

ACKNOWLEDGMENTS

This document, *Financing Environmental Compliance and Enforcement Programs*, is one of six Environmental Compliance and Enforcement Capacity Building Technical Resource Documents that are being developed to support the Fourth International Conference on Environmental Compliance and Enforcement to be held in Chiang Mai, Thailand, April 22-26, 1996. These documents have been developed as resource documents to be used by government officials and others with responsibility for developing environmental compliance and enforcement programs. The six Technical Resource Documents include:

- 1) Organization of Environmental Enforcement Programs.
- 2) Financing Environmental Compliance and Enforcement Programs.
- 3) International Comparison of Source Self-Monitoring, Reporting, and Recordkeeping Requirements.
- 4) Multimedia Inspection Protocols.
- 5) Communications Strategies for Enforcement Programs.
- 6) Enforcement Issues Related to Transboundary Shipments of Hazardous Waste, CFCs, and Pesticides.

Consistent with the goals of the Fourth Conference, its international sponsors, and the Executive Planning Committee to build capacity internationally for environmental compliance and enforcement, *Financing Environmental Compliance and Enforcement Programs* provides an overview of the required resources and associated costs of compliance and enforcement programs, introduces budgeting concepts necessary for effective program management, and discusses potential funding sources applicable to the implementation of compliance and enforcement program activities. The document also offers numerous examples of the use of specific funding mechanisms worldwide.

Working under the direction of Dr. Kenneth Rubin, President, Ms. Tamar Henkin, Ms. Jennifer Bing, and Ms. Karin DeMoors, staff of Apogee Research, Inc., were principal authors of this document. Apogee Research staff prepared this document under Environmental Law Institute Contract 9423B. Technical direction was provided by Ms. Cheryl Wasserman of the Office of Enforcement and Compliance, U.S. Environmental Protection Agency, and Mr. Jo Gerardu of the Inspectorate for the Environment, Ministry of Housing, Spatial Planning and the Environment (VROM), in cooperation with the conference sponsors and Executive Planning Committee members.

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1 INTRODUCTION

Compliance and enforcement programs are integral components of environmental management strategies established to prevent or control pollution. Such environmental strategies usually contain legal requirements that must be met by members of the regulated community responsible for causing pollution. Compliance is the full implementation of environmental requirements resulting in the achievement of desired changes in behavior. Enforcement is the range of approaches governments or others take to compel or encourage compliance within the regulated community and to correct or halt situations that endanger the environment or public health. Compliance and enforcement program activities include:

- Inspections to determine compliance status;
- Negotiations with those who are out of compliance to develop plans and schedules for achieving compliance;
- Legal actions to compel compliance, where necessary; and
- Compliance promotion to encourage voluntary compliance.

As compliance and enforcement programs are newly implemented by some countries and vastly expanded by others, funding for new program activities becomes critical. Countries must work to both carefully plan, or budget, for their new and enhanced programs and to make financial resources available — either through development of new funding mechanisms or expansion of existing mechanisms.

1.1 Purpose and Scope of Document

This Capacity Building Technical Resource Document, prepared for the Fourth International Conference on Environmental Compliance and Enforcement, has two primary objectives. First, it provides guidance on budgeting and financing methods that can be used to maximize resources available for environmental compliance and enforcement programs. The scope of the document is intentionally broad since any number of financing mechanisms may be applicable for a given country or sub-national government. Second, through illustrative examples, the document describes how compliance and enforcement programs are generally financed throughout the world. Country-specific examples illustrate the use of various funding mechanisms and budgeting techniques. These examples are not meant to be an all-inclusive catalogue of the use of specific mechanisms, but instead represent the results of a comprehensive literature review and discussions with individuals involved with environmental compliance and enforcement programs worldwide.

This financing technical resource document was designed specifically for use by government officials and individuals associated with non-governmental organizations directly responsible for the design and management of environmental compliance and enforcement programs. The document also will be invaluable to others interested in how different budgeting approaches and funding mechanisms can be used to further both the development and implementation of compliance and enforcement programs.

The process of budgeting for compliance and enforcement programs — that is assessing funding needs and designating sources of funding to meet those needs — and the process of identifying and securing funding

should be addressed in a coordinated manner. As program goals and objectives are established, preliminary budgets can be developed. These budgets often must be revised, however, based on the ability to secure necessary funding. As such, the budgeting and financing steps create an iterative process that also is closely linked to overall program development. While many texts would address budgeting issues first and then tackle issues related to obtaining funding, given the importance of first understanding the full range and scope of funding opportunities and overcoming the perception that there are not enough good options, this document addresses potential funding options first (Chapter 2) and then discusses approaches to budgeting for environmental compliance and enforcement programs (Chapters 3 and 4).

1.2 Document Overview

This section provides a road map and overview of the remainder of the technical resource document. The document is made up of three technical chapters and two substantive appendices, in addition to this introductory chapter. A brief overview of each chapter follows.

1.2.1 General Concepts and Funding Mechanisms

Fundamental concepts related to the identification of alternative sources of funding for compliance and enforcement programs are provided in Chapter 2. This chapter first describes funding available from general revenue and special revenue sources and introduces common considerations regarding the application of general and special taxes. The chapter then introduces economic principles that relate to the question of who should pay for pollution control and highlights the role of cost recovery in designing program finance approaches.

Following the introduction of basic funding concepts, Chapter 2 provides a general overview of funding mechanisms relevant to the financing of compliance and enforcement programs. It presents eight broad funding mechanism categories and discusses the applicability of each broad category to compliance and enforcement programs. This section also includes a brief analysis of the applicability of specific mechanisms to operating and capital costs and introduces general evaluative criteria to consider when analyzing funding options for compliance and enforcement programs.

Chapter 2 concludes with a description of how different institutional mechanisms can be used to secure funding for compliance and enforcement programs. Such mechanisms include:

- General fund mechanisms and accounts.
- Dedicated fund mechanisms and accounts.
- Fund transfers between levels of government.
- Public authority mechanisms.
- Bilateral or multilateral mechanisms.

Table 1-1 highlights examples of institutional mechanisms employed by various countries and notes where these examples can be found in Chapter 2.

Table 1-1. Institutional Mechanisms Employed: Country Examples

	General Fund Mechanisms	Dedicated Mechanisms	Funds Transfer
Public Authorities	Bilateral/ Multilateral Mechanisms		
France	2-16		2-20
Germany	2-16		
Hungary	2-17		
Italy		2-19	
Lithuania	2-16		
Mexico			2-21
Nepal	2-17		
The Netherlands	2-16		
Nigeria	2-17	2-19	
Philippines	2-18		
Poland	2-16,17		
Russia	2-17	2-19	
Thailand	2-18		
United States	2-16,17	2-16	2-19 2-20

1.2.2 Specific Funding Mechanisms

Building on the introductory discussion of alternative funding mechanisms presented in Chapter 2, this document provides an inventory of funding mechanisms, including an analysis of each mechanism's general advantages and limitations (see Appendix A). Appendix A also contains numerous examples of the application of each funding mechanism from countries worldwide (see Table 1-2 for an index of country-specific examples). Neither Table 1-2 nor the examples presented in Appendix A should be taken as a comprehensive list of which countries apply particular mechanisms, but rather as illustrative examples of the use of various mechanisms.

Table 1-2. Funding Mechanisms Employed: Country Examples

Mechanisms	Taxes	Fees	Fines	Loans/Debt	Grants	V o l u n t a r y
	Public/Private Partnerships					
AFRICA & MIDDLE EAST						
Burkina-Faso				A-39	A-46	
Egypt					A-46	
Ghana				A-39	A-46	
Israel	A-11, 13	A-19, 33				
Mauritius				A-39	A-46	
Morocco					A-46	
Nigeria				A-39	A-46	
South Africa	A-2	A-19, 24, 34		A-38		A-52
Tunisia					A-46	
ASIA						
Australia	A-15	A-34		A-42		
China		A-27, 28		A-40, 42		
Hong Kong		A-19	A-36			
India	A-9	A-30				
Indonesia	A-13					
Japan	A-17					
Malaysia		A-30				
Nepal		A-26				
New Zealand		A-21, 23	A-37			
Pakistan					A-46	
Philippines		A-21	A-37	A-40, 41, 44	A-47	
Singapore		A-32				
South Korea		A-19	A-38	A-44	A-48	
Taiwan		A-32	A-38			
Thailand	A-11	A-19	A-38	A-42	A-48	
Vietnam	A-13					
EUROPE						
Albania		A-26				
Austria	A-8, 15				A-46, 48	
Belgium	A-15	A-34				
Czech Republic		A-29	A-36			
Denmark	A-8, 10, 16, 17		A-18, 21			
Estonia	A-13	A-29				
Finland	A-8, 9, 11, 15					
France	A-11	A-29		A-44		A-51
Germany	A-10, 11	A-29		A-44		
Great Britain	A-17	A-34			A-48	
Greece	p. A-11					
Hungary		A-19	A-36		A-48	
Ireland	A-17	A-34				
Italy	A-11, 16					
Lithuania	A-13	A-30	A-37			
The Netherlands		A-21, 31				
Norway	A-8, 9, 11					
Poland	A-13	A-26, 31	A-37		A-47, 48	
Portugal	A-15					

Romania				A-48		
Russia		A-31				A-52
Spain				A-44		
Sweden	A-2, 3, 8, 11, 16, 17			A-38	A-44	
NORTH AMERICA						
Canada	A-16	A-21, 23				
Mexico			A-37	A-40, 44		A-52
United States	A-2, 3, 4, 5, 7, 8, 9, 11, 13, 14, 15			A-20, 23, 24, 25, 26, 32, 33, 35		A-38 A-41, 45 A-48
	A-49, 50	A-52				
SOUTH AMERICA						
Argentina		A-18, 20	A-36	A-39	A-46	
Brazil	A-2, 3, 4, 5, 9		A-18, 20, 21, 26, 28	A-36	A-40	
Chile	A-2, 3, 4, 5, 9		A-18, 20	A-36	A-40	
Colombia			A-36			
Uruguay	A-2	A-26		A-40	A-47	A-49

1.2.3 Budgeting for Environmental Compliance and Enforcement

Chapter 3 provides information on how to assess the financial resources that are required to operate compliance and enforcement programs and introduces approaches to developing budgets for these programs. This chapter outlines ongoing activities for compliance and enforcement programs, including both operating or programmatic costs and capital costs. Operating costs generally include:

- Personnel, including training.
- Office supplies and publications.
- Laboratory materials and chemicals.
- Vehicle/fleet maintenance.
- Maintenance for computers, laboratories, and publication equipment.
- Field sampling material.
- Funds for contractor support.

Capital costs include significant one-time expenditures that have useful lives of at least one year. Examples include:

- Central and regional laboratories.
- Office space.
- Computers.
- Vehicles.
- Other miscellaneous items.

There are distinct processes to conduct budgeting for operating costs and capital costs. These budgeting processes result in an annual operating budget and a separate capital budget, which is often a multi-year planning document. While the operating budget process is widely applicable to all countries with compliance and enforcement programs, the capital budgeting process may be of significant interest to countries which are either in the process of developing a new compliance and enforcement program, or wish to implement large-scale improvements to their existing programs. Chapter 3 provides a real-life example of a combined operating and capital budget.

1.2.4 Measures to Minimize Financing Demands

Following the discussion of general budgeting approaches in Chapter 3, Chapter 4 addresses approaches to minimize the financial demands of compliance and enforcement programs, including:

- Allocating existing resources efficiently.
- Utilizing staff among various government agencies effectively.
- Providing for the technical training of staff necessary for compliance and enforcement programs.
- Offering economic incentives to the regulated community supplementing the efforts of traditional regulatory programs.

Together, these approaches help minimize the financial resources needed to run an effective compliance and enforcement program and thus bridge the gap between funding currently available and total resources needed to meet program objectives fully.

Table 1-3 summarizes examples of the use of economic incentives by various countries that are provided as illustrative examples in Chapter 4.

Table 1-3. Economic Incentives: Country Examples

	Tradable Permits	Subsidies	Deposit-Refund Systems	Industry
	Self-Compliance Monitoring and Reporting			
Austria		4-8		
Canada		4-7		
Czech Republic	4-4			
Finland			4-9	
France		4-6		
Germany		4-7		
India		4-6		
Indonesia		4-6		
Japan		4-7		
The Netherlands		4-6	4-9	
Philippines	4-4		4-9	
Sri Lanka		4-7		
Sweden				4-10
Taiwan		4-5,6	4-8	
United States	4-4	4-8	4-8	4-10

1.2.5 Sources of Additional Information

Following the document text, two appendices offer additional information. As described earlier, Appendix A provides an inventory of individual funding mechanisms that can be implemented to secure funding for compliance and enforcement programs, as well as numerous country-specific examples of where these mechanisms have been employed. Appendix B provides a targeted list of reference sources for additional information on the general concepts presented in this technical resource document. The nature of the resource document limits the depth to which each issue is addressed. Therefore, as compliance and enforcement program managers move to incorporate the budgeting and financing approaches presented here into their environmental management programs, they will undoubtedly wish additional detail on many of the elements introduced.

2 FUNDING MECHANISMS

The vast majority of compliance and enforcement programs have historically been funded by a combination of own-source general revenues and intergovernmental and foreign grants. However, as programs develop and the competition for traditional funding sources increases, new, more innovative, approaches are required to maintain and expand traditionally limited programs. This chapter introduces funding mechanisms that may be adapted to environmental compliance and enforcement program funding and discusses general concepts related to the selection of funding mechanisms. This chapter also discusses institutional approaches or mechanisms that can be employed to help secure program funding (also see Appendix A for an in-depth inventory of specific mechanisms and country-specific examples of their use).

2.1 Program Funding: General Concepts

To meet the goals and objectives of compliance and enforcement programs, it is important to understand how to obtain program funding from both traditional funding sources, such as general revenues, and from more innovative mechanisms, such as special taxes and user charges. This section introduces fundamental concepts related to identifying alternative sources of funding for compliance and enforcement programs. It also describes economic principles that relate to the question of who should pay for pollution control.

2.1.1 Cost Recovery

Program managers are encouraged to consider cost recovery as an objective in designing new program funding mechanisms. Since user fees and charges are implemented primarily for revenue raising purposes, are not designed as incentives, and often go directly into a designated fund, they exhibit a high degree of cost recovery. A good example of where cost recovery objectives were integrated into the preliminary design of an environmental program is the United States' implementation of the Clean Air Act Amendments of 1990. This legislation called for recovery of all costs related to the permitting and regulation of stationary sources of air pollution. States were granted flexibility in structuring their cost recovery programs, with the default approach being an emissions-based fee assessed on all emissions above pre-established thresholds. Enactment of this new law resulted in all state air quality programs implementing new fee programs or revising existing programs to meet the requirements of the federal law.

2.1.2 Economic Principles

Given the potential role of special dedicated revenue sources to augment funds available from traditional general revenue sources, techniques to develop appropriate special revenue mechanisms have an increasing importance in compliance and enforcement program development. Such techniques have their grounding in several key economic principles that relate to the question of who should pay for environmental improvements and pollution control.

This section describes the economic theory behind the polluter and beneficiary pays principles and their role in developing special revenue sources. This section also provides a brief description of mechanisms that encompass these principles. Additional examples of the application of both these principles can be found in Appendix A to this document.

Polluter Pays Principle

The origins of the polluter pays principle can be traced to the welfare economic ideas expressed by Pigou from as early as the 1920's, which state that prices of goods and services should reflect the full social costs, including the environmental costs as related to pollution, resource exploitation and other forms of environmental degradation. The polluter pays principle views the polluter as the primary accountable agent, but the principle does allow polluters to pass on their environmental costs to their customers to the extent feasible.

Because of the growing severity of pollution in industrialized countries, the polluter pays principle was adopted by the Organization for Economic Co-Operation and Development as a background economic principle for environmental policy. The principle, as then adopted, implies that the polluter should bear the cost of pollution reduction measures necessary to bring the environment to an "acceptable state" as defined by public authorities. The recommendations adopted in 1974 specify that member countries should not assist polluters in bearing pollution reduction costs, with some exceptions for industries where the polluter pays principle would create severe difficulties. As a general rule, subsidies for environmental protection are not in conformity with the polluter pays principle.

Polluter Pays Mechanisms

There are a wide range of mechanisms that build on the polluter pays principle. Fines and penalties, for example, are methods that are directly linked to the violations of environmental regulations, and thereby exhibit the polluter pays principle. The costs recovered through fines and penalties include those associated with damage to human health or cleaning up the environment, plus the costs incurred directly by the regulatory agency to conduct the enforcement response. Fines and penalties can be punitive in structure in order to serve as a deterrent to current and potential violators. Targeted special taxes, such as taxes on hazardous waste generation or resource consumption, provide other examples of the polluter pays mechanism, where those who are responsible or most likely to contribute to pollution must pay more than others (see Appendix A for specific examples of funding mechanisms).

Beneficiary Pays Principle

According to the beneficiary pays principle, those who benefit from a cleaner environment should pay for this benefit. Likewise, those who gain more than others from pollution prevention or other public goods should pay more for such services.

The beneficiary pays principle is generally considered to be a second best alternative to implementation of the polluter pays principle and appropriate in more limited circumstances. The beneficiary pays principle is most applicable when an individual polluter or group of polluters cannot be identified or where such individuals do not have the necessary resources to fund needed environmental improvements. At the same time, application of the beneficiary pays principle requires that program managers are able to identify a particular beneficiary or group of beneficiaries who have adequate financial resources to help pay for necessary environmental improvements.

Beneficiary Pays Mechanisms

Special taxes and user fees can both be structured to incorporate the beneficiary pays principle. Examples of mechanisms that encompass the principle include recreational fees for the use of specific waterbodies or parks and special tax assessments imposed on property owners who will benefit most from an environmental improvement such as a lake clean-up project. If beneficiaries are defined broadly as the general public, then general taxes that are paid by the public also encompass the beneficiary pays principle (see Appendix A for more specific examples).

2.1.3 Distinction Between Taxes and Fees

Theoretically, there is a distinction between special taxes and user fees. Taxes, according to a narrow definition, have revenue raising objectives for the public budget, whereas user fees are intended to cover the costs associated with providing a service or as sources of dedicated funding. Taxes also differ from user charges in that they are usually intended to alter the behavior of producers and consumers, much like regulatory instruments. Special taxes can be levied on both products and processes with the ultimate goal of shifting production or consumption away from a product or practice toward a more environmentally friendly product or practice. Unlike taxes, because user fees are payments made in exchange for a good or service rendered and are generally set in proportion to the cost of the good or service, they are generally not intended to function as incentives.

In reality, the distinction between taxes and charges is sometimes difficult to make and the terms user charges, environmental charges, and environmental taxes often are used interchangeably. Moreover, local laws sometimes make legal distinctions between taxes and fees and dictate allowable applications for each.

2.2 Overview of Funding Mechanisms

For the purposes of this document, funding mechanisms are defined as any techniques that can potentially be used to raise funds for environmental compliance and enforcement programs, facilities, or services. Funding mechanisms fall into one of eight broad categories:

- 1) General Taxes.
- 2) Special Taxes.
- 3) User Fees and Charges.
- 4) Fines and Penalties.
- 5) Loans/and Other Debt Instruments.

- 6) Grants.
- 7) Voluntary Mechanisms.
- 8) Public-Private Partnerships.

This section describes each broad category and discusses general advantages and limitations of each. As noted earlier, specific mechanisms are described in detail in Appendix A.

2.2.1 General Taxes

Governments generally rely on taxes as the ultimate source of funding for government service delivery and collect most of their own-source revenue from taxes on income, sales, or property. General revenues are a common source of funding for environmental compliance and enforcement programs. Central governments also collect user fee and charge revenue and other miscellaneous revenue, although the amount collected in general taxes is usually much greater. Increased funding for such programs from general revenues, however, necessitates tax increases or reductions in spending for other government programs.

Most general taxes are charged against either personal or corporate income, property, or sales of a commodity. Income taxes are charged on a percent of the money earned by an individual or corporation. Property taxes are based on a percentage of the value of the property owned. Commodity taxes, or sales and use taxes, are charged as a percentage of the commodity's value, or at a flat rate per transaction.

The primary advantage that taxes have over fees is that they typically have a broader revenue base, and, therefore, can generate high revenues at relatively low rates. In addition, assessing charges to the general public can foster a shared sense of responsibility for the environment. Sub-national governments also are often able to pass "piggy-back" taxes on existing taxes imposed at a higher government level to generate additional revenue without substantial administrative cost.

Revenues from taxes, however, are still dependent upon the base — income, property, or commodity value — on which they are levied. Also, unless the tax is targeted to a particular type of property or income, there is only an indirect relationship between the tax base and the use of funds. Given this indirect relationship and public opposition associated with new taxes, passage of new or increased general taxes is often difficult.

2.2.2 Special Taxes

In addition to general taxes, more and more countries are turning to a variety of special taxes to fund their compliance and enforcement program activities. Through special taxes, those most responsible for pollution can be targeted to fund the related regulatory programs.

Special taxes include those taxes that are not applied to the general public as a whole. Instead, they are imposed upon the regulated community and, in the case of compliance and enforcement programs, relate specifically to environmental protection. These include selective sales taxes that are imposed on the sale of a particular product or service or severance or natural resource extraction taxes charged on selected commodities at the point of extraction rather than point of sale.

Special taxes can be assessed as a graduated tax on the revenues of the regulated community. The more productive or profitable companies would therefore pay a higher portion of the costs. It also is possible to tax raw or processed materials that contribute to the need for environmental regulation. An example would be a tax on petroleum products. Alternatively, special taxes can be applied to stages of production. This would tax the processing of raw materials or manufacturing of items that contribute to environmental pollution. Specific operations of the regulated community also can be taxed, such as transportation and disposal of waste. Finally, the products produced by the regulated community can be taxed before they are sold to consumers (see Appendix A for specific examples of special taxes).

Special taxes can more easily be dedicated to a particular program than general taxes. Since the tax is targeted to a particular type of property or income, there is a direct relationship between the tax base and the use of funds. As a result, special taxes often are easier to administer than general taxes.

