

United States  
Environmental Protection  
Agency

MCD-64  
March 1980

Municipal Environmental  
Research Laboratory

Office of  
Water Program Operations



# **EPA Innovative and Alternative Technology**

## **A New Approach to An Old Problem**

US EPA HQ & Chemical Libraries  
1200 Penn. Ave NW WJC West 3340  
Washington DC 20460



**A new Federal law, the Clean Water Act of 1977, PL-95-217, provides extra dollars for municipalities that adopt innovative or alternative solutions to their municipal wastewater and other waste treatment needs. Special emphasis is on ideas that:**

- Reclaim, reuse water
- Recycle wastewater constituents, i.e., nutrients
- Eliminate surface discharge
- Conserve or recover energy
- Lower total costs

## **What Is The Innovative and Alternative Technology Program?**

**The Innovative and Alternative Technology Program is a new program established by Congress to allow increased grant assistance to qualifying communities for the construction of wastewater treatment facilities. The current program began on October 1, 1978, and continues until the end of September, 1981, unless extended by Congress.**

**The new program is a modification of the normal Federal Construction Grants Program and has several important added features such as:**

- 85% grants for the construction of innovative or alternative municipal treatment technologies instead of the normal 75% grants.
- The 10% grant increase (75% to 85%) will be paid out of a special fund set aside annually from each State's allocation that can only be used for I/A technology. This set-aside fund is 2% for the first two years (FY 79 and 80) and 3% for the third year (FY 81).
- Each year at least 1/2% of the special set-aside fund must be used for innovative technology
- If a new I/A technology fails to meet design goals during the first two years of operation, another grant may be awarded for 100% of the costs of replacing or correcting the failed system. This means the local government and the local taxpayers will not have to pay for new technologies that do not work.

**Who Is Responsible for Implementation of the Program?** The new law says that the Environmental Protection Agency is responsible but that the States also have a major part in managing the Construction Grants Program, including the special I/A provisions. Success of the program will rely heavily on cooperative participation by the consultants and local government at the grass roots level.

**What Will the New I/A Provisions Cost?** The actual amount may vary from year to year, but Congress has set aside 2% of the total Construction Grant funds to be spent in FY 79 and FY 80 and 3% in FY 81 for I/A technology. The set aside amounts to \$100 million in FY 79 and FY 80 and \$150 million in FY 81.

**This is not the whole story. Since the set-aside funds are only used to increase the Federal funding share from 75% to 85%, the set-aside money can be stretched over a**



large number of projects in different communities, giving everyone a better chance to participate in the new program. For example, in FY81, it is estimated that one out of four projects will involve I/A technology funding.

## **What Is Alternative Technology?**

Alternative technologies are proven methods of wastewater treatment that Congress and EPA would like to encourage:

### **Effluent Treatment**

- land treatment
- aquifer recharge
- aquaculture
- silviculture
- direct reuse (non potable)
- horticulture
- revegetation of disturbed land
- containment ponds
- treatment and storage prior to land application
- preapplication treatment

### **Sludge**

- land application
- composting prior to land application
- drying prior to land application

### **Energy Recovery**

- co-disposal of sludge and refuse
- anaerobic digestion with > 90% methane recovery
- self-sustaining incineration

### **Individual and On-Site Systems**

- on-site treatment
- seepage treatment
- alternative collection systems for small communities

These Alternative Technologies automatically qualify for the grant increase. They may also be considered cost-effective even if their total cost is up to 15% greater than other treatment methods because Alternative Technologies have the added benefits of recycling, reclamation, or water and energy conservation.

An Alternative Technology qualifies as an Innovative Technology if it is designed to meet any one of the following criteria

- Save 15% total cost
- Save 20% net primary energy
- Improve operational reliability
- Improve toxics management
- Increase environmental benefit
- Improve joint industrial/municipal treatment potential.

Since at least 1/2% of the 2% or 3% set-aside funds must be spent on Innovative Technology, States should encourage municipalities to examine these improved applications of Alternative Technology that qualify them as Innovative Technology

## **What Is Innovative Technology?**

Innovative Technologies are developed methods of wastewater treatment *not* fully proven under the circumstances of their intended use.

