	354
Forest Preservation	2	22	29	38	43	38	42	37	38	39
Modified Forest Management	12	20	10	33	41	42	44	41	47	48
Conservation Tillage	1	1	1	2	2	2	2	2	1	1
Other Projects	3	4	5	10	4	5	5	5	5	5
Total	**58**	**175**	**175**	**279**	**321**	**401**	**468**	**369**	**413**	**446**

[R] Revised data.

Notes: Project totals do not equal sum of components, because some projects are counted in more than one category. In last year's report, "Unspecified" tree planting projects were included in the "Other Projects" category.

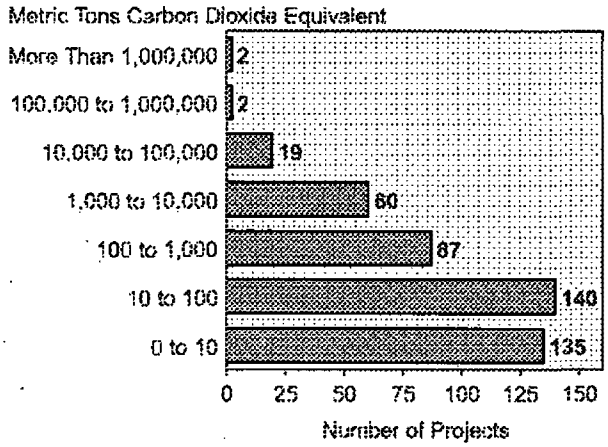
Source: Energy Information Administration, Form EIA-1605.

[51] Afforestation is the planting of new forests on lands that have not been recently forested. Reforestion is the replanting of forests on lands that have recently been harvested or otherwise cleared of trees. Urban forestry is the planting of trees individually or in small groups in urban or suburban settings. Agroforestry is the cultivation of trees in plantations for fuel or fiber.

reported per urban forestry project for 2003 was just 517 metric tons. In contrast, tree planting projects in rural or wilderness areas generally are much larger, accounting for 16 of the 19 projects that sequestered more than 10,000 metric tons carbon dioxide each in 2003 (Figure 12). For the 445 projects for which data were reported, average sequestration in 2003 was 16,456 metric tons carbon dioxide per project.

Almost all (414 or 93 percent) of the reported sequestration projects were undertaken in part to fulfill commitments made under the U.S. Department of Energy's Climate Challenge program.[52] Twenty-eight (28) of the investors in the UtiliTree Carbon Company[53] each submitted reports on the 10 projects that were operational in 2003. All the investors reporting were also participants in Climate Challenge. In addition, 36 sequestration projects reported on Form EIA-1605 for 2003 were undertaken as part of the U.S. Initiative on Joint Implementation (USIJI). Established under the Climate Change Action Plan (CCAP),[54] the USIJI is a pilot program that seeks to encourage foreign-based emission reduction and carbon sequestration projects conducted by U.S. and non-U.S. partners. The USIJI program has been inactive since 2000. The projects reported represent individual partner shares in two USIJI-approved forestry projects: the Rio Bravo Carbon Sequestration Pilot Project (Belize) and the Noel Kempff Mercado Climate Change Action Project (Bolivia).

Figure 12. Carbon Sequestration Projects Reported on Form EIA-1605 by Amount of Carbon Sequestered, Data Year 2003



Source: Energy Information Administration, Form EIA-1605.

Table 16. Carbon Sequestration Reported on Form EIA-1605 by Project Type, Data Years 1994-2003
(Thousand Metric Tons Carbon Dioxide Equivalent)

Data Year	1994	1995	1996	1997	1998	1999	2000	2001	2002(R)	2003
Tree Planting										
Afforestation and Reforestation	726.8	620.4	237.3	322.4	449.0	590.6	628.0	637.9	676.1	711.7
Urban Forestry	0.2	1.1	1.3	1.9	5.3	5.8	10.5	11.2	14.4	17.6
Woody Biomass Production and Other Agroforestry	356.6	213.9	1,964.6	1,962.3	1,962.3	503.2	392.5	425.7	428.0	425.4
Unspecified	---	7.0	*	---	0.1	---	---	---	---	---
Subtotal	727.0	627.7	2,188.1	2,263.6	2,393.6	1,077.3	1,006.4	1,056.4	1,097.6	1,135.7
Forest Preservation	73.0	615.8	6,546.5	7,545.5	10,073.4	8,523.4	7,879.6	6,804.3	6,055.9	6,469.6
Modified Forest Management	363.9	366.2	93.6	148.3	167.9	164.6	74.0	51.9	98.9	81.5
Conservation Tillage	4.3	4.3	3.3	8.5	8.5	8.5	11.9	4.4	4.4	4.4
Other Projects	2.8	3.1	4.1	44.9	58.9	59.1	59.1	59.8	59.7	59.8
Total	**746.5**	**1,190.8**	**8,676.6**	**9,849.8**	**12,490.9**	**9,623.6**	**9,011.1**	**7,956.8**	**7,296.5**	**7,730.9**

(R) Revised data.

*Less than 50 metric tons.

Notes: Project totals do not equal sum of components, because some projects are counted in more than one category. In last year's report, "Unspecified" tree planting projects were included in the "Other Projects" category.

Source: Energy Information Administration, Form EIA-1605.

[52]The Climate Challenge program, established in 1994, focused on commitments by electricity generators to reduce, avoid, or sequester greenhouse gases by the year 2000. Because its focus was on the year 2000, the Climate Challenge program is no longer active. It has been replaced by Power Partners[SM], which is the electric power industry's vehicle for participating in President Bush's Climate VISION initiative.

[53]The UtiliTree Carbon Company, a consortium of 41 North American electric utility companies investing in forestry projects that sequester carbon, was established under the Climate Challenge Program. It is administered by the Edison Electric Institute's (EEI's) Forest Carbon Management Program, which has identified and sponsored 10 ongoing domestic and international forestry projects. EEI has established a new program, PowerTree, to coordinate electric power industry sponsorship of forestry projects through Power Partners[SM] for Climate VISION.

[54]President William J. Clinton and Vice President Albert Gore, Jr., *The Climate Change Action Plan* (Washington, DC, October 1993), Appendix II, web site www.gcrio.org/USCCAP/toc.html.

Afforestation and Reforestation

Of the sequestration projects reported for 2003, 320 (72 percent) involved either afforestation or reforestation. The carbon sequestration and emission reductions reported for these projects totaled 0.7 million metric tons carbon dioxide, representing 10 percent of the total sequestration reported for 2003. All the afforestation and reforestation projects reported for 2003 were domestic.

American Electric Power, Inc. (AEP), a large investor-owned utility, accounted for the largest number of afforestation and reforestation projects, submitting 60 (19 percent) of the projects in this category for 2003. The AEP projects, all of which were afforestation projects, sequestered a reported 102,810 metric tons carbon dioxide in 2003. AEP reported 4 new domestic afforestation projects initiated in 2003, which sequestered a reported 2,121 metric tons carbon dioxide during the year.

Members of UtiliTree Carbon Company, a nonprofit consortium of 41 North American electric utilities, reported on 8 afforestation projects, including the Western Oregon Carbon Sequestration Project and 7 bottomland hardwood restoration initiatives in Louisiana, Arkansas, and Mississippi that are intended to convert marginal agricultural land to forest: the Mississippi River Valley Bottomland Hardwood Restoration, Upper Ouachita River Valley Bottomland Hardwood Restoration, Overflow Bottomland Hardwood Forest Restoration Project, St. Catherine-NFWF, Bayou Cocodrie Bottomland Hardwood Forest Restoration, St. Catherine-ESI, and St. Francis River Carbon Offset. The following afforestation and reforestation projects were reported for the first time for 2003.

The St. Francis River Carbon Offset Project, shares of which were reported by 28 UtiliTree Carbon Company partners, involves the restoration of 405 acres of bottomland hardwood forest using native tree species. The project site is on privately owned, marginal agricultural farmland in Lee County, Arkansas. Sequestration totaling 279 metric tons carbon dioxide equivalent was reported for 2003.

American Electric Power, Inc., reported on projects AEP-AGSPOIL-2003 and AEP-Private Lands-2003. AEP-AGSPOIL-2003 is an afforestation project on 1,089 acres of reclaimed mined grassland. AEP planted a total of 885,360 seedlings in 2003, including green ash; white ash; sycamore; pitlolly pine; loblolly pine; white oak; red oak; bur oak; sawtooth oak; black locust; and black alder. AEP-Private Lands-2003 involves financial assistance provided by AEP to private landowners who want to plant trees on their property in return for any associated greenhouse gas reduction benefits. These agreements are in 45- or 70-year durations, depending on the species planted and the nature of the site. The 2003 plantings involved afforestation of marginal agriculture cropland previously used for grain, hay, or cattle production. The species planted include white pine, white ash, green ash, sycamore, bur oak, white oak, and red oak. Together, these projects sequestered a reported 2,088 metric tons carbon dioxide equivalent in 2003.

ESI Florida Longleaf Pine Restoration, reported by Environmental Synergy, Inc., is located in the Withlacoochee State Forest managed by the Florida Division of Forestry. Native longleaf pine trees were planted in this 70-year project, which, beyond sequestering carbon, was designed to help create large forested blocks, rejoin fragmented forests, and create wildlife corridors for the benefit of neotropical migratory birds, waterfowl, and other animals such as deer and turkey. Carbon sequestration values were not estimated for this project.

DTE Energy/Detroit Edison reported on projects called "Six Lakes–2002" and "Miscellaneous Tree Plantings–2003." For Six Lakes–2002, DTE Energy/Detroit Edison planted trees on the site of the Six Lakes-Taggert Compressor Station, which is owned by Michigan Consolidated Gas Company (a subsidiary of DTE Energy). The planting in 2002 consisted of 80,000 red pine seedlings planted on 90 acres and 20,000 white spruce seedlings planted on 30 acres. These plantings reportedly sequestered 489 metric tons carbon dioxide equivalent in 2003.

Entergy Services, Inc., reported on projects called "Little Gypsy Plant Reforestation" and "Willow Glen Plant–Reforestation," which involved tree plantings at Entergy power plant sites. The former involved the planting of 20,000 nuttall oak, cypress, willow oak, green ash and pecan saplings and seedlings on 44 acres. The latter included the planting of 70,577 bottomland hardwoods on 234 acres, including the following species: water oak, nuttall oak, cottonwood, cherrybark oak, pecan, sweetgum, shumard oak, cow oak, sugarberry, green ash, and sycamore. These efforts sequestered a reported 462 metric tons carbon dioxide equivalent in 2003.

Urban Forestry

A total of 24 reporters, all of which were electric utilities, reported 34 urban forestry projects for 2003. For the 34 projects, total sequestration of 17,565 metric tons carbon dioxide was reported for 2003 (Table 16). Urban forestry projects are unique, in that under some circumstances they can reduce energy consumption as well as sequester carbon. Shade trees planted near buildings reduce summer air conditioning requirements; in addition, trees can act as windbreaks, reducing heating needs in the winter. Although the emission reductions associated with energy effects of urban forestry can be several times the sequestration benefits on a carbon dioxide equivalent basis, they are difficult to estimate. As a result, no energy-related emission reductions were submitted for 2003.

One new urban forestry project was reported for 2003. DTE Energy/Detroit Edison reported the planting of 3,082 trees, which were mostly white spruce, fir, pine, beech, oak, maple and birch. This project sequestered 5 metric tons carbon dioxide equivalent in 2003.

Forest Preservation

Forest preservation projects sequester carbon by avoiding the harvesting of timber or clearing of land and, thus, preventing the release of stored carbon. For 2003, 39 forest preservation projects were reported by 31 reporters; however, the vast majority (33) of these projects were reported separately by participating electricity generators as shares in the Rio Bravo Carbon Sequestration Pilot Project in Belize, held independently or through the UtiliTree Carbon Company. Also, 3 reporters provided information on their shares in the Noel Kempff Mercado Climate Action Project in Bolivia. No new forest preservation projects were reported for 2003.

The two largest forest preservation projects were reported by AES Hawaii and AES Shady Point, subsidiaries of the AES Corporation. AES Hawaii reported on the Mbaracayu Conservation project in Paraguay, and AES Shady Point reported on the OXFAM America Amazon project in Bolivia. Together, the two projects sequestered a reported 6.15 million metric tons carbon dioxide in 2003, representing 95 percent of the total sequestration reported for forest preservation projects (6.5 million metric tons carbon dioxide equivalent).

The Mbaracayu Conservation project is designed to offset carbon dioxide emissions from the AES Hawaii plant, a 180-megawatt circulating fluidized-bed coal-fired cogeneration plant on the island of Oahu. Sequestration of carbon is accomplished through the planting of fruit trees and cash-producing indigenous trees in the 143,000-acre Mbaracayu forest tract, which, according to AES, would have been sold to a timber company in the absence of the project.

AES Shady Point describes the OXFAM America Amazon Project as an innovative project to protect the tropical forest in the Amazon regions of Peru, Ecuador, and Bolivia. The project, which is being conducted in cooperation with national indigenous groups, OXFAM America, and the World Resources Institute (WRI), is intended to offset carbon dioxide emissions from the AES Shady Point plant in Oklahoma. The project will support efforts by indigenous groups to gain control over their lands and to develop sustainable resource extraction plans for the forest, thus avoiding tropical deforestation. WRI estimates that over 10 years the project would prevent the deforestation of 1.2 million hectares and avoid emissions of at least 233 million metric tons carbon dioxide equivalent.

American Electric Power, BP America, and PacifiCorp reported on the Noel Kempff Mercado Climate Action Project in Bolivia, which was accepted by the USIJI in November 1996. The project, which involves the preservation of 634,286 hectares of land on the southern and western boundary of the Noel Kempff Mercado National Park by incorporating it into the park, includes the following components: (1) carbon dioxide emission reductions through the cessation of logging activities and the protection of forest land from conversion to agricultural use; (2) protection, regeneration, and preservation; and (3) leakage prevention.[55] The sequestration reported for this project for 2003 totaled 243,660 metric tons carbon dioxide.

The Rio Bravo Carbon Sequestration Pilot Project, a forest preservation project in Belize, was reported by 28 utilities. Begun in 1995, the project is being undertaken through a partnership between Wisconsin Electric, Detroit Edison, Cinergy, PacifiCorp, and UtiliTree Carbon Company (which provided financial support), as well as The Nature Conservancy and a Belizean nongovernmental organization, Programme for Belize. A 14,400-acre parcel of forest threatened by agricultural conversion was secured, linking two forested Rio Bravo properties. The project implemented a sustainable forestry management program on the entire Rio Bravo Conservation and Management Area that aims to increase carbon sequestration through improved forest and timber management.