However, the tax base for special taxes is much narrower than that of general taxes. Therefore, a higher rate must be charged to generate the same amount of revenue. Special taxes also may have a negative impact on the market for the product or service singled out for taxation, thereby reducing potential revenues. This impact can take several forms:

- The producer of the service or product can increase prices, passing along to the consumer the cost of the tax. This could result in reduced competitiveness for those affected by the tax and reduced profitability.
- The consumer may choose to reduce their use of the taxed item. This would reduce the tax revenue, but in some instances also would reduce the pollution caused by production of the taxed item.
- The producer may absorb the cost of the tax, rather than increase prices. However, if the tax burden is too high some producers may go out of business or stop selling the product, which also would reduce potential tax revenues and possibly overall pollution caused by production of the taxed item.

If too severe, these economic effects can weaken a country's ability to attract foreign or domestic investment in private industry. Therefore, it is important to be aware of comparable taxes imposed by other countries.

2.2.3 User Fees and Charges

As with special taxes, countries are moving toward a greater dependence on innovative charges and fees to fund their compliance and enforcement program activities. Often, the revenues from these charges are specifically dedicated to program operations or to the provision of subsidies to the regulated community and, thus, directly returned to those who provided the revenue.

A user fee is generally a charge for services rendered. Fees establish direct links between the demand for services and the cost of providing them. User fees are either charged for provision of a service or on the environmental impact of an action. These are referred to as *fees applied on a fee-for-service basis* and *fees applied on a quantified impact basis*, respectively. As applied to compliance and enforcement programs, user fees are designed to cover the regulatory agency's costs for:

- Permitting the operation of a facility.
- Conducting inspections to identify violations or ensure compliance.
- Conducting other compliance or enforcement activities related to a specific facility.

Well-structured fees can be an equitable means of matching program costs to program beneficiaries, or assigning cleanup costs to parties responsible for the original pollution. In contrast to a tax on the general public, user fees reflect more directly the principle that the polluter should pay for measures that ensure the protection of human health and the environment from risks resulting from environmental damage. Additionally, fees often can be set administratively, requiring no legislative action to impose the fee.

However, since they are targeted to a particular service or group, fees have a narrower revenue base than most taxes. In fact, there are sometimes legal restrictions limiting fee levels to the costs of providing the service. In addition, if no opportunities exist to reduce the payment of user fees, the regulated community has few incentives to prevent or control pollution.

It is sometimes argued that fixed user fees do not allow the flexibility that the regulated community needs to afford the cost of pollution control while promoting industrial development and economic stability. To address potential conflicts between pollution control and economic development, the regulatory agency can take several measures. The agency can consult with the regulated community to assure them that the costs are not excessive. The agency also may bill a facility directly for permitting and inspection activities, rather than apply a fixed fee that may not reflect actual costs accurately. Last, the regulatory agency may choose to establish categories that differentiate regulated facilities by levels of revenue, extent of contribution to environmental pollution, or investment in pollution prevention and control technologies. These categories would allow adjustment of fees so that smaller facilities bear a smaller burden, facilities that pollute more pay more, or relief is provided for efforts to reduce pollution.

2.2.4 Fines and Penalties

Fines and penalties have long been an important component of compliance and enforcement programs throughout the world. In most countries, fines and penalties play a dual role. First, they are meant to serve as a deterrent to non-compliance. Second, they are sometimes a very significant source of revenue for program operation or special projects.

Fines and penalties require offenders to pay monetary damages for violating government laws or regulations. Funds collected are often used to cover costs directly related to violations of environmental regulations. The costs may be both those caused to human health or the environment and the costs incurred directly by the regulatory agency to conduct the response. Alternatively, the recovery may not be of full costs but, instead, may simply be set to serve as a deterrent.

Depending on the nature of the fine, fine and penalty revenue can be a large funding source suitable for financing capital costs or setting up trust funds for future costs. If structured correctly, the fines and penalties also will provide incentives to change polluting behavior.

Unfortunately, revenues generated by fines and penalties are unpredictable. Therefore, it is inappropriate for regulatory agencies to rely too heavily on fines for ongoing program expenditures. It also is possible that the government may not dedicate fines to a particular program, but instead might direct them to general funds.

Enforcement programs that do dedicate fines to their continued operation are sometimes criticized for a conflict of interest. It is commonly argued that the objective of fines and penalties should be to increase compliance not to raise program supporting revenues. It has been argued that programs that rely on fine revenues for operation may have incentives to take enforcement actions solely for the purpose of raising revenue and thus may be tempted to increase enforcement actions when other funding falls short of targets.

2.2.5 Loans and Other Debt Instruments

Both newly implemented compliance and enforcement programs and programs implementing programmatic expansions or significant equipment replacement programs require substantial funding for long-term capital investments. Such investments are best financed through long-term financing mechanisms, such as government and commercial loans and debt.

Loans

A loan is money provided by a lending institution or individual that must be repaid in a set amount of time at a negotiated interest rate. Loan programs typically provide capital at subsidized or market rates for projects that meet specific eligibility criteria. Loans can be granted by state or national governments to local governments or they can be provided by commercial financial institutions. Multilateral and bilateral organizations also are common sources of loans to finance environmental compliance projects. These organizations are generally either multinational banks or foreign governments.

The primary advantage of loan programs is that they sometimes provide loans at lower interest rates than available for bond financing on the capital markets. In addition, arranging a loan may be a quicker means of acquiring capital than issuing bonds, and involves lower transaction costs. Multilateral and bilateral sources are especially advantageous to developing countries that lack resources needed for environmental projects. By making loans for portions of a project, for example, they enhance the credit-worthiness of projects and thus make them more attractive to international investors.

The limitations of subsidized loan programs include the possibility of significant competition and difficulty meeting criteria for low interest rate loans. Also, commercial loan programs will often carry higher interest rates than most governments can command for bond issues.

Other Debt Instruments

Other debt instruments include a variety of types of bond issues. A bond is a certificate of indebtedness issued by a borrower to a lender. Bonds usually take the form of securities issued by governments, local authorities, or companies and come in many forms (e.g., fixed or variable rates of interest, redeemable or irredeemable, short- or long-term, secured or unsecured). In each case, however, the borrower repays a specific sum of money plus the face value or par value of the bond.

Bonds are a good way to raise capital when a long time period is needed to spread out repayment. Bonds also are a viable alternative when loan and grant programs are too competitive or too limited in the availability of capital. However, there are often limits on the amount of outstanding debt a national or sub-national government can sustain. Where a mechanism does exist for issuing debt, voter approval may be required for certain bond issues, making the process both time consuming and politically difficult.

It should be noted that loans and bonds are mechanisms that merely spread out the costs of a project; they do not generate revenues. The advantage of loans and debt issuance is that large sums of revenue do not need to be generated upfront by the government. However, an ultimate revenue source must be identified to repay the lender or bondholder.

2.2.6 Grants

Newly implemented compliance and enforcement programs of developing countries rely most heavily on international funding organizations for start-up funds. These organizations often provide incentive grants that are meant to encourage program development, but are generally not intended to be long-term sources of program funding.

A grant is a sum of money generally awarded to governments or non-profit organizations. Typically, grants are awarded by the national government to the state or local governments, or by state or provincial governments to local governments, for the purpose of financing a particular activity or facility. Grants also are provided by multilateral organizations to individual governments.

The primary advantage of grants is that the receiving country or sub-national government does not have to use their own resources to pay the costs that the grant covers. However, applying for grants can be costly and time consuming. Due to the intense competition for a limited pool of funds, governments may find it difficult to acquire grant funding for projects. In addition, due to eligibility limitations, only a percentage of the total project costs may be eligible for project assistance. Some grant programs also specify that the grantee must provide a share of the funds (a matching grant). Even if funding is approved, the grantee may need to seek short-term debt instruments to cover cash shortages while awaiting the arrival of grant funds.

2.2.7 Voluntary Mechanisms

Voluntary mechanisms play a fairly limited role in the funding of compliance and enforcement programs. They do, however, often have a side benefit of encouraging broad participation in and knowledge of environmental programs.

Voluntary mechanisms include the acquisition of private donations and the voluntary purchase of affinity products. Affinity products are items sold by a government, such as license plates, stamps, and decals, that are closely related or associated with the environmental program for which they are raising funds.

The primary advantages of voluntary mechanisms are that they encounter little or no public opposition and simultaneously raise public awareness of environmental programs. However, both donations and the purchase of affinity items will fluctuate with the economy, making them a relatively unstable revenue source. Also, some voluntary mechanisms require substantial funds for start-up costs.

2.2.8 Public-Private Partnerships

While they do not generate revenues directly, public-private partnerships can play a large role in compliance and enforcement program activities. Through public-private partnership arrangements, the burden on government of both implementation and funding of compliance and enforcement related activities can be lessened.

Public-private partnership arrangements generally involve private participation in the design, financing, construction, ownership, and/or operation of a public purpose facility or private provision of a service that is traditionally provided by the public sector. For example, compliance and enforcement program activities that lend themselves to private participation include, but are not limited to:

- Operation of scientific laboratories.
- Completion of field sampling and on-site inspections.
- Preliminary drafting of site-specific permits.

Care should be taken, however, in delegating any law enforcement related functions to outside parties.

Public-private partnerships enable each party to do what it does best and can result in a “win-win” solution to providing public services. Depending on the nature of the arrangement, a public-private partnership may be able to capitalize on a number of private sector resources. These advantages are:

- Reduction in the burden of public debt, if private financing is used.
- Possible efficiency savings, with private sector operation.
- Provision of services that may be unavailable to the public sector and of higher quality, with private sector specialized expertise.
- A shorter implementation time, with private sector operations.

There are a number of concerns regarding private participation, however. The primary concerns of governments who turn over services or facility operation and/or ownership to a private partner is loss of public control over:

- Compliance with all relevant standards.
- Quality of the service provided.
- Potential rate increases in cases where the partnership involves operation of a facility which charges fees.

2.2.9 Summary

The preceding discussion of funding mechanism categories highlights general advantages and disadvantages of the broad categories of mechanisms and other instruments and notes their relevance to compliance and enforcement programs. However, individual mechanisms within a category have distinct characteristics that make them either more or less applicable to certain funding requirements (see Appendix A for a more in-depth discussion of advantages and disadvantages of specific mechanisms). It also is often the case that several mechanisms are utilized together to fund compliance and enforcement programs and projects. The next section of this chapter discusses how to choose among mechanisms to meet particular funding needs.

2.3 Evaluating and Selecting Funding Mechanisms

Before choosing funding mechanisms for a compliance and enforcement program, it is necessary to evaluate each mechanism's suitability to the program's financing needs. The characteristics of the mechanism and the composition of the program's funding demands should be matched as closely as possible. This match will ensure that the compliance and enforcement program will receive the proper amount of funding in the appropriate timeframe. This section discusses the general suitability of funding mechanisms to various program costs, including both operating and capital costs, and provides guidance on evaluating the appropriateness of specific funding mechanisms for various program purposes.

2.3.1 Mechanisms' Suitability to Financing Needs

When choosing a funding mechanism or a combination of mechanisms, it is important to first determine each mechanism's suitability to meet required financing needs. For example, some mechanisms are more suitable for financing operating costs and others for capital costs. Generally, those that are suitable for program operations financing provide a steady and predictable stream of funds, while those that are best suited for capital costs provide a substantial one-time sum. Table 2-1 relays the general suitability of each funding mechanism category to program operations financing and/or capital cost financing. Several country-specific examples of each category's use for program operations and/or capital cost financing also are noted.

2.3.2 Other Evaluation Criteria

Once the general appropriateness of a funding mechanism to the type of cost to be funded is assessed, other evaluation criteria become critical. Below are evaluation criteria that should be considered when choosing funding mechanisms for environmental compliance and enforcement programs. These criteria create a structure by which to think critically about the categories of funding mechanisms described in this chapter and the individual funding mechanisms detailed in Appendix A. The criteria include:

- **Characteristics of the revenue stream.** These characteristics primarily include revenue potential and revenue stability. Estimates of revenue potential should be based on the size of the anticipated revenue base, typical rates, and past experiences with the funding mechanism. Revenue stability is based on the volatility of the revenue base, methods of collection, and previous experience with the mechanism.
- **Ease of implementation and administration.** This criteria provides a general evaluation of the administrative feasibility of the funding mechanism. The feasibility is based primarily on whether the implementing government can take advantage of existing administrative structures. For example, if the institutional capacity for the funding mechanism is previously established, then the administrative feasibility of implementing the mechanism is higher.

Table 2-1. Mechanisms' Suitability to Funding Needs

Mechanism Category	Suitable for Program Operations Funding	Suitable for Capital Cost Funding	Examples of Mechanism's Use
TAXES			
Generally applied taxes	Very Suitable	Partially Suitable	United States: One state (Ohio) in the U.S. dedicates 1.2 percent of its corporate income tax to litter control and recycling.
Special taxes	Very Suitable	Partially Suitable	Sweden: Since 1990, a selective value added tax has existed for energy generating fuels in Sweden. The rate is set at 25 percent of the price.
FEES			
Fees Applied on a Fee-For-Service Basis	Very Suitable	Less Suitable	Denmark: Charges user fees for the public sewage treatment system. Mandatory guidelines maintain uniform charge systems across municipalities.
Fees Applied on a Quantified Impact Basis	Partially Suitable	Less Suitable	China: Imposes a system of pollution charges on polluters for the discharge of wastewater, waste gas, noise, and radioactive waste.
FINES and PENALTIES	Less Suitable	Very Suitable	South Korea: Collects fines from industries that violate water pollution standards. The money is then loaned to industries for improvement of pollution control.
LOANS / DEBT	Less Suitable	Very Suitable	South Korea: Historically, sewage facilities have been financed by compulsory, low interest municipal bonds that mature in five years.
GRANTS	Very Suitable	Very Suitable	Thailand: One of the principal sources for the financing of a wastewater treatment plant is grants from the Environment Fund totaling US \$388 million from 1996-1999.
VOLUNTARY MECHANISMS	Very Suitable	Partially Suitable	United States: A number of states use a check-off box on their state income tax return form to allow taxpayers to earmark refunds for environmental initiatives.
PUBLIC-PRIVATE PARTNERSHIPS	Very Suitable	Very Suitable	France: Sixty percent of the total population is served by privately operated water systems. It has been noted that France has the most developed system of private contracting for water safety and sanitation management in the world.

- **Legislative/political issues.** The evaluation of legislative and political issues includes such areas as whether the funding mechanism would generally require voter approval and which level of government would normally be capable of utilizing the mechanism. Both of these factors affect the overall feasibility of particular mechanisms.
- **Equity considerations.** This criteria evaluates whether the burden of payment will fall on parties that contribute to the environmental problem (i.e., the polluter), on parties that benefit from cleanup of an environmental problem (i.e., the beneficiary) or upon the general public. The economic impacts of the funding mechanism also are evaluated under this criteria. It should be determined whether the mechanism has any disproportionate impacts on an individual or group (e.g., small businesses) or has a diffuse impact on a broad population.

Table 2-2 summarizes these evaluation criteria for each category of funding mechanisms. The evaluation of an *individual* mechanism's revenue potential or stability, political or administrative feasibility, equity, and incentive effects may be different from evaluations of the general mechanism category provided here. Each mechanism also will have different characteristics depending on how the mechanism is implemented. Public-private partnerships are not included in Table 2-2 because they are institutionally different from the other mechanisms and thus cannot be evaluated using the same criteria.

2.4 Use of Institutional Mechanisms to Secure Funding

Institutional mechanisms, including dedicated funds, public authorities, and multilateral organizations, can be used to secure funding for compliance and enforcement programs. If institutional mechanisms can secure a greater amount of targeted funding for compliance and enforcement programs, then less financial resources are required from a central or sub-national government's general fund for the funding of such programs.

This section describes the objectives and applicability of institutional mechanisms for the funding of environmental compliance and enforcement programs. A number of country-specific examples of each institutional approach also are provided.

2.4.1 General Funds

General revenue funds are typically the largest type of government fund, accounting for all financial resources other than those accounted for in other government funds. Most current operations of the government are recorded here. Property, income, and sales taxes will typically be recorded in the general revenue fund, as will other sources of general program revenue. Compliance and enforcement activities for environmental protection also have been traditionally financed from general revenue funds of environmental agencies, although in recent years there is a greater prevalence of dedicated funds for environmental program operations.

Table 2-2. Evaluation of Funding Mechanisms

FUNDING MECHANISMS		General Taxes	Special Taxes	User Fees and			
Charges	Fines and Penalties	Grants	Voluntary	Mechanisms			
CHARACTERISTICS:							
Revenue Potential		■	◆	◆	◆	◆	○
■ = High							
◆ = Moderate							
○ = Low							
Revenue Stability		■	◆	◆	○	N/A	○
■ = Stable							
◆ = Partially Stable							
○ = Unstable							
Political Feasibility		○	◆	■	◆	◆	■
■ = Easy							
◆ = Moderate							
○ = Difficult							
Administrative Feasibility		■	◆	◆	◆	◆	■
■ = Easy							
◆ = Moderate							
○ = Difficult							
Equity (Who Pays?)		○	■	◆	■	*	N/A
■ = Polluter							
◆ = Beneficiary							

○ = General Public

Incentive Effects

(e.g., Pollution Reduction)

■ = Yes

◆ = Maybe

○ = No

N/A = not applicable.

* The equity and incentive effects of loans and debt instruments depend upon the repayment stream designated.

○ ◆ ◆ ■ * ○ ○

Many countries traditionally place the revenue from cost recovery mechanisms for compliance and enforcement activities into a national treasury account. It is therefore likely that recovered costs may fund items other than their intended purpose. The compliance and enforcement program's funding is subject to the discretion of the legislature, and the regulatory agency may not be able to control the amount of funding it receives. Therefore, a regulatory agency may not want its recovered costs deposited into the government's general treasury. However, some economists do argue that excess dedication of funds is not economically efficient and that compliance and enforcement program functions should compete against other government program functions for funding on an ongoing basis.

2.4.2 Dedicated Funds

Dedicated funds have been established to supplement general revenue funding for environmental investments in various countries throughout the world. The revenue sources for dedicated funds can vary, although fees and fines are the most common sources of funding. Dedicated funds can be used to provide grants or low-interest loans for compliance and enforcement program functions, or for general program activities.

Earmarking revenues for dedicated funds from environmental taxes and charges has been common practice in many Organization for Economic Co-Operation and Development economies and serves as an attractive option for policy-makers in transition economies. However, the Organization for Economic Co-Operation and Development believes that earmarking may be inefficient because these funds might be used for more pressing needs elsewhere in the government budget. As such, the environment should compete with short-term political priorities to obtain funding. Therefore, the Organization for Economic Co-Operation and Development believes that earmarking may be acceptable as a transitional measure, but not for the long term.

Alternatively, those in favor of earmarking believe that it revolves revenue directly back into sectors that raised them. Using earmarked funds to finance environmental investment also can enhance the acceptance of tax instruments, as well as fees and charges, and may result in more timely clean-up and more successful environmental protection programs.

Country Examples — General Revenue and Special Dedicated Program Funding

- In the **United States**, most state air, water, drinking water, and solid waste statutes require that recovered fines and penalties be deposited in *special environmental funds*, in addition to state treasury or general funds. For example, hazardous waste

statutes require penalties to be deposited into special environmental funds, such as emergency spill response funds, hazardous waste trust funds, hazardous waste emergency accounts, or water pollution abatement grant funds.

- See Table 2-3 for a summary of the disposition of **United States** penalty revenues between general and dedicated accounts and funds among the 50 states.
- In the **United States**, state officials have come to rely increasingly on *dedicated revenues* from permit fees, fines, trust funds, and other similar sources of revenue that vary from state to state. For example, car owners pay for air pollution control programs with a portion of their license-tag fees and factories pay for water quality efforts with fees for permits to discharge waste water. This trend has been most significant in six of the most populous states — California, Florida, Illinois, New Jersey, New York, and Texas.
- Environmental authorities in **France, Germany, and The Netherlands** have *earmarked funds* by setting tax rates in such a way as to generate the revenue needed for various pollution control programs. These taxes are viewed as a source of money to fund projects for water-quality management, not as incentives for the regulation of waste flows.
- In **Central and Eastern European Countries**, most resources required to improve environmental conditions come from the countries themselves. However, difficulties in raising revenues, combined with continuing growth of expenditures, have resulted in severe budgetary difficulties in Central and Eastern European countries. As a result, projects supported by appropriate cost recovery mechanisms can be financed most readily. *Earmarked environmental funds*, which have been established in a number of Central and Eastern European Countries, also are likely to provide an important source of finance. For example, national and regional funds accounted for more than 40 percent of environmental investments in **Poland** in 1991.
- **Lithuania** has a *State Environmental Protection Fund* for the collection of revenue to finance environmental protection measures. The Fund encourages the effective management and supervision of compensatory policies for environmentally related damages.

Country Examples — General Revenue and Special Dedicated Funding (*Continued*)

- **Hungary's Environment Protection Fund** not only provides financing for environmental investments, but is also used as a method to set priorities. The Fund collects revenue from economic instruments, including pollution charges and product taxes. Subsidies from the water management fund serve as another source of direct government assistance for environmental investments.
- In **Nepal**, a *Pollution Prevention Fund* has been designed to assist industry to come into compliance with the environmental standards associated with regulations. The fund is expected to consist of pollution charges and fees from the issuance of environmental licenses. The fund may be used for the following purposes: (1) early community-based monitoring of Environmental Impact Assessment conditions; (2)

low-cost loans and grants to industry for monitoring equipment; (3) matching funds for shared wastewater treatment or other waste treatment facilities for industry; (4) training courses in pollution management; (5) loans for spill remediation; and (6) education/awareness in pollution prevention. The Ministry of Industry is expected to have responsibility for the management of the Fund, with assistance from the Ministry of Finance.

- At the federal government level in **Nigeria**, the *Environmental Protection Fund* provides funding for recurring expenses of various programs at the federal and state levels and for specific projects. The *Environmental Protection Fund* receives funding directly from the federal budget.
- In **Poland**, 40 percent of the fees and fines collected are channeled to the *National Fund for Environment Protection and Water Economy* for environmental investments. The Fund makes direct grants, especially for water-related investments, and provides low-interest loans.
- A *Federal Environmental Fund* was established in **Russia** by the 1991 Environmental Law. The purpose of the Fund is to provide funding for urgent environmental protection tasks, the restoration of environmental losses, and to provide compensation for damages and other environmental protection measures. The Fund collects revenue from pollution fees, fines for violations of environmental laws, and private contributions.
- *Ecological Funds* also have been established in **Russia** to direct resources to environmental protection and nature conservation programs, scientific studies, technological development, and compensation for the health damage that has been caused by pollution. Revenues for Ecological Funds come from pollution charges (both fees and fines), waste disposal fees, and other payments that compensate for environmental damages. The Ecological Funds were designed as a mechanism for financing environmental improvements which do not rely on transfers from the government budget.

