Financing Environmental Programs in Maryland: Many Shades of Green

Department of Legislative Services 2009

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Department of Legislative Services
Office of Policy Analysis
Annapolis, Maryland

September 2009

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September 9, 2009

The Honorable Thomas V. Mike Miller, Jr., President of the Senate
The Honorable Michael E. Busch, Speaker of the House of Delegates
Members, Maryland General Assembly

Ladies and Gentlemen:

Financing environmental programs across the nation continues to be a challenge, especially in this economic climate. Although Maryland has taken numerous steps to identify innovative financing strategies for its various environmental, natural resource, and energy conservation programs, funding needs still exceed amounts available from existing funding sources. Because existing funding sources cannot bear the cost of all of the State's environmental goals, it is imperative that we continue to identify additional ways to finance these programs.

In an effort to identify additional steps that may warrant action, the Natural Resources, Environment, and Transportation Workgroup within the Office of Policy Analysis (OPA) prepared this report on financing environmental programs in Maryland. Specifically, the report provides an overview of environmental financing challenges across the nation and in Maryland; an overview of the various categories of financing mechanisms available to governments, including examples of specific mechanisms that have been implemented around the nation; and a menu of options that the State may wish to consider in order to reduce State implementation costs and generate additional revenue for these programs.

OPA wishes to thank the University of Maryland's Environmental Finance Center for its valuable input regarding this report. In addition, OPA would like to acknowledge the U.S. Environmental Protection Agency, as its August 2008 report entitled *Guidebook of Financial Tools: Paying for Environmental Systems*, was referenced heavily in preparing this report.

We trust this report will prove useful to the General Assembly in identifying possible financing options to help the State attain its environmental, natural resource, and energy conservation goals. If you would like additional information regarding this report, please contact Lesley Cook of OPA at (410) 946-5510.

Sincerely,

Warren G. Deschenaux
Director

WGD/LGC/kjl

Contents

Chapter 1. Background

Overview of State Budget Problems

The country has endured the longest recession since the Great Depression. Since the current recession began in December 2007, almost every state has faced what seems to be the unenviable challenge of successive revenue write-downs. According to the National Conference of State Legislatures (NCSL), 46 states have addressed or are facing budgetary shortfalls for fiscal 2010. As of July 2009, the fiscal 2010 cumulative budget shortfall for states is around $143 billion – including gaps that have been addressed through budget cuts and other measures. According to NCSL, nearly two-thirds of the states have already projected a budget shortfall in fiscal 2011 – the remainder reported that it is too early to know if a shortfall will occur, although several report that one is likely.

Because of the recession, environmental programs face significant budgetary constraints. These programs are typically being impacted from both the revenue side of the budgetary equation (in those instances where a program relies on special funds and revenues have consistently come in lower than expected) as well as the expenditure side. As a result of the rapid economic deterioration, states have made significant reductions that have affected all types of programs – including environmental programs. While it is widely acknowledged that successful environmental programs are important to the overall well-being of a population, the reality is that when faced with the challenge of reducing funding for education or a land preservation program, for example, lawmakers will inevitably choose to preserve education funding. This is not to say that this is a bad policy choice; indeed, many argue that the role of state government should be to provide education; protect the most vulnerable; and develop the infrastructure necessary for businesses to flourish. In addition, some reductions to environmental programs such as those relating to land preservation or infrastructure upgrades do not have an immediate impact on services received by individuals.

It is important to note that the choice between which policy areas to fund has become more pronounced since the passage of the *American Recovery and Reinvestment Act of 2009* (ARRA). While ARRA has aided the states in addressing budgetary shortfalls to an extent, this aid is not distributed evenly across all policy areas. Thus far, the federal government has required that most funds from ARRA that have been distributed to state governments be used for funding K-12 education, Medicaid, and transportation projects. The federal government has also required that these funds be used to supplement, not supplant, state funding for these programs. Therefore, the State has needed to maintain funding for these federally aided programs, sometimes to the detriment of other policy areas. Nevertheless, it is estimated that the State will receive approximately $123.3 million for wastewater and drinking water infrastructure, $57.5 million for energy programs, and $65.6 million for weatherization programs as a result of ARRA.