The entire Rio Bravo Carbon Sequestration Pilot Project sequestered an estimated 20,412 metric tons carbon dioxide in 2003, of which 19,890 metric tons (97 percent) was reported to the Voluntary Reporting Program.[56] The reported carbon sequestration for this project was estimated by defining a reference case that assumes a profile of carbon releases that would have occurred if the project had not been undertaken and the forest had been converted to agriculture over a 5-year period (1995-1999). The estimated carbon sequestration equals the projected avoided carbon releases. To date, it has been reported that the entire project has sequestered an estimated 4.4 million metric tons carbon dioxide. The UtiliTree Carbon Company estimates that most (91 percent) of that carbon dioxide was sequestered during the 5-year preservation phase of the project. The smaller annual sequestration totals reported for years after 2000 represent the accumulation of carbon in the forest that has occurred since the 1995 to 1999 preservation phase.

[55] "Leakage" refers to the migration of logging and land-clearing activities that would have occurred in the preserve to areas outside the preserve, which would offset the sequestration achievements of the project.

[56] Ten UtiliTree participants did not submit reports to the Voluntary Reporting Program for data year 2003, including one Canadian utility that is ineligible to report.

We Energies reported its independent sponsorship of an expansion to the Rio Bravo Conservation and Management Area, which added 20,630 acres to the preserve. We Energies reported that this preservation initiative sequestered an estimated 54,431 metric tons carbon dioxide equivalent in 2003.

Only one domestic forest preservation project was reported for 2003, by Alliant Energy, which reported sequestering 1,597 metric tons carbon dioxide by maintaining forested buffer lands around its power plants in the Wisconsin River Valley. This project involves the management of more than 10,000 acres along the Wisconsin River valley. Included in the land management plan are access restrictions for the preservation of osprey and eagle habitats in the forest.

Modified Forest Management

Modified forest management involves the modification of the management regimes of existing forests to increase their carbon capture rates. Of the 48 modified forest management projects reported for 2003, 29 were associated with two related reduced-impact logging initiatives in Malaysia. The first initiative was a pilot project reported by NEGT Corporation.[57] Started in 1992, this project implemented new logging techniques with the goal of reducing logging damage by 50 percent. The new techniques include pre-cutting of vines, directional felling, and planned extraction of timber on impact-reducing skid trails. On the second initiative, 28 utilities reported their shares of a full-scale project sponsored by the UtiliTree Carbon Company that introduced reduced-impact logging practices to 2,422 acres of forest beginning in 1997. The reported sequestration for the second initiative was 9,405 metric tons carbon dioxide equivalent in 2003.

American Electric Power reported the only new modified forest management project for 2003. This project was conducted in predominantly upland central hardwood stands ranging from 30 to 50 years in age. The stands were selectively harvested, removing overmature, mature, cull, and diseased trees, as well as other stems as necessary to improve growing relationships and maximize growth rates. The project is a continuation of annual forest management efforts reported separately since 1991. Including the 378 metric tons carbon dioxide equivalent for the 2003 project, these efforts together sequestered a reported 15,128 metric tons carbon dioxide equivalent in 2003.

Sequestration exceeding 10,000 metric tons carbon dioxide equivalent in 2003 was reported for the following three previously reported modified forest management projects:

- Southern California Edison Co. reported sequestration of 23,587 metric tons carbon dioxide equivalent by its Net Growth of Timber at Shaver Lake project.
- Alliant Energy's afforestation project also had a modified forest management component. The entire project sequestered a reported 19,958 metric tons carbon dioxide equivalent in 2003; however, Alliant Energy did not report the sequestration quantity attributable to modified forest management alone.
- American Electric Power's Guaraquecaba Climate Action Project, located in Brazil, sequestered a reported 11, 272 metric tons carbon dioxide equivalent in 2003.

On a smaller scale, DTE Energy/Detroit Edison conducted selective harvesting operations in previously unmanaged wood lots in southeastern Michigan and reported increasing sequestration by 1,398 metric tons carbon dioxide equivalent in 2003.

Forest Plantations

Forest plantations include woody biomass production and agroforestry. Woody biomass production is the cultivation of trees in intensively managed plantations to produce fuel or fiber. Agroforestry involves mixing trees with annual crops to provide wind shelter, stabilize soil, sequester carbon, and produce fuel wood and fruit crops.

One of the two woody biomass production projects reported for 2003 was Minnesota Power's Short Rotation Woody Crop Establishment project. Contracts to plant hybrid poplars were established with landowners enrolled in the Conservation Reserve Program. Following pre-planting site preparation, first commenced in 1994, the planting of 2,800 acres was phased in over 1995, 1996, and 1997. The project area was reduced to 2,550 acres in 2003 after consideration of adverse conditions such as seasonal flooding of low spots, insect damage, and poor growth rates. The project sequestered a reported total of 15,430 metric tons carbon dioxide equivalent in 2003.

The other plantation project reported was an AES Thames agroforestry project in Guatemala, which

[57]This project was originally sponsored by the New England Power Company and reported by its parent company, New England Electric System (NEES) Company. In August 1998, USGen New England, Inc. (USGenNE) completed the acquisition of New England Electric System (NEES) Company's hydroelectric and fossil power generation business previously operated by New England Power. As part of the acquisition, the rights to the emission reductions and carbon sequestration achieved by this and other projects were transferred to USGenNE. For 2000 through 2002, the activities previously reported by USGenNE were incorporated into the report submitted by its parent, PG&E Corporation. For 2003, this project was included in a separate report submitted by NEGT (National Energy and Gas Transmission), formerly known as PG&E National Energy Group, a subsidiary of PG&E Corporation.

involves establishing a plantation of fruit, pulp, and fuelwood trees. For 2003, AES Thames reported sequestering 410,000 metric tons carbon dioxide equivalent for this project.

Conservation Tillage and Other Sequestration Projects

Not all the carbon sequestration projects reported for 2003 involved conventional forestry. Other projects reported involved conservation tillage,[58] reuse of utility poles, and restoration of terrestrial, wetland, and marine habitats. Six such projects were reported for 2003.

Exelon (formerly Commonwealth Edison and PECO) reported on its Illinois Prairie Grass Plantings project, in which native prairie grasses are planted on various properties in the utility's State system. In contrast to conventional turf grass, the deep root systems of native Illinois prairie grasses afford environmental benefits that include reducing soil erosion and downstream flooding and eliminating the need for irrigation, fertilizers, pesticides, and herbicides. In addition, the deeper root systems sequester more carbon dioxide. For this project, Exelon claimed responsibility for the sequestration of 718 metric tons carbon dioxide in 2003. In another project, Exelon reused wood utility poles that are structurally sound in order to avoid the harvesting of trees to manufacture new utility poles. The utility pole reuse project was reported to have sequestered 649 metric tons carbon dioxide in 2003.

Alliant Energy reported on a conservation tillage project in south central Wisconsin that involved the conversion of 956 acres of former corn and soybean row cropland to a variety of other uses, including tall grass prairie, wetlands, conservation tillage, and oak savanna. This project reportedly sequestered 4,390 metric tons carbon dioxide in 2003. Alliant Energy also reported on a habitat restoration project in Wisconsin, which sequestered 3,493 metric tons carbon dioxide in 2003.

Other carbon sequestration projects include the reclamation of 5,500 acres of wetlands in Texas and Louisiana by Entergy Services, Inc., and the reclamation of 6 acres of wetlands by Conectiv Atlantic Generation. The two projects sequestered a reported 54,885 and 12 metric tons carbon dioxide in 2003, respectively.

[58]Conservation tillage includes practices (such as reduced till or no till) that, compared to conventional tillage methods, increase carbon storage on cropland.

5. Reducing Methane Emissions

Introduction

U.S. methane emissions totaled an estimated 26.2 million metric tons (601.9 million metric tons carbon dioxide equivalent) in 2003, representing 8.7 percent of total U.S. greenhouse gas emissions. Methane emissions in 2003 were approximately equal to 2002 levels and 4.6 million metric tons lower than 1990 levels.[59]

Methane emissions have been decreasing since 1990. Emissions from waste management and energy sources have been reduced, while emissions from the other primary methane source, agriculture, have remained nearly constant. In the waste management area, estimated emissions from landfills—the second largest source of methane after natural gas systems—have dropped from 10.5 million metric tons in 1990 to 6.3 million metric tons in 2003 as a result of a rapid increase in methane recovery at landfills. Overall, methane recovery at landfills, due to tax credits, regulation, and high natural gas prices have grown from about 1.3 million metric tons in 1990 to 6.3 million metric tons in 2003. Emissions from energy sources have also fallen, as a result of reductions in methane emissions from coal mining. Methane emissions from coal mines are estimated to have declined from 4.2 million metric tons in 1990 to 2.9 million metric tons in 2003. To some extent, the decline is attributable to an increase in methane recovery at coal mines, from 0.3 million metric tons in 1990 to about 0.8 million metric tons in 2003.[60]

The Voluntary Reporting Program has seen a rapid increase in reported methane emission reductions since 1994. The number of waste management projects reported (primarily landfill gas projects) has increased from 17 in 1994 to 425 in 2003. For the 2003 data year, reduction activities were reported on Form EIA-1605 for at least 341 separate landfills, up from 321 in 2002.[61] Projects reporting methane recovery from energy production (natural gas systems and coal mine methane recovery) have increased from 8 in 1994 to 41 in 2003. Agricultural projects remain a small category, fluctuating from 3 to 5 a year since 1994.

Overview of Projects Reported

For 2003, 71 organizations reported a total of 470 projects to reduce methane emissions, a 5.4-percent increase in projects from 2002 and nearly a 17-fold increase from the first (1994) reporting cycle (Table 17). Of the projects that were reported for 2003, 36 were reported for the first time, either because they began achieving reductions in 2003 or because they were reported by one of the 5 new reporters in the methane emission reduction categories. Some projects reported for previous years were not reported for 2003.

Direct reductions of methane emissions reported on Form EIA-1605 for all project types in 2003 totaled 3.3 million metric tons methane, down from 3.5 million metric tons reported for 2002 (Table 18). Waste treatment projects accounted for 72.8 percent of reported methane reductions. These reductions were derived from 425 waste treatment projects reported, averaging 5,736 metric tons of direct methane emission reductions per project (Figure 13). The 218 projects reported by Waste Management, Inc., resulted in a reported reduction of 1.4 million metric tons methane (33.0 million metric tons carbon dioxide equivalent), or 42.8 percent of total reported direct reductions of methane emissions.

Projects to reduce methane emissions from coal mines and natural gas systems generally yielded much larger direct reductions per project (Figure 13), averaging 22,964 metric tons methane. Total direct emission reductions of 0.4 million metric tons methane were reported for coal mining projects in 2003, accounting for 12.1 percent of the direct methane emission reductions reported for 2003. The 28 natural gas system projects reported for 2003 reduced direct methane emission by a total of 0.5 million metric tons methane, or about 15.9 percent of all reported direct methane emission reductions.

Indirect methane emission reductions from all projects types totaled 1.0 million metric tons for 2003 (Table 18), down slightly from the 1.1 million metric tons reported for 2002. The vast majority (99 percent) of indirect

[59] Energy Information Administration, *Emissions of Greenhouse Gases in the United States 2003*, DOE/EIA-0573(2003) (Washington, DC, December 2004), web site www.eia.doe.gov/oiaf/1605/ggrpt.

[60] Energy Information Administration, *Emissions of Greenhouse Gases in the United States 2003*, DOE/EIA-0573(2003) (Washington, DC, December 2004), web site www.eia.doe.gov/oiaf/1605/ggrpt.

[61] The counts of landfills represent minimum levels, because not all reporters explicitly identified the landfills on which they were reporting. The counts exclude reports received after the close of the reporting cycles, in order to maintain comparability.

methane emission reductions were reported for waste treatment and disposal projects. The waste treatment and disposal category included two very large projects reported by DTE Energy and the Integrated Waste Services Association (IWSA). DTE Energy reported 0.2 million metric tons of indirect reductions from multiple landfill gas-to-energy systems reported as one large project, and IWSA reported indirect reductions of 0.4 million metric tons from the waste-to-energy facilities of its members.

Reducing Methane Emissions from Waste Treatment and Disposal

Reducing emissions from waste treatment and disposal sites was the most frequently reported method for lowering methane emissions in 2003. These projects made up 90 percent of all the methane emission reduction projects reported, with 21 more projects reported for 2003 than for 2002. The principal reported method for reducing methane emissions from waste treatment and disposal was landfill gas recovery (the capture of methane generated during the anaerobic decomposition of wastes in a landfill). The recovered methane may be flared, piped to an end-use customer to be used as a fuel, or used to generate electricity, which can reduce the need for generation from other, more carbon-intensive fuels. Other methods of lowering emissions from waste treatment and disposal include reducing the volume of waste reaching landfills through combustion or recycling, and capturing methane generated during anaerobic decomposition of organic material in wastewater.

The 425 waste treatment and disposal projects reported for 2003 accounted for 2.4 million metric tons of direct methane emission reductions and 1.0 million metric tons of indirect reductions (Table 19). Of the 425 projects reported, 412 achieved methane emission reductions at landfills by capturing methane from landfill gas generated at waste disposal sites, 5 lowered emissions through diversion of wastes that would have emitted methane during decomposition, and 8 captured methane from wastewater treatment facilities.

Recovery of Landfill Gas

As waste decomposes in a landfill, it produces a biogas that is approximately 50 percent carbon dioxide and 50 percent methane. As a result, landfill gas is a potentially

Table 17. Projects Reported on Form EIA-1605 with Methane Reductions as the Principal Outcome by Project Type, Data Years 1994-2003
(Number of Projects)

Project Type	1994	1995	1996	1997	1998	1999	2000	2001	2002(R)	2003
Waste Management and Disposal	**17**	**23**	**44**	**53**	**90**	**153**	**350**	**391**	**404**	**425**
Landfill Gas Recovery	14	19	40	48	80	139	337	381	391	412
Wastewater Treatment	2	2	2	3	5	6	8	4	7	8
Waste Combustion	1	2	2	2	5	8	5	6	6	5
Agriculture	**3**	**3**	**3**	**3**	**4**	**4**	**5**	**3**	**3**	**4**
Energy Production and Consumption	**8**	**11**	**13**	**15**	**28**	**28**	**28**	**35**	**39**	**41**
Coal Mining	2	3	4	5	17	15	14	16	18	13
Natural Gas Production, Transmission, and Distribution	6	8	9	10	11	13	14	19	21	28
Total	**28**	**37**	**60**	**71**	**122**	**185**	**383**	**429**	**446**	**470**

(R) = revised.
Note: Project totals do not equal sum of components, because some projects are counted in more than one category.
Source: Energy Information Administration, Form EIA-1605.