Country Examples — General Revenue and Special Dedicated Funding (*Continued*)

- An *Environmental Trust Fund* has been proposed in the **Philippines**, where earmarked revenue raised from regulated enterprises for environmental management purposes is intended to supplement the national budget for program related costs.
- In **Thailand**, The Enhancement and Conservation of National Environmental Quality Act (B.E. 2535) calls for the establishment of an *Environmental Fund* by the Ministry of Finance. Funding sources, described in Section 22 of this Act, include: money from the Fuel Oil Fund; money transferred from the Revolving Fund for Environmental Development and Quality of Life; service fees and penalties collected from this Act; government grants; money or property donated by the private sector, foreign governments, or international organizations; interest and benefits accrued from this Fund; and other funds received for the operation of this Fund.

Section 23 outlines activities and purposes for fund disbursement, which include: grants to government agencies or local administrations for investment in and opera-

tion of the central wastewater treatment plant or waste disposal facility, or to support any activity concerning the promotion and conservation of environmental quality as the Fund Committee sees fit and with the approval of the National Environment Board; loans to local administrations, state enterprises or private individuals for air pollution control, wastewater treatment or waste disposal facilities; and expenditures for administering the Fund.

Table 2-3. Disposition of Penalty Money Collected: U.S. Summary

Category	State Treasury/ General Fund		Special Environmental Fund	
		Other Special Funds		
Air	29	11		9
Water/NPDES/Water Quality		27	15	7
Drinking Water/UIC	22	10		2
Hazardous Waste	21	28		6
Solid Waste	19	9		6
Pesticides	15	4		0
Wetlands/Dredge and Fill		5	4	0
Oil	7	6		2

Note: Many states have provisions which split money between the general fund and a special fund, or give it to one or the other depending on the statute, circumstances, court orders, etc. Those which are split are not counted separately and may count in the total for one, two or all of the columns, where appropriate.

2.4.3 Funds Transfer Between Levels Of Government

Since much of the day-to day functions of compliance and enforcement programs take place at the provincial and local levels in various countries, the extent to which the central environmental agency can distribute the proper types of funding in a timely manner to the provincial and local agency levels can significantly influence the ability of compliance and enforcement programs to meet their goals and objectives.

Intergovernmental assistance usually consists of grants or revenue sharing. Grants can be distributed for specific program assistance in the form of categorical grants, or they can be distributed as block grants according to a statutory formula to finance activities in a broad functional area. With block grants, much of the expenditure is decided upon by the recipient. Revenue sharing involves the formal distribution of funds according to a formula for general governmental purposes with few or no restrictions on the use of funds provided.

Country Examples — Funds Transfer

- In **Italy**, a portion of the funding for the Ministry of Environment is transferred from the central to the regional level, then from the regional level to the local level. Sixty percent of the local budgets come from successive transfers. Most of the Ministry's funds are intended to be transferred to the regions, but if regions do not prepare satisfactory plans, such funds cannot be transferred. Funds that are not spent by the end of the year are lost, and the system by which they can be recovered

for use in other years is fairly unwieldy.

- In **Nigeria**, it has been proposed that state institutions could be responsible for monitoring and enforcing federally established industrial regulations and standards to complement federal functions. Such activities would be financed by federal economic mechanisms, such as fines, licensing fees, and bonding and insurance requirements.
 - In **Russia**, the law requires that funds be distributed from the Federal Environmental Fund to the local, republic, and federal levels at 60 percent, 30 percent, and 10 percent, respectively, in order to implement environmental protection measures.
 - In the **United States**, state and local dependence on *intergovernmental assistance* is significant. These intergovernmental grants also typically carry substantial matching fund requirements, varying by program area (e.g., air, water). Under these matching arrangements, states must devote substantial resources to their environmental programs to capture available federal funds. For example, state and local air quality programs are eligible for up to 60 percent funding from the federal government for eligible program costs, requiring at least 40 percent of total program costs to come from state and local sources. A recent study found that, among fifteen representative state air quality programs, federal funds provided between 8 percent and 52 percent of total program funding.
-

2.4.4 Public Authorities

Public authorities are commonly created by state and local governments in order to raise funds for specific projects or activities that benefit more than one local jurisdiction. In some countries, these authorities can assess taxes or issue tax-exempt bonds to provide funding for projects. Public authorities provide funding for a wide variety of environmentally targeted projects, such as water, sewer, and utility services and, thus, may also be appropriate to raise revenues for compliance and enforcement programs.

Country Example — Public Authorities

- In **France**, the Water Act of 1964 established regional water *authorities* that could impose levies on polluters to finance the treatment of wastewater and related activities. The levy is earmarked and accounts for only a small share of the total water bill. It is a supplement to water tariffs and user fees for wastewater treatment. The agencies created following enactment of the 1964 Water Act are special-purpose public agencies, governed by independent boards. These agencies serve as financing and technical advisory institutions; they do not directly manage sewage treatment plants or water supply themselves, but rather provide financing and technical support to communes and industries, which contract with the agencies.
- In 1989, in the **United States**, Chicago, Illinois created the Metropolitan Water Reclamation District as a *regional authority* to control wastewater discharge. The Metropolitan Water Reclamation District is an independent special purpose government established to provide wastewater services to the city and 124 surrounding municipalities. The Metropolitan Water Reclamation District has the authority to

regulate local communities with respect to required maintenance or capital investments that must be made to their sewer pipes. Metropolitan Water Reclamation District's revenues come from state and federal grants, bond proceeds, user charges, and property taxes. A portion of each property owner's county property taxes are allocated to the Metropolitan Water Reclamation District. Industrial and commercial businesses also pay a residual user fee directly to Metropolitan Water Reclamation District to cover the costs they impose on the system.

2.4.5 Multilateral Organizations

Multilateral organizations consist of two or more combined sources, such as foreign governments or multinational banks, which provide financial assistance for a variety of environmental compliance and enforcement-related projects. Multilateral organizations typically provide loans or grants to recipient countries or sub-national governments, with permissible scopes for the uses of funds either broadly or narrowly defined. Multilateral or bilateral organizations also can be established to take joint action regarding an environmental problem or objective.

Multilateral Organization Examples

- The *Global Environment Facility* provides grant and concessional funds to developing countries for projects and activities that seek to protect the global environment. The World Bank has responsibility for investment projects and for mobilizing financial resources from the private sector. Other Global Environment Facility implementation responsibilities are shared by the United Nations Development Programme and by the United Nations Environment Programme. Countries can obtain Global Environment Facility funds if they are eligible to borrow from the World Bank or if they receive technical assistance grants from United Nations Development Programme.
 - Multilateral project financing continues to be important in **Mexico**, as both the *World Bank* and the *Inter-American Development Bank* have targeted environmental infrastructure as key areas for investment, while the North American Development Bank is also starting to explore this area.
 - In December 1994, the *European Union* rejected the idea of a multilateral, Union-wide environmental tax on carbon dioxide (CO₂) emissions. In March 1995, Environmental Minister Michel Barnier stated that the European Commission will "make new proposals shortly."
-

3 BUDGETING FOR ENVIRONMENTAL COMPLIANCE AND ENFORCEMENT

Proper budgeting for and financing of environmental compliance and enforcement programs helps ensure that the goals and objectives of environmental programs are met. Successful budgeting requires not only prioritizing program activities that need to be funded, but also determining the best method to finance these identified priorities within limited resources and instituting measures to effectively minimize financing demands, while maximizing program results.

This chapter introduces budgeting approaches applicable to both operating and capital costs and discusses related needs for tracking revenues and expenditures on an ongoing basis. The following chapter (Chapter 4) then discusses measures to minimize financing demands, including, for example, the importance of efficient resource allocation and the potential application of economic incentives to encourage voluntary compliance and thus lower traditional regulatory program costs.

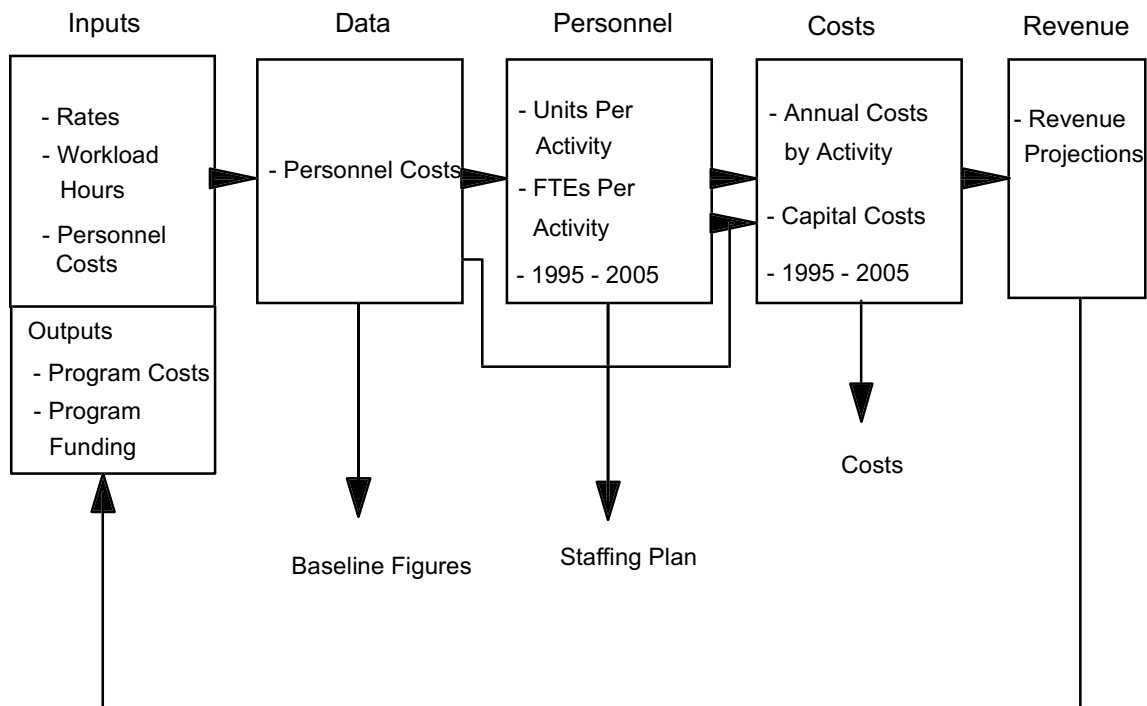
3.1 Assessing Financing Needs

Expenditures to implement environmental compliance and enforcement programs are comprised of operating or programmatic costs and capital costs. This section provides information on budgeting methods for assessing both operating and capital needs, isolating and planning for expenditures sufficient to meet projected needs, and tracking revenue dedicated to future operating and capital expenditures.

3.1.1 Type and Level of Costs

To assess the financing needs for compliance and enforcement programs, budgets need to be developed for operating expenditures that occur on an annual basis, and for capital expenditures which require financing over relatively longer periods of time. Developing such budgets first requires assessing staff and other resource needs and then estimating the costs associated with identified needs. These expenditures are then compared to projected revenues in an iterative fashion until projected expenditures match projected revenues, including previous year fund balances (see Exhibit 3-1 for an example of a budgeting process that assesses the costs and funding for an emissions fee-funded air quality compliance and enforcement program).

Exhibit 3-1. Budgeting Process



3.1.2 Operating/Programmatic Costs

Funds for operational resources are generally required on an annual basis to ensure the continuity of program functions. Ongoing tasks within compliance and enforcement programs typically include: planning and developing environmental requirements; preparing and issuing permits; and conducting compliance monitoring and inspections. A sufficient staff is required to carry out these activities. Therefore, personnel-related costs generally represent the most significant operating expenditure, contributing as much as 80 to 90 percent of all program costs. Operational resources for compliance and enforcement programs typically include:

- Personnel, including training.
- Office supplies and publications.
- Laboratory materials and chemicals.
- Vehicle/fleet maintenance.
- Maintenance for computers, laboratories, and publication equipment.
- Field sampling material.
- Funds for contractor support.

Funding for the operation and maintenance of projects that have been approved in capital budgets also are typically included in a compliance and enforcement department's operating budget.

3.1.3 Alternative Budgeting Methods for Operating Costs

There are several different methodologies to assess operating resource needs. Line-item budgeting serves as the basic structure for budget preparation and is used as the starting point for all budget classifications. With line-item budgeting, the budget structure is focused on the tangible resources that are required to provide services, such as labor, buildings, and supplies. Alternative budget formats include:

- Performance budgets, which focus on the cost of performing tasks or activities during the budget year.
- Program budgets, which examine the cost of the products or outputs that are used to achieve governmental objectives.

Operating Budget Techniques

Operating budgets are most often developed and considered on a single-year basis. Some governments employ biannual budgets, whereby budgets are developed every two years. Different techniques exist for estimating operational costs, especially for personnel and non-personnel costs. Personnel services are typically the single largest cost element in a government agency budget. In order to assess costs associated with staff resources, the type and amount of staff must be determined first. Then, the prevailing wage and salary rates are used to compute the total cost. A standard procedure works from personnel data on individuals in each pay step, adjusted for anticipated movements to the next pay step in the budget year. The total cost of labor includes fringe benefits, in addition to direct compensation. Fringe benefits include pensions, social security, and insurance, which can represent substantial costs.

Non-personnel related costs are generally more difficult to estimate than personnel costs. Non-personnel costs often are calculated by employing cost-estimating ratios that have been used in prior year budgets. These ratios relate non-personnel related costs to a percentage of projected personnel costs to estimate next year's non-personnel costs. Alternatively, a comprehensive bottom-up inventory of expected expenditures may be created. A bottom-up approach is generally more accurate when there is a comprehensive program plan to be implemented, for which associated non-personnel costs can be readily identified. Such an approach, however, is more time-consuming than an approach that relies on ratios and only more accurate when detailed program planning has been initiated. An example of an operating budget from a state air program in the United States is provided in Table 3-1 below.

Table 3-1. Operating Budget

	1995	1996	1997
Salaries	\$5,948,660	\$8,168,952	\$10,379,175
Benefits	\$2,260,290	\$3,103,926	\$3,943,736
Supplies	\$416,406	\$571,827	\$726,542
Travel	\$297,433	\$408,447	\$518,959
Agency Overhead	\$1,805,969	\$2,480,033	\$3,151,040
Total	\$10,728,758	\$14,733,185	\$18,719,452

3.1.4 Capital Costs

Capital expenditures generally refer to the purchase of assets that provide services beyond a single accounting period or a single year. A capital budget for compliance and enforcement programs facilitates financial planning for projects that:

- 1) Require long-term financing.
- 2) Are relatively expensive.
- 3) Are generally non-recurring.

Following are examples of capital expenditures that are required for effective implementation of compliance and enforcement program functions:

- **Central and regional laboratories** are needed to conduct applied research and provide reliable sample analysis. Sampling kits, sampling and clean-up mobile units and other investments also are required for effective compliance monitoring and response to emergencies if such services are not provided by the private sector. The availability of reliable laboratory services is vital to a successful compliance and enforcement program.
- **Office space** is required both for the headquarters and regional units. Office space may be secured through rental arrangements, long-term leases, or through direct purchase or construction. While rental arrangements are not considered capital expenditures, the other methods warrant capital planning and financing.
- **Computers** are necessary for information management and for other enforcement-related functions. The purchase or lease of such equipment is a capital expenditure warranting separate capital planning and budgeting.
- **Vehicles** are needed to facilitate inspection and facility visits. The purchase or lease of vehicles is another example of expenditures to be made within a capital budget.
- **Other capital miscellaneous items** are libraries, furniture, inspection or sampling equipment, and equipment for publication and education functions.

3.1.5 The Role of Capital Budgets in Program Planning

While many governments do not prepare and maintain a capital budget distinct from the current expenditures in an operating budget, separate consideration of capital resource needs improves both the efficiency and equity of providing non-recurring projects with long-term funding. Separate capital budgets may be most applicable at the provincial and local levels of government. In general, national government operations do not require the project-financing planning inherent in capital budgeting. Nevertheless, capital budgeting still has a role in national government operations, especially where the central government has responsibility for significant capital investments.

In addition to isolating capital costs from ongoing operating expenditures, capital budgets differ fundamentally from operating budgets, which must be balanced on a regular basis. Capital budgets can be used to designate funding mechanisms for long-term financing (i.e., borrowed funds) to improve equity among

taxpayers over an extended period of time. To illustrate this point, if a laboratory facility with a twenty or thirty year service life is paid for in a single year, the full costs are borne by the current residents. Individuals who move into the area after construction still obtain the benefits provided by the facility but pay none of the construction costs. However, if the construction costs are financed over twenty or thirty years, through the use of debt instruments, the distribution of costs would be considerably more equitable on an intergenerational basis.

Capital budgets also can provide for protection against a reluctance to fund expensive items, especially if there is already great pressure on operating budgets. By spreading out the resource needs over the useful life of the items to be funded, separate consideration of capital budget items apart from the operating budget may preserve the chances for financing expensive, but necessary capital projects.

Capital Budgeting Techniques

Capital budgeting for the implementation of compliance and enforcement program functions must address:

- The selection of projects from different possible alternatives.
- The timing of expenditures for the selected projects.
- The impact on total government finances of various financial spending plans.

To do so, capital budgeting often involves the development of a capital improvement program. A capital improvement program is a listing of capital expenditure projects for a specified time period — often, five to ten years. The list usually contains project proposals accompanied by justifying narratives and cost data. These project proposals are typically screened by a government agency to evaluate costs and establish initial priorities. The capital improvement program, present and anticipated revenues, and existing debt are analyzed together to determine how much financing is available for new projects. A comprehensive capital planning process typically involves the evaluation of potential investments against program goals. Capital items are typically reviewed for inclusion in the capital budget before they are proposed for legislative review and approval. The approved projects in a capital improvement program then become part of the capital budget section of an annual budget.

In sum, capital budgets can serve as valuable tools for managing limited fiscal resources. This is especially important, given the long-term impact on resources that items in the capital budget may have. Table 3-2 provides an example of a capital budget, as well as the full program budget for a state air quality management program in the United States.

Table 3-2. Operating and Capital Budget

	1995 FTEs	Costs	1996 FTEs	Costs	1997 FTEs	Costs
OPERATING BUDGET						
PROGRAM DEVELOPMENT	4.5	\$442,467	4.5	\$512,941		\$594,639
4.5						
MONITORING	13.8	\$1,214,374	28.3	\$2,964,349		\$3,729,059
30.7						
Stationary Source Monitoring	4.0	\$372,405	14.1	\$1,524,612	15.4	\$1,926,585
Ambient and Toxics Monitoring	9.8	\$841,969	14.1	\$1,439,737	15.3	\$1,802,473

PERMITS-TO-CONSTRUCT	10.8	\$1,048,708	13.4	\$1,498,509	
16.4				\$2,133,156	
OPERATING PERMITS	22.8	\$2,172,110	18.7	\$2,095,573	
19.2				\$2,492,000	
PERMIT COMPLIANCE	7.5	\$719,275	18.5	\$2,049,358	
20.8				\$2,664,099	
ENFORCEMENT	4.7	\$446,516	12.4	\$1,375,566	
15.2				\$1,946,714	
MISCELLANEOUS	16.4	\$1,550,324	19.2	\$2,096,501	
20.5				\$2,593,458	
State Implementation Plan Activities	11.9	\$884,022	14.5	\$1,296,458	
Emergency and Complaint Response	1.6	\$147,330	1.7	\$181,634	
Special Programs	1.7	\$157,851	1.7	\$182,993	
Tribal Lands	0.7	\$82,418	0.7	\$95,546	
INEL Coordination	0.5	\$46,551	0.5	\$53,965	
Controversial Document Requests	0.0	\$4,053	0.0	\$4,698	
PROGRAM ADMINISTRATION	18.2	\$1,468,733	23.1	\$2,136,865	
24.1				\$2,561,972	
Small Business Assistance Program	2.0	\$186,203	5.0	\$539,650	
Emissions and Source Inventory	3.6	\$300,491	3.6	\$348,351	
Public Involvement	5.6	\$487,054	6.0	\$600,459	
Regional, Local, Other Agency Guidance	0.4	\$39,568	0.4	\$45,870	
Other	6.6	\$455,441	8.1	\$602,597	
TOTAL AIR PROGRAM WORKLOAD (FTEs)	98.7	\$9,063,840	138.0	\$14,733,185	
151.3				\$18,719,452	
Attrition	3.7		9.2	9.9	
New Hires & New Hire Training Costs	56.6	\$1,234,711	0.0	\$0	
				2.8	
				\$986,950	
TOTAL AIR PROGRAM FTEs & OPERATING COSTS		116.6	\$10,728,758	148.7	\$14,733,185
161.9				\$18,719,452	
CAPITAL BUDGET					
Laboratory Services		\$239,208		\$153,797	
				\$197,373	
Office Space		\$318,944		\$205,063	
				\$263,164	
Computers		\$119,604		\$76,899	
				\$98,687	
Vehicles		\$79,736	\$25,633	\$65,791	
Miscellaneous		\$39,868	\$25,633	\$32,896	
TOTAL NON-PERSONNEL & CAPITAL COSTS		\$797,359		\$512,657	
				\$657,910	
TOTAL AIR PROGRAM COSTS		\$11,526,117		\$15,245,842	
				\$20,364,311	

**FTE = Full-time equivalent (personnel)

3.1.6 Tracking Revenues and Expenditures

The operating (and capital) budget, when approved, becomes the standard against which actual operations

can be controlled. Budgets are usually approved for an entire fiscal year, while execution of the budget occurs on a day-to-day, week-to-week basis. From annual operating (and capital) budgets, periodic (generally monthly) allotment schedules can be developed. The allotment schedule must be consistent with both the approved budget and activity flow expectations if it is to be useful for control and management. For this reason, activities that produce uneven expenditure flows during the year to meet seasonal needs or the opening or closing of new facilities require uneven allotments.