According to NCSL, in order to address the revenue crisis, a number of states are reducing or eliminating funding for environmental and natural resource programs. Several states, for example, are eliminating funding for state parks and other land conservation programs. For instance, funding for the Idaho Department of Water Resources was reduced by over 16% and the state is asking a Native American tribe to take over the upkeep of a state park for which funding has been eliminated. In Illinois, the Governor has proposed across-the-board reductions to all grant programs except healthcare and education. California recently announced budget cuts to both its state parks system and its land conservation program.

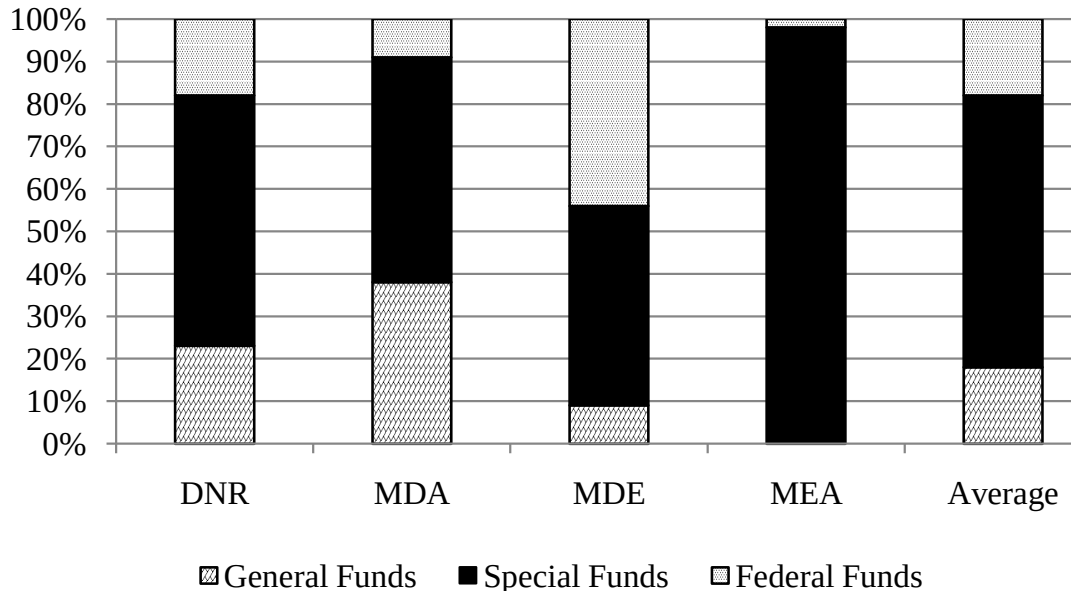
A number of states also have introduced proposals that would raise additional revenue. For example, Idaho has enacted a law that raises fees on out-of-state hunters and anglers and has imposed a fee ranging from $5 to $20 on all vessels launched into state rivers and lakes – the proceeds from this fee will be used to pay for boat washing stations to help prevent invasive mussels from reaching the state's waterways. In addition, there have been proposals in several states to increase the entrance fees to state parks. For example, in an effort to keep several of its parks open, California announced that it will increase its camping fees by $10 and its day-use fees by $2. In addition, the state is currently seeking sponsors to help prevent widespread park closures.

Financing Environmental Programs in Maryland Continues to Be a Challenge

Overview

In Maryland, a number of agencies administer programs related to the protection of the State's environment and natural resources. The four agencies most heavily involved with environmental protection, natural resources management, and energy conservation/efficiency are the Maryland Department of the Environment (MDE), the Department of Natural Resources (DNR), the Maryland Department of Agriculture (MDA), and the Maryland Energy Administration (MEA). Despite the significant costs involved with some of the State's environmental and natural resource goals, it is important to note that these four agencies represent a very small portion of the State budget. The fiscal 2010 legislative appropriation for all four agencies, which totals approximately $777 million, equals approximately 2.7% of the State's total operating budget appropriation, and the general fund appropriation for all four agencies, which totals approximately $120 million, represents less than 1% of the State's total general fund appropriation. As **Exhibit 1** illustrates, these agencies rely on special funds for a majority of their operating budgets.

Exhibit 1
Fiscal 2010 Source of Funding by Agency



DNR: Department of Natural Resources
MDA: Maryland Department of Agriculture
MDE: Maryland Department of the Environment
MEA: Maryland Energy Administration

Note: Based on fiscal 2010 legislative appropriation. Includes operating and pay-as-you-go funding. For MEA, does not include *American Recovery and Reinvestment Act of 2009* federal funds.