Table 18. Total Methane Emission Reductions Reported on Form EIA-1605, All Project Types, Data Years 1994-2003
(Metric Tons Methane)

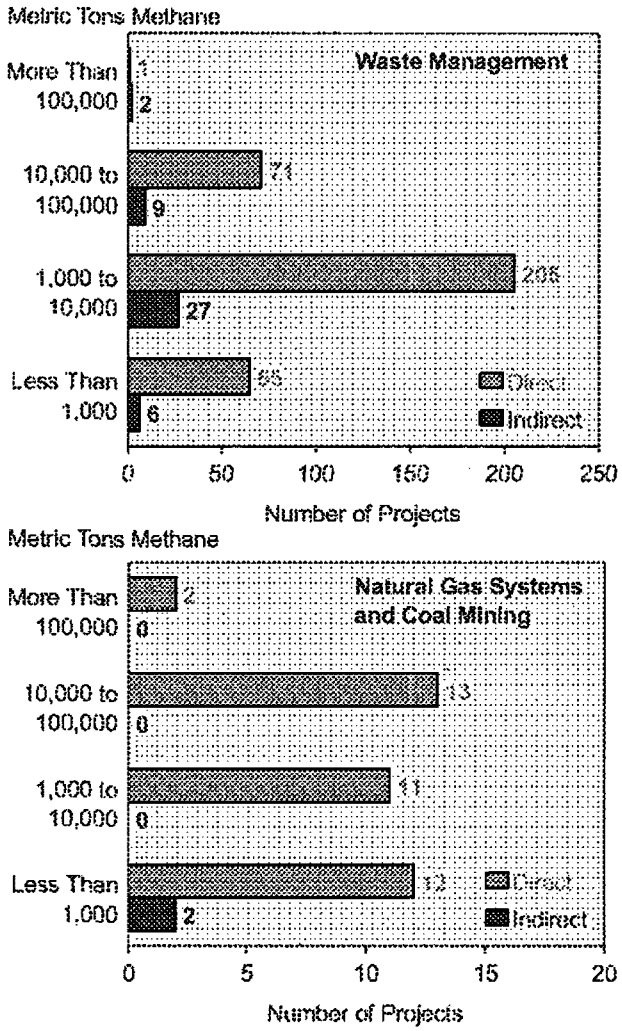
Type of Reduction	1994	1995	1996	1997	1998	1999	2000	2001	2002(R)	2003
Direct	25,079	8,450	409,176	378,494	1,379,162	1,564,958	2,693,295	3,546,480	3,481,465	3,347,511
Indirect	102,641	1,077,272	1,157,048	505,663	658,811	827,294	897,465	1,009,400	1,067,643	1,000,063

(R) = revised.
Source: Energy Information Administration, Form EIA-1605.

valuable source of energy, with a heat content of about 500 British thermal units (Btu) per cubic foot, or about half that of commercially marketed natural gas. Because of its relatively low Btu content and the presence of several impurities, the typical method for using landfill gas is to burn it for electricity generation rather than upgrading it for sale to a pipeline. The electricity generated is then used on site or sold to the grid. The process lowers methane emissions and reduces consumption of other fuels for electricity generation. When the electricity generated displaces oil- or coal-fired generation, carbon dioxide emissions are reduced. More recently, higher natural gas prices have resulted in an increasing number of projects that involve piping landfill gas for direct use in medium-Btu boilers, which also displaces fossil fuels.

For the 412 landfill gas recovery projects reported for 2003, reported direct methane emission reductions totaled 2.4 million metric tons and indirect reductions totaled 0.6 million metric tons. Of the projects reported, 170 recovered landfill methane for energy, 183 simply flared the gas, 49 included both recovery for energy and flaring, and 10 reported other activities.

Figure 13. Methane Emission Reduction Projects Reported on Form EIA-1605 by Type and Size of Reduction, Data Year 2003



Source: Energy Information Administration, Form EIA-1605.

Waste Combustion

When waste is diverted from a landfill through waste combustion, methane emissions that would have resulted when the waste decomposed at a landfill are avoided. Five waste combustion projects were reported for 2003. The preponderance of the methane emission reductions reported for waste combustion are indirect, because they typically occur at a landfill where diverted waste would have decomposed to produce methane, rather than at the site of the waste diversion activities. Total indirect reductions for the five projects were 0.4 million metric tons methane (Table 19). The majority of the reductions were reported by IWSA, which reported reductions associated with the combustion of waste at facilities owned by its members across the United States. IWSA's total reported reduction of methane emissions in 2003 was 0.4 million metric tons. Other methods of reducing methane emissions from waste include recycling and source reduction (see box on page 52).

Reducing Methane Emissions from Wastewater Treatment Plants

When wastewater is treated under anaerobic conditions, the decomposition of its organic portion yields methane. Like methane generated from waste at landfills, the methane generated from wastewater treatment may be captured and either flared or used as an energy resource. Because captured methane has value as an energy resource, operators may use an anaerobic digester to treat the wastewater and maximize methane generation. Eight projects to capture methane generated from wastewater treatment were reported for 2003, with total reported direct reductions of 60.1 thousand metric tons methane and indirect reductions of 10.7 thousand metric tons methane. Direct reductions of 43.2 thousand metric tons methane were reported for a Los Angeles County Sanitation District project, and Blue Source reported direct reductions of 16.9 thousand metric tons methane. Indirect reductions were reported for two projects sponsored by FirstEnergy.

Reducing Emissions from Energy Production and Consumption

Reducing Emissions from Coal Mines

As coal is formed from organic material by natural chemical and physical processes, methane is also created. The methane is stored in the pores (open spaces) of

Materials Management Projects

"Materials management" is a crosscutting category that can encompass a variety of greenhouse gas and emission sources, and may include any of the following activities:

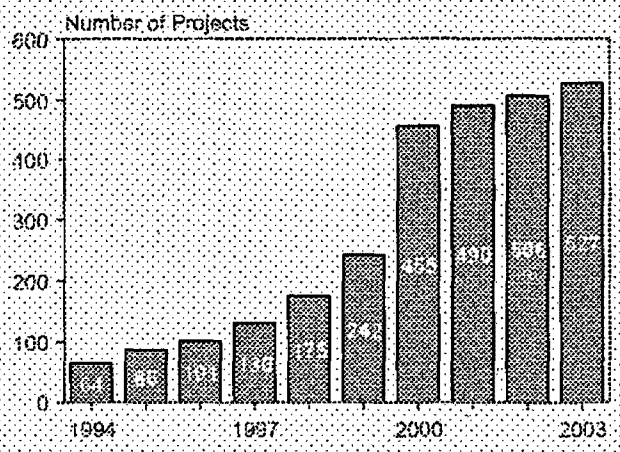
- Use of biomass fuels, such as wood waste, which reduces carbon dioxide emissions by displacing fossil fuels
- Avoidance of methane emissions from the decay of waste materials in landfills, wastewater treatment plants, and other waste management systems through activities such as recovery of methane from landfills or from anaerobic digesters treating municipal sewage, agricultural wastes, or animal manure, and diversion of municipal solid waste from landfills to waste-to-energy systems
- Recycling of halogenated substances, such as sulfur hexafluoride, hydrofluorocarbons, chlorofluorocarbons, and hydrochlorofluorocarbons
- Recycling and source reduction of solid waste, which reduce methane emissions from municipal landfills and reduce emissions of carbon dioxide and other gases associated with the production of virgin materials displaced by the materials recycled
- Reuse of coal ash as a substitute for Portland cement in concrete, which reduces carbon dioxide emissions from the manufacture of the cement.

Reporting of materials management activities on Form EIA-1605 increased more than eightfold from 1994 to 2003. A total of 526 projects were reported for 2003, 4 percent more than were reported for 2002 (see figure).

Landfill gas recovery accounted for most (78 percent) of the 526 materials management projects reported for 2003. In addition to 13 other methane emission avoidance projects reported, other materials management projects included coal ash reuse (33), recycling and source reduction of solid waste (34), recycling of halogenated substances (18), and biomass burning (16).

The emission reductions reported for materials management projects are shown in the table below. For 2003, reported net reductions in direct emissions were 50.4 million metric tons carbon dioxide equivalent, representing 19 percent of the total direct reductions reported. Reported indirect reductions were 52.0 million metric tons carbon dioxide equivalent, representing 64 percent of the total indirect reductions reported. Most of the reductions (99 percent of the direct and 89 percent of the indirect reductions) were associated with methane avoidance activities discussed in this chapter.

Materials Management Projects Reported on Form EIA-1605, Data Years 1994-2003



Source: Energy Information Administration, Form EIA-1605. (R) = revised.

Reported Emission Reductions from Materials Management Projects by Project Type and Type of Reduction, Data Year 2003
(Metric Tons Carbon Dioxide Equivalent)

Project Type	Number of Projects	Direct Reductions	Indirect Reductions
Biomass Burning	16	468,399	91,828
Methane Emission Avoidance			
Landfill Gas Recovery	412	54,659,548	14,923,688
Municipal Waste Combustion	1	-7,933,287	23,750,820
Wastewater Treatment	8	1,360,164	260,765
Agricultural Waste	4	1,616	2,204
Total	*425*	*48,088,042*	*38,937,478*
Halogenated Substances	18	1,633,398	2,224,018
Recycling and Source Reduction of Solid Waste	34	217,709	5,540,865
Coal Ash Reuse	33	0	5,233,686
Total	**526**	**50,407,548**	**52,027,875**

Source: Energy Information Administration, Form EIA-1605.

the coal itself and in cracks and fractures in the coalbed. As coal is mined, the pressure surrounding the stored methane decreases, allowing much of it to be released into the operating coal mine. Because methane in concentrations of 5 to 15 percent is explosive, mine operators use large fans to provide a steady airflow across the mine face and ventilate the mine shaft. Some very gassy mines must also employ degasification wells to remove methane before or after mining so that it does not enter the mine. Because methane is a valuable energy source, most of the mines with degasification systems now inject the methane into gas pipelines or use it to generate electricity or heat.

For 2003, 13 projects to reduce methane emissions from coal mines were reported, with total direct emission reductions of 0.4 million metric tons and indirect reductions of 96 metric tons methane (Table 20). Jim Walters Resources reported direct reductions of 0.2 million metric tons methane from three degasification projects, and CDX reported direct methane reductions of 0.1 million metric tons methane from its two projects.

Reducing Emissions from Natural Gas Production, Transmission, and Distribution

Methane is the principal constituent of natural gas (about 95 percent of the mixture). Methane emissions from natural gas production, processing, transmission, and distribution are generally process related, with normal operations, routine maintenance, and system upsets being the primary contributors. Emissions vary greatly from facility to facility and are largely a function of operation and maintenance procedures and equipment conditions. Thus, methane emissions can be reduced by replacing leaky system components, improving operations and maintenance, and limiting routine venting procedures. For 2003, 28 such projects were reported, with total direct emission reductions of 0.5 million metric tons methane. No indirect reductions were reported. NIPSCO reported 9 projects, associated with the Natural Gas STAR Program, that yielded 0.2 million metric tons of methane emission reductions. Other major reporters included NEGT, which reported one Natural Gas STAR

Table 19. Methane Emission Reductions from Waste Treatment and Disposal Projects Reported on Form EIA-1605, Data Years 1994-2003
(Thousand Metric Tons Methane)

Reduction and Project Type	1994	1995	1996	1997	1998	1999	2000	2001	2002(R)	2003
Direct Reductions	*	**0.6**	**128.4**	**135.6**	**484.7**	**966.8**	**2,171.5**	**2,117.2**	**2,514.7**	**2,437.7**
Landfill Gas Recovery	*	0.6	128.4	135.3	451.4	921.7	2,134.0	2,079.6	2,476.5	2,377.6
Wastewater Treatment	—	—	—	0.3	33.3	40.8	37.5	37.6	38.5	60.8
Waste Combustion	—	—	—	—	*	4.4	*	*	-0.8	-0.7
Indirect Reductions	**99.4**	**1,061.7**	**1,142.9**	**449.6**	**644.7**	**815.3**	**884.5**	**1,003.3**	**1,003.3**	**988.4**
Landfill Gas Recovery	99.4	111.3	250.5	298.3	470.9	575.5	612.9	701.9	623.8	569.1
Wastewater Treatment	—	*	*	—	4.7	19.6	12.7	13.1	13.1	10.7
Waste Combustion	*	950.4	892.4	151.3	169.1	220.2	259.0	288.3	366.5	408.6

*Less than 500 metric tons.
(R) = revised.
Source: Energy Information Administration, Form EIA-1605.

Table 20. Methane Emission Reductions from Natural Gas Systems and Coal Mining Reported on Form EIA-1605, Data Years 1994-2003
(Metric Tons Methane)

Reduction and Project Type	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Direct Reductions	**19,687**	**7,714**	**279,766**	**242,040**	**893,927**	**595,311**	**518,590**	**657,894**	**797,154**	**941,512**
Coal Mining	13,767	4,191	271,549	232,131	885,807	581,307	505,941	538,285	567,088	406,782
Natural Gas Systems	5,920	3,522	8,217	9,909	8,121	14,004	12,648	119,609	230,066	534,731
Indirect Reductions	—	**3,543**	**4,039**	**5,439**	**7,603**	**6,565**	**6,785**	**96**	**96**	**96**
Coal Mining	—	278	893	2,285	1,568	528	747	96	96	96
Natural Gas Systems	—	3,265	3,146	3,154	6,035	6,036	6,038	0	0	0

Source: Energy Information Administration, Forms EIA-1605 and EIA-1605EZ.

project with methane emission reductions of 0.2 million metric tons, and BP America, which reported 3 projects with aggregate reductions of 0.1 million metric tons methane.

Reducing Emissions from Agriculture

Four projects reported for 2003 focused on reducing emissions from agricultural activities, but only three of them reported methane emission reductions. FirstEnergy reported indirect methane emission reductions of 109 metric tons as the result of purchases of electricity generated from an anaerobic digester of animal waste at Mason Dixon Farms—an increase from the 73 metric tons reported for 2002. Alliant Energy reported two projects, at Deer Ridge Dairy and Double S Dairy, which reduced carbon dioxide emissions by 1,237 metric tons. The fourth agriculture project, reported by AES, was to improve feed supplements for cattle in India and reduce emissions from enteric fermentation. AES did not report an emission reduction quantity for 2003.

Federal Voluntary Programs To Reduce Methane Emissions

The U.S. Government sponsors a number of voluntary programs specifically targeted to reduce methane emissions. Most frequently cited by reporters to the Voluntary Reporting Program are the U.S. Environmental Protection Agency's Landfill Methane Outreach Program (LMOP), Coalbed Methane Outreach Program (CMOP), and Natural Gas STAR Program. In addition, reducing methane has been an effective method for meeting the reduction targets adopted by utilities under the U.S. Department of Energy's Climate Challenge voluntary program. The number of reported methane reduction projects associated with Federal voluntary programs has increased 14-fold since 1994, with a particularly large increase in the number of projects associated with the LMOP. Of the 425 waste treatment and disposal projects reported to the Voluntary Reporting Program for 2003, 365 (86 percent) were associated with the LMOP (Table 21).