Comparisons of budget allotments with actual expenditures is useful to indicate:

- Areas in which expenditures may need to be curtailed.
- Areas in which surpluses may be available for use against deficits in other areas.
- Patterns that may be helpful in preparation of future budgets.
- A possible need to request supplemental appropriations.

In order to facilitate comparisons between actual and budgeted revenues and expenditures, compliance and enforcement programs will want to implement systems to track revenues and expenditures. Such a system can be as simple as monthly handwritten logs of expenditures and revenues or can rely on more sophisticated technological approaches currently available. The scope and scale of the tracking system depends most on the size of the overall program and the level of integration with other government program areas.

4 MEASURES TO MINIMIZE FINANCING DEMANDS

All governments face significant demands for scarce financial resources. Compliance and enforcement programs must compete not only with other environmental program activities, but also with schools, prisons, medical care, and other traditional government services for funding. The extent to which governments can minimize the demands on financial resources through the efficient use of government resources and the encouragement of private-sector participation in the provision of traditional public sector services maximizes the effectiveness of all government programs.

This chapter introduces approaches to minimize the financial demands of compliance and enforcement programs. It first discusses the importance of allocating existing resources efficiently, utilizing staff among various government agencies effectively, and providing for the necessary technical training of staff to ensure effective program implementation. It then discusses the potential role of economic incentives to minimize program resource demands. Economic incentives discussed include issuance of tradable permits, industry subsidies and deposit-refund systems, and industrial self-compliance monitoring and reporting arrangements.

4.1 Ensuring Effective and Efficient Use of Scarce Resources

The ability to allocate available resources efficiently is an important step in minimizing overall program resource needs and maximizing the effective use of scarce financial resources. The costs of obtaining resources need to be evaluated against the potential return from the use of such resources. In general, the availability and limitations of resources determine which goals can be achieved and which priorities can be set in order to meet those goals.

4.1.1 Setting Priorities

Through evaluating and setting priorities, it is likely that efficiencies will result in the compliance and enforcement program. Various priorities, such as overall priorities for the program, as well as industry-specific or facility-specific priorities, can be established.

Several important objectives are considered when setting funding priorities, including:

- Protecting and restoring environmental quality and public health.
- Assuring the integrity of administrative and data-gathering aspects of the program.
- Maintaining enforcement.
- Leveraging program resources by determining where changes can have the greatest impact in improving environmental quality.

4.1.2 Reviewing Existing Capabilities

A thorough review of existing capabilities can serve as a baseline for evaluating possible inefficiencies as well as areas where additional resources are needed. To the extent possible, existing structures and functions within the government should be utilized to assist with a compliance and enforcement program's requirements. By sharing information and personnel, various government agencies can determine links and similarities between functions to avoid duplication of effort. Different government agencies can achieve common goals, leverage resources, and reduce costs by increasing cooperation to conduct overlapping functions. The extent to which government agencies can share and leverage resources reduces the amount of general revenue funding required not only for compliance and enforcement programs, but for other government program functions as well.

4.1.3 Maximizing Resource Effectiveness

A number of steps can be taken to ensure that compliance and enforcement programs gain maximum effectiveness from fairly limited resources. Two examples of such techniques include:

- Application of multimedia approaches.
- Implementation of comprehensive training programs.

Some programs have found that having compliance and enforcement staff with the ability to address multimedia programs is an effective way to conserve resources and funding. Utilizing staff with multimedia expertise not only reduces additional personnel requirements, but also minimizes duplication of effort.

Similarly, because compliance and enforcement programs are highly specialized, these programs generally require the staffing of skilled technical experts. Integrated training, designed to develop basic skills in a number of specialized areas, can be important to develop the interdisciplinary skills often required for compliance and enforcement programs. In sum, a skilled, technical workforce that can address multimedia programs can yield significant program efficiencies and cost savings, which should also minimize the need for additional funding.

4.2 Incentives To Regulated Community

Economic incentives to encourage voluntary compliance and thus reduce enforcement costs can be effective tools with substantial implications for program finance. Economic incentives work on the premise that if environmentally more appropriate behavior is made more rewarding, then attitudes and behavior will shift in favor of the more desirable alternatives. In contrast to direct regulations, economic incentives allow industry to respond in a way that they themselves determine as most beneficial, which should induce meeting environmental objectives in a cost-effective manner.

Economic incentives seem to operate best in combination with, or in support of direct regulation, since such incentives usually cannot effectively deal with environmental problems on their own. Because economic incentives assist regulatory agencies in meeting their compliance and enforcement program objectives without significant direct outlays for command-and-control regulatory programs, the costs associated with compliance and enforcement programs of regulatory agencies can be reduced through the effective application of incentives.

Examples of economic incentives that may be used as alternatives to traditional regulatory programs in-

clude:

- Permit trading.
- Direct subsidies.
- Deposit-refund systems.
- Industry self-compliance monitoring and reporting.

These approaches can be used to achieve comparable environmental objectives to command-and-control compliance and enforcement programs, at considerably less cost. Each is described below.

4.2.1 Tradable (Marketable) Permits

Trading describes any agreement between parties contributing pollutants to either a waterbody or the air that affects allocation of pollutant control responsibilities among dischargers. The product traded is pollution control or water/air quality improvements. The vehicle for executing the trade is a marketable emissions permit.

Trading includes arrangements where one pollution source pays for pollutant control reductions and/or other water/air quality improvements at another source that can achieve reductions at less cost by purchasing their emissions credits. Essentially, a buyer and seller trade pollution reductions.

Trading allows sources to take advantage of differences in pollution reduction costs. Buyers purchase reductions at a lower cost than they could achieve themselves. Sellers provide greater reductions than required and receive a premium or profit. In general, trading often can achieve the same level of pollution reduction at a lower cost than command and control regulations.

An important aspect of any trading scenario, however, is that all sources meet certain minimum regulatory or other requirements before they can trade for loading reductions. In addition, through constraining trading in certain areas or by certain polluters, the government can control the level of emissions in locations that suffer most from environmental and health effects of pollution.

Country Examples — Tradable (Marketable) Permits

- In January 1995, an international conference that focused on the use of economic instruments to improve environmental quality was held in the **Czech Republic**. A main topic at the conference was the use of *tradable permits* to aid in the reduction of carbon dioxide emissions. An international permit model discussed at the conference introduced the concept of “joint implementation.” Under this concept, a country contributing to the decrease of CO emissions in another country would reap a reward, for example, additional pollutant permits. The permit system was also discussed for controlling sulfur dioxide (SO₂) emissions. However, the full cost-saving potential of SO₂ emission trading in Europe’s electricity industry, which generates 65 percent of their total SO₂ emissions, is considered to be significantly undermined by the structural and regulatory diversity of that industry.
- An Industrial Waste Exchange Program has been developed and administered by the Philippine Business for the Environment in the **Philippines** since 1993. Philip-

pine Business for the Environment is an association of private industries dedicated to responsible environmental management. The principal advantages of establishing the Industrial Waste Exchange Program are the flexibility it affords to industries in meeting pollution standards and the potential for reduced direct regulation.

- In the **United States**, there is a national marketable *permit trading* program for SO₂ emissions. SO₂ sources trade emissions allowances that are listed on the Chicago² Board of Trade² annually. There also are locally implemented trading programs throughout the country. Southern California has the only air trading program in the United States active enough to approximate a market, the Regional Clean Air Incentives Market, where NO_x emissions vouchers or credits are traded.
-

4.2.2 Subsidies

Subsidies are financial incentives given to facilities that comply with specified requirements — usually by applying certain cleaner technologies in the production of goods or provision of services. Subsidies can be in the form of tax relief, reduced interest rates on government provided loans, or direct subsidies, as described below.

- *Tax relief* is the reduction in taxes granted in exchange for capital investments made to improve environmental quality (e.g., installing pollution control equipment, or changing a process to prevent pollution). Forms of tax relief include tax credits, tax exemption, tax deductions, and accelerated depreciation. A tax credit is simply a tax rebate or a forgiveness scheme conditional on the beneficiary's meeting specified requirements. Tax exemption is direct exemption from tax payment. Tax deductions enable the taxpayer to deduct expenses associated with pollution abatement from their income statement. In essence, tax deductions are gains to the taxpayer in unpaid taxes. Accelerated depreciation allows the purchaser of pollution prevention equipment and "clean" technologies to increase the rate at which the asset is written off, which increases depreciation expense, thereby reducing the amount of taxable net income.
- *Interest rate reductions* are reductions in the amount charged for a loan. Such reductions are often offered for the purchase of pollution prevention equipment or facilities. The reduced rate provides an incentive to utilize these financial resources for the acquisition of the needed equipment or facilities.
- *Direct subsidies* — or grants — are forms of financial assistance that can be obtained without incurring an obligation to repay. Grants provide incentives to complete pollution prevention projects or purchase needed equipment because they provide very low or no cost alternatives to meet regulatory requirements.

Country Examples — Subsidies

- A range of subsidies are offered by the government of **Taiwan**. One form of tax relief is an *exemption from import duties* on machinery and equipment for the prevention of air pollution, water pollution, noise, vibration, and the monitoring and testing of environmental pollution and waste treatment. As of 1991, there were

1,349 cases of exemption and the import value exempted was NT \$6.6 million (US \$246,000).

- **Investment tax credits** also are available in **Taiwan** that range from five to twenty percent of the investment on pollution control equipment and technologies used for production automation, pollution control, personnel training, or the establishment of international brand names. The minimum investment is NT \$600,000 (US \$24,611) in the taxable year and the total amount of credit allowed in a given year is limited to 50 percent of the corporate income tax payable in that year. If this is exceeded in a given year, the credit may be carried over for a period of four years. The credit is applied as follows: 20 percent for pollution-control equipment procured domestically; 15 percent for pollution-control equipment procured abroad; and 5 percent for pollution-control technologies procured either domestically or abroad.
- The **Taiwan** Statute for Upgrading Industry also allows a corporation to have **tax-exemption status on retained earnings**. The Statute for Upgrading Industry allows a corporation to retain undistributed earnings (also called retained profits) up to twice its accumulated paid-up capital, which is exempt from the 10 percent profit-seeking enterprise income tax if the funds are used for the following specified purposes: purchasing various classes of products, including pollution-control equipment; repaying loans borrowed for the purpose of purchasing the aforementioned equipment; and investing in certain important industries specified by the government.

Country Examples — Subsidies (*Continued*)

- **Taiwan's** Sino-American Fund and the Development Fund of Executive Yuan provide **reduced interest rate loans** to private sector companies investing in pollution control equipment.
- The 1970 Statute for Encouraging Industry in **Taiwan** permitted straight-line **accelerated depreciation** for pollution-control equipment over two years. The present Statute for Upgrading Industry allows the depreciation of certified investments to be accelerated by up to half the number of years of normal service life. Although the law is not explicitly drafted to include pollution-control equipment, the wording is sufficiently broad to include such investments.
- In **Indonesia**, subsidies include **exemption from import duties** for equipment dealing with industrial waste treatment and **"soft loans"** (loans with artificially low rates of interest) for buying equipment for treating waste.
- Various forms of subsidies are utilized in **India** to provide incentives for pollution prevention and control. These incentives include: **a depreciation allowance at 100 percent** for installing pollution control devices; **reduced rates for customs and excise duties**; and an **exemption from corporate taxes** for installation of pollution control devices.
- To encourage the reuse and recycling of wastes in **India**, fiscal concessions, such as **exemption from excise or customs duty** are granted. Fiscal concessions are stipulated for prospective entrepreneurs to set up manufacturing units of building materials and help in promoting environment-friendly technology for the building in-

dustry. There is also a provision for obtaining *loans at reduced rates of interest* from financial institutions for installing pollution control devices.

- **Germany** has a number of subsidy programs for environmental protection. For example, in 1990, approximately DM 1.4 billion (US \$870 million) of *interest subsidized loans* for environmental investments were granted under the European Reconstruction Program. In the past, tax concessions were also used in Germany. In 1989, DM 3.3 billion (US \$1.76 billion) or 40 percent of the overall environmental investment made by industry qualified for accelerated depreciation schemes. Some of these created considerable incentive effects. Those involving demonstration projects for state-of-the-art technology improvements to older installations had especially noticeable incentive impacts.
- In **The Netherlands**, *the Accelerated Depreciation on Environmental Investment Scheme* has been active since September, 1991. The goal of the program is to promote the use of environment-friendly equipment. Accelerated depreciation allows the company to write off the cost of investing in a piece of equipment faster than normally allowed. It is even possible to write off the total investment in the year of purchase. In later years, there will be less to write off, but the deferral of tax payments is beneficial to cash and interest position.

Country Examples — Subsidies (*Continued*)

- **Japan** has a complex *special accelerated (initial) depreciation* method. This method allows a certain percentage of the acquisition costs of eligible assets to be deducted once during the year when the assets are first placed in use. Examples include: *qualified facilities to prevent pollution*, 25 percent of acquisition cost; *qualified plants equipped with special anti-pollution devices and qualified energy-efficient plants*, 18 percent of acquisition cost; and *certain energy-saving machinery*, 18 percent of acquisition cost. The scheme, set up by the Japanese government, allows the investor to choose between immediate partial expensing and the use of normal depreciation. Corporations also may *carry losses forward over five years and back one; establish certain special tax-incentive reserve accounts; and take certain tax- incentive deductions and credits*.
- In **France**, *accelerated depreciation* is available for pollution-control equipment. For example, immovable installations for the purification of water and air can be depreciated by 50 percent straight-line in the first year. In addition, the French law contains a number of incentives, such as *regional tax concessions and grants*. These are not specifically slated for pollution-control equipment investment, but may reduce the effective burden of environmental regulation.
- The **Canadian** government's treatment of pollution-control equipment for *capital cost allowance* purposes operates on a pool basis, with separate classes for various types of property. The capital cost of each asset is added to the appropriate pool or class. Each class is then reduced by the specific capital allowance permitted. For both air and water pollution control equipment, properties acquired after November 12, 1981, may be depreciated by claiming a maximum capital cost of 25 percent in the year of acquisition, 50 percent in the second year of ownership, and 25 percent in the third year. Therefore, eligible equipment can usually be written off over three years.

- As of 1994, **Sri Lanka** was currently developing two economic incentive schemes targeted for environmental control. The first is the Control of Pollution from Existing Sources, which attempts to provide incentives to existing industries to enable them to meet pollution control standards. Incentives to be offered will be available only to those industries submitting pollution control plans within one year of commencement of the scheme and will include *depreciation allowances* for pollution control equipment and civil works at twice the normal rate for projects implemented within two years of approval and one and a half the normal rate for projects implemented within three years of approval, and *exemption from business turnover tax and import duty* for pollution control equipment. The second incentive being implemented is the Pollution Control and Abatement Fund. Pollution Control and Abatement Fund, which will provide *soft loans* (loans with artificially low rates of interest) and technical assistance for pollution control measures and is targeted primarily to existing industries.

Country Examples — Subsidies (*Continued*)

- In **Austria**, bonuses for industrial investment in environmental protection have been granted since 1982. Incentive bonuses include both *cash bonuses (refunds) and accelerated depreciation*.
 - In the **United States**, wastewater systems run by local governments are eligible for low-interest loans provided by the Clean Water Act State Revolving Fund (SRF) Program. Through this program, states are given capitalization grants from the federal government, which they in turn use to provide loans at interest rates ranging from 0% to market rate to local governments to meet their needs for wastewater system improvements.
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4.2.3 Deposit-Refund Systems

The use of deposit-refund systems can assist regulatory agencies in accomplishing their compliance and enforcement program objectives by replacing command and control regulatory programs with incentives for proper disposal. Deposit-refund systems provide refund payments to consumers when they return a used product or container to a recycling center or otherwise properly dispose of a product or by-product. With deposit-refund systems, consumers, not producers, generally bear the economic burden. As an alternative to regulatory approaches, deposit-refund systems also have been applied to containers that hold chemicals or other environmentally hazardous products.

Country Examples — Deposit-Refund Systems

- With a 1988 revision of the Waste Disposal Act in **Taiwan**, the Environmental Protection Agency began to implement a *recovery/recycling system* for ten types of solid waste, including polyethylene terephthalate bottles, pesticide containers, and others. In 1993, an impressive recovery rate of 80 percent was achieved.
- In the **United States**, Maine, New York, and Rhode Island have established *deposit-refund systems* for various products. The state of Maine enacted a law in

1985 requiring a deposit system for limited and restricted use pesticide containers and approved an act in July 1989 to encourage the recycling of lead-acid batteries. A Return Incentive Program was established in New York based on the Lead-Acid Battery Recycling Law. Customers pay a \$5 deposit to retailers when they purchase a new battery for their vehicles if they cannot provide a used battery and have up to one month to return an old battery to receive their \$5 back. In Rhode Island, Title 23, Chapter 60 of the Rhode Island General Law provides for a mandatory deposit system for automobile batteries. As of January 1989, each battery sold in Rhode Island must have a \$5 deposit paid at the time of sale and have up to seven days to turn in their used battery to receive their deposit back.

Country Examples — Deposit-Refund Systems (*Continued*)

- In the **Philippines**, *deposit-refund systems* presently apply to glass and plastic soft drink containers and steel drums used for chemicals. Initiatives have been attempted for channeling a portion of the fees collected to environmental preservation activities.
 - In **The Netherlands**, there are *deposit-refunds* on glass bottles (soft drinks, beer and milk) and on PET bottles. The system is instituted by the industry itself. As of 1994, environmental legislation did not yet allow obligatory introduction of deposit refund systems.
 - The market-based incentive of a *deposit-refund system* has been successful in **Finland**. For example, approximately 90 percent of all recyclable beverage containers are returned.
-

4.2.4 Industry Self-Compliance Monitoring and Reporting

Under self-compliance monitoring and reporting arrangements, industries track their own compliance and record or report the results for government review. In general, self-compliance monitoring and reporting provides much more extensive information on compliance than can be obtained from periodic inspections. Self-compliance monitoring and reporting also can produce significant cost savings for regulatory agencies because of reduced oversight and inspections. However, the success of self-compliance monitoring and reporting programs depends on the accuracy of the data reported, which requires a significant level of review, monitoring, and training. Some level of continued government monitoring and clear enforcement also is necessary to conduct an effective self-compliance monitoring and reporting program.

Country Examples — Industry Self-Compliance Monitoring and Reporting

- In **Sweden**, companies receive instructions on how to *monitor themselves* once they receive a “checking” permit that is initially drawn up by the company and then reviewed and adjusted by the County Administrations. The permit stipulates how the data are to be reported and to which particular authority (local, regional, or the National Environment Protection Board). Private consultants may be hired by

industries to conduct inspections. If the inspections reveal negligence by companies, sanctions can be imposed.

- In the **United States**, facilities of a certain size use continuous emissions monitoring programs for *industry self-monitoring monitoring and reporting*. With continuous emissions monitoring, facilities are required to have equipment that monitors emissions on a continuous basis and records the amount of pollutants emitted from a facility. Continuous emissions monitoring ensures compliance with a facility's air permit by producing a signal if a facility exceeds compliance standards which is reported to the state permitting agency.
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4.3 Conclusions

To the extent that the measures presented in this chapter (efficient allocation of resources, careful use of those resources, and appropriate use of incentives to and partnerships with the regulated community) are effectively used to lower overall resource demands, compliance and enforcement program managers will maximize the overall impact of their programs. Moreover, as these tools are used to lower resource needs in one program area, managers will be able to expand into new program areas needing their attention. Revisions to overall program goals and objectives can then be made, updates to annual operating and multi-year capital budgets considered, and innovative strategies for funding newly implemented program areas developed. In this way, the cycle of program development, budgeting, and financing forms an iterative process, or continuous loop, which, over time, leads to ever more effective compliance and enforcement program development and implementation.

APPENDIX A: INDIVIDUAL FUNDING MECHANISMS AND EXAMPLES OF USE

This appendix details specific funding mechanisms that fall under each of the eight broad categories defined in Chapter 2 of this document. For each mechanism, the appendix provides a classification of the type of mechanism (general taxes, special taxes, user fees, fines and penalties, loans or other debt instruments, grants, voluntary mechanisms, or public-private partnerships), offers a brief description of the mechanism, and discusses advantages and limitations of the mechanism. In addition, this appendix provides a number of examples of each mechanism's application by individual countries worldwide. These examples are meant to illustrate the range of approaches taken by various countries and are not meant in any way to be a comprehensive listing of which countries employ particular mechanisms.

A.1 General Taxes

This section describes taxes that are placed upon the general public. General taxes include individual and corporate income taxes, real and personal property taxes, general sales and use taxes, general value added taxes, death and gift taxes, and generally applied import taxes. Each of these tax mechanisms are discussed below.

A.1.1 Individual Income Taxes

Type: General Tax.

Description: Taxes based on percentage of individual income earned.

Advantages: Relatively stable revenue base. It is possible to dedicate or earmark a percent of income tax to environmental programs with broad impact.

Limitations: No direct correlation between environmental programs and individual income taxes. In many areas, it is politically difficult to increase and/or dedicate income taxes to specific programs.

Country Examples — Individual Income Taxes

- **Brazil and Chile.** Individual income taxes imposed in Brazil and Chile aid in the financing of environmental compliance and enforcement programs.
 - **Sweden.** In 1991, Sweden implemented a tax reform that created a simpler and more “neutral” tax system and diminished the perceived disincentives of the very high marginal income taxes in Sweden. The marginal income tax was reduced to about 30 percent for some 80-90 percent of income earners and to about 50 percent for the remaining high income earners (as compared to a marginal tax rate of 73 percent in 1989 and 85 percent a few years earlier). At the same time, Sweden introduced a set of environmentally motivated taxes and increased their role in order to allow for the reduction in income taxes.
 - **South Africa.** Several general taxes are used in South Africa for funding environmental compliance and enforcement programs. Examples include individual income taxes, corporate income taxes, real estate taxes, value added taxes and death and gift taxes.
 - **United States.** States and counties in the United States typically use income taxes for general fund support, which includes environmental compliance and enforcement program management. Some states also earmark a share of the state income tax to local governments.
 - **Uruguay.** Environmental compliance and enforcement programs in Uruguay are financed through the country’s general budget. Mechanisms used to fund this budget include general taxes on income.
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A.1.2 Corporate Income Taxes

Type: General Tax.