One of the big problems in the past with the design of wastewater treatment works is the "better be safe than sorry" attitude on the part of designers and local and state government decision officials. This has lead to the construction of overly-conservative and often times cost-



ly conventional treatment works. The operation and maintenance costs of conventional treatment systems have also risen sharply during the past five years and cut deeper into local municipal budgets.

The innovative technology program recognizes that if a special effort is made during the planning stages of municipal treatment works, many potential *money-saving* and *energy-saving* techniques could be identified and incorporated into new facilities.

Innovative Technologies can come about as:

- New process and equipment inventions
- Improvement and modification of old or known processes
- New or unique combinations of known processes and techniques
- Greater integration and use of natural processes
- Maximum use of physical surroundings and environmental conditions

In addition to new or improved applications of Alternative Technology, technologies that originate as conventional forms of treatment, but contain elements of increased risk and benefit, may qualify as innovative if they:

- Save 15% total cost or
- Save 20% net primary energy

Over the most cost-effective non-innovative alternative.

The purpose of the three-year trial period is to convince designers and local authorities that the cost, energy, and other benefits of innovative approaches outweigh the slightly increased risk.

Both Congress and EPA recognized that there might be a reluctance on the part of designers and municipal governments to take a chance on unproven Innovative Technologies.

This concern has given rise to the *100% payback provision* of the new law. If an Innovative or Alternative Technology fails to meet design goals within the first two years of operation, the Federal Government will pay 100% of the cost of replacing or correcting the failed system.

With this provision, a municipality is protected — if it makes sure its consultant thoroughly investigates Innovative Technology as part of the facility planning process.

## **Why Are Cost and Energy Important?**

**Cost** — The Environmental Protection Agency recognizes its obligation to cost-effectiveness in the overall management and expenditure of the \$5 billion per year Construction Grants Program. A fundamental operating principle of the Program is the maintenance of the highest standards in achieving the Congressional and Agency goal of increased cost-effectiveness in the construction of publicly-owned treatment works.

In addition to the capital cost associated with the construction of wastewater treatment facilities, the local



communities must bear the cost of operating the facility. This cost over the life of the facility can equal and sometimes exceed the capital investment. The local share of capital and operating costs of collection and treatment facilities for small rural communities can often exceed \$300 per user per year, which is disproportionately high and unaffordable.

For I/A technology projects, the Agency has taken a very positive step forward in providing the economic incentive of a 10% grant increase for Innovative Technologies that save a minimum of 15% over the total cost of the most cost-effective, non-innovative alternative.

**Energy** — Both the Clean Water Act and its legislative history emphasize energy *conservation* and energy *recycling* in the construction and operation of wastewater treatment works.

Conservation of energy is doubly important, first because it conserves an unrennewable resource, and second because it lowers operating costs. EPA set a specific achievable goal of *20% net primary energy reduction* as a criterion for eligibility as Innovative Technology in the I/A regulations.

Early experiences with the program show a strong interest in the incorporation of energy-saving concepts such as alternative energy sources in the design of wastewater treatment works. Proposed concepts include:

- Energy conservation measures
- Energy recovery systems
- Use of solar energy
- Use of geo-thermal sources.

## **How Does the I/A Program Work?**

All municipalities in the U.S. that can apply for a normal 75% Federal Construction Grant to construct improved wastewater treatment works may also be eligible for an I/A (85%) grant.

The normal Construction Grant Program operates in three steps:

- *Step 1* - Evaluation of alternative solutions and preparation of a preliminary plan called a facilities plan
- *Step 2* - Preparation of a detailed plan and specifications for actual construction
- *Step 3* - Construction of the approved wastewater treatment works.

Since the Congress and EPA want to encourage innovative and alternative solutions, all Step 1 plans initiated after September 30, 1978 *must* consider innovative and alternative solutions.

