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**Environmental
Financial Advisory Board**

**FINANCING ENVIRONMENTAL INFRASTRUCTURE
ALONG THE UNITED STATES-MEXICAN BORDER
AND IN EASTERN EUROPE
AND THE FORMER SOVIET REPUBLICS**

This report has not been reviewed for approval by the U.S. Environmental Protection Agency; and hence, the views and opinions expressed in the report do not necessarily represent those of the Agency or any other agencies in the Federal Government.

July 1993

Honorable Carol M. Browner
Administrator
U.S. Environmental Protection Agency
Washington, D.C. 20460

Dear Administrator Browner:

On behalf of the Environmental Financial Advisory Board (EFAB), we are very pleased to transmit to you the EFAB Report, "Financing Environmental Infrastructure Along the U.S./Mexican Border and in Eastern Europe and the Former Soviet Republics." This Report provides a creative strategy for financing the growing environmental needs in these geographic regions. We believe the initiatives presented here are particularly timely for the Administration because they will support the delivery of essential environmental services in these regions and at the same time assist with trade negotiations.

The Board proposes a public finance system based on user fees and innovatively supported by a financial guaranty fund to raise the necessary capital for badly needed environmental facilities. This system would enable newly created environmental districts to sell public bonds in the domestic and international markets. The financial guaranty fund would serve as a credit enhancement mechanism to guarantee the bond issues and improve their acceptance in the credit markets. The proceeds from the bonds, along with other capital subsidies that may be required, would build needed environmental facilities. The facilities would, in turn, provide services to various customers -- industry, communities, and residences -- that would be subject to user fees payable to the environmental district to cover operation and maintenance costs for the facilities and debt service. The establishment of user fees is critical to the market acceptability of the new public finance system debt.

We believe that the public finance system approach offers a sound and effective way of paying for environmental facilities along our southern border and in Eastern Europe and the former Soviet Republics. We and the EFAB Executive Committee are available at your convenience to discuss this Report and to provide any further analyses you may require.

Sincerely,


Frieda K. Wallison
Vice Chair, Environmental
Financial Advisory Board

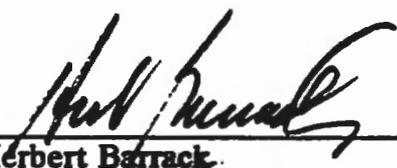

Herbert Barrack
Executive Director, Environmental
Financial Advisory Board

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**1993 Report of the Environmental Financial Advisory Board
of the
United States Environmental Protection Agency**

I. INTRODUCTION

BACKGROUND

Upon convening in January 1993, the International Committee (the "Committee") of the Environmental Financial Advisory Board (the "Board") of the United States Environmental Protection Agency (the "Agency") briefly assessed the environmental finance issues facing the world. Although the Committee saw many problems on each continent, faced with limited time and resources, it elected to address two issues which it considered vital: first, the disparity in environmental quality between the United States and Mexico, as it might affect the adoption of the North American Free Trade Agreement (NAFTA); and, second, the almost staggering need for new environmental infrastructure in Eastern Europe and the republics of the former Soviet Union.

As negotiations for the North American Free Trade Agreement gained momentum throughout 1991 and 1992, concern was expressed by many environmental interests in the United States over the disparity in environmental quality between the U.S. and Mexico. In particular, there was a concern that badly needed water, wastewater, and solid waste disposal projects along the 3,200 mile border with the United States would not be built. The Agency estimated the cost of these needed facilities at between \$5 - 7 billion.

The Committee considered strategies for dealing with the problem of financing environmental infrastructure projects in Mexico along the U.S. border. The goal of the Committee was to pass along to the Board, and ultimately to the Administrator, a series of recommendations to assist in the financing of such environmental infrastructure projects in Mexico, which would, in turn, facilitate the passage and implementation of NAFTA.

In like manner, the Committee also considered published reports describing a tremendous need for new environmental infrastructure projects in the republics of Eastern Europe and the former Soviet Union. Here, the Committee wished to recommend to the Board, and to the Administrator, a course of action which not only would assist the republics of Eastern Europe but which would also inure to the benefit of the United States, as well, in terms of stimulating exports.