Description: Taxes on the net income earned by corporations in a given jurisdiction.

Advantages: Relatively broad revenue base; tax can be charged at a relatively low rate and still generate significant revenues. Corporate income taxes could be dedicated to finance environmental programs that stem from the corporate activity itself. Can spread costs of environmental impacts of business activities to out-of-province/state consumers, adding pollution control to the overall costs of production.

Limitations: Implementing or increasing corporate tax rates may be politically difficult, since national and sub-national governments attempt to be competitive with other governments 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. Further, net income can vary widely from year to year, so it may not be a suitable revenue source for funding environmental programs that require a predictable stream of revenue. Finally, a corporate headquarters may be located in a different country or sub-national jurisdiction from its production activities, meaning that the revenues from the income tax may not go to the area that experiences environmental damage from the production activities.

Country Examples — Corporate Income Taxes

- **Brazil and Chile.** Corporate income taxes imposed in Brazil and Chile aid in the financing of compliance and enforcement programs.
- **Sweden.** Under the Swedish tax reform of 1991, Sweden reduced corporate income taxes and individual income taxes (see previous section). Between 1989 and 1991, the Swedish corporate income tax fell from 2.8 percent of gross domestic product to 1.9 percent of gross domestic product. To finance the reduction in income tax, the value added tax rate was increased and taxes on capital and energy were restructured and raised to higher average levels.
- **United States.** Normally in the United States, corporate income taxes are limited to state governments, but there is a federal tax on corporate income that provides funding for the federal Superfund for hazardous waste remediation. The State of Ohio dedicates 1.2 percent of its corporate income tax to litter control and recycling.

A.1.3 Real (Ad Valorem) Property Taxes

Type: General Tax.

Description: Charged to owners of real property, based on a percentage of the assessed property value.

Advantages: Large revenue base. A share of property taxes could be used for land-based environmental protection programs, or for improving infrastructure services, such as stormwater drainage

or wastewater treatment, or those activities directed at bringing industries and citizens into compliance with emissions requirements.

Limitations: No direct relationship between tax and polluting behavior. There also is generally substantial competition for property tax revenues.

Country Examples — Real (Ad Valorem) Property Taxes

- **Brazil and Chile.** Real property taxes are imposed in Brazil and Chile to fund environmental programs.
- **United States.** In the United States, real property taxes are generally limited to local, and to a lesser extent, state governments. Some dedicate specific percentages to environmental programs. For example, in June 1990, Dade County, Florida, dedicated over \$45 million in yearly revenues from a property tax increase to funding for local natural areas. Colorado's Cherry Creek Basin project relies a direct increase in property tax assessments. 1988 Legislation authorized a 0.50 mill (a mill is equal to one-tenth of a United States cent) tax increase on all property in the two counties and nine municipalities within the basin's boundaries. Revenue is to be used to construct artificial wetlands, channels, and sediment holding ponds to address the reservoir's nonpoint source pollution problems.

A.1.4 Personal (Tangible) Property Taxes

Type: General Tax.

Description: Charged on the assessed value of personal property. Sometimes limited to property worth more than a specified monetary value or to specific types of property, such as automobiles, large appliances, etc.

Advantages: Feasible to dedicate revenues from personal property taxes to mitigating negative environmental impacts of personal property use. For example, the revenues from a personal property tax on refrigerators could be used for freon disposal; revenues from a tax on lawnmowers and small engines could be used for small source emissions reduction. In addition, personal property taxes could be structured to encourage emissions reduction by discounting tax rates on high-efficiency appliances (e.g., heaters, refrigerators, air conditioners) and low-emissions vehicles. Depending on the structure of the tax, it may provide incentives for taxpayers to purchase higher efficiency appliances and low-emissions vehicles.

Limitations: Difficult to track ownership of personal property causing this tax to be hard to enforce. In addition, few governments have such systems in place, with the possible exception of automobiles, making the administrative costs of this tax high.

Country Examples — Personal (Tangible) Property Taxes

- **United States.** In the United States, the personal property tax is used by both state

and local governments. An example is the personal property tax on the value of motor vehicles in Arlington, Virginia. The revenues from the tax are used to support the general fund.

A.1.5 Sales and Use Taxes

Type: General Tax.

Description: Taxes on the sale of all or most goods or services sold in retail stores. May also be applied to sale of mail order goods.

Advantages: Potentially a relatively broad revenue base; a small percentage of the general sales tax can bring in significant revenues. Possible to dedicate a specified percentage of the sales and use tax for environmental programs. In addition, local levels of government can charge riders on existing taxes and dedicate them to environmental programs.

Limitations: No direct correlation between general sales tax and polluting behavior.

Country Examples — General Sales and Use Taxes

- **Brazil and Chile.** Sales and use taxes are imposed in Brazil and Chile, which aid in the financing of environmental compliance and enforcement programs.
- **United States.** The State of Missouri uses a portion of its general sales tax to fund soil conservation measures that include programs to reduce nonpoint source pollution. The money is placed in a soil tax fund and is used primarily for cost-share programs. Idaho also uses revenue from the state sales tax to fund a portion of its water pollution control activities. The Water Pollution Control Account is a dedicated fund that finances point and nonpoint source pollution programs. The majority of the money for the fund, \$4.8 million, comes from the state sales tax. The money finances the construction of wastewater treatment facilities and provides grants for agricultural pollution control projects.

Also see Selective Sales and Use Taxes under Special Taxes section for other targeted examples.

A.1.6 General Value Added Taxes

Type: General Tax.

Description: A form of consumption or sales taxation that is based on the addition to the value of consumer goods or services at each stage of production or distribution (normally rebatable, if exported). It is simply an alternative way of collecting a tax on consumption expenditure and does not tax a base different from other consumption taxes. Value added taxes resembles a sales tax in that each trader adds the tax to sale invoices issued and accounts for the tax so collected. However, the trader is permitted to deduct the amount of tax paid on

invoices received for goods and services (but not for wages and salaries).

Advantages: The value added tax 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. 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 value added tax is an appropriate consumption tax if tax evasion and lack of vendor cooperation is a problem. Value added taxes induce 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 will pay the tax because persons purchasing those items will demand tax receipts for credit purposes. The self-enforcing nature of value added taxes makes them attractive when the tax-compliance climate is weak. The value added tax is also appropriate for the easy removal of domestic taxes from items that will be sold in international trade. The chain of tax documentation produced by value added taxes makes this extraction simple, although it does not extract any taxes other than the value added tax.

Limitations: The European experience with value added tax shows that tax evasion still exists and delinquency continues to be a problem despite the self-enforcing nature of the tax. With a value added tax, there is no direct correlation to polluting behavior.

Country Examples — General Value Added Taxes

See Selective Value Added Taxes under the Special Taxes section for targeted examples.

A.1.7 Death and Gift (Inheritance) Taxes

Type: General Tax.

Description: Taxes on inherited property or on gifts worth more than a set amount.

Advantages: Broad revenue base. As has been done in some states in the United States, a portion of death and gift taxes could potentially be earmarked for general environmental programs, including compliance and enforcement programs.

Limitations: Limited correlation between tax and polluting behavior, except perhaps in relation to land inheritance and land-based environmental programs.

Country Examples — Death and Gift (Inheritance) Taxes

- **United States.** In the United States, state death and gift taxes are often dedicated to local government, pension funds, and local police and fire protection funds. Idaho uses a percentage of inheritance taxes to fund sewage treatment projects, agricultural nonpoint source pollution control, and part of the state's water program activities.
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A.2 Special Taxes

Special taxes are those taxes placed upon a specified set of products or against producers or consumers of a particular good or service. Examples of special taxes applied to environmental programs include fertilizer and pesticide taxes, severance taxes, selective sales and use taxes, selective value added taxes, import taxes, feedstock taxes, waste-end taxes, and hard-to-dispose taxes. Each of these special tax mechanisms are described in this section.

A.2.1 Fertilizer and Pesticide Taxes

Type: Special Tax.

Description: Taxes on fertilizer or pesticides, generally levied as a retail sales tax.

Advantages: In some countries, the tax can generate significant revenues because of the relatively large volume of fertilizers and pesticides used. The tax also may discourage excessive use of fertilizers or pesticides. This tax could fund remediation and enforcement of standards of agricultural nonpoint source pollution because of the impact of fertilizer and pesticide use on agricultural nonpoint source pollution. It could also be used to fund research into farming techniques that have reduced environmental impact, thereby increasing opportunities for voluntary compliance.

Limitations: Agricultural interests will oppose tax.

Country Examples — Fertilizer and Pesticide Taxes

- **Denmark.** As of April 1995, Denmark planned to introduce a 25 percent tax on pesticides (to commence in January 1996). The tax is designed to help Denmark meet its goal of cutting pesticide use in half by 1997. The tax, however, will be largely offset by a reduction in existing taxes on farmland. Ten percent of the revenue will be earmarked for research into organic farming.
- **Finland.** In Finland, a tax is charged on the nitrogen and phosphorus content of fertilizers. The rate varies between ECU 0.41 (US \$0.49, as of 1994) and 0.27 (US \$0.32, as of 1994) per kilogram and is equivalent to between 5 and 20 percent of the price of the fertilizer. The revenue collected from the tax is spent on agricultural subsidies and the general budget. Since implementation, there has been a decrease in the use of phosphorus, but this may be due to other policy instruments as well.

- **Organization for Economic Co-operation and Development Countries.** The Organization for Economic Co-operation and Development countries that levy fertilizer charges include **Austria, Finland, Norway, Sweden and the United States.** The charges range between 2.5 and 20 percent of the price. Norway and Sweden also levy charges on pesticides.
 - **Sweden.** Artificial fertilizers and pesticides used in agriculture have been subject to a product charge since 1984. The rates on fertilizers are SEK 0.60 (US \$0.08, as of 1994) per kilogram of nitrogen and SEK 1.20 (US \$0.16, as of 1994) per kilogram of phosphorus. This represents about 10 percent of the price of the most widely used types of fertilizers. The Swedish Board of Agriculture calculated that the optimum input level of nitrogen fertilizer falls by 10 to 15 percent at the prevailing 30 percent charge rate (the environmental charge plus the price regulation charge). In reality, the use of nitrogen has fallen less. The charge on pesticides is SEK 8 (US \$1.04, as of 1994) per kilogram of active substances. This is about 5 percent of the present price level. The revenues from these taxes are earmarked for environmental research, agricultural advisory service, counter-acidification measures, and other measures to reduce the overall volume of fertilizers and pesticides used.
-

A.2.2 Import Taxes

Type: Special Tax.

Description: Taxes on goods that are manufactured internationally and sold domestically.

Advantages: Import taxes can be increased for goods that are environmentally harmful and lowered for goods that aid in environmental protection or pollution control.

Limitations: If set too high, import taxes may inhibit competition.

Country Examples — Import Taxes

- **Brazil and Chile.** Import tariffs aid in providing revenue for compliance and enforcement programs in Brazil and Chile.
- **India.** In India, a customs duty is levied on a variety of equipment, machinery and capital goods.
- **Norway.** In Norway, an import tax is levied on road motor vehicles. To encourage environmental conservation, electric vehicles are exempt. The average import tax is approximately Nkr 70,000 (US \$10,939, as of 1995) per car.
- **Regional Europe.** Import duties are uniform within the European Community. The present situation, in which a lower rate is imposed on raw materials than on finished products, has a positive environmental impact, because production processes in the West are usually cleaner than in developing countries. On the other

hand, a relatively low price for raw materials discourages recycling. In January of 1994, Tran Van Thinh of France, Dean of European Union Ambassadors to the General Agreement on Tariffs and Trade presented the idea of introducing a uniform levy of 0.25 percent ad valorem on all imports of goods on which customs duties are collected. The money collected would be used to help finance “green” programs in developing countries and promise the transfer of environment related technology to those nations. Asian and Latin American officials viewed this tariff as discriminatory because domestic goods would not be taxed.

A.2.3 Selective Sales and Use Taxes

Type: Special Tax.

Description: Taxes on particular goods and services (May also be applied to sale of mail order goods.). In the case of environmental compliance and enforcement, taxed items could include fuel, automobiles, fast food packaging, disposable beverage containers, water, and oil.

Advantages: Potentially a relatively broad revenue base, depending upon the particular goods and services that are selected to be taxed. Sales taxes on fuels discourages the use of fuels with harmful emissions. Direct correlation between use of fuels and the environmental impact. Possible to dedicate a specified percentage of the sales and use tax for environmental compliance and enforcement programs. In addition, local levels of government can charge riders on the existing tax and dedicate them to environmental programs.

Limitations: Taxes often face strong political opposition. Instituting new taxes normally requires legislative approval.

Country Examples — Selective Sales and Use Taxes

- **Denmark.** In the early 1990’s, the Danish government introduced a CO₂ tax on fuel. Then, in the spring of 1995, the Danish government proposed new taxes on CO₂ and SO₂. The taxes are waiting approval (as of April 19, 1995) by the European Commission and will likely be challenged by Danish companies in the European Court of Justice. The new CO₂ tax raises the already established levy of 50 Danish Kroner (US \$8.59) per ton to 90 DKR per ton (US \$15.46) by the year 2000. The proposed SO₂ tax is 10 DKR (US \$1.72) per kilogram and will apply to all fuels. It is intended that all money earned from the tax be returned to industry in the form of investment credits.
- **Germany.** Germany currently imposes a differentiated taxation system on leaded and lead-free (unleaded) gasoline. In addition, tax differentials are imposed on cars that depend on emissions. The categories of emissions are low emissions, reduced emissions, and regular emissions. The tax differential has increased from DM 0.04 to DM 0.10 (US \$0.03 to US \$0.68, 1995). The purpose of this tax was to increase the share of “clean cars” — both new models and retrofitted “old” cars and to increase the use of lead-free gasoline use. Also, in June of 1995, the German

Economics Minister, Gunter Rexrodt, was quoted as saying that he would support a national CO₂ energy tax if other leading industrialized countries (European Union members, United States, and Japan) could not agree soon on a global solution.

Country Examples — Selective Sales and Use Taxes

- The City of Kassel in **Germany** implements a local tax on fast food one-way packaging. In Germany, municipalities have no powers to levy environmental charges, unless Federal laws and Lander (political equivalent of provinces or states) laws have not comprehensively regulated specific environmental problems which may affect cities and municipalities. In the Federal Administrative Court it was decided that this was the case for the City of Kassel's one-way package tax.
- **Greece.** In Greece, the sale of cars are taxed differentially according to the degree of compliance with emission standards.
- **Israel.** In Israel, a tax is imposed on the sale of all disposable beverage containers. It constitutes 0.25 percent of disposable beverage sales. The revenues are paid into the Cleanliness Fund and are used to finance cleanup campaigns, educational programs, and the entire enforcement infrastructure of the Maintenance of Cleanliness Law.
- **Sweden.** Since 1993, new vehicles have been subject to a sales tax that is levied according to weight and differentiated according to environmental qualities, such as noise and emissions. The rate charged is between ECU 237 (US \$282, as of 1994) and ECU 474 (US \$563, as of 1994) depending upon the degree of compliance with emissions standards.)

A CO₂ tax also is levied on the average carbon content and calorific values of oil, coal, natural gas, liquefied petroleum gas, gasoline, and fuel for domestic air transportation. An SO₂ tax is levied on the sulfur content in oil, coal, and peat. The incentive is to discourage the use of fuels with CO₂ and SO₂ emissions.

- **Thailand.** A differential excise tax on leaded versus unleaded gasoline is charged in Thailand. The tax is designed to encourage drivers to choose the no-lead alternative.
 - **United States.** In the State of New Jersey, a 1 cent per 1,000 gallon water tax raises \$3 million per year for research, program administration, and enforcement of drinking water standards.
 - **Finland, France, Italy, Norway, and the United States.** All five of these countries places taxes on lubricant oil. In all, except Norway, the revenues are dedicated to waste oil treatment. Norway places its revenues in the general budget. The charge is generally too low to create incentive effects in any of the countries. The taxes are intended as revenue raising instruments to finance waste oil treatment only.
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A.2.4 Severance Taxes

Type: Special Tax.

Description: Taxes on natural resources extracted from the land or water. Examples of severance taxes include the following:

- Water/Groundwater Withdrawal Taxes (based on volume of water withdrawn).
- Oyster/Shellfish Taxes (based on volume or value of shellfish harvested).
- Timber Taxes (based on volume of timber logged).
- Fuel/Mineral Taxes (based on volume of oil, gas, or minerals extracted).

Advantages: Severance taxes can be directly dedicated to activities that will mitigate the environmental impacts of natural resource extraction, such as habitat restoration. Spreads costs of remedying impact of extraction activities to businesses that engage in them, or to consumers; essentially, adds the cost of pollution control and remediation to the cost of resource extraction.

Limitations: By definition, severance tax revenues depend on the level of extraction activity. If the tax base fluctuates, the tax may not be suitable for funding environmental programs that require a stable revenue source.

Country Examples—Severance Taxes

- **Estonia.** Estonia has a system of taxes for using and protecting such natural resources as water, oil shale, timber, sand, clay, gravel, and peat. After a 1991 assessment, the country decided that the tax system for these resources did not reflect their true market value. In addition to restructuring the tax so that the true market values of these resources were reflected, other resources (e.g., land) were added to the system.
- **Indonesia.** Two primary fees on the logging industry in Indonesia have been the “reforestation” levy, recently raised from US \$10 per cubic meter to US \$15, and the forest products “royalty” payments, which amount to about 6 percent of the deliverable price of logs. Funds from the reforestation levy are earmarked for, and managed by, the Ministry of Forestry. This fund has been used to support the “re-greening” program for critical watershed areas and the reforestation of logged-over land where the concession owner has not properly carried out a replanting program.
- **Israel.** Quarry operators pay a tax calculated according to the type and quantity of material quarried and sold. Income from the levy is allocated to the Quarry Restoration Fund and is administered by the Ministry of Industry and Commerce. This is a dedicated fund which finances restoration of abandoned quarries.
- **Lithuania.** One of Lithuania’s new practices is subjecting the use of natural resources to a tax. Since all natural resources are, as stated in Article 45 of the Provisional Basic Law of the Republic of Lithuania, “the national wealth and exclusive property of the Republic of Lithuania,” the use of these resources requires

compensation to the state in accordance with their assessed value. Revenue accumulated from such taxes will serve to offset state expenditures required to monitor the use of the remaining supply of natural resources.

- **Poland.** Poland also places a charge on mined minerals. The charge is assessed on industry at the input stage and is intended to encourage firms to recycle raw materials or use them more efficiently. The tax aids in the reduction of environmental hazards that are posed in the manufacture, use, or disposal of certain raw materials.
 - **United States.** Severance taxes are employed primarily at the state level in the United States. Although severance taxes are levied in 38 states, they are not a major source of revenue, accounting for only between one and two percent of total state general revenues. However, severance taxes are a significant source of revenue in a few states, such as Alaska, Louisiana, Texas, and Wyoming.
 - **Vietnam.** In Vietnam, the exploitation of petroleum and gas is subject to a 0.5 percent tax on the volume extracted. Additionally, the mineral resources of metal minerals, non-metal minerals, and coal and peat are subject to 0.4 percent, 0.3 percent, and 0.2 percent taxes on the volume extracted, respectively.
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A.2.5 Feedstock (Front-End) Taxes

Type: Special Tax.

Description: Taxes on the primary chemicals that produce hazardous products and ultimately hazardous wastes.

Advantages: Since a large volume of petrochemicals are used in several countries, the tax can generate significant revenues even at low rates. The tax is directly correlated to the activities it will be used to finance, and may encourage manufacturers to substitute less hazardous chemicals where possible. This encouragement fosters voluntary compliance with pollution control regulations. The tax could be used to fund any activities or enforcement measures that address problems or issues raised by the use of these substances.

Limitations: If waste-end taxes are also charged on end products, generators could be taxed twice.

Country Examples—Feedstock (Front-End) Taxes

- **United States.** In the United States, taxes on chemical feedstocks are a source of revenue for Superfund, a national program to remediate hazardous waste sites. The taxes on chemical feedstocks range from \$0.24 to \$4.87 per ton. Some states also levy taxes on petroleum and chemical feedstocks, dedicating the revenues to state hazardous water cleanup funds. An example is New Jersey.
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A.2.6 Waste-End Taxes

Type: Special Tax.

Description: Waste-end taxes are charged on hazardous waste after generation. They may be assessed against waste generators, transporters, storers, treaters, or disposal facility operators. The tax may be calculated based on a flat rate; on the volume of waste disposed, stored, or transported; on a combination of volume and toxicity of the waste; or the kind of disposal method.

Advantages: Encourages waste reduction. Tax also can be structured to encourage the use of particular disposal methods. Waste-end taxes can be used to finance hazardous waste compliance and enforcement programs.

Limitations: Depending on type of waste, waste-end taxes may have a small revenue base.

Country Examples—Waste-End Taxes

- **Organization for Economic Co-operation and Development Countries.** The Organization for Economic Co-operation and Development countries that levy charges on hazardous waste include **Australia, Austria, Belgium, Finland, Portugal, and the United States.** In all countries, the charge is volume-based. Generally, the rates are considered too low to produce significant incentive effects.
- **United States.** It is estimated that hazardous wastes are generated in the United States at a rate of 700,000 tons per day. To fund their hazardous waste regulatory costs and their contribution to the clean up costs of abandoned sites, many states have implemented hazardous waste disposal facility charges. Some of these charges are structured to encourage preferred disposal methods.

A.2.7 Hard-to-Dispose Taxes

Type: Special Tax.

Description: Taxes on hard-to-dispose items that contribute heavily to solid or hazardous waste disposal problems, including tires, batteries, mattresses, fast food containers, new cars, and oil. The taxes can be assessed at a flat rate per item, or as a percentage of the value of the taxed items.

Advantages: Taxes could be imposed on any item contributing to a landfill problem, such as diapers, or on surrogates for landfill use, such as plastic garbage bags. Encourages consumers to conserve taxed commodities, which saves landfill space and reduces impacts of hazardous waste disposal. A tax also could be structured to encourage recycling of reusable commodities.