Source: Department of Legislative Services

Many of the special funds available to these agencies come from dedicated fees and taxes, including:

- application and permit fees (such as air permit fees, hazardous waste facility permit fees, wetlands and waterways permit fees, brownfields application fees, industrial discharge permit fees, sewage sludge utilization permit fees, and coal and mineral license/permit fees);

- license and registration fees (such as hunting and fishing license fees, hazardous materials license fees, radiation machine license fees, lead registration fees, computer recycling registration fees, pesticide license fees, and vessel registration fees);

- inspection fees (such as nursery inspection fees);

- accreditation and certification fees (such as lead accreditation fees and pesticide certification fees);

- user fees (such as park entrance fees and boat launching fees);

- surcharges (such as the tire recycling fee imposed on the sale of every new tire sold in the State, the oil transfer fee imposed on oil transported into the State, mineral surcharges, and the environmental surcharge imposed on electric companies);

- excise taxes (such as the vessel excise tax); and

- other dedicated taxes (such as the State transfer tax and the agricultural land transfer tax).

Other sources of revenue for the State's environmental, natural resource, agriculture, and energy conservation programs include general obligation bonds, revenue bonds, cap-and-trade auction proceeds, loan repayments, penalties, interest, and matching funds from local governments and other sources.

Examples of Financing Mechanisms Already Used in Maryland

A number of financing mechanisms are already used in Maryland. These are described below and organized into four categories: revenue generation and capital financing, market-based regulation, incentive programs, and private sector cooperation.

Revenue Generation and Capital Financing

As noted above, the State generates a significant amount of funding for its environmental programs through dedicated fees and taxes, some of which are also used to leverage the issuance of revenue bonds. Examples of several revenue generating mechanisms and capital financing programs that generate a significant amount of funding for the State are described below.

Bay Restoration Fee and Fund: A main source of funding for the State's efforts to restore the Chesapeake Bay is the bay restoration fee imposed on users of wastewater facilities and septic systems. The fee on users of wastewater facilities is $2.50 monthly for residential users, and for nonresidential users, up to $120,000 annually determined by a sliding scale based

on the volume of wastewater generated. The fee on septic system users is $30 annually. Fee revenue, which totaled nearly $70 million in fiscal 2008, is paid into the Bay Restoration Fund. The revenue collected from users of wastewater facilities is used to provide grants and to pay the debt service on revenue bonds for the costs of upgrading the State's 67 major publicly owned wastewater facilities with enhanced nutrient removal technology (technology capable of achieving wastewater effluent quality of 3 milligrams per liter (mg/l) total nitrogen and 0.3 mg/l total phosphorus). Through July 2009, approximately $243 million in fee revenue had been collected from users of wastewater facilities. To date, 11 of the State's 67 major wastewater facilities have been upgraded. Once all 67 facilities have been upgraded, nitrogen loading to the bay will be reduced by approximately 7.5 million pounds per year, and phosphorus loading to the bay will be reduced by more than 260,000 pounds per year (from 2000 levels). For contextual purposes, Maryland's 2011 milestones aim to reduce nitrogen loading to the bay by approximately 8.5 million pounds and phosphorus loading to the bay by approximately 565,000 pounds (from 2000 levels).

Sixty percent of the fee revenue collected from septic system users is used to provide grants to septic system owners to upgrade their systems with nitrogen removal technology.[1] According to MDE, the average septic system delivers about 30 pounds of nitrogen per year to the groundwater. Of the estimated 420,000 septic systems in Maryland, 52,000 septic systems are in the Critical Area,[2] and approximately 80% of the nitrogen from a septic system in the Critical Area will reach surface waters. MDE advises that an upgraded septic system cuts a system's nitrogen load in half. Through July 2009, over $51 million in fee revenue had been collected from septic system users. To date, nearly 1,300 septic systems have been upgraded with nitrogen removal technology.

The remaining 40% of the fee revenue collected from septic system users is used to make cost-share payments to farmers to plant cover crops.[3] Cover crops are small grains such as wheat or rye that are planted in the fall after the harvest of corn, soybeans, and other summer crops to absorb unused fertilizers that may remain in the soil. Cover crops also provide a ground cover to prevent soil erosion in the winter. Maryland's Tributary Strategy goal is to plant 800,000 acres of cover crops each year. In 2008, less than 200,000 acres were planted. MDA advises that 1,233 applications for 330,469 acres of cover crops have been approved for 2009; however, due to funding constraints, not all of those acres will be planted.