In furtherance of its goals, the Committee made a series of eight general findings. It then adopted a series of resolutions on each issue, which it augmented with discussion and conclusions based on its resolutions. The proceedings of the Committee are as follows:

GENERAL FINDINGS.

In considering the Mexican Border Issue and the Issue of Eastern Europe and Former Soviet Republics, the Committee made eight findings. They are:

- 1) It is highly unlikely that any central government will ever be able to provide all of the funds needed for necessary environmental infrastructure projects.**
- 2) Environmental infrastructure projects will face ever-more fierce competition for funding as nutrition, health, housing, education, and other vital societal needs lay claims to scarce central government financial resources.**
- 3) The only alternative to central government funding is funding through domestic and international capital markets.**
- 4) The principal funding mechanism for environmental infrastructure projects should be fair and reasonable user fees, which can serve as a means of access to the international capital market.**
- 5) Certain environmental infrastructure projects could be funded if subsovereign finance mechanisms, based on user fees and similar to the American municipal bond market in the United States, were created in other countries.**
- 6) In order to gain broad market acceptance within a relatively short period of time, this subsovereign finance system should be augmented with a financial guaranty mechanism to enhance the credit of such projects to the investment grade level.**
- 7) The financial guaranty mechanism required to launch a new subsovereign financing system should be privately funded in whole or in part.**
- 8) It is in the best interest of the United States to encourage the creation of public finance systems abroad, since the U.S. has the greatest repository of legal, financial, organizational, administrative and managerial expertise in the field of public finance, all of which services can be exported.**

Based on these eight findings, the Committee adopted the following resolutions and conducted the following discussions on each issue:

II. THE MEXICAN BORDER ISSUE

RESOLUTIONS

1) **RESOLVED**, that the Administrator is advised to suggest, pursuant to the North American Free Trade Agreement, to the appropriate authorities in Mexico, the creation of a financial system, based on user fees, which provides for the issuance of public debt by subsovereign governmental entities.

2) **RESOLVED**, that the Administrator is advised to suggest, pursuant to the North American Free Trade Agreement, to the appropriate authorities in Mexico, the creation of a privately funded financial guaranty mechanism to enhance the new public securities system.

3) **RESOLVED**, that the Administrator is advised to offer, within the limits of appropriations to the Agency, technical assistance to support efforts of the government of Mexico to create a public securities system, based on user fees, and to support the creation of a privately funded financial guaranty mechanism to enhance such new public securities system.

DISCUSSION

In the United States, 75-80% of all environmental infrastructure funding comes from the public finance system. The same could be true in Mexico. The environmental infrastructure funding problem in Mexico will not be solved without a public finance system. Creating a public finance system in Mexico, however, will not be easy. Nor will it be quick.

Mexico is poor. The average wage-earner in Mexico takes home \$2,000 per year. In the more prosperous 65-mile wide Mexican zone that borders the U.S. along the states of California, Arizona, New Mexico, and Texas, known as the maquiladora corridor, the median wage is \$3,000. In rural America, where median incomes are five to six times higher than in Mexico, user fees cannot support many environmental infrastructure projects, even at interest rates of 0%. The same will be true in Mexico, even more so. In Mexico, less of the burden of paying for a project can be laid upon the users.

Whatever user fees can be imposed in Mexico, it imperative that they first be dedicated to the payment of the operation and maintenance of the system. No capital market will accept the debt of a system which relies on subsidies to pay for its operation and maintenance. Users will not pay for shoddy or intermittent service. If inadequate service is provided, there will be no assured stream of income from user fees. Having a constant and assured stream of income from user fees is absolutely essential in obtaining access to domestic and international capital markets. Therefore, whatever pesos are raised from fees must first be used to guarantee the integrity of the ongoing operation of

the system. Only user fees in excess of real operation and maintenance expenses can be dedicated to the payment of principal and interest on debt instruments issued to build or improve systems.

The point, however, is that every peso raised through a user fee based system is one peso less that has to depend on the central government. If 10% of a capital project can be paid for with user fees, then it should be. That is 10% less the central government will be asked to pay. If 50% can be paid with user fees, even better. It is intuitive that the probability of a project's receiving central government funding is in inverse proportion to the percentage of funds requested.