Table 21. Number of Reported Methane Reduction Projects Associated with Other Federal Voluntary Programs, Data Years 1994-2003

Voluntary Program	1994	1995	1996	1997	1998	1999	2000	2001	2002(R)	2003
Climate Challenge	22	27	32	36	34	39	42	34	34	36
Landfill Methane Outreach Program	6	8	29	32	90	116	309	359	354	365
Coalbed Methane Outreach Program	1	1	2	2	10	11	6	9	9	6
Natural Gas STAR	7	9	11	6	5	7	7	14	17	23
Other	0	6	2	2	1	3	4	5	5	5
Total	**30**	**42**	**64**	**65**	**132**	**164**	**354**	**407**	**405**	**420**

(R) = revised.
Note: Totals may not equal sum of components, because some projects are associated with more than one voluntary program.
Source: Energy Information Administration, Form EIA-1605.

6. HFCs, PFCs, and Sulfur Hexafluoride

U.S. Emissions of HFCs, PFCs, and Sulfur Hexafluoride

In addition to the three principal greenhouse gases (carbon dioxide, methane, and nitrous oxide), three types of engineered gases—hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6)—are also considered greenhouse gases under the United Nations Framework Convention on Climate Change (UNFCCC). HFCs are used as refrigerants, solvents, and propellants and in many other applications. PFCs are emitted as a byproduct of aluminum smelting and are used in semiconductor manufacture. The primary uses of SF_6 are in electrical transmission and distribution equipment and in magnesium production.

U.S. emissions of HFCs, PFCs, and SF_6 in 2003 were estimated to be 143.4 million metric tons carbon dioxide equivalent, down slightly from 143.7 million metric tons in 2002. Collectively, they accounted for 2.1 percent of total U.S. greenhouse gas emissions in 2003.[62] Annual emissions of these gases have increased by 62 percent since 1990, primarily due to increases in emissions of HFCs, which are used as replacements for chlorofluorocarbons (CFCs) in automobile air conditioners (Figure 14). CFCs are being phased out under the Montreal Protocol,[63] because they damage the Earth's stratospheric ozone layer, which absorbs harmful ultraviolet radiation from the sun. Emissions of both PFCs and SF_6 have fallen since 1990.

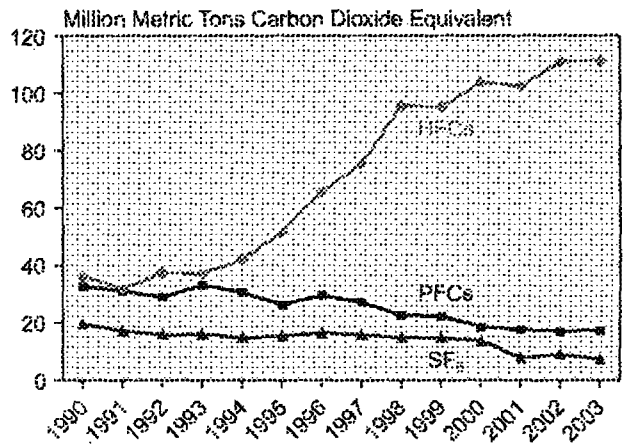
Projects Reported

For 2003, 38 entities reported on 66 projects that reduced emissions of HFCs, PFCs, and SF_6—1 more reporter and 2 more projects than were reported for 2002 (Table 22). Emissions avoidance and recycling of halogenated substances were two of the most frequently reported project types (24 and 18 projects reported, respectively), followed by substitution of other chemicals (7 projects reported) and the destruction of halogenated substances (1 project reported). Reductions in PFC emissions were also reported for 23 post-consumer waste-recycling projects in which aluminum was one of the materials collected and recycled.

The 38 entities reporting projects to reduce emissions of HFCs, PFCs, and SF_6 for 2003 included: 30 electric utilities; 2 aluminum smelters (Alcan Primary Products Corporation's Sebree Works and Noranda Aluminum, Inc.); a chemical company (Allergan); 1 transportation equipment company (General Motors); a company from the electronic equipment industry (Lucent Technologies, Inc.); a refrigerant reclamation company (Polar Refrigerant Technology); a holding and investment company (CLE Resources); an SF_6 recycling company (Xenon Specialty Gas); and a government organization (Burlington County Board of Chosen Freeholders).

Of the 38 entities that reported projects in this category, 16 were past participants in the U.S. Department of Energy's Climate Challenge Program and Rebuild America. Other voluntary programs with which the projects reported in this category were affiliated include the U.S. Environmental Protection Agency's (EPA's) Voluntary Aluminum Industrial Partnership, EPA's

Figure 14. Estimated U.S. Emissions of HFCs, PFCs, and Sulfur Hexafluoride, 1990-2003



Source: Energy Information Administration, *Emissions of Greenhouse Gases in the United States 2003*, DOE/EIA-0573(2003) (Washington, DC, December 2004).

[62] Energy Information Administration, *Emissions of Greenhouse Gases in the United States 2003*, DOE/EIA-0573(2003) (Washington, DC, December 2004), web site www.eia.doe.gov/oiaf/1605/ggrpt.

[63] The Montreal Protocol on Substances that Deplete the Ozone Layer is an international agreement, signed by most of the industrialized nations, to substantially reduce the use of CFCs. Signed in January 1989, the original document called for a 50-percent reduction in CFC use by 1992 relative to 1986 levels. The subsequent London Agreement called for a complete elimination of CFC use by 2000. The Copenhagen Agreement later accelerated that schedule, calling for a complete phaseout by January 1, 1996.

Waste Wise Program, and EPA's Sulfur Hexafluoride Emissions Reduction Partnership for Electric Power Systems.

Emission Reductions by Gas

Direct reductions of PFC and SF_6 emissions totaling 6.2 million metric tons carbon dioxide equivalent were reported by 21 entities for 24 projects carried out in 2003 (Table 23). The direct reductions included emissions of PFCs (3.6 million metric tons carbon dioxide equivalent) and SF_6 (2.6 million metric tons carbon dioxide equivalent). Indirect emission reductions totaled 2.5 million metric tons carbon dioxide equivalent, consisting primarily of SF_6 (2.2 million metric tons carbon dioxide equivalent) and smaller amounts of PFC and HFC emissions.

Hydrofluorocarbons

HFCs are used primarily as replacements for ozone-depleting substances such as CFCs and hydrochlorofluorocarbons (HCFCs). U.S. emissions of HFCs were estimated at 111 million metric tons carbon dioxide equivalent in 2003, a 209-percent increase over 1990 levels.[64] HFCs are used to replace CFCs as blowing agents, in automobile air conditioners and refrigerators, and in other manufacturing applications, where emissions result from system leaks. In the semiconductor industry, HFCs are also used in plasma etching and chemical vapor deposition processes. HFC-23 is a

Table 22. Number of Projects Reported on Form EIA-1605 for Hydrofluorocarbon, Perfluorocarbon, and Sulfur Hexafluoride Emissions, Data Years 1994-2003

Project Type	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
General	0	1	0	1	0	0	0	0	0	0
Reclamation: Recycling	7	10	10	14	15	15	18	16	18	18
Reclamation: Destruction	0	0	1	1	0	1	1	1	1	1
Substitution	1	5	7	7	8	9	9	6	6	7
Emissions Avoidance	3	6	8	13	17	16	23	23	24	24
Use of Improved Appliances	0	1	1	1	1	1	1	0	0	0
Other Projects/Activities	1	1	0	0	0	0	0	0	0	0
PFC Reductions from Materials Recycling	0	0	0	4	7	10	20	19	21	23
Total Number of Projects	**13**	**21**	**22**	**33**	**42**	**46**	**63**	**58**	**63**	**66**

Note: Project totals may not equal sum of components because some projects may be counted in more than one category.
Source: Energy Information Administration, Form EIA-1605.

Table 23. Reductions of Hydrofluorocarbon, Perfluorocarbon, and Sulfur Hexafluoride Emissions Reported on Form EIA-1605, Data Years 1994-2003
(Thousand Metric Tons Carbon Dioxide Equivalent)

Gas and Reduction Type	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
HFCs										
Direct	*	*	15.2	*	-1.7	-1.7	—	—	—	—
Indirect	—	—	—	—	—	—	—	—	**	38.7
PFCs										
Direct	3,199.6	2,962.4	3,345.8	3,318.6	3,504.4	3,425.5	3,233.6	3,606.8	3,562.9	3,550.5
Indirect	—	—	—	3.6	6.1	5.9	35.5	34.3	36.7	237.4
SF_6										
Direct	83.6	186.4	-70.0	516.7	624.8	595.4	1,407.3	2,475.1	3,043.7	2,611.9
Indirect	—	7.7	—	**	**	**	**	**	0.1	2,184.7
Total										
Direct	**3,283.2**	**3,148.8**	**3,291.0**	**3,835.3**	**4,127.4**	**4,019.1**	**4,641.0**	**6,082.0**	**6,606.6**	**6,162.4**
Indirect	**—**	**7.7**	**—**	**3.6**	**6.1**	**5.9**	**35.5**	**34.3**	**36.8**	**2,460.8**

*Less than 0 but greater than -50 metric tons.
**Greater than 0 but less than 50 metric tons.
(R) = revised. — = none reported.
Source: Energy Information Administration, Form EIA-1605.

[64]Energy Information Administration, *Emissions of Greenhouse Gases in the United States 2003*, DOE/EIA-0573(2003) (Washington, DC, December 2004), web site www.eia.doe.gov/oiaf/1605/ggrpt.

byproduct of HCFC-22 manufacturing. The Tennessee Valley Authority reported on a project that included direct reductions of HFC-134a, but for which no reduction data have been available since 1998.

Perfluorocarbons

U.S. emissions of PFCs in 2003 totaled 7.3 million metric tons carbon dioxide equivalent.[65] The principal source of PFC emissions is aluminum smelting. PFCs are produced during aluminum production when the alumina content of the electrolytic bath falls below critical levels required by the electrolytic effect. The resulting electrical upset in the reduction cell is manifested as a rapid voltage increase. The gases formed accumulate at the anode of the reduction cell (hence the name "anode effect"). PFCs are also used in some semiconductor manufacturing processes and, consequently, may be emitted from fabrication plants.

For 2003, five companies (Alcan Primary Products Corporation, Burlington County Board of Chosen Freeholders, City Public Service, Los Angeles Department of Water and Light, and Noranda Aluminum, Inc.) reported reductions in direct emissions of PFCs totaling 3.6 million metric tons carbon dioxide equivalent, which accounted for 58 percent of total reported project-level direct reductions in emissions of PFCs, HFCs, and SF_6 in 2003. Alcan and Noranda together accounted for 98 percent of total reported direct reductions of PFC emissions (3.5 million metric tons carbon dioxide equivalent) and 56 percent of total reported direct reductions of HFC, PFC, and SF_6 emissions.

During 2003, efforts by Noranda to reduce PFC emissions were focused on controlling the amount of alumina in solution to avoid anode effects and monitoring the process more closely to stop or correct them expeditiously. According to Noranda's report, perfluoromethane emissions were reduced by 2.6 million metric tons carbon dioxide equivalent and perfluoroethane emissions by 0.6 million metric tons carbon dioxide equivalent. Alcan reported direct reductions of perfluoromethane emissions totaling 0.3 million metric tons carbon dioxide equivalent. Additionally, City Public Service and Los Angeles Department of Water and Power reported materials recycling projects (see box in Chapter 5, page 52) that included direct reductions of PFC emissions totaling 22,516 and 1,630 metric tons carbon dioxide equivalent, respectively, during 2003.

The U.S. Environmental Protection Agency sponsors the Voluntary Aluminum Industrial Partnership, which seeks to reduce emissions of PFCs, carbon tetrachloride, and SF_6 during primary aluminum processing. For 2003, both Alcan and Noranda reported participation in the program.

Sulfur Hexafluoride

U.S. emissions of SF_6 in 2003 totaled 17.3 million metric tons carbon dioxide equivalent.[66] SF_6 is used as an insulator for circuit breakers, switch gear, and other electrical equipment and as a cover gas in magnesium smelting. It is also emitted during the aluminum smelting process. It has a very high GWP—22,200 times the warming effect of carbon dioxide per ton emitted.[67]

For 2003, 17 companies—including Allegheny Energy, Inc., American Electric Power, Inc., Cinergy Corp., City Public Service, City Utilities of Springfield, Consolidated Edison of New York, Inc., Constellation Energy Group, Inc., Duke Energy Corporation, Entergy Services, Inc., FirstEnergy Corporation, FPL Group, Minnesota Power, National Grid USA, NiSource/NIPSCO, Southern California Edison Co., Southern Company, Tucson Electric Power Company, and TXU—claimed direct reductions of SF_6 emissions that totaled 2.6 million metric tons carbon dioxide equivalent, accounting for 42 percent of the total reported project-level direct reductions in emissions of PFCs, HFCs, and SF_6 (Table 23).

For those companies reporting direct reductions of SF_6 emissions for 2003, Consolidated Edison of New York, Inc., reported the largest single reduction (1.5 million metric tons carbon dioxide equivalent), followed by the Southern Company (0.6 million metric tons), TXU (0.3 million metric tons), and Southern California Edison Company (0.1 million metric tons). These four project-level claims of emission reductions combined to account for 99 percent (2.6 million metric tons carbon dioxide equivalent) of total reported project-level direct reductions of SF_6 emissions for 2003 and 42 percent of total project-level direct emission reductions claimed for HFCs, PFCs, and SF_6 combined (Table 24).

[65] Energy Information Administration, *Emissions of Greenhouse Gases in the United States 2003*, DOE/EIA-0573(2003) (Washington, DC, December 2004), web site www.eia.doe.gov/oiaf/1605/ggrpt.

[66] Energy Information Administration, *Emissions of Greenhouse Gases in the United States 2003*, DOE/EIA-0573(2003) (Washington, DC, December 2004), web site www.eia.doe.gov/oiaf/1605/ggrpt.

[67] Energy Information Administration, *Emissions of Greenhouse Gases in the United States 2003*, DOE/EIA-0573(2003) (Washington, DC, December 2004), web site www.eia.doe.gov/oiaf/1605/ggrpt.

Table 24. Largest Project-Level Direct Reductions of Sulfur Hexafluoride Emissions Reported on Form EIA-1605 by Reporter, Data Year 2003

Reporter	Direct SF_6 Emission Reductions Reported		Percent of Total Reported Direct Reductions of HFC, PFC, and SF_6 Emissions[a]
	Metric Tons of Gas	Metric Tons Carbon Dioxide Equivalent	
Consolidated Edison Company of New York, Inc.	69.5	1,542,047	25.0
Southern Company	25.0	555,000	9.0
TXU	15.6	347,060	5.6
Southern California Edison Co.	6.1	134,363	2.2
National Grid USA	2.6	57,388	0.9
Cinergy Corp.	2.4	52,948	0.9
NiSource/NIPSCO	2.0	44,710	0.7
Duke Energy Corporation	1.9	42,180	0.7
Tucson Electric Power Company	1.6	35,561	0.6
National Grid USA	1.3	28,085	0.5
American Electric Power, Inc.	0.4	9,476	0.2
City Public Service	0.4	8,660	0.1
Entergy Services, Inc.	0.2	3,524	0.1
FPL Group	0.2	3,524	0.1
Reported Total	**129.0**	**2,864,526**	**46.5**

[a]Based on metric tons carbon dioxide equivalent.