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[1] For fiscal 2010 only, the allocation of septic system user fee revenue was altered by budget reconciliation legislation. Pursuant to Chapter 487 of 2009, for fiscal 2010 only, 22.4% of the revenue is allocated to MDE for septic system upgrades, while 77.6% of the revenue is allocated to MDA for cover crop activities.

[2] The Chesapeake and Atlantic Coastal Bays Critical Area generally consists of all lands within 1,000 feet of the edge of tidal waters of the Chesapeake Bay, the coastal bays, and their tributaries, or from the landward edge of adjacent tidal wetlands, and all tidal waters and lands under those waters and wetlands.

[3] For fiscal 2010 only, the allocation of septic system user fee revenue was altered by budget reconciliation legislation. Pursuant to Chapter 487 of 2009, for fiscal 2010 only, 22.4% of the revenue is allocated to MDE for septic system upgrades, while 77.6% of the revenue is allocated to MDA for cover crop activities.

Chesapeake and Atlantic Coastal Bays 2010 Trust Fund: Another special fund, the Chesapeake and Atlantic Coastal Bays 2010 Trust Fund, was established during the 2007 special session to implement nonpoint source control projects in order to help meet the State's nutrient reduction commitments under the Chesapeake 2000 Agreement (C2K). The revenue source for this fund is a portion of the existing taxes on motor fuel and short-term vehicle rentals that used to be paid into the general fund. It is important to note that when the trust fund was established, it was assumed that $50.0 million would be appropriated to it annually. However, due to revenue underattainment and the State's continuing fiscal crisis, only $10.0 million was appropriated to the trust fund by the General Assembly in fiscal 2010. At the July 22, 2009 meeting of the Board of Public Works, another $2.0 million was transferred from the trust fund to the general fund, leaving $8.0 million in the fund for fiscal 2010. In fiscal 2009, DNR, MDA, and MDE spent or encumbered $9.6 million from the trust fund.

State Transfer Tax and Bonds: The primary source of funding for the State's land conservation programs is the State transfer tax, which is assessed at a rate of 0.5% of the purchase price of real property conveyed in the State. General obligation bonds have also been used for certain land conservation programs to some extent, especially in years when the State has redirected transfer tax revenues to the general fund in order to balance the State budget. Transfer tax revenues vary depending on the housing market and peaked at over $200 million in fiscal 2007. Historically, the transfer tax has supported a number of State land conservation programs, including Program Open Space (POS) and the Maryland Agricultural Land Preservation Foundation (MALPF), through the purchase of easements and land in fee simple. As alluded to above, however, during times of fiscal crisis, transfer tax fund balances and future revenues have been diverted to the general fund. During the 2009 legislative session, for example, the entire POS fund balance (approximately $70 million) was transferred to the general fund. However, legislation was enacted in 2009 that authorizes the issuance of revenue bonds backed by future transfer tax revenues to support land purchases.

As of July 2009, the State had protected over 300,000 acres of land through POS acquisitions. Through fiscal 2008, MALPF had protected nearly 275,000 acres of agricultural land through the purchase of easements. Overall, an estimated 22% of Maryland's 6.2 million acres have been protected through public ownership and State and local land conservation programs.

Market-based Regulation

In recent years, the use of market-based policies has garnered attention in Maryland as a means to finance various programs. In the environmental area, the most notable of these policies is the State's participation in the Regional Greenhouse Gas Initiative (RGGI), a regional cap-and-trade program involving nine other states. Auction proceeds from the sale of carbon dioxide allowances under RGGI account for a significant portion of MEA's special fund revenues. These funds are paid into the Strategic Energy Investment Fund (SEIF) and used for a variety of consumer benefit programs, including low-income energy assistance, rate relief, and energy conservation/efficiency programs. To date, Maryland has collected $72.4 million in

auction proceeds from the first four auctions. In response to the State's fiscal crisis, during the 2009 legislative session, the uses of the SEIF were altered for two years, most significantly to increase the proportion of funds available for low-income energy bill payment assistance, saving an estimated $35.6 million in general funds each year.