Studies of reasonable user charges in developing countries range from 1% to 20% of median income depending on a multiplicity of factors. For Mexico, this would mean a range of annual fees of between \$20 and \$600. Assuming a \$100 annual user fee pledged to a properly structured public security, about \$1,000 per user could be raised in the capital markets to pay for environmental infrastructure projects. This would go a long way to alleviate the environmental problems facing the region.

It must be noted that user fees alone will sometimes be insufficient to pay the full cost of a capital project. This is true in the United States for both large and small communities. It will also be true for Mexico. In such cases, traditional subsidies must be used in Mexico to make up cash shortfalls, as they are in the United States. However, the principle must obtain that subsidies should be minimized. The greatest possible amount of financial support must come from user fees.

So, although user fees alone cannot bear the entire burden of paying for environmental infrastructure (much less annual operation and maintenance costs), they are not insignificant; and a structure should be devised to harness these potential funding streams.

Mexico also has a tradition of strong central government. Little real power has devolved to the states and cities. One of the most jealously guarded powers is the power to raise funds or levy taxes. Local governments in Mexico do not have these powers. Recently, however, Mexican treasury officials have begun to reverse long-standing opposition to local financial autonomy. In the last year, they have approved a privately owned toll road which was privately financed in the international capital market. This example is structurally analogous to a financially autonomous public water or wastewater district. Both involve single function entities. Both involve entities whose financial "autonomy" is restricted to the use of a highly limited set of fees. Both involve circumstances where the penalty for non-payment is non-use. In short, no general powers to tax; no police powers to sanction non-payers. Mexico seems to be leaning strongly in favor of creating a broader array of such entities which are ideal to finance environmental infrastructure. The key here is autonomy. Capital markets will not

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accept the debt of entities whose legal basis or fundamental organization can be changed by any legislature or any government at will.

There seems to be, therefore, both a reasonable user fee base in Mexico as well as a growing desire to create limited-purpose, financially autonomous public entities. But more will be needed. Mexico needs good engineers to run the works and good managers to collect the fees.

If users are to be required to pay fees, then they must be furnished with reliable and quality service. To do so requires engineers to run the works. Mexico does not have a well developed community of sanitary engineers. It is reputed that fewer than 50% of the sewage treatment plants in Mexico are fully operational, and that the principal reason therefore is a lack of qualified personnel. In the long term, Mexico must look to the establishment of university-level training programs for engineers in the water, wastewater and solid waste fields. In the short term, it could look to the Agency for technical assistance. It could also look at the establishment of reciprocal programs with public water and sewer districts in the U.S. Mexico could also, as in the case of the private toll road, look to private contractors to run their water and wastewater systems.

Administration is also a problem. For an entity to be creditworthy, it must have sound management. In Mexico, there are no university-level courses of study in public administration. These will have to be developed to assure that the new autonomous units of government can look to cadres of qualified candidates for management. In the interim and on a short-term basis, however, Mexico can look for technical assistance from the Agency. The pilot Environmental Finance Center at the University of New Mexico could serve as a resource. In addition, reciprocal arrangements with American public utility districts could also be organized, as could contracts for management services with private companies.

Good management is essential to good credit, but is not the only criterion. In a market-based financing system, a legal nexus must exist between the fees paid by a system's users and the payments made to the system's creditors. Pledges of system funds must be constitutionally enforceable. Lenders must have an absolute legal right to any fees pledged to them. Furthermore, there must be legal mechanisms in place to assure that such funds, once collected by a system, duly make their way to the system's bondholders. Studies must be done to identify what statutes, similar to the Trust Indenture Act of 1940, must be enacted or amended, to assure that pledged funds will be properly handled and that there are strong legal sanctions against the careless and the criminal. Finally, Mexican banks must be able to offer services as traditional bond registrars, trustees, and payment agents.

The creation of a public securities market in Mexico involves three areas of effort. In addition to the training of the technical and administrative personnel and the enactment of appropriate statutory and constitutional safeguards, there remains the

overwhelming logistical problem of drawing demographic lines, constructing facilities, installing meters, establishing user accounts, and educating a populace unaccustomed to receiving high levels of service and unaccustomed to paying for any level of service to react and behave in the predictable and reliable financial patterns, day-to-day and year-to-year, that are necessary to create the history of solvency and stability required for a system to receive an investment grade credit rating.