Limitations: May be administratively difficult to separate out specific commodities for taxation.

Country Examples — Hard-to-Dispose Taxes

- **Canada.** Canada charges a 6 to 7 percent tax on disposable diapers. The revenue is allocated to the general budget, not a dedicated fund. A tax is also charged on car tires at a rate of ECU 1.1 to 2.8 per tire (US \$1.31 to \$3.33, as of 1994). The revenue from this tax is allocated to both the general budget and dedicated funds.
 - **Denmark.** As of April 1995, Denmark planned to introduce a number of new environmental taxes starting January 1, 1996. The government has received approval from parliament for a tax on rechargeable nickel-cadmium batteries and lead batteries for automobiles. The nickel-cadmium batteries will be taxed at 6 kroner per battery (US \$1) and lead batteries at 20 kroner (US \$3.30) each. The revenue from both taxes will go towards a bonus system rewarding customers for returning used batteries. This bonus system encourages voluntary compliance with regulations governing the disposal of batteries.
 - **Italy.** Italy places a tax on lead batteries and lubricating oil at their time of sale. The objective of the taxes is to finance the collection and recycling of the batteries and oil.
 - **Sweden.** Since 1987, batteries have been subject to a tax in Sweden. The levy is based on the weight and type of battery. Batteries are exempt if the total content of mercury oxides and cadmium is less than 0.025 percent of the battery weight. The revenues from the tax are used to finance various activities to collect and process scrapped batteries. The charge levels were calculated so as to cover the costs of final disposal as well as the costs of providing information to the public regarding these charges.
-

A.2.8 Selective Value Added Taxes

Type: Special Tax.

Description: Selective value added taxes are similar to *general* value added taxes but are targeted to particular products or services. Selective value added taxes are a form of consumption or sales taxation that is based on the addition to the value of *particular* consumer goods or services at each stage of production or distribution. Selective value added taxes resemble selective sales and use taxes in that the targeted trader adds the tax to sale invoices issued and accounts for the tax so collected.

Advantages: Selective value added tax are multistage taxes that produce a burden equivalent to that of a single-stage retail selective sales tax. The selective value added tax base for any firm, in the production-distribution process, will equal its value-added to the targeted goods and services — the difference between the value of its sales of the targeted goods and services and the value of its purchases of materials to produce the targeted goods and services — instead of simply the value of its sales of the targeted goods and services. The selective value added tax on targeted goods and services also enables at least an indirect correlation to polluting behavior.

Limitations: The European experience with imposition of selective value added taxes shows that tax evasion still exists and delinquency continues to be a problem despite the self-enforcing

nature of the selective value added tax.

Country Examples — Selective Value Added Taxes

- **Great Britain and Northern Ireland (United Kingdom).** The United Kingdom places a selective value added tax on fuel. It has not, however, been clearly demonstrated in the United Kingdom that increasing the price of petrol reduces the cars on the number of cars on the road.
 - **Sweden.** Since March of 1990, a selective value added tax has existed for energy generating fuels in Sweden. The rate is 25 percent of the energy price, including excise taxes. Fuels used in air transportation are exempted from the value added tax. The base of the value added tax is frequently broadened to increase tax revenues.
 - **Organization for Economic Co-operation and Development Countries.** Many Organization for Economic Co-operation and Development countries, with the exception of Australia and the United States, impose a value added tax on motor fuel. The value added tax ranges from three percent in **Japan** to 25 percent in **Sweden** and **Denmark**.
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A.3 User Fees And Charges

User fees and charges can be divided into two categories:

1. Fees and charges applied on a fee for service basis.
2. Fees and charges applied on a quantified impact basis.

Within each category, there are a number of specific mechanisms. These mechanisms are described below.

A.3.1 Fees Applied on a Fee for Service Basis

Examples of fees applied on a fee for service basis include utility charges, connection fees, facility permit and monitoring fees, application processing fees, inspection and certification fees, recreational fees, license fees, and product registration and inspection fees.

Utility Charges

Type: User Fees and Charges — Fees Applied on a Fee for Service Basis.

Description: Fees charged to customers for the receipt of a specific service, such as drinking water, wastewater treatment, or stormwater drainage.

Advantages: Potentially broad revenue base; most utilities provide services that all residents require. As a result, small increases in utility rates can raise significant revenues while imposing a

relatively small burden on households. Can be used to cover the full cost of providing the service in question or government may subsidize the cost of such service (and hence maintain low rates), for example, by using general revenues to cover capital costs. User fees can then be set to cover operating costs only. If, instead, laws allow fees to be charged to cover the full cost of service provision then utility fees can be raised to cover the capital costs associated with such services.

Limitations: Some areas may be accustomed to a subsidized rate, making rate increases difficult. In small or economically disadvantaged communities, reliance on user charges for capital financing and operations and maintenance costs may not be affordable.

Country Examples — Utility Charges

- **Argentina, Brazil, and Chile.** Environmental compliance and enforcement programs are generally financed by the polluter in Argentina, Brazil, and Chile. Utility charges are imposed for the use of water and sewer systems.
- **Denmark.** Since passage of the 1907 Sewer Act, Denmark has charged user fees for the public sewage treatment system. However, since there were no mandatory guidelines established, the system evolved in differing ways across municipalities. In some municipalities, the user fee system was abolished and general taxes cover the cost of public sewage treatment. The approval of the Plan for the Aquatic Environment, in 1987, replaced optional guidelines with mandatory guidelines. The Pollution Council, however, found the system of user fees for provision of sewage treatment insufficient to provide incentives. The lack of incentives meant that industries discharging into fresh or marine waters obtained substantial advantages compared with firms served by public sewage networks.

Country Examples — Utility Charges (*Continued*)

- **Hong Kong.** The government of Hong Kong has decided to impose waste disposal charges incorporating the “polluter pays principle” to cover costs associated with sewage, chemical waste, and solid waste disposal. As of September 1994, it was determined that initial charges would be set to achieve partial cost recovery. After producers have become accustomed to the charge arrangements, gradual increases in charges to full cost recovery may be considered.
- **Hungary.** User charges are imposed on both water and wastewater in Hungary. These charges apply to both households and companies. Companies, however, are charged 30 percent more. Moreover, many multiple household buildings lack meters and therefore there is no incentive to conserve.
- **Israel.** Israel has implemented user fees to cover sewage treatment and garbage collection. The sewage fee is based on the amount of water used by each consumer and is included in the water bill. The revenues are used for maintaining the sewage system. By law, the fees are set at a level appropriate for running the sewage system as a closed system; however, the fees are often used to finance other municipal activities. The garbage collection fee is usually incorporated into the annual municipal tax assessment. As a result, the consumer cannot attach a specific value to

the service and there is no incentive for reducing waste volume or recycling.

- **South Korea.** In South Korea, user charges cover the costs of operation and maintenance for water supply and sewage treatment. These charges are referred to as water tariffs and sewerage tariffs. Supplemented by foreign and local loans, revenues from water tariffs have allowed the sector to satisfy increasing water demand so that only a few cities now have water shortages. In 1987, sewerage tariffs were being used in over 52 cities but averaged only 30 to 40 percent of water tariffs. However, by January 1992, these tariffs were expected to generate a large enough rate of return to also finance a portion of capital expenditures.
 - **South Africa.** In South Africa, utility charges are imposed to aid in the financing of environmental compliance and enforcement program activities.
 - **Thailand.** Provincial and local agencies in Thailand are authorized to develop and operate wastewater systems and to assess service charges in the areas affected by these systems. At a May 1995 seminar, reports were presented that conclude that increasing fees to pay for improved environmental management has mixed support from the Thai public. The studies showed that most Thai people surveyed were ready to pay higher entrance fees for national parks if the money were used to preserve the park and improve facilities, but the majority of people said they were willing to pay only a fraction of the true costs needed to supply homes with potable drinking water and wastewater services.
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Connection Fees

Type: User Fees and Charges — Fees Applied on a Fee for Service Basis.

Description: Charged to property owners for connection to a municipal utility. Possible uses include hook-up fees and new connection fees to water supply services and wastewater collection systems.

Advantages: Requires new residents to pay for extension of services to them. Charging connection fees allows general revenues that often subsidize these activities to be used for other purposes.

Limitations: Provides funds only at time of new customer's arrival or upon system development, not in advance of the need for capacity.

Country Examples — Connection Fees

- **Argentina, Brazil, and Chile.** Connection fees are imposed to aid in the financing of environmental compliance and enforcement program activities in Argentina, Brazil, and Chile.
- **United States.** The State of New Jersey's Bureau of Safe Drinking Water charges a connection fee to industries for connections to their own source of water. The fee is a flat \$200 for all types of industries. Massachusetts also assesses a connection fee

of \$25 per device. The fee, in Massachusetts, raised \$261,000 in 1990, 11 percent of the state's total drinking water budget. Revenue raised from the connection fee is considered to be equal to the cost of administering the program. However, fee revenues are not earmarked for the program, but are deposited into the general fund.

Facility Permit and Monitoring Fees

Type: User Fees and Charges — Fees Applied on a Fee for Service Basis.

Description: Charged to a company or individual for the privilege of operating a facility or for associated monitoring activities. Examples include drinking water monitoring fees, solid waste facility fees, hazardous waste facility fees, and underground storage tank facility fees. In addition, governmental monitoring of privatized water supply plants, solid waste disposal facilities, vehicle emissions inspection facilities, and other privately operated facilities could be financed by facility permit fees.

Advantages: In addition to revenues, such fees provide a means of tracking which facilities are engaged in environmentally-sensitive activities.

Limitations: If set too high, fees may discourage private companies from owning and operating environmental facilities. In some countries, this may discourage successful privatization of wastewater treatment plants, for example.

Country Examples — Facility Permit and Monitoring Fees

- **Brazil.** Facility and permit monitoring fees are imposed to aid in the financing of environmental compliance and enforcement program activities in Brazil.
- **Canada.** On July 1, 1992, in British Columbia, Canada, the Waste Management Permit Fee Regulation was amended to incorporate the principles of equity, polluter pay, cost recovery, and reinvestment. These principles ensure all dischargers are treated equally; higher fees are charged for discharges of higher environmental risk; administrative costs of the permit fees program are covered; and funds are available for initiatives that address environmental problems.

The permit fee system consists of an annual permit fee and a variable permit fee. The annual fee covers administrative costs for applications, approvals, and amendments to permits. The variable permit fee is calculated based on the quantity of discharge and its risk to the environment. Amendments to the Waste Management Permit Fee Regulation developed a contaminant weighting scheme for this purpose. In addition, because of uncertainty in the contaminant weightings, fee caps were established to moderate the fee per ton on more hazardous compounds.

- **Denmark.** Denmark's 1949 Water Course Act subjected direct industrial dischargers to a permit procedure. In 1973, Denmark's Environmental Protection Act required that every discharger obtain a permit. Permits under the 1949 Act still remained in force. In 1972, fewer than ten firms were responsible for 80 percent of the direct industrial discharges of organic pollutants, and several of these were

already licensed under the 1949 Act.

- **New Zealand.** In New Zealand, regional councils recover the full cost of any consent (permit) compliance monitoring programs from consent holders. The councils have a policy to recover the full cost of enforcement wherever possible in order to implement a “polluter pays” concept.
- **Philippines.** In the Philippines, a fee is applied to construct and operate the following facilities:
 - Wastewater treatment facilities.
 - Air pollution sources and control facilities (dust collectors, washers, scrubbers, bag filters and other similar equipment).
 - Steam boilers.
 - Oven roasters, incinerators, furnaces and other similar equipment.

Country Examples — Facility Permit/Monitoring Fees (*Continued*)

The fee to construct varies from P100 (US \$3.86) to P500 (US \$19.31) for the facilities mentioned above. The fee to operate varies from P100 (US \$3.86) to P200 (US \$7.82) for the facilities mentioned above. These fees vary depending on discharge (m³/day - wastewater treatment facilities), emissions (cu.m./minute - air pollution sources and control facilities), horsepower (steam boilers), and area (square meters - ovens, roaster, etc.).

Most industries are subject to the fees. Exemptions apply to some septic and drainage field systems, air conditioning systems, transportation sources, some incinerators in family dwellings, and some specified equipment.

- **The Netherlands.** The Surface Waters Pollution Act requires permits for dischargers be issued by regional water authorities based on national standards. There is central supervision of the permitting procedure and all permits issued by the water authorities are based on national standards. RIZA, the National Institute of Sewage Technology, accumulates an overview of the available abatement technologies in the country and can provide a basis for approving permits for similar firms. However, RIZA does not formally partake in the permit decision making by the local water authorities.

Application and Processing Fees

Type: User Fees and Charges — Fees Applied on a Fee for Service Basis.

Description: Application and processing fees are charged for processing costs associated with the initial permitting of a facility or other permitted location.

Advantages: Environmental programs can use permit application fees to cover the initial administrative costs associated with permit writing and issuance. The fees may cover some or all of the start-up costs associated with the permit application process.

Limitations: Unless permit renewal fees are also charged, revenues will drop off when most facilities or businesses have been permitted.

Country Examples — Application and Processing Fees

- **Canada.** Under previous regulations, an *application* fee equal to one year's *annual* permit fee was required at the time of application for the operating permit. Under amendments to the Waste Management Fee Regulation that became effective in July of 1992 (see Canada, Facility Permit and Monitoring Fee section), the application fee is \$100 plus 10 percent of the annual variable fee, as determined by the quantity and quality of the discharge in the application. The application fee is capped at \$50,000. The purpose of an application fee is to prevent unnecessary work for the Ministry of Environment, Land and Parks on frivolous applications, and to recover some of the costs incurred in administering and processing applications. However, the Ministry notes that the 90 percent reduction and the \$50,000 cap in the application fee results in permit applicants being subsidized by existing permittees.
 - **New Zealand.** The regional councils charge consent (permit) applicants the full costs (plus expenses) for processing consent applications, including investigations, hearings, and any legal costs. The councils also have a policy that they recover the full cost of enforcement wherever possible in order to implement a "polluter pays" concept.
 - **United States.** In the United States, both state and local governments use permitting fees to cover the initial administrative costs associated with permit writing and issuance. Examples of this type of fee include state implemented National Pollutant Discharge Elimination System permit application fees, state air emissions source permit application fees, and wetlands permit application fees (in Maine, New Jersey, Wisconsin, Maryland, and other states).
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Inspection and Certification Fees

Type: User Fees and Charges — Fees Applied on a Fee for Service Basis.

Description: Charged for certifying or inspecting construction plans, operators, or outputs of facilities which have an impact on the environment. Governments can charge a variety of inspection and certification fees. Examples include:

- Construction Permit/Plan Review Fees.
- Solid and Hazardous Waste Facility Operator Certification Fees.
- Underground Storage Tank Installer Certification Fees.
- Septic Tank Installer Certification Fees.
- Laboratory Certification Fees.
- Emissions Inspection Fees.

In addition to planning, reviewing and processing costs, construction inspection fees can pay for public notification or mitigation of runoff/erosion problems associated with the construction process. Laboratory fee revenues can pay for oversight of privately operated

environmental monitoring facilities, such as private air emissions inspection contractors.

Advantages: Construction certification fees give advance warning of potentially damaging construction, as well as the funds to analyze the extent of the potential impact. Laboratory and operator certification fees allow the government to maintain some oversight of 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 licensing or the costs of a construction permit.

Country Examples — Inspection and Certification Fees

- **South Africa.** In South Africa, inspection/certification fees are imposed and utilized for the financing of environmental compliance and enforcement program activities.
- **United States.** The State of Arkansas charges water system plan review fees. The fee is equal to 1 percent of construction cost and is a one-time fee to review construction plans for all public water systems. Ohio also makes extensive use of these fees to fund its drinking water program. The state's program fees include plan review, lab certification, and operator certification. Revenue generated defrays the costs of administering each program component. In 1990, these fees generated \$378,000 and accounted for nearly 13 percent of the total drinking water program budget.

Recreational Fees

Type: User Fees and Charges — Fees Applied on a Fee for Service Basis.

Description: Examples of recreational fees include charges for the privilege of mooring boats on provincial/state waters, or for using regional parks and campgrounds. Mooring fees can be used to finance port operations, boat safety programs, and pumpout facilities.

Advantages: Untapped revenue source in many countries. Allows the government to use general funds for remediation and other activities, instead of recreational provisions; allows general revenues to be used for other purposes.

Limitations: May be difficult to institute recreational fees if use of province/state water and park use has historically been free. May have a disproportionate impact on lower income segments of the population, who may have few other low cost recreational opportunities.

Country Examples — Recreational Fees

- **United States.** Both state and local governments in the United States use mooring fees for a variety of purposes. Some local governments charge mooring fees only at municipal marinas operated by regional port authorities, where fee revenues fi-

nance port operations. For example, Delaware charges a \$1.50 per square foot fee for private docks on state waters, which partially funds the state's boat safety program. Both state and local governments also charge fees for park use, with Arizona's park user fees generating over \$1 million in yearly revenue for park operating costs.

License Fees

Type: User Fees and Charges — Fees Applied on a Fee for Service Basis.

Description: Fees charged to a company or individual for the privilege of engaging in an activity. Examples include business license fees and pesticide applicators' license fees.

Advantages: Most license fees have a built-in enforcement mechanism; the licensing government can revoke the privilege granted with the license if fees are not paid. License fees can be used to finance administrative and enforcement costs associated with related government activities. License revenues could also be used to cover the costs of environmental programs associated with the licensed activity.

Limitations: 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.

Country Examples — License Fees

- **Albania.** In January of 1993, Parliament approved a new law on environmental protection, which compels those who develop economic and social activities which influence the environment to get licenses from the responsible authorities.
- **Brazil.** License fees are imposed in Brazil to assist in the financing of environmental compliance and enforcement programs.
- **Nepal.** The Ministry of Industry in Nepal charges license fees to facilities that use finite natural resources in aid of industry's industrial process (e.g., either water or as a waste disposal sink). All money collected is deposited in the Pollution Prevention Fund which is used to assist industry in achieving environmental standards. During the 18-month term of the license, the owner or operator of each facility that is not in compliance with the generic standards must develop a compliance plan, reflecting steady progress toward the goal of meeting the generic standards. Following the 18-month period and approval of a compliance plan, a license is issued for a 3-year period. Those facilities in compliance at the end of the 3-year period receive a tax reduction of up to 50 percent of the cost of installed pollution prevention equipment.
- **Poland.** As of 1991, Poland charges a license fee for the temporary right to mine minerals from a given deposit or designated area.
- **United States.** The State of Maryland charges \$5 per individual and \$250 per boat for sport fishing license fees. The fee raises \$600,000 per year for fisheries management.

- **Uruguay.** In Uruguay, licensing fees aid in the financing of environmental enforcement and compliance programs.
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Product Registration and Inspection Fees

Type: User Fees and Charges — Fees Applied on a Fee for Service Basis.

Description: Charged for the registration and/or inspection of particular products that have some environmental impact, such as fertilizers and pesticides.

Advantages: Discourages polluting behavior; any environmentally-sensitive product could be registered. For example, a registration fee could be charged for each quart of motor oil sold, with a rebate if recycled motor oil is brought in at time of purchase. The rebate aids in enforcement through encouraging voluntary compliance.

Limitations: May face opposition from agricultural lobbies.

Country Examples — Product Registration and Inspection Fees

- **China.** China's Environmental Protection Bureau is planning to collect registration fees for chemical imports as part of the country's environmental controls (as an alternative to an import tax). The Bureau is considering charging US \$200-\$10,000 in "chemical products quality provision" fees for each chemical imported. The fees were part of China's environmental control rules, written in June 1994. The three fee categories include:
 - \$10,000 for acrylonitrile and other highly toxic chemicals.
 - \$2,000 for non-toxic chemicals, such as ethylene oxides, printing ink, dyes, and cosmetic ingredients.
 - \$200 - \$1,500 for solutions, additives, sprays, and other chemical products.

In order to collect the fees, the Bureau requires that exporter's register data for the manufacture of chemicals, their properties, and specifications. The import fees for Chinese companies are discounted by one-tenth of the fee structure.

A.3.2 Fees Applied on a Quantified Impact Basis

Fees applied on a quantified impact basis are those that are assessed according to the effect, measured by either quantity or quality, that the pollutants have on the environment. Examples of these fees include emissions/discharge-based fees, impact fees, disposal fees, and transport fees.

Emission/Discharge-Based Fees

Type: User Fees and Charges — Fees Applied on a Quantified Impact Basis.

Description: Charged on the volume of pollutants emitted into the atmosphere or discharged into waterbodies. Includes emissions fees where permitted sources are charged per ton of pollutant emitted and fees are charged based on volume and/or toxicity of discharges. Fees also can be charged to users of municipal wastewater systems for pretreatment of particular types of waste. In addition, emissions-based permits could be extended to small sources that are not generally covered by permit regulations, but because of overall volume, represent a large share of overall emissions. The concept of discharge-based permits could also be extended to agricultural nonpoint source control, estimated by land size or other measures of each property owner's contribution to the runoff problem.

Advantages: Provides incentive to reduce emissions or discharges. The charge is proportional to pollution caused.

Limitations: Although sources can be required to monitor their own emissions, cost of compliance and enforcement can be high. Depending on the structure of the fee, it may not always represent a polluter's contribution to the environmental problem.

Country Examples — Emission/Discharge-Based Fees

- **Brazil.** Emissions/discharge-based fees are imposed in Brazil and assist in the financing of environmental compliance and enforcement programs.
- **China.** Since the late 1970s, China has implemented a system of pollution charges. In the mid 1980s, the system of pollution charges became a comprehensive and nationwide system. The system of pollution charges has more than one hundred charge rates for five categories of pollution: sewage, waste gas, noise, radioactive waste, and solid waste. The charges are imposed in accordance with established standards. The system of pollution charges is an economic means to make polluting enterprises manage, prevent, abate or eliminate the discharge of pollutants.

There are two types of pollution charges designated by the pollution discharge standards, namely, the exceeding-standard pollution charge, the most common type, and the general pollution charge, an auxiliary type. The system of pollution charges is based on exceeding-standard pollution charges that are:

- Set slightly higher than the operating costs of pollution reduction equipment and include the depreciation of the lump sum investment for equipment. This prevents the polluter from paying the charge rather than taking pollution reduction measures.
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- Based on the quantity and quality of the discharge.
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- Scientifically rational and easily enforceable.