Incentive Programs

A variety of federal, State, and local tax incentives, including income tax credits and special property tax assessments, are available to assist Maryland individuals and businesses that invest in property and improvements to property that encourage energy efficiency and reduce environmental impacts. For example, the State provides a $0.03 per-gallon tax credit up to $500 for individuals and corporations that purchase bio-heating oil for the purpose of space and water heating; a tax credit of up to 8% of the total cost of constructing a green building that meets specified requirements; a clean energy production tax credit ranging from 0.50 cents per kilowatt hour (kWh) to 0.85 cents per kWh, depending on the fuel used to generate the electricity; and a tax credit of up to $5,000 for donating a perpetual easement to MALPF or the Maryland Environmental Trust. Among others, the federal government offers a tax credit for 30% of the cost, up to $1,500, for consumers who purchase and install home energy efficiency improvements such as energy efficient windows, insulation, doors, roofs, and heating and cooling equipment.

In addition to tax policy, the State also administers several cost-share programs that provide incentives to local governments, businesses, and individuals to install pollution controls or modify behavior that benefits the environment. For example, the Maryland Agricultural Water Quality Cost Share Program within MDA provides farmers with grants to cover up to 87.5% of the cost to install best management practices (BMPs) on their farms to control soil erosion, manage nutrients, and safeguard water quality in streams, rivers, and the Chesapeake Bay. Cover crops planted after the fall harvest to soak up unused fertilizers, streamside buffers of grasses and trees planted to protect waterways from sedimentation and agricultural runoff, and animal waste systems designed to help farmers collect and use manure resources, are among 30 BMPs currently eligible for funding. Another cost-share program administered by MDA is the Manure Transport Program, which pays farmers up to $20 per ton to help cover the cost associated with transporting excess manure off their farms. To encourage the transport of manure out of the most critical areas, participants in the four counties on the lower Eastern Shore qualify for a cost-share rate 20% higher than participants in other parts of the State. The State also administers a number of other financial assistance programs to assist local governments to improve water quality and water supply systems.

Private Sector Cooperation

Public-private partnerships (P3s) have been identified as an innovative way states can construct new projects or monetize existing assets. While most of the national discussion surrounding the use of P3s relates to transportation infrastructure, Maryland has entered into at

least one P3 relating to natural resource management: The Chesapeake Forest Project. The Chesapeake Forest Project consists of approximately 66,700 acres of forest land owned by the State. The original 58,000 acres of forest land were part of a 1999 divestment by the Chesapeake Forest Products Corporation. At that time, a partnership between the State, the Conservation Fund, and Hancock Timber Resources Group moved to purchase the forests. As the project unfolded, DNR purchased half of the land directly, while the Conservation Fund acquired the other 29,000 acres with the intention of transferring them to the State at a later time. Prior to doing so, however, the Conservation Fund commissioned the development of a sustainable forest management plan and contracted with a private land management firm (Vision Forestry LLC) to implement the plan. The land, along with the management plan and contract, was donated to the State in 2000. The management plan for the property includes goals of wildlife habitat protection, soil and water quality protection, special sites preservation, and economic benefits. Vision Forestry LLC receives an annual per-acre fee for basic management services, which it receives after distributions of timber revenue to local governments and timber firms. The cooperative partnership enables Vision Forestry LLC to staff at the levels needed to implement the management plan and DNR to maintain oversight.

Challenges Remain

Despite the numerous mechanisms that have already been implemented in Maryland to generate new funding for or reduce the State's costs of implementing its various environmental programs, funding the wide array of activities administered by the State remains a challenge. In general, special fund revenues have not kept pace with program costs. Several fees have not been increased in years, and most fees are not adjusted to inflation. In some cases, special fund revenues from certain pollution-based fees are decreasing because of the successful implementation of pollution reduction programs. In addition, in this fiscal climate, general funds and debt capacity are limited, and in recent years, the State has balanced the budget by diverting some special funds to the general fund. Finally, with the exception of recent stimulus funding for certain energy and environmental programs, federal funds in these areas have generally been declining over the years. Add to these challenges the massive capital and operating costs involved with many of the State's highest environmental priorities and the need for additional sources of funding becomes clear.

Estimated Costs to Implement Programs Are Significant

Despite the significant amount of funding available for the State's environmental programs, the overall costs to achieve the State's goals in this area greatly exceed what is available. A few examples of the enormous costs facing the State are provided below.