There are no shortcuts in this process. It takes time to create a credit history. But it takes longer to create a credit history of investment grade quality. Furthermore, under certain circumstances a system may wish to take on more debt (to improve the quality of its services), than would be expected of an investment grade system. Investment grade credit ratings require the setting of user fees far in excess of operational and debt service requirements (to provide a cushion against unplanned expenses or drop-offs in user charges). A system may not want to tax its users beyond the necessary.

In short, although long credit histories of great solvency and firm stability are desirable, they may not be realistically attainable for new, autonomous Mexican utility districts charged with the Augean task of cleaning up the environmental problems along the border. For these reasons, a financial guaranty mechanism will be necessary to bring a large number of relatively small (under \$10 million) bond issues of newly created, Mexican utility districts to the domestic or international capital market. In this regard, it must be noted that the creation of a broad domestic capital market for subsovereign government debt should be a highly desirable goal for the Mexican economy. The creation of an international market for such debt should also be desirable but will also involve additional questions of sovereign risk.

A financial guaranty for environmental infrastructure projects in Mexico cannot depend on the central government for the same reason that the funding of environmental infrastructure projects in Mexico cannot depend on the central government. Both the cash and the credit are exhaustible. Both central government funds and central government guaranties are finite. Central governments cannot afford to fund every environmental project, and they cannot afford to guaranty every environmental project, either.

An appropriate financial guaranty mechanism for Mexican environmental infrastructure projects would involve a substantial fund. As will be shown below, a financial guaranty fund would undoubtedly have to be in the range of \$100 - \$250 million. Such a fund would be able to serve as an effective financial guaranty for about \$1 - 2.5 billion of bonds issued by new, Mexican utility districts. Moreover, if properly structured and supported by annual guaranty fees, such a fund could be self-sustaining and, therefore, facilitate the funding of virtually all of the \$5 - 7 billion of identified environmental infrastructure projects in Mexico along the U.S. border.

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The Standard & Poor's Corporation (S&P) has done seminal work in developing the methodology to rate structured funds which act as financial guaranties for much larger amounts of issued debt in the U.S. municipal market. This work was published in conjunction with the rating of state programs involved in the Agency's State Revolving Fund (SRF) Program. Using this methodology, S&P estimates that, under the worst case scenario (which they specifically hypothesize in each instance), a certain percentage of a given class of bonds (such as water and sewer bonds), issued with a specific credit rating, will be delinquent for a certain period of years at some point during their term.. For the sake of conservatism, S&P methodology postulates that the delinquency will occur one year after issuance; and, for the sake of reality, it postulates that all of the delinquencies will phase in over three years.

Let us assume \$100 of sewer bonds of Non-Investment Grade (NIG) quality, the annual debt service payments on which are \$10. Let us assume, using published S&P methodology, that sewer bonds with the lowest investment grade rating (BBB) have a default frequency of 10%. This means that in each year of presumed delinquency, 10% of the annual debt service payment, or \$1, will be missing. Let us also assume, using S&P methodology for U.S. municipals, that such delinquent sewer bonds have a five year delay period. This means that the \$1 will be missing each year for five years. Bearing in mind that the delinquency process begins in the second year and phases in over three years, the total delinquencies on all of the \$100 of bonds issued would be as follows:

Year 1 -	\$0.00	Year 6 -	\$1.00
Year 2 -	\$0.33	Year 7 -	\$0.67
Year 3 -	\$0.67	Year 8 -	<u>\$0.33</u>
Year 4 -	\$1.00		
Year 5 -	\$1.00	Total -	\$5.00

Thus, according to S&P, the \$100 of BBB sewer bonds in the above example, will experience total losses of \$5. (We ignore the effect of discounting which would further reduce these results. It should also be noted that these results are based solely on U.S. experience and that there are no assurances that Mexican credit will provide comparable default or loss experience.) Using this methodology, generally, we can develop an amount of cash appropriate for guaranteeing bonds at the BBB or higher rating levels. This approach can be extended to NIG bonds, but collateral levels will be much greater. For example, for a NIG portfolio to attain a AAA rating, considerable cash collateral would have to be put up, perhaps as much as 20 - 40% of par, or more.

The principle, however, is established that NIG bonds may attain investment grade status if additional funds are pledged, as a financial guaranty, to their bondholders. This is precisely the type of financial guaranty mechanism which can be brought to bear on the NIG bonds of new, Mexican utility district bonds. A guaranty ratio of 10% is postulated for a proposed Mexican environmental infrastructure guaranty fund.