Note: Totals may not equal sum of components due to independent rounding.

Sources: Energy Information Administration, Form EIA-1605. Global warming potentials from Intergovernmental Panel on Climate Change, *Climate Change 2001: The Scientific Basis* (Cambridge, UK: Cambridge University Press, 2001), Table 6.7, pp. 388-389.

7. Entity-Level Reporting and Future Commitments

Overview

The Voluntary Reporting of Greenhouse Gases Program permits three distinct types of emissions reporting:

- Entity-level emissions and emission reductions, defined as the emissions and reductions of an entire organization, usually defined as a corporation
- Project-level emissions and reductions, defined as the emission reductions consequences of a particular project or action
- Commitments to take action to reduce emissions in the future.

Chapters 2 through 6 of this report cover project-level emissions and reductions. This chapter covers entity-level emissions, emission reductions, and commitments to reduce emissions in the future.

Entity reporting and project reporting are not mutually exclusive. Most (177, or 76 percent) of the 233 non-confidential participants in the Program for 2003 reported project-level information on emissions and/or reductions, and 126 (54 percent) reported entity-level information. Of all the participants in the Program, 70 (30 percent) reported both entity-level information and project-level information. In addition, 89 entities (38 percent of all participants in the Program) reported formal commitments to reduce greenhouse gas emissions in the future or to provide financial support for activities related to greenhouse gas reductions.

Entity-Level Reporting

Who Reported

Electric power producers accounted for 45 of the 126 entity-level reporters. They included Allegheny Energy, Alliant Energy, Cinergy Corp., Constellation Energy, DTE Energy/Detroit Edison, Entergy Services, Inc., FirstEnergy Corporation, FPL Group, PG&E, PacifiCorp, Seattle City Light, the Southern Company, the Tennessee Valley Authority (TVA), and most of the largest electric power companies in the United States. In addition, 4 subsidiaries of the AES Corporation (an independent power producer) reported on domestic power plants with emissions offset by international forestry projects.

The remaining 81 entity-level reporters included an aluminum smelter (Alcan Primary Products Corporation, Sebree Works), 8 plants of CommScope (a designer and manufacturer of cables for telecommunications applications), a semiconductor manufacturer (Lucent Technologies, Inc.), and several large manufacturers (Daimler Chrysler, Toyota Motor North America, Inc., Ford, General Electric, General Motors, IBM, Johnson & Johnson, and Rolls-Royce Corporation). Also reporting at the entity level were the Lehigh Cement Company, 2 oil companies (Sunoco, Inc., and BP America), a chemical company (the Dow Chemical Company), an aircraft manufacturer (Sikorsky Aircraft Corporation), textile manufacturers (including 2 plants of Hanes Dye & Finishing, 4 plants of M.J. SOFFE Company, 6 plants of National Spinning, Inc., and the Valdese Manufacturing Company), a trade association (Integrated Waste Services Association), and the Miller Brewing Company.

Reported Emissions

Total 2003 entity-level direct emissions of greenhouse gases reported to the Voluntary Reporting Program were 889 million metric tons carbon dioxide equivalent, or 13 percent of total estimated U.S. emissions of greenhouse gases[68] (Table 25). Entity-level indirect emissions reported to the Program were 105 million metric tons carbon dioxide equivalent, or 2 percent of total U.S. greenhouse gas emissions. Carbon dioxide was the most widely reported greenhouse gas in terms of tonnage. Reported entity-level direct carbon dioxide emissions were 861 million metric tons, representing 97 percent of entity-level reported direct emissions (Table 25). Carbon dioxide also accounted for 95 percent (100 million metric tons) of all reported indirect emissions (Table 25), of which 99 million metric tons resulted from purchased power transactions (i.e., the indirect emissions associated with generation of the electricity purchased) (Table 26).

The single largest category of direct carbon dioxide emissions reported was the 836 million metric tons carbon dioxide emitted by stationary combustion sources (mostly electricity generators), which represented 97 percent of the total direct carbon dioxide emissions

[68]Energy Information Administration, *Emissions of Greenhouse Gases in the United States 2003*, DOE/EIA-0573(2003) (Washington, DC, December 2004), web site www.eia.doe.gov/oiaf/1605/ggrpt.

reported for 2003 (Table 26). The 5 largest reporters of direct carbon dioxide emissions were TVA (85 million metric tons), Cinergy Corporation (60 million metric tons), Duke Energy Corporation (56 million metric tons), FPL Group (55 million metric tons), and PacifiCorp (46 million metric tons) (Table 27). Companies reporting at least 20 million metric tons of direct carbon dioxide emissions included FirstEnergy Corporation, Allegheny Energy, Inc., DTE Energy/Detroit Edison, BP America, Entergy Services, Inc., The Dow Chemical Company, Florida Power Corporation, NEGT, Dynegy, Inc., and Constellation Energy.

Direct emissions of greenhouse gases other than carbon dioxide included methane (24 million metric tons carbon dioxide equivalent), hydrofluorocarbons (3 million metric tons carbon dioxide equivalent), sulfur hexafluoride (1 million metric tons carbon dioxide equivalent), and perfluorocarbons (less than 1 million metric tons carbon dioxide equivalent). Reported direct emissions of nitrous oxide were less than 0.1 million metric tons carbon dioxide equivalent (Table 25).

Entity-level direct emissions of methane were reported by 13 companies for 2003, including 4 companies that

Table 25. Total Reported Entity-Level Emissions of Greenhouse Gases Other Than Carbon Dioxide by Type of Emissions, Data Year 2003
(Million Metric Tons Carbon Dioxide Equivalent)

Gas and Type of Emissions	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Carbon Dioxide														
Direct	737.3	575.7	676.6	712.5	762.2	791.2	798.0	842.9	937.4	946.3	964.5	853.3	861.1	861.3
Indirect	434.4	420.9	423.0	429.7	432.5	432.4	438.9	457.8	428.5	428.3	98.1	91.7	107.7	99.9
Methane														
Direct	59.1	18.1	18.5	14.2	32.4	33.3	30.0	31.9	36.9	31.4	30.0	29.9	27.0	23.8
Indirect	2.1	2.1	2.1	2.1	2.0	1.9	1.9	1.8	1.7	1.6	0.4	0.4	0.3	0.3
Nitrous Oxide														
Direct	*	*	*	*	*	*	*	*	*	*	0.1	*	0.1	*
Indirect	17.3	18.1	19.0	19.8	20.5	20.4	19.9	19.3	18.6	17.9	*	*	*	*
Hydrofluorocarbons														
Direct	*	*	*	*	*	*	*	*	0.1	0.2	0.4	0.8	2.4	2.6
Indirect	*	*	0.1	2.2	4.9	5.4	5.0	5.2	5.2	5.2	5.2	3.9	5.6	4.5
Perfluorocarbons														
Direct	0.6	0.6	0.6	0.6	0.3	0.3	0.3	0.3	0.2	0.1	0.2	0.2	0.2	0.3
Sulfur Hexafluoride														
Direct	0.2	0.4	0.4	0.4	1.4	1.4	1.5	1.2	1.0	0.5	1.1	1.2	1.2	0.9
Total														
Direct	**797.2**	**594.8**	**696.1**	**727.7**	**796.4**	**826.2**	**829.8**	**876.4**	**975.5**	**978.5**	**996.3**	**885.4**	**892.0**	**888.8**
Indirect	**453.9**	**441.1**	**444.2**	**453.8**	**459.8**	**460.1**	**465.7**	**484.1**	**454.0**	**453.1**	**103.6**	**96.0**	**113.6**	**104.7**

*Less than 0.05 million metric tons.
Source: Energy Information Administration, Form EIA-1605.

Table 26. Total Reported Entity-Level Carbon Dioxide Emissions by Type and Source, Data Year 2003
(Million Metric Tons Carbon Dioxide)

Type of Emission Source	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Direct Emissions														
Stationary Combustion	731.8	570.6	667.8	703.2	752.1	770.5	777.1	822.3	915.3	924.1	942.7	830.9	838.1	835.8
Transportation	1.3	0.2	0.2	0.2	0.8	11.8	11.7	12.0	13.3	13.5	13.3	13.2	13.1	13.8
Other Direct Sources	4.2	4.9	8.6	9.0	9.3	8.9	9.2	6.6	8.4	8.6	8.4	9.2	9.9	11.7
Total Direct	**737.3**	**575.7**	**676.6**	**712.5**	**762.2**	**791.2**	**798.0**	**842.9**	**937.4**	**946.3**	**964.5**	**853.3**	**861.1**	**861.3**
Indirect Emissions														
Purchased Power	60.2	55.6	53.6	59.3	60.5	65.8	79.0	105.3	83.3	87.6	97.9	91.5	107.1	99.3
Other Indirect Sources	374.2	365.3	369.4	370.5	372.0	366.6	360.0	352.5	345.3	340.8	0.2	0.2	0.6	0.6
Total Indirect	**434.4**	**420.9**	**423.0**	**429.7**	**432.5**	**432.4**	**438.9**	**457.8**	**428.5**	**428.3**	**98.1**	**91.7**	**107.7**	**99.9**

Source: Energy Information Administration, Form EIA-1605.

reported direct methane emissions in excess of 1 million metric tons carbon dioxide equivalent: Consol Coal Group (11 million metric tons), Jim Walter Resources, Inc. (4 million tons), Peabody Holding Company, Inc. (4 million metric tons), and BP America (3 million metric tons) (Table 28). These 4 entities together accounted for 81 percent of all reported direct emissions of other greenhouse gases for 2003. Direct emissions of HFCs

Table 27. Largest Reported Entity-Level Direct Carbon Dioxide Emissions by Reporter and Source, Data Year 2003

Reporter	Emissions Source	Reported Direct Carbon Dioxide Emissions (Million Metric Tons)	Percentage of Total Reported Direct Emissions of All Greenhouse Gases
Tennessee Valley Authority	Stationary Combustion	85.4	9.6
Cinergy Corp.	Stationary Combustion	60.4	6.8
Duke Energy Corporation	Stationary Combustion	56.3	6.3
FPL Group	Stationary Combustion	55.1	6.2
PacifiCorp	Stationary Combustion	46.4	5.2
FirstEnergy Corporation	Stationary Combustion	42.3	4.8
Allegheny Energy, Inc.	Stationary Combustion	41.7	4.7
DTE Energy/Detroit Edison	Stationary Combustion	38.3	4.3
BP America	Stationary Combustion	33.7	3.8
Entergy Services, Inc.	Stationary Combustion	33.4	3.8
The Dow Chemical Company	Stationary Combustion	27.1	3.1
Florida Power Corporation	Stationary Combustion	22.5	2.5
NEGT	Stationary Combustion	21.3	2.4
Dynegy, Inc.	Stationary Combustion	20.4	2.3
Constellation Energy	Stationary Combustion	19.7	2.2
Total		**604.1**	**68.0**

Source: Energy Information Administration, Form EIA-1605.

Table 28. Largest Reported Entity-Level Direct Emissions of Greenhouse Gases Other Than Carbon Dioxide by Reporter and Emissions Source, Data Year 2003

Reporter	Gas	Emissions Source	Reported Direct Emissions (Thousand Metric Tons Carbon Dioxide Equivalent)	Percentage of Total Reported Direct Emissions of Other Greenhouse Gases
Consol Coal Group	Methane	Other Direct	11,129.8	40.4
Jim Walter Resources, Inc.	Methane	Other Direct	4,438.7	16.1
Peabody Energy	Methane	Other Direct	3,572.1	13.0
BP America	Methane	Other Direct	3,275.8	11.9
General Electric Company	HFC-134a	Other Direct	1,141.8	4.1
Dow Chemical Company	HFC-134a	Other Direct	1,128.5	4.1
Public Service Enterprise Group	Methane	Other Direct	723.1	2.6
Cinergy Corp.	Methane	Other Direct	459.7	1.7
Duke Energy Corporation	Sulfur Hexafluoride	Other Direct	297.5	1.1
Public Service Enterprise Group	Sulfur Hexafluoride	Other Direct	284.0	1.0
Alcan Primary Metals Group Sebree Works	Perfluoromethane	Other Direct	210.2	0.8
Mitsubishi Motors North America, Inc.	HFC-143a	Other Direct	137.6	0.5
Cinergy Corp.	Sulfur Hexafluoride	Other Direct	116.2	0.4
The Dow Chemical Company	Methane	Other Direct	115.8	0.4
Mitsubishi Motors North America, Inc.	HFC-125	Other Direct	108.8	0.4
Total			**27,139.6**	**98.5**

Source: Energy Information Administration, Form EIA-1605.

were reported by 6 companies, including 2 companies (General Electric and Dow Chemical) with emissions in excess of 1 million metric tons carbon dioxide equivalent. Direct emissions of sulfur hexafluoride were reported by 8 companies, including 2 companies (Duke Energy and Public Service Enterprise Group) with emissions in excess of 0.2 million metric tons carbon dioxide equivalent. Direct emissions of perfluorocarbons were reported by 3 companies, including Alcan Primary Metals Group–Sebree Works, which reported emissions of 0.2 million metric tons carbon dioxide equivalent.

Reported Reductions

Entity-level direct reductions of greenhouse gas emissions reported for 2003 totaled 214 million metric tons carbon dioxide equivalent, and reported indirect reductions totaled 43 million metric tons carbon dioxide equivalent. Carbon sequestration reductions reported at the entity level were 7 million metric tons carbon dioxide equivalent (Table 29).

Reported entity-level direct reductions of carbon dioxide emissions totaled 140 million metric tons (Table 30), of which 131 million metric tons was reported as reductions in emissions from stationary source combustion. Reported indirect reductions of carbon dioxide emissions totaled 31 million metric tons, including 30 million metric tons from sources other than stationary source combustion, such as load control improvements, building shell improvements, improvement or replacement of equipment and appliances, lighting and lighting control improvements, coal ash reuse, materials recycling and reuse, heating, ventilation, and air conditioning (HVAC), and improvements in motors and motor drives.

Reported direct reductions in emissions of greenhouse gases other than carbon dioxide for 2003 totaled 74 million metric tons carbon dioxide equivalent, and indirect reductions totaled 11 million metric tons (Table 29). Virtually all were reductions in emissions of methane.