The consulting engineers and local governments must carefully analyze the local problems and propose innovative and alternative solutions. The plans they develop are reviewed by the State and Federal authorities to see if the solutions are cost-effective and meet qualifying criteria.



**Are There Any Strings Attached to the Increased Grant Funding for Innovative and Alternative Projects?** Both EPA and Congress feel strongly that the new program *must not delay* the normal progress of the Construction Grants Program in meeting the national goals.

Alternative Technologies that meet the stated goals of increased recycling, reclamation, reuse, and energy recovery are *automatically* eligible for the grant increase if their cost is no more than 15% greater than the cost of other treatment methods that do not recycle, reclaim or save energy. These applications can be processed with no substantial delay or additional requirements.

Innovative technology applications require an additional evaluation in accordance with legislative and regulatory mandates. EPA has initiated specific actions to accelerate and streamline the preparation and evaluation of innovative applications which include:

- Preparation of a comprehensive I/A Technology Assessment Manual.
- Formation of an I/A Technology Clearinghouse.
- Formation of a special Technical Support Group to assist State and Regional Offices in processing I/A applications.

Since applications for the I/A set-aside funds will normally be considered on a first-come, first serve basis, it is important for municipalities and local citizens to get involved early.

## **What Can I Do?**

As a vital part of the CWA of 1977, EPA has developed specific programs to encourage public participation. There are also a number of actions that can and should be undertaken by those concerned with seeing that their community fully benefits from the new I/A Technology Program.

- Identify and meet with local community officials.
- Find out what wastewater treatment facilities are being constructed.
- Learn the identity of the design engineer.
  - Is the designer a specialist in wastewater treatment technology?
  - Has the designer had previous experience with innovative or alternative technologies?
  - Has the designer explained the important questions of total and local costs to the affected persons?
- Compare the proposed cost of the recommended solution to those of other similar communities.

**Where and How Can I Find Out More About I/A Technology?** The National I/A Program is being managed, along with the normal Construction Grant Program, by the ten EPA Regional Offices and by the State agencies that have been delegated authority. Each EPA Regional Office has designated an I/A technology coordinator who can provide further information.



**REGIONAL I/A COORDINATORS**

<b>Region</b>	<b>Name</b>	<b>Phone</b>
<b>I</b>	<b>Natalie Taub</b> JFK Federal Building, Room 2203 Boston, Massachusetts 02203 Water Division Director Lester Sutton	<b>617-223-5604</b>
<b>II</b>	<b>George McCann</b> 26 Federal Plaza, Room 1009 New York, New York 10007 Water Division Director Conrad Simon	<b>212-264-9596</b>
<b>III</b>	<b>James Hagan</b> Curtis Building 6th & Walnut Streets Philadelphia, Pennsylvania 19106 Water Division Director Greene Jones	<b>215-597-9131</b>
<b>IV</b>	<b>George White</b> 345 Courtland Street, NE Atlanta, Georgia 30308 Water Division Director Paul Traina	<b>404-881-2056</b>
<b>V</b>	<b>Steve Poloncsik</b> 230 South Dearborn Street Chicago, Illinois 60604 Water Division Director Charles Sutlin	<b>312-353-2314</b>
<b>VI</b>	<b>Ancil Jones</b> First International Building 1201 Elm Street Dallas, Texas 75270 Water Division Director (Acting) Earl Karl	<b>214-729-2845</b>
<b>VII</b>	<b>Lynn Harrington</b> 324 East 11th Street Kansas City, Missouri 64106 Water Division Director Earl Stephenson	<b>816-758-2725</b>
<b>VIII</b>	<b>Stan Smith</b> 1860 Lincoln Street Denver, Colorado 80203 Water Division Director David Standley	<b>303-327-2735</b>
<b>IX</b>	<b>Irving Terzich</b> 215 Fremont Street San Francisco, California 94105 Water Division Director Frank Covington	<b>415-556-8316</b>
<b>X</b>	<b>Carl Nadler</b> 1200 Sixth Avenue Seattle, Washington 98101 Water Division Director Robert Burd	<b>206-399-1266</b>