A financial guaranty fund for Mexican environmental infrastructure projects would have to be substantial. In the first instance, the guaranty ratio declines with the number of bond issues guaranteed. Thus a guaranty ratio for the first bond might be 100%. For twenty bonds it might be 30%. It is only after several hundred bonds have been included in a guaranty portfolio that the guaranty ratios will decline to reasonable levels. What the size of the proposed bond issues will be and what the level of a proposed guaranty ratio might be can only be determined through further study. Suffice it to say that any meaningful guaranty fund must be substantial enough to sustain itself until the number of included issues is great enough for the guaranty fees to decline to reasonable levels. For this reason, a fund in the \$100 - 250 million range, as a minimum, has been suggested.

The guaranty fund should be structured as a private enterprise. The first reason for this is that the guaranty funds will be pledged to support bond issues whose default rates are based on worst case scenarios. Worst cases seldom happen. This means that there is a good probability that the original guaranty funds will not be invaded to pay debt service on delinquent bonds. This probability increases when the effect of compounding is factored in. As the guaranty funds earn interest, and the interest is added to the funds's principal, the guaranty fund itself will grow well beyond the amount of the original funds contributed.

In addition, the guaranty fund should charge a modest annual fee for its guaranty to the bond-issuing district. This policy is in accord with the Committee's sense that environmental infrastructure should be paid for according to use; so too, therefore, should services, such as guaranties, through which environmental infrastructure funding is obtained.

The annual guaranty fee should be sufficient to keep the guaranty fund self-sustaining. This will mean that no further infusion of capital from external sources will be needed. More importantly, this will mean that the guaranty fund will eventually be able to facilitate the issuance of bonds to provide for all \$5 - 7 billion of identified environmental infrastructure projects in Mexico along the U.S. border.

The effect of the annual guaranty fee on the fund constitutes the second reason why the fund should be structured as a private enterprise. Under current market conditions, the shareholders who contributed capital to the fund would earn about a 6% return, absent losses. As the guaranty fees and retained earnings build up the fund, the investor's returns will increase apace. In short, from a balance sheet point of view, the guaranty fund resembles an insurance company -- one that is engaged in a low-risk business. As such, the guaranty fund should be an attractive investment for the long-term institutional market.

CONCLUSION

A public securities system can be created in Mexico so that new, autonomous environmental infrastructure districts can gain access to domestic and international capital markets to fund needed projects. To facilitate this process, a privately funded financial guaranty mechanism can be created which will initially facilitate the issuance of \$1 - 2.5 billion of environmental infrastructure bonds and will eventually, because of its self-sustaining structure, be able to facilitate the funding of virtually all of the \$5 - 7 billion of identified environmental infrastructure projects in Mexico along the U.S. border. If properly structured, the financial guaranty mechanism should be an attractive investment for the long-term institutional market.

III. THE ISSUE OF EASTERN EUROPE AND THE FORMER SOVIET REPUBLICS RESOLUTIONS

1) **RESOLVED**, that the Administrator is advised to suggest to the appropriate authorities in the new republics of Eastern Europe and the former Soviet Union the creation of a financial system, based on user fees, which provides for the issuance of public debt by subsovereign governmental entities.

2) **RESOLVED**, that the Administrator is advised to facilitate the creation of an International Center for Environmental Finance, at a major university within the United States, to promote the development of public finance systems, similar to the American municipal bond market, in other countries as a means of financing their environmental infrastructure projects.

3) **RESOLVED**, that the Administrator is advised that one of the principal purposes of the International Center for Environmental Finance should be to conduct conferences and informational meetings for the appropriate government officials in Eastern Europe and the former Soviet republics on the organization, administration and management of local government entities, cooperatives and private utilities which finance environmental infrastructure projects through the American capital market.