The largest direct reductions for 2003 were reported by Waste Management, Inc. (33 million metric tons carbon dioxide equivalent of methane), TVA (25 million metric tons carbon dioxide), FPL Group (22 million metric tons carbon dioxide), Consol Coal Group (20 million metric tons carbon dioxide equivalent of methane), Southern Company (15 million metric tons carbon dioxide), and Duke Energy Corporation (11 million metric tons carbon dioxide). These 6 reported entity-level direct reductions

Table 29. Total Reported Entity-Level Reductions in Emissions of Greenhouse Gases by Gas and Source, Data Year 2003
(Million Metric Tons Carbon Dioxide Equivalent)

Gas and Type of Reduction	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Carbon Dioxide													
Direct	25.7	43.5	46.4	62.9	85.3	93.5	94.4	108.5	114.3	136.4	141.7	142.5	139.8
Indirect	12.7	10.9	9.1	5.4	10.1	13.4	13.4	17.3	18.8	19.4	20.9	26.1	31.1
Methane													
Direct	5.9	8.1	15.8	21.5	30.9	36.6	41.2	45.4	51.6	58.1	63.9	71.9	74.7
Indirect	1.7	2.7	3.2	3.6	4.0	4.6	5.6	6.2	6.8	8.0	9.0	10.7	11.3
Nitrous Oxide													
Direct	*	*	*	*	*	*	*	*	*	-0.1	*	*	*
Indirect	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Hydrofluorocarbons													
Direct	—	—	—	*	*	*	*	*	-0.2	-0.3	-0.7	-1.2	-1.1
Indirect	—	—	—	—	—	—	—	—	—	—	—	—	—
Perfluorocarbons													
Direct	*	*	*	0.1	0.1	0.1	0.1	0.2	0.3	0.3	0.4	0.5	0.4
Indirect	*	*	*	*	*	*	*	*	*	*	*	*	*
Sulfur Hexafluoride													
Direct	*	*	*	*	0.1	*	0.4	0.6	0.6	0.6	0.7	0.9	0.5
Indirect	—	—	—	—	—	—	*	*	*	*	*	*	*
Total													
Direct	**31.6**	**51.5**	**62.3**	**84.5**	**116.4**	**130.3**	**136.1**	**154.7**	**166.5**	**195.0**	**206.1**	**214.5**	**214.2**
Indirect	**14.5**	**13.7**	**12.3**	**9.1**	**14.2**	**18.2**	**19.1**	**23.6**	**25.7**	**27.5**	**29.9**	**36.9**	**42.6**

*Less than 0.05 million metric tons.
— = none reported.
Note: Negative numbers indicate increases in emissions.
Source: Energy Information Administration, Form EIA-1605.

accounted for 59 percent (125 million metric tons) of total reported entity-level direct reductions (Table 31).

The largest reporter of indirect emission reductions was the Integrated Waste Services Association (IWSA), which reported indirect emission reductions on behalf of its members. IWSA reported indirect emission reductions of 15 million metric tons of carbon dioxide and 9 million metric tons carbon dioxide equivalent of methane, resulting from the combustion of municipal solid waste. Southern Company and FPL Group reported indirect reductions of carbon dioxide emissions at 4 million and 3 million metric tons, respectively (Table 32). These 4 reductions together accounted for 30 million metric tons carbon dioxide equivalent or 62 percent of total reported positive indirect emission reductions.[69]

Most of the larger reported reductions (direct and indirect) were computed on the basis of "modified" reference cases—i.e., the reporter indicated that emissions were lower than they would have been without the actions taken (Tables 31 and 32). TVA, for example, used a generation planning model to calculate what its emissions from 1990 through 2003 would have been if it had used the set of generating units operational in 1990 at the 1990 capacity factors and heat rates. Since 1990, TVA has greatly expanded nuclear generation. Browns Ferry Unit 2 returned to service in 1991, Browns Ferry Unit 3 returned to service in 1995, and Watts Bar Unit 1 started commercial operation in 1996. TVA's reported carbon dioxide emissions from stationary combustion sources for 2003 were 11 million metric tons above 1990 levels but 25 million metric tons below what they would have been if the 1990 generation mix and heat rates had been used.

IWSA reported two sources of indirect reductions: (1) by burning municipal solid waste to generate electricity, its members made it possible for electric utilities to burn less coal; and (2) if the municipal solid waste had not been burned, it could reasonably have been expected to be landfilled, and some portion of the landfilled waste would have decomposed anaerobically, producing methane emissions. Thus, IWSA reported that burning the waste reduced both fossil fuel burning and methane emissions on the part of others.

A total of 31 companies reported emission reductions or sequestration at the entity level using a "basic" reference case. In a basic reference case, reductions are calculated as the difference between actual emissions in the reporting year and emissions in a baseline year. Of these 31 companies, 15 were electric power producers: AES Thames, LLC, Arizona Public Service Company, Consolidated Edison of New York, Inc., DTE Energy/Detroit Edison, Duke Energy Corporation, Florida Power Corporation, Hawaiian Electric Company, KeySpan Energy Corporation, Los Angeles Department of Water and Power, National Grid USA, PG&E Corporation, Sacramento Municipal Utility District, TVA, Tucson Electric Power Company, and Waverly Light & Power Company. The 16 other reporters using a "basic" reference case included BMW US Holding Corp., Consol Coal Group, The Dow Chemical Company, General Motors Corporation, International Truck and Engine Corporation, Lucent Technologies, Inc., Peabody Energy, Republic Metals Group, Rolls-Royce Corporation, Sunoco, Inc., and Toyota Motor North America, Inc.

Table 30. Total Reported Entity-Level Carbon Dioxide Emission Reductions by Type and Source, Data Year 2003
(Million Metric Tons Carbon Dioxide)

Type of Reduction Source	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Direct Reductions													
Stationary Combustion	25.5	44.6	47.7	64.1	86.1	94.1	94.0	107.7	112.9	128.3	133.0	134.4	130.9
Transportation	*	*	*	*	*	0.1	0.2	0.5	0.5	0.7	0.8	0.8	0.7
Other Direct Sources	0.2	-1.2	-1.3	-1.2	-0.9	-0.6	0.1	0.3	0.8	7.4	7.9	7.4	8.1
Total Direct	**25.7**	**43.5**	**46.4**	**62.9**	**85.3**	**93.5**	**94.4**	**108.5**	**114.3**	**136.4**	**141.7**	**142.5**	**139.8**
Indirect Reductions													
Purchased Power	*	-2.6	-4.1	-9.7	-8.4	-6.7	-6.8	-3.4	-5.1	-5.1	-4.4	-3.6	1.4
Other Indirect Sources	12.7	13.5	13.2	15.1	18.6	20.2	20.2	20.7	24.0	24.5	25.3	29.6	29.7
Total Indirect	**12.7**	**10.9**	**9.1**	**5.4**	**10.1**	**13.4**	**13.4**	**17.3**	**18.8**	**19.4**	**20.9**	**26.1**	**31.1**
Carbon Sequestered	**0.6**	**1.6**	**6.0**	**6.1**	**6.9**	**6.9**	**7.8**	**8.0**	**8.1**	**7.4**	**7.6**	**6.9**	**6.9**

*Less than 0.05 million metric tons.
Note: Negative numbers indicate increases in emissions.
Source: Energy Information Administration, Form EIA-1605.

[69]Negative indirect reductions in entity-level emissions (i.e., emission increases) were reported for 2003 by 25 participants in the Voluntary Reporting Program.

Future Commitments To Reduce Emissions

The Voluntary Reporting Program also permits entities to report commitments to reduce emissions or to take action to reduce emissions in the future. There are three types of future commitments in the Program: entity commitments, financial commitments, and project commitments. Entity and project commitments roughly parallel the entity and project aspects of emissions reporting: an entity commitment is a commitment to reduce the emissions of an entire organization; and a project commitment is a commitment to take a particular action that will have the effect of reducing the reporter's future emissions. A financial commitment has no emissions reporting counterpart: it is a commitment to spend a particular sum of money on emission reduction activities, without a specific promise on the emissions consequences of the expenditure.

Table 31. Largest Individual Reported Entity-Level Direct Emission Reductions by Gas, Source, and Type of Reference Case Employed, Data Year 2003

Reporter	Gas	Source	Reference Case	Reported Direct Emission Reduction (Million Metric Tons Carbon Dioxide Equivalent)	Percent of Total Reported Direct Reductions
Waste Management, Inc.	CH_4	Other Direct	Modified	32.9	15.4
Tennessee Valley Authority	CO_2	Stationary Combustion	Modified	25.2	11.8
FPL Group	CO_2	Stationary Combustion	Modified	21.6	10.1
Consol Coal Group	CH_4	Other Direct	Basic	20.2	9.4
Southern Company	CO_2	Stationary Combustion	Modified	14.5	6.7
Duke Energy Corporation	CO_2	Stationary Combustion	Modified	11.0	5.1
FirstEnergy Corporation	CO_2	Stationary Combustion	Modified	8.0	3.7
Blue Source, LLC	CO_2	Other Direct	Modified	6.8	3.2
Entergy Services, Inc.	CO_2	Stationary Combustion	Modified	6.7	3.1
Constellation Energy	CO_2	Stationary Combustion	Modified	6.2	2.9
Jim Walter Resources, Inc.	CH_4	Other Direct	Modified	5.1	2.4
NiSource/NIPSCO	CH_4	Other Direct	Modified	4.8	2.2
Florida Power Corporation	CO_2	Stationary Combustion	Modified	4.8	2.2
NEGT	CH_4	Other Direct	Modified	3.9	1.8
The Dow Chemical Company	CO_2	Stationary Combustion	Basic	3.8	1.8
PG&E Corporation	CO_2	Stationary Combustion	Modified	2.9	1.4
Municipal Electric Auth of Georgia (MEAG Power)	CO_2	Stationary Combustion	Modified	2.9	1.3
Palmer Capital Corporation	CH_4	Other Direct	Modified	2.8	1.3
Alliant Energy	CO_2	Stationary Combustion	Modified	2.6	1.2
KeySpan Energy Corporation	CO_2	Stationary Combustion	Basic	2.4	1.1
BP America	CO_2	Stationary Combustion	Modified	2.0	0.9
BP America	CH_4	Other Direct	Modified	2.0	0.9
DTE Energy/Detroit Edison	CO_2	Stationary Combustion	Basic	1.8	0.8
General Motors Corporation	CO_2	Stationary Combustion	Basic	1.7	0.8
Allegheny Energy, Inc.	CO_2	Stationary Combustion	Modified	1.5	0.7
Cinergy Corp.	CO_2	Stationary Combustion	Modified	1.5	0.7
Sunoco, Inc.	CO_2	Stationary Combustion	Basic	1.4	0.7
Hawaiian Electric Company, Inc.	CO_2	Stationary Combustion	Basic	1.3	0.6
PacifiCorp	CO_2	Stationary Combustion	Modified	1.2	0.6
Santee Cooper	CO_2	Stationary Combustion	Modified	1.2	0.6
NiSource/NIPSCO	CO_2	Stationary Combustion	Modified	1.1	0.5
The Burlington Northern and Santa Fe Railway Co.	CO_2	Transportation	Modified	1.0	0.5
Total				**207.0**	**96.6**

Note: For 2003, negative direct entity-level emission reductions were reported by 27 participants in the Voluntary Reporting of Greenhouse Gases Program.

Source: Energy Information Administration, Form EIA-1605.

Entity-Level Commitments

Entity-level commitments to reduce greenhouse gas emissions were reported by 56 participants in the Voluntary Reporting Program. These firms made promises to reduce, avoid, or sequester future emissions at the corporate level. As in the case of entity reporting, some commitments were to reduce emissions below a specific baseline, others to limit the growth of emissions per unit of output, and others to limit emissions by a specific amount in comparison with a baseline emissions growth trend. Participants reporting entity-level commitments to reduce greenhouse gas emissions in the future included Allegheny Energy, Inc., Alliant Energy, City of Klamath Falls, Entergy Services, Inc., FirstEnergy Corporation, FPL Group, Middlesex Generating Company, National Grid USA, Noranda Aluminum, Inc., and TVA.

The reporters of the largest individual entity-level commitments pledged to reduce emissions in the future by 84 million metric tons carbon dioxide (Table 33). TVA (23 million metric tons carbon dioxide), National Grid USA (15 million metric tons carbon dioxide), FPL Group (10 million metric tons carbon dioxide), City of Klamath Falls (6 million metric tons carbon dioxide), and Entergy Services and Middlesex Generating Company (5 million metric tons carbon dioxide, each) reported the 6 largest entity-level reduction commitments. These 6 commitments combined accounted for 74 percent (64 million metric tons carbon dioxide) of the total reported entity-level commitments to reduce greenhouse gases. National Grid USA, City of Klamath Falls, and Entergy Services, Inc., measured their reduction commitments using basic reference cases. The 3 other reporters used modified reference cases.

Project-Level Commitments

A total of 27 companies reported on commitments to undertake 191 individual emission reduction projects. Some of the commitments were linked to future results from projects already underway and forming part of the reporters' submissions. Others were for projects not yet begun. Data on the quantities of reductions expected were provided by 22 reporters for 116 projects.

Reporters indicated that projects were expected to reduce future emissions by 73 million metric tons carbon

Table 32. Largest Individual Reported Entity-Level Indirect Emission Reductions by Gas, Source, and Type of Reference Case Employed, Data Year 2003

Reporter	Gas	Source	Reference Case	Reported Indirect Emission Reduction (Million Metric Tons Carbon Dioxide Equivalent)	Percent of Total Reported Indirect Reductions
Integrated Waste Services Association	CO_2	Other Indirect	Modified	15.0	35.3
Integrated Waste Services Association	CH_4	Other Indirect	Modified	8.6	20.3
Southern Company	CO_2	Other Indirect	Modified	3.7	8.6
FPL Group	CO_2	Other Indirect	Modified	3.0	7.0
Sacramento Municipal Utility District	CO_2	Purchased Power	Basic	2.4	5.8
Mystic Development, LLC	CO_2	Other Indirect	Modified	2.0	4.6
Public Service Enterprise Group	CO_2	Other Indirect	Modified	1.6	3.8
Portland General Electric Co.	CO_2	Purchased Power	Modified	1.3	3.2
General Motors Corporation	CO_2	Purchased Power	Basic	0.9	2.1
PG&E Corporation	CO_2	Other Indirect	Modified	0.8	1.9
NEGT	CH_4	Other Indirect	Modified	0.8	1.9
Alliant Energy	CO_2	Other Indirect	Modified	0.8	1.9
FirstEnergy Corporation	CH_4	Other Indirect	Modified	0.7	1.7
Berkshire Power LLC	CO_2	Other Indirect	Modified	0.7	1.7
Waste Management, Inc.	CO_2	Purchased Power	Modified	0.6	1.4
Peabody Holding Company, Inc.	CO_2	Purchased Power	Modified	0.5	1.1
Total				**43.5**	**102.4**

Note: Twenty-eight participants in the Voluntary Reporting of Greenhouse Gases Program reported negative indirect entity-level emission reductions for 2002.

Source: Energy Information Administration, Form EIA-1605.

dioxide equivalent. Of that amount, 61 million metric tons would be carbon dioxide, 7 million metric tons carbon dioxide equivalent would be methane, and 3 million metric tons carbon dioxide equivalent would be perfluorocarbons. Nitrous oxide and sulfur hexafluoride together would constitute about 1 million metric tons carbon dioxide equivalent.