The Interim Procedures on Pollution Charges stipulates that the pollution charges levied must be brought into the budget and managed as a special fund, which cannot be shared. The pollution charges should be mainly expended on subsidizing key polluting units for controlling pollution sources and comprehensive control

measures of the environmental pollution.

From 1979 to 1992, 15.7 billion Yuan (US \$1.9 billion) was collected in pollution charges. However, in the past 18 years (from 1992), only 3.0 billion Yuan (US \$360 million) in pollution charges were spent in the development of environmental protection. Of that amount, 1.84 billion Yuan (US \$221 million) were used as subsidies for purchase of monitoring equipment and operational procedures, and 1.16 billion Yuan (US \$139 million) for education and personnel training in environmental protection.

Country Examples — Emission/Discharge-Based Fees (*Continued*)

- **Czech Republic.** Previously, wastewater charges and air pollution fees were assessed in the Czech Republic and deposited into earmarked funds (State Water Management Fund and the Air Protection Fund). The funds were established to stimulate air pollution abatement by changing technologies; reduce water pollution and support end of pipe solutions; and centralize financial means and use them to finance activities in all sectors of the economy. However, in 1991, the State Fund for the Environment was created and substituted for the previous funds. This single fund handles the support of investment and non-investment measures for the protection of the environment. It includes water, air, nature, landscape and soil purity, and waste handling.
- **Estonia.** Estonia charges fees for regular confirmed emissions of wastes, based on health standards. The fees are based on the volume and toxicity of the emissions, and size and type of land use of the polluted area. The fees collected from polluting enterprises, agricultural farms, the army, etc. form the revenues of the Estonian Environmental Fund. The fund is used for compensating damages caused by pollution on the regional level, for investments to environmental technology, scientific research, training, grants, international cooperation, and other environmental protection activities.
- **France.** France introduced its effluent fee system in 1976 with Act 76-663. The system covers both municipal and industrial dischargers. The system also includes indirect dischargers that do not discharge directly to a sewage treatment center. They pay according to the amount of water consumed as opposed to the amount of waste discharged. The effluent charges are based on suspended solids, oxidizable matter, toxic substances, nitrates, phosphates, and soluble salts that are in the discharge. France's six river basin agencies set fees to cover costs for each year by adjusting rates to cover full system costs.
- **Germany.** Germany's Wastewater Charges Act of 1990 is a combination of effluent permits, wastewater charges, and the use of the proceeds for water clean-up. The charge is determined on an individual basis - with the permit - and according to quantity and quality of units of pollution. Rates are set on the basis of emissions permits. In order to determine the charge, for each unit of pollution as determined for every group of noxious substances, the rate (set by law) is multiplied by the total amount of units.

The uses of revenues collected include:

- Wastewater treatment plants.
- Rainwater retention and purification.
- Sewerage systems.
- Sewage sludge treatment.
- Improving quality of water bodies.
- Basic and further training.
- Research and development.

Country Examples — Emission/Discharge-Based Fees (*Continued*)

The charge is designed to promote compliance to the permit standard. The charge is implemented by the states and is based on various polluting substances. If plants institute updated technological standards and comply with these standards before they are obligated to do so, the charge rate is diminished by 75 percent.

- **India.** The Water Cess Act of 1977 provides for the levy and collection of cess on water consumed. The rate varies depending upon the purpose for which the water is consumed. The Act also provides rebates to any industry or authority which installs a plant for the treatment of industrial effluent or sewage.
- **Lithuania.** In 1992, a system of pollution fees and fines was introduced in Lithuania. The rates are determined by the degree of deviation from the standards and are defined by basic, increased, or reduced levels:

Basic Rate: A base fee is set according to a basic rate that is charged for not exceeding the established normal level of pollution.

Increased Rate: When the established norms are exceeded, a fine based on an increased rate is imposed. This fine is exacted from profits after taxation and therefore influences the activities of enterprises, providing the incentive to construct treatment facilities rather than pay extra fines.

Reduced Rate: Fees based on a reduced tariff are paid when the level of pollution emissions are less than maximum permissible emissions.

The revenue collected serves the needs of environmental protection in the form of subsidies. The state, therefore, performs environmental protection functions that are not accomplished by the producers. Subsidies are used to finance specific environmental protection measures which cannot be prompted by other economic activities. Revenue collected from the basic fee is equal to budgetary resources assigned to finance environmental protection measures.

- **Malaysia.** Malaysia imposes fees under the Environmental Quality (Sewage and Industrial Effluents Regulations of 1979. Fees Apply to both conventional and toxic pollutants. Dischargers located on inland waterbodies specified in the regulation are charged 10 times the amount that an identical discharger located on inland waterbodies that are not specified in the regulation. Some industries are exempted from this effluent related fee schedule. Most notable is the processing of crude palm oil which is the largest polluting industry in Malaysia. This industry does, however, have its own effluent related fee schedule. Fees are imposed on discharges of biochemical oxygen demand at concentrations both above and below the

standards.

Country Examples — Emission/Discharge-Based Fees (*Continued*)

- **The Netherlands.** The Surface Waters Pollution Act prescribes a detailed system of levies to finance water pollution control. The primary principle of the Surface Waters Pollution Act is to treat all polluters in the same manner regardless of whether they discharge to a treatment plant or directly to a waterbody. Thus, if a company or household discharges into a water course or canal, it will have to pay the same levy as if it were connected to the public sewerage system. Water boards are allowed to impose levies only to cover their costs for public sewage treatment, and the amount of the levy depends on the historical costs and depreciation rates for water pollution control. The levies must be paid according to the quantity of pollution discharged, although fixed values are used for calculating the levy for dwellings and smaller firms.
- **Poland.** Poland has charged air emission fees since before the political transitions that began in 1989. Since 1989, Poland has raised its emission fees. In 1990, Poland's Ministry of the Environment passed the Ordinance on the Protection of the Air Against Pollution. Under the ordinance, environmental standards govern both overall air quality (ambient standards) and the discharges of large factories.

However, several problems have been noted with Poland's air pollution fee system. First, fees remain low in many cases, indicating that they are more effective in raising revenue than in inducing polluters to reduce emissions. Second, emission fees and fines are not enforced in many instances because of the practical difficulty of imposing additional costs on firms already struggling. Last, the ordinance does not properly outline the legal basis for permit trading. As currently interpreted, the ordinance allows trading among pollution sources within enterprises. However, it leaves unsettled the scope of trading among polluters.

Poland also implements a non-compliance charge on discharges into surface water (under state ownership) and into soils. Discharges include sewage and mining waters contaminated with chlorides and sulfates.

- **Russia.** In 1991, the Russian Federation initiated a pollution charge system to curtail pollution. The pollution charge system marks the first time Russia has used economic incentives or a market-based approach to promote environmental policy. The system involves pollution charges for air emissions, water effluents, and waste disposal within the determined acceptable limits (fines are imposed on emissions that exceed the limits).

In 1991, maximum permitted concentration standards applied to 479 air pollutants, 2,675 water pollutants, and 109 soil-polluting substances. The charge program specifies nearly 300 base rates for air pollutants and nearly 150 for water pollutants. To calculate the base rate the amount of every pollutant is measured in equivalent pollution tons, which are equal to the amount of the pollutant in metric tons divided by the maximum permitted concentration values.

Country Examples — Emission/Discharge-Based Fees (*Continued*)

The maximum permitted concentration values are assumed to reflect the relative

health risk to humans caused by the corresponding pollutants.

The government collects the charges and deposits 10 percent in the general federal treasury and 90 percent into special non-budgetary “environment” funds at the central (10 percent), regional (30 percent), and local (60 percent) levels. These funds are then used to finance environmental cleanup and abatement technologies.

- **Singapore.** Under Singapore’s Trade Effluent Tariff Scheme, a variable fee is applied to effluent discharges to public sewers that exceed the standards for biochemical oxygen demand and total suspended solids. The fee for exceeding standards progresses upward with the concentration level, up to a concentration of 1800 milligram per liter. At this level, the effluent must be treated to below this standard at the factory prior to discharge. Biochemical oxygen demand fees range from S\$0.12 (US \$0.08) to S\$0.84 (US \$0.59) per cubic meter. TSS fees range from S\$0.10 (US \$0.07) to S\$0.70 (US \$0.49) per cubic meter. Singapore also applies a fixed fee to the disposal of organic sludge at designated Sewage Treatment Works. The rate for disposal is set at S\$5.00 (US \$3.50) per cubic meter. The same fee schedules apply to all industries and there is no differentiation in standards or fees between new and old facilities.
- **Taiwan.** In 1992, the government passed the Air Pollution Control Act which authorized the levying of an Air Pollution Prevention Fee. The Air Pollution Prevention Fee takes the dual form of a surcharge on petroleum products and an emission charge on stationary sources of air pollution. One proposal for the use of the Air Pollution Prevention Fee’s revenues was to earmark them for environmental uses, including the expansion of the air quality monitoring network, investments in environmental infrastructure, and compensation of pollution victims. A similar system to the Air Pollution Prevention Fee is included in the 1992 Water Pollution Control Act for effluent charges.
- In the **United States**, Title V of the Clean Air Act of 1990 requires that states impose *emissions fees* on stationary sources at levels sufficient to finance the Title V permit program. States must charge at least \$25 per ton per regulated pollutant unless they can prove that a smaller charge will cover the full direct and indirect costs of the permit program.
- Also in the **United States**, the State Water Resources Control Board in California charges *fees* for National Pollutant Discharge Elimination System permits, Non-Chapter 15 Waste Discharge Requirements, and Chapter 15 Waste Discharge Requirements. Annual fees are calculated on the basis of total flow, volume, number of animals, or area involved ranging from \$200 up to a maximum of \$10,000. Fees are deposited into the Waste Discharge Permit Fund which partially funds their permitting programs, including enforcement.

Impact Fees

Type: User Fees and Charges — Fees Applied on a Quantified Impact Basis.

Description: Impact fees are charged to new users of government services to pay for the expansion of the services that they require. They are an alternative, therefore, to connection fees.

Advantages: Beneficiaries pay for the extension of local government services to them, rather than having current users subsidize new customers. Impact fees could be used to finance any service or additions that an increase in the local population makes necessary. For example, local governments could use impact fees to finance water, natural resources, wastewater, landfills, and solid waste management facilities.

Limitations: Impact fees provide funding 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 to serve new residents upon arrival.

Country Examples — Impact Fees

- **Israel.** Municipalities collect a one-time fee from new home owners to pay for the construction of sewers and sewage treatment plants.
- **United States.** In the United States, many cities charge developers' fees for wastewater treatment, drinking water, stormwater control, and other public services as conditions of building permits.

Disposal Fees (Tipping Fees, Septage/Sludge Fees)

Type: User Fees and Charges — Fees Applied on a Quantified Impact Basis.

Description: Charged on volume of solid or hazardous waste disposed at management facilities. The fee may be charged only on particular products, such as tires or cars, or on all wastes.

Advantages: Disposal fees are most likely to be used to finance solid waste management costs and sludge management programs. However, they could be more broadly applied as an incentive mechanism to encourage participation in recycling programs, thus lowering overall waste management costs by decreasing the volume to be disposed. When solid waste disposers do not bear full costs of disposal, disposal is encouraged, since it becomes cheaper than recycling. Tipping fees should remove this disincentive if set at appropriate levels.

Limitations: Fees based solely on volume may not adequately capture revenue from the most toxic or least degradable waste. Very high fees could encourage illegal dumping of wastes. If significant waste reduction occurs in response to the fees, revenues will similarly decline.

Country Examples — Disposal Fees

- **Australia.** In Australia, fees on waste disposal are levied on waste disposed of at landfills and incinerators. The fee is set at ECU 12.3 (US \$14.62 as of 1994) per ton and the revenue is allocated to the general budget. The province of New South Wales reports increased recycling rates due to the charge.
- **Belgium.** Belgium charges a fee of ECU 3.1 to 18.9 (US \$3.68 to \$22.50, as of 1994) per ton on waste disposal at landfills and incinerators. The rates of the

Belgian waste fee depend on the type of treatment and waste origin. The revenue collected is used to finance a broad range of environmental projects.

- **Great Britain and Northern Ireland (United Kingdom).** On August 2, 1995, the government of the United Kingdom announced that the tax on landfills will now be levied on the basis of the weight of waste disposed of, rather than the price paid for disposal. The tax will use market forces to deter the landfilling of waste, which will encourage recycling and help the environment. The tax rates, due to be introduced in October 1996, will be announced in the next budget. The tax will be levied on two different tonnage rates: one for conventional waste and another for inert waste that does not decay. Likely charges will be between UK 5-7 (US \$7.90-\$11) per metric ton of conventional waste and between UK 2-3 (US \$3.15-\$4.75) per metric ton for inert waste.
 - **South Africa.** In South Africa, disposal fees are imposed and assist in the financing of environmental compliance and enforcement program activities.
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Transport Fees (Hazardous Wastes, Septic Hauler, Petroleum Product Transfer Fees)

Type: User Fees and Charges — Fees Applied on a Quantified Impact Basis.

Description: Fees charged to company or individual for hauling solid or hazardous wastes, septage, or petroleum products. Can be charged on volume of waste transferred, or as a flat fee per hauler. Can be used to pay cost of hazardous waste monitoring and spill response.

Advantages: The fees could capture revenue from transporters who are responsible for some waste spillage. Revenues could finance operating costs of a monitoring or enforcement program for hazardous waste transport.

Limitations: Small revenue base. Depending on the structure of the fee, it may have a disproportionate impact on small businesses. The fee might encourage polluters to dump wastes illegally to avoid the costs of transportation to a legal site.

Country Examples — Transport Fees

- **United States.** In the United States, hazardous waste transporter fees are used to pay the cost of hazardous waste monitoring and spill response in a number of states. Examples include New Jersey and Missouri.
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A.4 Fines And Penalties

Fines and penalties include all funds collected from entities that have violated government laws or regulations. Fines are always monetary payments, while penalties may include both monetary and non-monetary assessments, such as required actions to be taken by violator as a result of violation.

A.4.1 Fines and Penalties

Type: Fines and Penalties.

Description: Fines and penalties require offenders to pay monetary (and sometimes non-monetary) damages for violating government laws or regulations.

Advantages: Fine revenues can serve as a large funding source suitable for financing capital costs. However, since fine revenues are collected only on deviant behavior, revenues are erratic. Therefore, fine revenues are generally not suited to fund program operating costs on a regular basis, but can be used to set up trust funds for future operating expenses, to fill unexpected gaps in yearly budgeting, or for one-time capital expenditures. Additionally, fines serve as incentives to change polluting behavior.

Limitations: Revenues are unpredictable. If program funding relies heavily on fines, changes in polluting behavior will decrease revenues. The government may not dedicate fines to particular programs. Instead, they might direct them to their general fund. Programs that do dedicate fines are sometime criticized for conflict of interest, since the program will benefit from any fines it levies. As a result, there is at least the appearance of an incentive to take enforcement action simply for the money.

Country Examples — Fines and Penalties

- **Argentina, Brazil, and Chile.** Fines and penalties levied by Argentina, Brazil, and Chile aid in the financing of environmental compliance and enforcement programs.
- **Colombia.** The Colombian Ministry of Environment announced in late April, 1995 that it will fine or apply other sanctions to a number of private sector and state agencies. The actions will make use of the new punitive powers granted to it under Law 99 that was passed in 1993. Law 99 also created the Environment Ministry.
- **Czech Republic.** The budgets of local governments fund a large portion of environmental protection in the Czech Republic. A portion of the funds for these budgets come from air and water pollution fines.
- **Hong Kong.** Hong Kong imposes fines for air pollution, noise control, water pollution, waste disposal, and dumping at sea. The average fine for breaches of environmental law concerning air pollution range from \$860 - \$11,000. Fined offenses include use of prohibited fuel, dark smoke emission, and breach of Hong Kong's ozone layer protection ordinance.

Water pollution control is exercised through a system of licensing. Each discharge license specifies the conditions for emitting the discharge. Fines imposed under this category range from \$100,000 to \$200,000. Offenders may be charged under the following sections: industrial, commercial, domestic, sewage treatment plant, and institutional.

Under the Dumping at Sea Act of 1974, an offender is liable to a maximum fine of \$5,000 or to imprisonment for not more than 6 months or to both. Upon conviction

or indictment, the offender is liable to a fine or to imprisonment for not more than 5 years. In 1993, the average fine was \$6,383 per court case or \$3,737 per convicted offender.

- **Hungary.** Fines are imposed in Hungary for emissions in excess of allowable amounts for defined pollutants. The following example involves water pollutants, but similar fines are imposed on other pollutants. Wastewater fines are imposed where concentrations in the wastewater exceed nationally established limits for 19 polluting components and 12 toxic substances. There is a separate penalty for each pollutant levied in proportion to the increment of the concentration above the limit, but is higher for very large increments. The total fine is the sum of the individual penalties. The penalties vary regionally and increase over time for continuing offenses.

Country Examples — Fines and Penalties (*Continued*)

- **Lithuania.** In 1992, a system of pollution fees and fines was introduced in Lithuania. The rates are determined by the degree of deviation from the standards. When the established norms are exceeded, a fine based on an increased rate is imposed. This fine is exacted from profits after taxation and therefore influences the activities of enterprises, providing the incentive to construct treatment facilities rather than pay extra fines. The revenue collected serves the needs of environmental protection in the form of subsidies. Subsidies are used to finance specific environmental protection measures which cannot be prompted by other economic activities.
- **Mexico.** As of 1991, the Secretaria de Desarrollo Urbano y Ecologia or the Ministry of Urban Development and Environment planned to rely heavily on fines to discourage future violations of environmental regulations and standards. The law, as of 1991, allows the imposition of fines up to the equivalent of US \$80,000. Even a substantially lower amount would be a significant charge to a medium-sized Mexican company. An increased reliance on fines was expected by the Secretaria de Desarrollo Urbano y Ecologia to function as a deterrent. The Secretaria de Desarrollo Urbano y Ecologia also intended, through these charges, to pass along the costs of facility inspection.

In addition, Mexico has adopted a series of strict hazardous waste disposal regulations and standards and adopted strong administrative sanctions to enforce them. Fines may be imposed on a daily basis for non-compliance; and, in extreme cases, an operator's business license may be revoked. Of the 4,850 industrial inspections conducted in 1992, 3,963 resulted in citations for non-compliance. Of these, 3,144 resulted in fines or other enforcement actions.

- **New Zealand.** In 1967, the Water and Soil Conservation Act came into force and the maximum penalty for discharging waste into natural water was set at \$200, for a continuing offense; further fines were not to exceed \$10 per day. Over the years, these penalties have been increased through various amendments. Most recently, through the Resource Management Act of 1991, the maximum penalty was set at \$200,000 and the continuing offense fines at \$10,000 per day, tremendously more significant than earlier fines levels.
- **Philippines.** The Industrial Efficiency and Pollution Control Program cites the

collection of fines as a means of securing public financing. Presently, all funds generated by agencies that collect fines are directly remitted to the National Treasury's General Fund.

- **Poland.** In 1992, the Environment Ministry partially exempted (for up to 6 years) chemical industries from fines to encourage compliance with legislation. The fines and penalties that are collected are put into the National Fund for Environmental Protection and Water Management. In 1991, the fund was worth \$350 million and accounted for over 35 percent of Poland's environmental spending.

Country Examples — Fines and Penalties (*Continued*)

- **South Africa.** In South Africa, there is a system of fines and penalties in place for water pollution. While the fines are a revenue source for environmental compliance and enforcement program activities, they are set relatively low and do not provide an incentive for pollution reduction.
- **South Korea.** Since 1983, the Seoul Pollution Control Service Corporation has been collecting fines from industries that violate water pollution standards. The revenues collected are then placed into the Environmental Control Fund to be loaned to industries for acquisition or improvement of pollution control equipment.
- **Sweden.** Fines are levied against companies that are caught violating the terms of a permit during an inspection. The fines correspond to the money made by the company while avoiding compliance with the permit and its operating conditions. However, the fines are not automatic. The National Environment Protection Board has to prove that the company generated income by violating the permit. While the actual control and enforcement is left principally to county boards for environmental protection and health, the levying of fines and the determination of compensation for damages caused by a given industry's non-compliance with the terms of its operating permit is decided upon by the national courts.
- **Taiwan.** Non-compliant polluters of air and water face stringent punishment in Taiwan. For example, a maximum fine of one million NT dollars (US \$40,000) per day can be levied on serious violators. The fine can be charged consecutively on a daily basis until the violation is corrected.
- **Thailand.** In June of 1995, the Thai government set up two committees to hand down fines against firms that fail to adhere to industrial pollution control regulations. The committees are intended to speed up the process of penalizing firms when violations are deemed unintentional by avoiding drawn out legal proceedings. The Thailand Factory Act requires industrial sites to obtain a three year operator's license. Plant managers who operate without a license are subject to fines up to 200,000 baht (US \$80,000) and a two-year prison sentence. The act also gives the Ministry of Industry the authority to set limits on air pollution discharges and factory effluents.
- **United States.** Fines and penalties are imposed for violations of laws, rules and regulations related to environmental compliance and enforcement programs throughout the United States. Typically, environmental laws authorize the Environmental Protection Agency to impose administrative penalties. The Environmental Protection Agency also may ask the courts to impose additional civil and criminal penal-

ties. Federal statutes also give states similar authority to impose fines and penalties. Most states establish dedicated funds for the use of fine and penalty revenue, in some instances dedicated to the relevant environmental program or to a special project or education fund.

A.5 Loans And Other Debt Instruments

A.5.1 Loans

Loans are funds provided by a lender to a borrower for a specified rate of interest. The following forms of loans are described below: multilateral and bilateral loans; commercial loans; and intra-country loans. The next section describes other debt instruments, such as general obligation and revenue bonds.

Multilateral and Bilateral Loan Sources

Type: Loans/Debt.

Description: Multilateral loans consist of money lent from two or more combined sources (foreign governments) often through a multilateral organization to a single country to finance a variety of projects. Bilateral loans are between a single donor and a recipient. Loans are made on the condition that they are repaid, either in installments or all at once, on agreed dates and usually that the borrower pays the lender an agreed rate of interest (unless it is an interest-free loan).