DISCUSSION

In Eastern Europe and the republics of the former Soviet Union, environmental infrastructure, where it exists, is reported to be inoperable, malfunctioning or inadequate. Dr. John J. Boland of the Johns Hopkins University reports that "Fifty or more years of neglect, disinterest, and exploitation have resulted in a physical environment so poisoned that it is a daily threat to the lives and health of the citizens. In the industrial belt running from Germany to the Russian Republic, morbidity has climbed, life expectancy has fallen, and large areas of land are blighted by soil, air, and water pollution." The water of the Vistula River in parts of Poland is so corrosive that it cannot even be used to cool machinery. According to the Agency, the discharges of the past 50 years have rendered the Vistula so corrosive that untreated river water will actually eat through machinery. The financing of environmental infrastructure in Eastern Europe and the republics of the former Soviet Union is, therefore, an issue of the highest priority.

Although the environmental infrastructure problems of Eastern Europe and the republics of the former Soviet Union are truly staggering, members of the Agency's staff have reported that their colleagues in these countries have a thorough acquaintance with the latest pollution control technologies, but also a despairing inability to use them because of their central governments' lack of funding. In addition, and more importantly, there are no other public or private entities or instrumentalities within such

countries which can legally undertake environmental infrastructure projects. Moreover, environmental specialists from Eastern Europe and the republics of the former Soviet Union speak of a need to learn how the public finance system in the United States can be modified and replicated to work in their countries to finance needed environmental infrastructure projects. In short, these indigenous experts know that the answers to their environmental infrastructure problems lie in new financing techniques, but they have no traditional means to effect them.

To create a public finance system within Eastern Europe and the republics of the former Soviet Union will require a significant and systematic effort. Although these countries have highly skilled engineers and other technicians aware of the problems and acquainted with the latest pollution control methodologies, they have no subsovereign instrumentalities of the state capable of financing environmental infrastructure projects without the direct financial support of the central government. Furthermore, the new regimes of Eastern Europe and the republics of the former Soviet Union have neither the financial institutions nor the financial traditions necessary to assure international bondholders of the integrity of any financial instruments issued by any subsovereign entities.

In this regard, the building of appropriate legal and administrative structures for subsovereign financing of environmental infrastructure projects is the most important first step in the solution of this problem. To this end, the Agency can assist by facilitating the creation of an International Center of Environmental Finance, one of the principal purposes of which would be the dissemination of information on the efficacy of the public finance system within the U.S. in funding environmental infrastructure projects.

This solution will not be quick. Institution building is a long and arduous process. But it is best begun by inviting decision makers and other environmental officials in Eastern Europe and the republics of the former Soviet Union to the U.S. for an extended stay to learn how the domestic system of public finance is able to fund almost \$20 billion of infrastructure projects each year in the United States without significant aid from the United States government. This should be the work of the International Center.

Another important element is the deployment of U.S. personnel skilled in the management of environmental infrastructure systems to work in Eastern Europe and the republics of the former Soviet Union for periods of months or years to train their counterparts on the administration and management of environmental infrastructure districts or companies. This should also be a classic task for the International Center.

To begin these tasks, such an International Center should conduct, on a periodic basis, conferences and other informational meetings for officials from Eastern Europe and the republics of the former Soviet Union on the workings of legal entities in the

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United States, including public authorities, autonomous environmental infrastructure districts, cooperatives and privately owned utilities.

In this regard, it is in the best interest of the United States to support such efforts. Among all the nations of the world, the United States has developed one of the most highly advanced financial systems for the funding of environmental infrastructure projects in terms of its public finance system. The expertise necessary to create and sustain such systems is an extremely valuable commodity which should be exported. It takes legal, organizational, financial, administrative and management skills -- all of which are present in the United States in great abundance -- to create new, user based systems for financing environmental infrastructure. These ultimately renewable natural resources must be developed and exported to Eastern Europe and the republics of the former Soviet Union to assist in the financing of their badly needed environmental infrastructure projects.

CONCLUSION

The United States must demonstrate to the people of Eastern Europe and the republics of the former Soviet Union the effectiveness of the domestic public finance system in the U.S. in financing environmental infrastructure projects. The U.S. must also demonstrate how the domestic market can be transposed to the international capital market so that environmental infrastructure projects in other countries can be financed through similar finance systems which ultimately have access to new foreign domestic capital markets and to the international capital market. The optimum means to accomplish this end is to create and International Center for Environmental Finance at a major university within the United States which is charged with the responsibility of developing programs to train appropriate officials from Eastern Europe and the republics of the former Soviet Union in the organization and administration of subsovereign entities to operate and manage environmental infrastructure systems.