The largest individual project-level commitment, made by TVA, was described as "an increase in low-emitting capacity" as a result of TVA's nuclear power program. It would reduce carbon dioxide emissions by 18 million metric tons. The second and third largest individual project-level commitments were made by Middlesex Generating Company, LLC (5 million metric tons carbon dioxide equivalent) and FirstEnergy Corporation (4 million metric tons carbon dioxide equivalent). These 3 project-level commitments accounted for 44 percent of total reported project-level commitments, or 27 million metric tons carbon dioxide equivalent (Table 34).

Financial Commitments

A total of 40 financial commitments to reduce greenhouse gas emissions in the future were made by 21 companies, 18 of which were electric utilities. The total amount of funds promised was $50.3 million. The single largest reported financial commitment to reduce greenhouse gas emissions was that of Entergy Services, Inc., which committed to spend $25.0 million on a "carbon burnout plant" to make fly ash suitable for sale to cement companies, followed by Noranda Aluminum, Inc. ($5.5 million) and Ameren Corporation ($5.0 million). Minnesota Power, FirstEnergy Corporation, CLE Resources, and Kansas City Power & Light Company each committed to spend $2.0 million, and the City of Klamath Falls reported two individual financial commitments that totaled $2.5 million. These 8 entities reported financial commitments that together accounted for 92 percent of the total financial commitments reported for 2003 (Table 35).

The largest expenditures reported for 2003 were by Entergy Services, Inc. ($2.0 million), Ameren Corporation and Noranda Aluminum, Inc. ($0.5 million each), Dynegy Midwest Generation, Inc. ($0.4 million), and Bountiful City Light & Power, PacifiCorp, and NiSource/NIPSCO ($0.2 million each). These 7 companies combined reported $4.0 million in expenditures to reduce greenhouse gas emissions in 2003, or 98 percent of total reported expenditures (Table 36).

Table 33. Largest Reported Individual Entity-Level Commitments To Reduce Greenhouse Gases by Gas and Type of Reference Case, Data Year 2003

Reporter	Gas	Reference Case	Reported Entity-Level Commitment (Million Metric Tons Carbon Dioxide Equivalent)	Percent of Total Reported Entity-Level Reduction Commitments
Tennessee Valley Authority	CO_2	Modified	22.6	26.3
National Grid USA	CO_2	Basic	15.1	17.6
FPL Group	CO_2	Modified	10.0	11.6
City of Klamath Falls	CO_2	Basic	6.3	7.3
Entergy Services, Inc.	CO_2	Basic	5.0	5.8
Middlesex Generating Company, LLC	CH_4	Modified	4.8	5.6
FirstEnergy Corporation	CO_2	Modified	2.9	3.3
Noranda Aluminum, Inc.	CF_4	Basic	2.8	3.2
Alliant Energy	CO_2	Modified	2.4	2.8
Greater New Bedford Regional Refuse Mgt District	CH_4	Modified	2.1	2.5
The Burlington Northern and Santa Fe Railway Co.	CO_2	Modified	2.1	2.4
Allegheny Energy, Inc.	CO_2	Basic	1.8	2.1
South Carolina Electric & Gas Company	CO_2	Basic	1.8	2.1
Alliant Energy	CO_2	Modified	1.8	2.0
Public Service Company of New Mexico	CO_2	Basic	1.5	1.7
Alliant Energy	CO_2	Modified	1.0	1.1
Total			**83.8**	**97.6**

CO_2 = carbon dioxide. CH_4 = methane. CF_4 = perfluoromethane.
Note: Reporters are not asked to indicate whether future reductions will be direct, indirect, or sequestration.
Source: Energy Information Administration, Form EIA-1605.

Table 34. Largest Reported Individual Project-Level Commitments To Reduce Greenhouse Gas Emissions, Data Year 2003

Reporter	Project Description	Reported Commitment (Million Metric Tons Carbon Dioxide Equivalent)	Percent of Total Reported Project-Level Commitments
Tennessee Valley Authority	Increase in low-emitting capacity	17.6	24.3
Middlesex Generating Company, LLC	Landfill gas control and energy recovery to produce electric power	4.8	6.6
FirstEnergy Corporation	Undertake supply side efficiency improvements	4.4	6.0
City of Klamath Falls-Cogen	As part of KCP's carbon offset proposal to EFSC, $1.5 million in funding was committed to the FRT program to support reforestation of underproducing lands in western Oregon	3.0	4.2
Noranda Aluminum, Inc.	Reduction of PFC emissions through anode effect reduction program in keeping with USEPA goal of 30-50%: 90% reduction in PFC emissions from Lines 1 & 2 and 69% reduction from Line 3; all reductions from 1990 baseline emissions	2.8	3.8
FirstEnergy Corporation	Nuclear generation operation improvement	2.5	3.5
City of Klamath Falls-Cogen	Under the Oregon State Energy Facility Siting Council Site Certificate, the Klamath Cogeneration Project committed to invest $1 million (in 1998 dollars) to extract useful energy (methane) for electricity production from two largely untapped sources	2.5	3.4
Municipal Electric Auth of Georgia (MEAG Power)	Increase nuclear unit availability	2.5	3.4
Alliant Energy	Modified forest management	2.4	3.3
New York Power Authority	NYPA customer energy services programs	2.3	3.1
Tennessee Valley Authority	Fuel switching	2.2	3.0
Greater New Bedford Regional Refuse Mgt District	Landfill gas control and future utilization	2.1	2.9
City of Klamath Falls-Cogen	Cogeneration of steam to displace fossil-fired boilers used at an off-site industrial facility	2.0	2.8
Alliant Energy	Other energy end-use projects/activities (electric)	1.7	2.3
PacifiCorp	Other energy end-use projects/activities	1.3	1.8
Santee Cooper	Cross Unit 2 retrofit	1.1	1.6
Municipal Electric Auth of Georgia (MEAG Power)	Increase nuclear unit capacity	1.0	1.3
Santee Cooper	Upgrade Summer Nuclear Station	0.9	1.3
Allegheny Energy, Inc.	Utilitree: Rio Bravo Carbon Sequestration Project, Belize: 134,400 acres	0.9	1.3
City of Klamath Falls-Cogen	Sales and installation of solar photovoltaic systems in off-grid rural households in India and Sri Lanka	0.8	1.2
Tennessee Valley Authority	Heat rate improvement	0.8	1.1
Tennessee Valley Authority	Other energy end-use projects/activities	0.8	1.1
Total		**60.4**	**83.3**

Source: Energy Information Administration, Form EIA-1605.

Table 35. Largest Reported Individual Entity-Level Financial Commitments To Reduce Greenhouse Gas Emissions, Data Year 2003

Reporter	Industry	Financial Commitment (Dollars)	Voluntary Program Affiliation	Percent of Total Reported Financial Commitments
Entergy Services, Inc.	Electric, Gas, and Sanitary Services	25,000,000	None	49.7
Noranda Aluminum, Inc.	Primary Metals Industries	5,500,000	Voluntary Aluminum Industrial Partnership	10.9
Ameren Corporation (formerly UE and CIPS)	Electric, Gas, and Sanitary Services	5,000,000	Climate Challenge	9.9
Minnesota Power	Electric, Gas, and Sanitary Services	2,000,000	Climate Challenge	4.0
FirstEnergy Corporation	Electric, Gas, and Sanitary Services	2,000,000	Climate Challenge	4.0
Kansas City Power & Light Company	Electric, Gas, and Sanitary Services	2,000,000	Climate Challenge	4.0
CLE Resources	Holding and Other Investment Offices	2,000,000	None	4.0
City of Klamath Falls-Cogen	Services, not elsewhere classified	1,500,000	None	3.0
City of Klamath Falls-Cogen	Services, not elsewhere classified	1,000,000	None	2.0
PacifiCorp	Electric, Gas, and Sanitary Services	610,000	Climate Challenge	1.2
City of Klamath Falls-Cogen	Services, not elsewhere classified	500,000	None	1.0
Dynegy, Inc	Electric, Gas, and Sanitary Services	450,000	Climate Challenge	0.9
FirstEnergy Corporation	Electric, Gas, and Sanitary Services	400,000	Climate Challenge	0.8
Bountiful City Light & Power	Electric, Gas, and Sanitary Services	298,924	Climate Challenge	0.6
Kansas City Power & Light Company	Electric, Gas, and Sanitary Services	264,000	Climate Challenge	0.5
McMinnville Electric System	Electric, Gas, and Sanitary Services	249,600	Renewable Energy Commercialization	0.5
Conectiv Atlantic Generation (CAG)	Electric, Gas, and Sanitary Services	200,000	Climate Challenge	0.4
NiSource/NIPSCO	Electric, Gas, and Sanitary Services	200,000	Climate Challenge	0.4
FirstEnergy Corporation	Electric, Gas, and Sanitary Services	200,000	Climate Challenge	0.4
TXU	Electric, Gas, and Sanitary Services	105,000	Climate Challenge	0.2
Dynegy, Inc.	Electric, Gas, and Sanitary Services	105,000	Climate Challenge	0.2
TXU	Electric, Gas, and Sanitary Services	105,000	Climate Challenge	0.2
Constellation Energy	Electric, Gas, and Sanitary Services	100,000	Climate Challenge	0.2
City of Klamath Falls-Cogen	Services, not elsewhere classified	100,000	None	0.2
Total		**49,887,524**		**99.2**

Source: Energy Information Administration, Form EIA-1605.

Table 36. Reported Entity-Level Financial Expenditures To Reduce Greenhouse Gas Emissions, Data Year 2003

Reporter	Industry	2002 Financial Expenditure (Dollars)	Voluntary Program Affiliation	Percent of Total Reported Financial Expenditures
Entergy Services, Inc.	Electric, Gas, and Sanitary Services	2,000,000	None	49.1
Ameren Corporation (formerly UE and CIPS)	Electric, Gas, and Sanitary Services	500,000	Climate Change	12.3
Noranda Aluminum, Inc.	Primary Metals Industries	464,665	Voluntary Aluminum Industrial Partnership	11.4
Dynegy, Inc.	Electric, Gas, and Sanitary Services	400,000	Climate Change	9.8
Bountiful City Light & Power	Electric, Gas, and Sanitary Services	230,495	Climate Change	5.7
PacifiCorp	Electric, Gas, and Sanitary Services	218,067	Climate Change	5.4
NiSource/NIPSCO	Electric, Gas, and Sanitary Services	200,000	Climate Change	4.9
TXU	Electric, Gas, and Sanitary Services	20,000	Climate Change	0.5
TXU	Electric, Gas, and Sanitary Services	20,000	Climate Change	0.5
Kansas City Power & Light Company	Electric, Gas, and Sanitary Services	10,000	Climate Change	0.2
Xcel Energy	Electric, Gas, and Sanitary Services	5,000	Climate Change	0.1
NiSource/NIPSCO	Electric, Gas, and Sanitary Services	5,000	Climate Change	0.1
Cleco Corporation	Electric, Gas, and Sanitary Services	1,600	None	*
Total		**4,074,827**		**100.0**

*Less than 0.05 percent.
Source: Energy Information Administration, Form EIA-1605.

8. Project-Level Reporting on Form EIA-1605EZ

The Energy Information Administration (EIA) provides Form EIA-1605EZ to participants in the Voluntary Reporting of Greenhouse Gases Program as a less comprehensive and less detailed alternative to Form EIA-1605. Form EIA-1605EZ (the "short form") allows reporters to provide a brief summary of their emission reduction projects for a single year. The short form is used exclusively for reporting projects undertaken within the geographic boundaries of the United States, its territories and trusts. Because reports submitted on Form EIA-1605EZ do not make a distinction between owning or controlling an emissions source and simply initiating or participating in an emission reduction activity, there is no systematic way to distinguish between direct and indirect emissions reported on this form. Also, because the data reported in support of the emission reduction estimates are limited, it is difficult to perform anything but the most rudimentary arithmetic checks for accuracy.

Who Reported on Form EIA-1605EZ

A total of 34 entities submitted reports on Form EIA-1605EZ for 2003. Of those, 17 were electric power providers, typically, relatively small electric power cooperatives; 8 were alternative energy providers, including one coal mine methane developer, 2 landfill gas-to-energy developers, and 5 firms that combusted biomass to reduce greenhouse gas emissions; and 6 were manufacturing firms—one each from the textile, refining, fabricated metals, and microprocessor industries, and 2 from the chemical industry. One industry association, one individual household, and one forestry firm also filed Form EIA-1605EZ for 2003.

What Was Reported on Form EIA-1605EZ

A total of 219 projects were reported on Form EIA-1605EZ for 2003 (Table 37), down from 253 projects reported on the short form for 2002. The decrease was caused by the absence of reports for 2003 from 3 entities representing 14 projects that were reported for 2002, and by the reporting of fewer projects for 2003 than were reported for 2002 by 4 other entities. (For example, Wisconsin Public Power, Inc., reported 61 projects for 2002 but only 30 for 2003.) Another 10 entities reported more projects for 2003 than they reported in 2002. Of the 219 projects reported for 2003, 76 focused on improvements in energy efficiency, 50 emphasized reductions in emissions from electricity generation, transmission, and distribution, and another 44 involved the capture and combustion of methane. Although reporting on methane capture and combustion has grown steadily since 1994, 7 fewer such projects were reported for 2003 than were reported for 2002. For example, U.S. Energy Biogas Corp reported fewer methane capture and combustion projects for 2003 than it did for 2002.

Together, the 219 projects reported on the short form for 2003 reduced greenhouse gas emissions by 16.4 million metric tons carbon dioxide equivalent (Table 38). Of that total, 11.0 million metric tons resulted from efforts in the electricity generation, transmission, and distribution sector. Another 3.5 million metric tons was attributed to waste treatment and disposal, nearly all of which resulted from the capture and combustion of methane at municipal solid waste landfills (Table 39).

Federal voluntary programs played an important role in those projects reported on Form EIA-1605EZ. Of the projects reported, 120 (55 percent) were associated with some Federal voluntary initiative: 57 were associated with the U.S. Department of Energy's Climate Challenge program, and 41 of the 42 waste treatment and disposal projects reported referenced the U.S. Environmental Protection Agency's Landfill Methane Outreach Program (Table 40).

Table 37. Number of Projects Reported on Form EIA-1605EZ by Reduction Objective and Project Type, Data Years 1994-2003

Reduction Objective and Project Type	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Reducing Carbon Dioxide Emissions	**88**	**118**	**125**	**138**	**177**	**151**	**148**	**146**	**186**	**160**
Electricity Generation, Transmission, and Distribution	35	44	44	46	59	53	55	50	58	50
Cogeneration and Waste Heat Recovery	0	1	2	2	2	0	0	0	1	0
Energy End Use	44	50	53	60	66	56	61	64	97	76
Transportation and Offroad Vehicles	5	8	11	9	14	11	12	13	9	10
Other Projects	4	15	15	21	36	31	20	19	21	24
Reducing Methane and Nitrous Oxide Emissions	**15**	**21**	**30**	**32**	**41**	**45**	**44**	**47**	**51**	**44**
Waste Treatment and Disposal (Methane)	10	16	21	28	39	42	43	45	49	42
Agriculture (Methane and Nitrous Oxide)	0	0	0	0	0	0	0	0	0	0
Oil and Natural Gas Systems and Coal Mining (Methane)	5	5	9	4	2	3	1	2	2	2
Carbon Sequestration	**20**	**24**	**23**	**30**	**34**	**41**	**35**	**14**	**14**	**14**
Halogenated Substances	**2**	**1**	**1**	**1**	**0**	**0**	**2**	**3**	**2**	**1**
Total	**125**	**164**	**179**	**201**	**252**	**237**	**229**	**210**	**253**	**219**

Note: Table excludes projects submitted in confidential reports.
Source: Energy Information Administration, Form EIA-1605EZ.