Advantages: Suitable for financing projects that require large amounts of capital up-front. Can be used where lower interest financing is unavailable. Enhances credit worthiness of projects, making projects more attractive to private international investors. Assists developing countries that lack resources for needed environmental projects.

Limitations: Money borrowed must be repaid to the lender and therefore a revenue stream must be identified. There also are administrative costs associated with the use of a loan that can further increase the costs of the project that is being undertaken.

Country Examples — Multilateral and Bilateral Loans

- **Africa.** Thirty countries in Africa have National Environmental Action Plans, but only one-third of these countries have an investment program and an implementation plan. Four of these countries are **Ghana, Nigeria, Burkina-Faso, and Mauritius**. Approximately 60-80 percent of their financing comes from loans and grants from multilateral and bilateral sources. The remaining 20 percent comes from the general budget, funded mostly through taxes.
- **Argentina.** Currently, in Argentina, environmental compliance and enforcement programs, as well as other environmental projects, are financed through international funds. The mechanisms that are used are loans and grants from multilateral and bilateral sources.

Country Examples — Multilateral and Bilateral Loans (*Continued*)

- **Brazil and Chile.** In Brazil and Chile, multilateral and bilateral loans are used to finance environmental compliance and enforcement program activities.
- **China.** Multinational banks and foreign governments had loaned nearly US \$1.3 billion to China through 1994 for environmental program activities.
- **Mexico.** Multilateral and bilateral project financing are two traditional financing approaches that have been used extensively and will probably continue to be important in Mexico. Both the World Bank and the Inter-American Development Bank have targeted infrastructure as key areas for investment, and the North American Development Bank is starting to explore this area. Although traditional financing methods will continue to be useful to Mexico, they will not be sufficient to meet the goals of the national program, since the financing needs are too large. Instead, the World Bank and Inter-American Development Bank could use their resources to enhance the credit-worthiness of individual water projects, making these projects more attractive to international investors. The World Bank would not do this on an individual project basis, but rather through a central Mexican facility that packaged and possibly pooled the water projects.

In 1992, the World Bank approved a \$50 million loan to Mexico for improvement of the country's environmental regulatory efforts. This loan was designed to strengthen the operations of the former Secretaria de Desarrollo Urbano y Ecologia. Several new environmental regulatory and environmental infrastructure loans have also recently been approved by the World Bank or are being processed. One category of loans for industrial pollution control (\$200 million) involves the improvement of environmental regulation, the strengthening of enforcement, and the promotion of clean technology.

- **Philippines.** Funding sources for the Industrial Efficiency and Pollution Control Program include project loans and technical assistance from three multilateral sources and several bilateral sources. Bilateral sources include project loans, commodity loans, soft loans, and export credit from the Japan Overseas Economic Cooperation Fund, KFW (German Line), Italy, France, Spain, the Korea Economic Cooperation Development Fund, and Canada.
 - **Uruguay.** In Uruguay, multilateral and bilateral loans routinely aid in the financing of environmental compliance and enforcement programs.
 - **Regional Europe.** The World Bank is loaning money to aid in the cleanup of the Baltic Sea area. It is part of a \$23 billion 20 year plan that began in 1990 by the Helsinki Commission to improve the Baltic. Various bordering countries have received and are receiving money for wastewater treatment and water and wastewater infrastructure.
-

Commercial Loans

Type: Loans/Debt.

Description: Private banks or financial institutions offer governments loans to finance a variety of capital projects.

Advantages: Commercial loans can be used where lower-interest financing is unavailable. The application process for commercial loans can be faster than for government loan programs. Commercial lenders also have no pre-set eligibility criteria and no pre-established limits on the total funding available.

Limitations: Generally higher interest rates and less favorable pay back terms than government-funded loan programs.

Country Examples — Commercial Loans

- **Philippines.** Sources of financing for the Department of Environment and Natural Resources include commercial bank borrowings. Interest rates on commercial bank borrowings have averaged at levels between 15 and 20 percent.
- **United States.** In the United States, most commercial banks have public finance departments that will provide loans to state and local governments. States and local governments normally use commercial loans where lower-interest financing is unavailable or to fill short-term financing needs in anticipation of other revenues.

Intra-Country Loan Programs

Type: Loans/Debt.

Description: A sum of money lent to a private industry, province/state or local government, or non-profit organization from the national government. Generally, funds are lent for the purpose of financing a particular activity or facility. The scope of funding uses can be broadly or narrowly defined depending upon the government's desired role.

Advantages: Since the loan funds can be relent after they are repaid, larger projects can be undertaken without reducing the overall pool of funds. This enables more projects to be completed overtime than under grant programs.

Limitations: Some low income areas may find they are unable to meet the repayments requirement without imposing economic hardship on their community.

Country Examples — Intra-Country Loan Programs

- **Australia.** The Industrial Waste Management Policy of the Environment Protection Agency in Victoria includes a clause to provide financial assistance, or loans, to industry for waste minimization research and development, and installation of waste-reducing technologies. Since 1988, Victoria's Environmental Protection Agency has administered a Clean Technology Incentive Scheme that provides secured, interest-free loans to selected small and medium-sized companies wanting to invest in technologies that reduce or eliminate waste. Such loans cover up to 50 percent of capital spent directly on waste minimization technology. The Clean Technology Incentive Scheme program has provided nearly \$2 million in loans since its inception to help Victoria industries implement waste minimization and clean-production techniques.
- **China.** Through revolving loan funds, China provides below-market financing for pollution control efforts by local — mostly small and medium-size firms. The loans are financed by proceeds from waste discharge fees. Loans are extended for 50 percent to 80 percent of project cost, with 10 percent to 30 percent covered by grants. In the early 1990s, it was recognized that the levies did not generate funds significant enough to provide the large grants needed for meaningful environmental improvements. Under the loan system, larger projects can be undertaken and the capital can be allowed to accumulate with the addition of annual waste discharge fees. Loans are made at market rates with maturity in three to seven years. The availability of funds earmarked for environmental improvements provides a significant incentive for such projects, because of the difficulty of obtaining credit with current rapid economic growth.
- **Thailand.** With the creation of its Environmental Fund in 1992, Thailand included a policy of loan funding as an element of wastewater project financing. The fund also provides loans to local administrative bodies or state enterprises for pollution control equipment and treatment or disposal facilities. Fund loans also are made available to private persons if such persons have a legal duty to install and operate on-site pollution treatment or control equipment.

A.5.2 Other Debt Instruments

In general, other debt instruments are distinguished from loans by the form of indebtedness. Debt instruments (other than direct loans) provide for periodic repayment over a pre-established period of time, with both an interest and principal component to the repayment stream. Two forms of debt, general obligation bonds and revenue bonds, are described below.

General Obligation Bonds

Type: Loans/Debt — Bonds

Description: General obligation bonds are bonds backed with the guarantee that the issuing government will use its taxing power to repay the bond.

Advantages: General obligation bonds, backed by the full taxing power of a government, are regarded as safer than bonds backed by a single revenue source, and generally command lower interest rates and lower reserve fund requirements. General obligation bonds also have structural flexibility since the issuing government can repay the bond with a variety of revenue sources. General obligation bonds could be used to finance capital projects related to environmental programs. In general, general obligation bonds are suitable for financing any project that requires large amounts of capital up-front.

Limitations: Formal approval, either from a governing body or a vote of the citizenry, is frequently required for general obligation bonds. Frequently, limits are placed on total outstanding general obligation debt. Because general obligation bonds commit the borrower to repay the bonds in a pre-established timeframe, a steady revenue stream must be secured.

Country Examples — General Obligation Bonds

- **Mexico.** Credit-pooling is an idea that has been considered for financing the required water projects along the Mexican-United States border. With credit pooling, local governmental units with limited access to capital or that lack the required size, financial expertise, or credit history pool their resources to make themselves more attractive to investors. The goal is to achieve economies of scale, easier access to capital, and ultimately, lower borrowing costs. Two of the many ideas that have been considered for Mexican projects include bond banks and revolving loan funds.
 - **Philippines.** In the Philippines, the Cebu Equity Bond Unit is one example where a local government has attempted to raise funds in the local bond market. However, this is generally an expensive way to raise funds. Moreover, the under developed state of the local capital markets in the Philippines hinders further development of a secondary market for government debt issues.
 - **Regional Europe.** European nations are beginning to experiment with sub-sovereign debt, which is debt or bonds issued by regional or municipal governments. New issues have been brought to market in **Germany, Sweden, France, and Spain**. These issues are backed by direct and indirect guarantees of tax revenues of the parent sovereign.
 - **South Korea.** Historically, sewage facilities have been financed by compulsory, low interest municipal bonds that mature in five years. This results in high levels of subsidization by the government to prevent excessive burdens on city revenues. In recent years, the Ministry of Home Affairs' Water and Sewerage Fund has provided an additional source of financing for sanitation through the issuance of bonds in each province, although the funds' resources are limited to approximately \$200 million.
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Revenue Bonds

Type: Loans/Debt.

Description: Revenue bonds are generally backed by user fees or other dedicated revenue streams paid by users of a government service. A *utility enterprise* revenue bond is an example of a specific type of revenue bond that is backed by user charges generated from a utility.

Advantages: Revenue bonds can provide capital for projects that will ultimately generate revenues. Examples include solid waste landfills, wastewater treatment plants, drinking water utilities, and stormwater management districts. Beneficiaries of services ultimately repay revenue bonds through fees, taxes, or other dedicated revenue streams.

Limitations: Revenue bonds are regarded as less secure than general obligation bonds, and therefore have less market acceptance, higher interest rates, and higher reserve requirements. Because of strict repayment terms, revenue bonds require a stable revenue source for bond redemption.

Country Examples — Revenue Bonds

- **United States.** In the United States, both state and local governments routinely use revenue bonds to finance environmental projects, including renovation of wastewater treatment plants and start-up capital for stormwater districts.
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A.6 Grants

Grants are sums of money typically awarded for the financing of a particular facility or activity, without any requirement for repayment. Multilateral and bilateral grant sources and intra-country grant programs are described below.

A.6.1 Multilateral and Bilateral Grant Sources

Type: Grants.

Description: A multilateral grant is a sum of money awarded from two or more combined sources (foreign governments) often through a multilateral organization to a single country to finance a variety of capital projects. Bilateral grants are awarded from a single government or organization. Generally, multilateral and bilateral grants are awarded for the purpose of financing a particular activity or facility. The scope of eligible fund uses can be broadly or narrowly defined and no repayment is required.

Advantages: The primary advantage of multilateral and bilateral sources is that the government does not have to use its own resources to pay the costs that the grant covers.

Limitations: Intense competition for a limited pool of funds may make it difficult to finance many needed projects with grants.

Country Examples — Multilateral and Bilateral Grant Sources

- **Africa.** Thirty countries in Africa have National Environmental Action Plans, but only one-third of these countries have an investment program and an implementation plan. Four of these countries are **Ghana, Nigeria, Burkina-Faso, and Mauritius**. Approximately 60-80 percent of their financing comes from grants and loans from multilateral and bilateral sources. The remaining 20 percent comes from the general budget, funded mostly through taxes.
- **Argentina.** Currently, in Argentina, environmental compliance and enforcement programs as well as other environmental projects, are financed through international funds. The mechanisms that are used are loans and grants from multilateral and bilateral sources.
- **Austria.** Austria's East-Eco Fund may help reduce a Czech power plant's sulfur emissions by as much as 95 percent. The Fund is designed to reduce environmental damage in Austria's neighboring nations. The Fund receives its money from the Austria national budget, which has contributed \$70 million for 81 projects since 1991. Austria helps curb pollution that crosses boundaries by helping its neighboring countries, which include the Czech Republic, Slovakia, Hungary, and Slovenia. As of May 1995, each of these countries had received US \$36 million, \$19 million, \$13 million, and \$1 million, respectively.
- **Egypt, Morocco, and Tunisia.** In Morocco, Tunisia, and (more recently) Egypt, bilateral grants are being used for capacity building. Also in Tunisia, grants for monitoring have come from bilateral sources. Funding for environmental programs comes mostly from general taxes and grants in Middle Eastern and North African countries. These grants, which are currently being used for pilot projects, are used to build environmental capacity and must eventually be replaced with traditional budgetary sources.
- **Pakistan.** The annual Portfolio of Aid-Worthy Projects for the Pakistan Consortium totals US \$12.75 billion, consisting of on-going, approved, and unapproved projects for implementation over a two to three year period. Annual commitments total approximately US \$2.5 billion.

Country Examples — Multilateral and Bilateral Grant Sources (*Continued*)

- **Philippines.** In 1992, an environmental grants program was proposed to fund a package of projects including training, information programs, demonstration projects and community-based waste/industrial treatment facilities. Grant assistance from both multilateral and bilateral sources was an important component of the package.
- **Poland.** The forest lands where Poland, the Czech Republic, and Eastern Germany meet will receive funding from the Global Environmental Facility. The Global Environmental Facility is managed by the World Bank and financed largely by the United States, Western Europe, and Japan. The fund has four areas for support: (1) biodiversity; (2) the ozone layer; (3) greenhouse gas emissions and adoption of cleaner fuels and technologies in the energy agriculture and industry sectors; and (4) international waters. An initial \$4.5 million grant from the Global Environ-

mental Facility will support Poland's efforts to protect its endangered forest ecosystems. Some of this forest is known as the Black Triangle. The Black Triangle is where 13,000 hectares of forest are dead and another 8,000 are dying because of air pollution.

- **Uruguay.** In Uruguay, multilateral and bilateral grants routinely aid in the financing of environmental compliance and enforcement programs.
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A.6.2 Intra-Country Grant Programs

Type: Grants.

Description: An intra-country grant is a sum of money awarded to a provincial/state or local government or non-profit organization from the national government. Generally, these grants are awarded for the purpose of financing a particular activity or facility. Eligible fund uses can be broadly or narrowly defined depending upon the government's desired role and do not require repayment.

Advantages: The primary advantage of grants is that provincial/state and local governments do not have to use their own resources to pay the costs that the grant covers.

Limitations: Applying for grants can be costly and time-consuming for the province/state or local government. The national government also may find it too costly to grant the needed amount of money. Intense competition for a limited pool of funds may make it difficult to acquire funding for most projects.

Country Examples — Intra-Country Grant Programs

- **Austria.** The Ministry of Health and Environmental Protection administers an environmental fund to aid domestic industries in complying with regulations. The fund provides credit financing and investment subsidies for the modernization of old installations, implementation of pilot projects to develop soft technologies, and for hazardous waste disposal projects. The fund has been in operation since 1984, with annual funding from the federal budget.
- **Great Britain.** Under the Department of Environment's Environment Protection Technology Scheme, the government may provide up to 50 percent of the costs of industrial research projects to improve environmental standards.
- **Hungary.** The Hungarian government invests one percent of its gross domestic product in the environment. Over one-half of this amount is used to finance the protection of water supplies. Sources of government assistance include: direct "targeted support" to municipalities for water protection; direct transfer with investment support from the Central Environment Protection Fund; and subsidies from the Water Management and Central Environment Protection Funds.
- **Poland.** Grants from the National Fund for Environmental Protection and Water Resources Management finance environmental projects throughout Poland.
- **Romania.** According to the 1992-2000 strategy plan of the Romanian Industry Ministry,

the government will provide Lei80bn (US \$909 million) and US \$175 million in grants to restructure its industry. However, as of 1992, Lei300bn (alone) was known to be required for environmental protection measures within industry, leaving a shortfall to be filled by other sources, such as UNEP, the EC's Phare program, the World Bank, and private sector investment.

- **South Korea.** Central government grants are one component used for the financing of sector investments. Each municipality receives a grant, or share of tax revenues that has been collected by the national government and is redistributed to municipalities based on their financial position.
- **Thailand.** Grants from the Environment Fund, totaling US \$388 million over a three-year period (1996-1999), serve as one of the principal sources for the financing of the Samut Prakarn Wastewater Management & Pollution Control Project. Grants will be made to local administrative bodies for investment in and operation of central wastewater treatment or waste disposal facilities.
- **United States.** Major pieces of environmental legislation provide grant funds to support development and to some extent operating costs of state and local environmental programs where state and local governments seek approval to implement programs according to federal law. Usually, these programs have match requirements whereby state and local governments must provide a designated percentage of total program funding to receive federal funding. In addition, receipt of federal grants for environmental program management is generally premised on states entering into contractual agreements regarding performance of specified activities.

A.7 Voluntary Mechanisms

Voluntary mechanisms are funding mechanisms that are not directly imposed upon individuals, but are established to collect funds if an individual or entity volunteers them. Two examples of voluntary mechanisms, donations and lotteries, are described below.

A.7.1 Donations

Type: Voluntary Mechanisms.

Description: Donations are the voluntary giving of funds by individuals or foundations (in this way, they are similar to grants). They can either be solicited by an associated non-profit foundation or as a line item on a provincial/state or local tax return. Normally, foundations provide supplemental funding for cleanup efforts in particular media or geographic areas.

Advantages: Little public opposition to voluntary mechanisms. Can also raise public awareness of environmental programs. Best suited to finance environmental programs that could attract significant public interest.

Limitations: Donations will fluctuate with economy. Therefore, the revenue stream is not stable and should not be relied upon to finance essential ongoing items.

- **United States.** In the United States, many states have associated foundations that provide supplemental funding for cleanup efforts in particular media or geographic areas. For example, in Maryland, protection of water quality in Chesapeake Bay is partially funded by individual donations to the Chesapeake Bay Foundation. Many states also use a check-off box on state income tax return to allow taxpayers to earmark tax refunds for environmental purposes. In Virginia, for example, there is a program that encourages a voluntary donation from an individual's income tax refund to finance the protection of wildlife and habitat. Other states use the sale of special edition license plates to finance environmental protection. Maryland has a "Save the Bay" license plate program that, as of 1989, had generated over \$1 million in funds for Chesapeake Bay cleanup efforts.
 - **Uruguay.** In Uruguay, donations routinely aid in the financing of environmental compliance and enforcement programs.
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A.7.2 Lotteries

Type: Voluntary Mechanisms.

Description: Lotteries are the sale of tickets with a chance to win a sum of money or prize. The funds that are raised (beyond those given to lottery winners) can be dedicated to finance environmental programs that could attract significant public interest.

Advantages: Little public opposition to lotteries. Can also raise public awareness of environmental programs.

Limitations: Lotteries are a regressive source of income, placing a disproportionate share of the funding burden on lower income individuals. Also will require capital for start-up costs.

Country Examples — Lotteries

- **United States.** Minnesota uses state lottery proceeds to finance the protection and improvement of the natural resources and environment of the state. In 1990, Minnesota voters approved a referendum that requires not less than 40 percent of the net proceeds from any state lottery to be credited to the fund through the year 2001.
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A.8 Public-Private Partnerships

Public-private partnerships involve private participation in the design, financing, construction, ownership, and/or operation of a public purpose facility or service. One form of public-private partnerships relevant to environmental compliance and enforcement programs, contract services, is detailed below. Other public-private arrangements are discussed in Chapter 4 of this document.

A.8.1 Contract Services

Type: Public-Private Partnerships.

Description: A private partner is contracted to provide a specific municipal service. These services can include environmental regulation and standard enforcement, water and air quality monitoring, lab analysis, solid waste removal and disposal, or maintenance and operation of a publicly-owned facility, such as a wastewater treatment plant, hazardous waste facility, or drinking water facility.

Advantages: Depending on the nature of the activity, it has been shown that in the United States, private sector operators can achieve efficiency savings of 10-30 percent over public sector operation. Under some agreements, risk of operations is transferred to private partner.

Limitations: In some cases, the transfer of formerly public services to private companies can cause labor difficulties among public employees. Additionally, legal issues can arise if the service being contracted for is the provision of enforcement of environmental standards and regulations.

Country Examples — Contract Services

- **France.** In France, which has probably the most developed system of private contracting for water safety and sanitation management in the world, 60 percent of the total population is served by privately operated water systems. The three general types of contracting arrangements made between French municipalities and private management firms are:

Concession contract, in which the private firm builds and operates water safety and sanitation facilities. The firm is compensated by fees collected directly from the water safety and sanitation consumers, as stipulated in the contract between the municipality and the private firm.

Farm lease, in which the municipality builds the water safety and sanitation facilities with the firm managing the facilities and collecting fees. The firm, however, keeps only a portion of the fees collected to cover its management costs; the remainder is paid to the municipality to cover capital investment costs.

Management contract, in which the municipality retains control of the facilities and contracts out only certain parts of the management operation..

In France, most municipal governments retain ownership of the water safety and sanitation assets, with the private contractor operating under a long-term contract. Given their extensive experience within the country, French water management companies have grown quite large. They are now exporting their expertise to industrialized countries, such as the United States, and increasingly developing countries as well.

Country Examples — Contract Services (*Continued*)

- **Mexico.** A public-private arrangement for the provision of drinking water in Mexico City is structured in a series of phases, each of which increases the level of private-

sector participation. General contracts were awarded by la Commission de Agua del Distrito Federal, the city agency in charge of water, for a ten-year period which may be extended. Awards were based on a competitive bidding process to operate the city water supply system. The city will retain ownership of all facilities. Under Phase I, which is expected to last about two years, contractors will map out the system, determine the condition of the facilities, measure the quantity of unaccounted for water, identify repairs required to prevent water loss, and install meters for all users. In Phase II, contractors will develop a billing system and bill customers. Investments in the first two phases are underwritten by BANOBRAS, the Mexican public works bank. Under Phase III, it is expected that the contractors will purchase bulk water from the city and distribute it to users. Payment will consist of a portion of the rates collected.

- **Russia.** In Russia, privatization of state and municipal enterprises can be considered one of the largest sources of financing for environmental protection activities. A law covering privatization was adopted in June 1991.
 - **South Africa.** Contract services are commonly used for waste disposal purposes in South Africa.
 - **United States.** In the United States, local governments have used contract services to operate wastewater treatment plants, water utilities, and other municipal services. State governments have contracted out various portions of their environmental programs, including laboratory sources, inspection activities, and even permit writing. For example, monitoring of wastewater discharges is contracted out to a private laboratory by the Wisconsin water quality program.
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APPENDIX B: FOR ADDITIONAL INFORMATION

This section provides a reference list of sources that contain more information on particular topics covered in the support document.

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