Table 38. Emission Reductions Reported on Form EIA-1605EZ by Reduction Objective and Project Type, Data Years 1994-2003
(Million Metric Tons Carbon Dioxide Equivalent)

Reduction Objective and Project Type	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Reducing Carbon Dioxide Emissions	**3.7**	**5.0**	**4.4**	**6.7**	**16.4**	**9.6**	**9.2**	**10.9**	**12.8**	**12.5**
Electricity Generation, Transmission, and Distribution	2.3	2.9	2.1	3.8	13.0	8.1	7.8	9.7	11.6	11.0
Cogeneration and Waste Heat Recovery	—	*	*	*	*	—	—	—	*	—
Energy End Use	1.4	1.6	1.9	2.4	2.4	0.3	0.4	0.3	0.4	0.4
Transportation and Offroad Vehicles	*	*	*	*	*	*	*	*	*	*
Other Projects	0.1	0.5	0.4	0.5	0.8	1.1	1.0	0.9	0.9	1.0
Reducing Methane and Nitrous Oxide Emissions	**0.6**	**1.2**	**1.3**	**1.8**	**3.0**	**3.2**	**3.1**	**4.0**	**4.3**	**3.9**
Waste Treatment and Disposal (Methane)	0.6	1.1	1.2	1.8	3.0	3.2	3.1	3.8	4.0	3.5
Agriculture (Methane and Nitrous Oxide)	—	—	—	—	—	—	—	—	—	—
Oil and Natural Gas Systems and Coal Mining (Methane)	*	*	*	*	0.1	0.1	*	0.2	0.3	0.3
Carbon Sequestration	*	*	*	*	*	**0.1**	*	*	*	*
Halogenated Substances	—	—	—	**0.1**	—	—	*	*	**0.1**	*
Total	**4.3**	**6.1**	**5.7**	**8.6**	**19.4**	**12.9**	**12.3**	**14.8**	**17.3**	**16.4**

*Less than 0.05 million metric tons.
— = none reported.
Note: Table excludes data submitted in confidential reports.
Source: Energy Information Administration, Form EIA-1605EZ.

Table 39. Carbon Dioxide and Methane Emission Reductions Reported on Form EIA-1605EZ by Reduction Objective and Project Type, Data Year 2003
(Million Metric Tons Carbon Dioxide Equivalent)

Reduction Objective and Project Type	Carbon Dioxide	Methane
Reducing Carbon Dioxide Emissions	**12.4**	*
Electricity Generation, Transmission, and Distribution	11.0	—
Cogeneration and Waste Heat Recovery	----	----
Energy End Use	0.4	----
Transportation and Offroad Vehicles	*	—
Other Projects	1.0	*
Reducing Methane and Nitrous Oxide Emissions	*	**3.8**
Waste Treatment and Disposal (Methane)	*	3.5
Agriculture (Methane and Nitrous Oxide)	----	----
Oil and Natural Gas Systems and Coal Mining (Methane)	*	0.3
Carbon Sequestration	*	—
Halogenated Substances	—	—
Total	**12.5**	**3.8**

*Less than 0.05 million metric tons.
— = none reported.
Notes: No reductions of nitrous oxide emissions were reported on Form EIA-1605EZ for 2003. Table excludes data submitted in confidential reports.
Source: Energy Information Administration, Form EIA-1605EZ.

Table 40. Number of Projects Reported on Form EIA-1605EZ Associated with Other Federal Voluntary Programs, Data Years 1994-2003

Voluntary Program	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Climate Challenge	106	127	117	124	129	114	111	97	75	57
Landfill Methane Outreach Program	—	—	2	2	34	40	42	44	48	41
Climate Wise Recognition Program	----	3	5	12	25	25	12	1	1	2
ENERGY STAR Programs	5	6	10	5	2	1	2	8	28	11
Energy Efficiency and Renewable Energy Information and Training Programs	—	—	—	—	—	—	—	—	27	—
Green Lights Program	1	3	6	4	6	2	1	1	1	----
Coalbed Methane Outreach Program	----	----	1	1	2	3	----	----	----	----
WasteWise Program	—	—	—	—	—	—	—	2	4	3
Other	4	11	3	9	7	1	3	11	7	6
Total	**116**	**150**	**144**	**157**	**205**	**186**	**171**	**164**	**191**	**120**

---- = none reported.
Note: Table excludes data submitted in confidential reports.
Source: Energy Information Administration, Form EIA-1605EZ.

Glossary

Afforestation: Planting of new forests on lands that have not been recently forested.

Anaerobic lagoon: A liquid-based manure management system, characterized by waste residing in water to a depth of at least 6 feet for a period ranging between 30 and 200 days.

Associated natural gas: See associated-dissolved natural gas.

Associated-dissolved natural gas: Natural gas that occurs in crude oil reservoirs either as free gas (associated) or as gas in solution with crude oil (dissolved gas).

Baseline period: The years 1987 through 1990 for which entity-level emissions may be reported.

Biofuels: Liquid fuels and blending components produced from biomass (plant) feedstocks, used primarily for transportation.

Biogas: A mixture of carbon dioxide and methane produced through bacterial action.

Biomass: Organic nonfossil material of biological origin constituting a renewable energy source.

British thermal unit: The quantity of heat required to raise the temperature of 1 pound of liquid water by 1 degree Fahrenheit at the temperature at which water has its greatest density (approximately 39 degrees Fahrenheit).

Carbon sink: A reservoir that absorbs or takes up released carbon from another part of the carbon cycle. The four sinks, which are regions of the Earth within which carbon behaves in a systematic manner, are the atmosphere, terrestrial biosphere (usually including freshwater systems), oceans, and sediments (including fossil fuels).

Carbon sequestration: The fixation of atmospheric carbon dioxide in a carbon sink through biological or physical processes.

Chlorofluorocarbon (CFC): Any of various compounds consisting of carbon, hydrogen, chlorine, and flourine used as refrigerants. CFCs are now thought to be harmful to the earth's atmosphere.

Cogeneration: The production of electrical energy and another form of useful energy (such as heat or steam) through the sequential use of energy.

Commercial scale: Application of a demonstrated technology at a cost-effective scale.

Commitment: An expressed intention to undertake an action or actions that will reduce greenhouse gas emissions, increase carbon sequestration, or achieve a stated emissions goal.

Conversion factor: A number that translates units of one measurement system into corresponding values of another measurement system. *Note:* For specific conversion factors, see EIA data products.

Deforestation: The net removal of trees from forested land.

Emissions coefficient: A unique value for scaling emissions to activity data in terms of a standard rate of emissions per unit of activity (e.g., pounds of carbon dioxide emissions per unit of fossil fuel consumed).

Emissions: Anthropogenic releases of gases to the atmosphere. In the context of global climate change, they consist of radiatively important greenhouse gases (e.g., the release of carbon dioxide during fuel combustion).

Emissions, direct: Emissions from sources owned (wholly or in part) or leased by an entity.

Emissions, fugitive: Unintended leaks of gas from the processing, transmission, and/or transportation of fossil fuels.

Emissions, indirect: Emissions from sources not owned or leased by an entity that occur, wholly or in part, as a result of its activities.

Emission reduction: A decrease in annual greenhouse gas emissions.

Energy conservation: Activities that reduce end-use demand for energy by reducing the service demanded.

Entity: For the purposes of the Voluntary Reporting Program, an individual or organization that is a legal U.S. person (e.g., a U.S. citizen, resident alien, company, organization, or group incorporated under or recognized by U.S. law; or a Federal, State, or local government agency).

Entity boundary: Conceptually, a line drawn to encompass the emissions sources and sinks to be evaluated in an entity-level report. An entity boundary should

include all the emissions sources and sinks owned (wholly or in part) or leased by the entity and, to the extent possible, other emissions sources and sinks affected by the entity's activities.

Entity-level reporting: The reporting of greenhouse gas emissions, emission reductions, and carbon sequestration for an entire entity. See also Project-level reporting.

Estimation method: The techniques, including key assumptions and data sources, used by the reporter to derive the reported emissions, emission reductions, or sequestration.

Foreign activities: All actions outside the United States, its territories, and trusts.

Forest preservation: Protecting existing forests from harvest and, in some cases, conversion to another land use as a means of mitigating increases in atmospheric carbon.

Fossil fuel: An energy source formed in the Earth's crust from decayed organic material. The common fossil fuels are petroleum, coal, and natural gas.

Fuel cycle: The entire set of sequential processes or stages involved in the utilization of fuel, including extraction, transformation, transportation, and combustion. Emissions generally occur at each stage of the fuel cycle.

Fuel switching: The substitution of one type of fuel for another. The fuel substitution may be either temporary (as in the case of a power plant that temporarily switches from coal to natural gas) or permanent (as in the case of a fleet operator who replaces gasoline-powered automobiles with electric cars).

Fugitive emissions: See Emissions, fugitive.

Global warming potential (GWP): An index used to compare the relative radiative forcing of different gases without directly calculating changes in their atmospheric concentrations. GWPs are calculated as the ratio of the radiative forcing that would result from the emission of one kilogram of a greenhouse gas to that from the emission of one kilogram of carbon dioxide over a fixed period of time, such as 100 years.

Gob: A zone of rubble created when the roof of a coal mine collapses behind the mining operations.

Greenhouse effect: The result of water vapor, carbon dioxide, and other atmospheric gases trapping radiant (infrared) energy, thereby keeping the Earth's surface warmer than it would otherwise be. Greenhouse gases within the lower levels of the atmosphere trap infrared radiation that would otherwise escape into space, and subsequent re-radiation of some of the energy back to the Earth maintains higher surface temperatures than would occur if the gases were absent. See Greenhouse gases.

Greenhouse gases: Those gases, such as water vapor, carbon dioxide, nitrous oxide, methane, hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulfur hexafluoride, that are transparent to solar (short-wave) radiation but opaque to long-wave (infrared) radiation, thus preventing long-wave radiant energy from leaving Earth's atmosphere. The net effect is a trapping of absorbed radiation and a tendency to warm the planet's surface.

Halogenated substance: A volatile compound containing halogens, such as chlorine, fluorine, or bromine.

Horizon year: The year in which a commitment to reduce greenhouse gas emissions or increase sequestration (reported on Schedule IV) is expected to be met.

Intergovernmental Panel on Climate Change (IPCC): A panel established jointly in 1988 by the World Meteorological Organization and the United Nations Environment Program to assess scientific information related to climate change and to formulate realistic response strategies.

Life cycle: The progression of a product through its service life. For most products, emissions and energy-consuming characteristics will be altered as they age.

Longwall mining: An automated form of underground coal mining characterized by high recovery and extraction rates, feasible only in relatively flat-lying, thick, and uniform coalbeds. A high-powered cutting machine is passed across the exposed face of coal, shearing away broken coal, which is continuously hauled away by a floor-level conveyor system. Longwall mining extracts all machine-minable coal between the floor and ceiling within a contiguous block of coal, known as a panel, leaving no support pillars within the panel area. Panel dimensions vary over time and with mining conditions but currently average about 900 feet wide (coal face width) and more than 8,000 feet long (the minable extent of the panel, measured in direction of mining). Longwall mining is done under movable roof supports that are advanced as the bed is cut. The roof in the mined-out area is allowed to fall as the mining advances.

Manure management: The method used to dispose of the solid waste produced by livestock and poultry.

Modified forest management: The modification of the management regimes of existing forests to increase their carbon capture rates.

Municipal solid waste: Residential solid waste and some nonhazardous commercial, institutional, and industrial wastes.

Ozone: A molecule made up of three atoms of oxygen. Occurs naturally in the stratosphere and provides a protective layer shielding the Earth from harmful ultraviolet radiation. In the troposphere, it is a chemical oxidant, a greenhouse gas, and major component of photochemical smog.

Photosynthesis: The manufacture of carbohydrates and oxygen from carbon dioxide and water in the presence of chlorophyll, with sunlight as the energy source. Carbon is sequestered and oxygen and water are released in the process.

Pilot project: A small-scale trial designed to test or demonstrate the efficiency or efficacy of a project.

Project: An action undertaken to reduce greenhouse gas emissions or sequester carbon.

Project boundary: Conceptually, a line drawn to encompass the emissions sources and sinks affected by a project. A project boundary should include all the significant and quantifiable effects of the project.

Project ID code: A unique code assigned by the Energy Information Administration to a reported project for tracking purposes.

Project-level reporting: Reporting on emission reductions or carbon sequestration achieved as a result of a specific action or group of actions.

Reconductoring: Replacement of existing conductors with large-diameter conductors to reduce line losses. Conductors (including feeders and transmission lines) are a major source of transmission and distribution system losses. In general, the smaller the diameter of the conductor, the greater its resistance to the flow of electric current, and the greater the consequent line losses.

Reference case: The emissions level to which current actual emissions levels are compared when emission reductions are calculated.

Reference case, basic: A reference case using actual historical emissions or sequestration values.

Reference case, modified: A reference case using projected emissions or sequestration values, representing the emissions level that would have occurred in the absence of reduction or sequestration efforts.

Reforestation: Replanting of forests on lands that have recently been harvested or otherwise cleared of trees.

Reporter: An entity (see definition above) completing either Form EIA-1605 or Form EIA-1605EZ and submitting it to the Energy Information Administration.

Room-and-pillar mining: The most common method of underground mining in which the mine roof is supported mainly by coal pillars left at regular intervals. Rooms are places where the coal is mined; pillars are areas of coal left between the rooms. Room-and-pillar mining is done either by conventional or continuous mining.

Sequestered carbon: Carbon that is removed from the atmosphere and retained in a carbon sink (such as a growing tree) or in soil.

Sequestration: See Carbon sequestration.

Sink: See Carbon sink.

Third-party reporter: An authorized party that submits a report on behalf of two or more entities that have engaged in emissions-reducing or sequestration-increasing activities. Possible third-party reporters include trade associations reporting on behalf of members that have undertaken reduction projects.

Urban forestry: The planting of trees individually or in small groups in urban or suburban settings.

Vhar metering: Phase shifters on watt-hour meters that measure reactive volt ampere hours or varhours.

Watt (W): The unit of electrical power equal to one ampere under a pressure of one volt. A watt is equal to 1/746 horsepower.