Bay Restoration: A 2008 report by the University of Maryland's Environmental Finance Center, *The Chesapeake Bay Restoration Trust Fund: Implementing a Sustainable Investment Strategy*, noted an estimated budget shortfall of approximately $5.4 billion to meet the State's Tributary Strategy goals. Similarly, the *Maryland Transition Work Group Report on Environment and Natural Resources* (January 2007) estimated the cost of implementing all of

the actions in the State's tributary strategies to be over $5.0 billion. Prior to the establishment of the Chesapeake and Atlantic Coastal Bays 2010 Trust Fund, a 2007 report by the University of Maryland's Environmental Finance Center entitled *Chesapeake Bay Financing Strategy* estimated that the State will need to generate an additional $200 million annually to effectively finance the bay restoration effort. Although the federal government and the bay watershed states recently announced a new framework for restoring the bay, which will replace the C2K commitments and instead focus on two-year milestones, the cost to restore the bay will still be significant. Although a comprehensive funding analysis of what it will take to implement the new framework has not yet been completed, the U.S. Environmental Protection Agency's Chesapeake Bay Program notes that $774 million in existing State and federal funding will be directed over a three-year period toward reaching the State's first two-year milestones. However, most expect the total cost to exceed available amounts. Realizing sufficient funding levels would be challenging in any times, but the current economic climate makes this particularly difficult.

Land Conservation/Recreation: According to the *Maryland Land Preservation, Parks, and Recreation Plan* (2009), the amount of public funding needed for conservation and recreation far exceeds estimated funding for the foreseeable future. Optimistic revenue and spending projections prepared by the Task Force to Study MALPF found that full, dedicated funding for all State and local rural land preservation programs would fall about $800 million short of the amount needed to achieve the State's goal to preserve 1.03 million acres of productive agricultural land by 2022 through MALPF, Rural Legacy, and local purchase and/or transfer of development rights programs. In addition, the report notes that priorities for recreational land acquisition and facility development estimated by local governments for 2005 to 2020 totaled $2.3 billion – far less than what will be provided to local governments under POS. Finally, DNR estimates that approximately $11.0 billion is needed to preserve the State's priority natural resource lands identified in DNR's latest inventory and evaluation; this cost far exceeds the amount of funding that will be available through POS.

Energy Conservation and Efficiency: The EmPOWER Maryland Energy Efficiency Act of 2008 requires electric companies to procure and provide customers with a cost effective demand response program that is designed to achieve specific electricity savings and demand reductions through 2015. Electric companies are required to submit energy efficiency and conservation plans to the Public Service Commission (PSC) for review. Based on the plans submitted to PSC pursuant to the Act, five electric companies in Maryland estimate the cost to establish such programs at approximately $265 million from fiscal 2009 through 2011. Although such costs will be borne by the electric companies, and not the State, it shows the magnitude of the significant costs expected to be incurred to meet the State's goals with respect to energy conservation and efficiency. Furthermore, additional energy savings and demand reduction are expected to be achieved through MEA-led efforts funded with RGGI proceeds deposited into the SEIF. As noted above, however, in response to the State's fiscal crisis, during the 2009 legislative session, budget reconciliation legislation altered the uses of the SEIF for fiscal 2010 and 2011, most significantly to increase the proportion of funds available for low-income energy

bill payment assistance; this reduces the amount of funding available for MEA's energy efficiency, conservation, and demand response programs, among other activities.

Conclusion

To put the challenge succinctly, at the beginning of fiscal 2010, the State's general fund budget was approximately $700 million, or 5%, out of balance because of revenue underattainment, and estimates for the fiscal 2011 budget suggest that the State will need to address a cash shortfall of over $1 billion (before any additional revenue write-down). This situation is made all the more pressing by an underlying structural deficit of approximately $2 billion. Because existing funding sources cannot bear the cost of all of the State's environmental goals, it is imperative that Maryland continue to identify additional ways to finance these programs. The Department of Legislative Services has prepared this report to provide the Maryland General Assembly with a menu of innovative environmental finance mechanisms used around the nation that could be implemented or expanded in Maryland.

Chapter 2. Overview of Environmental Finance and Various Types of Financing Mechanisms

Overview

According to the U.S. Environmental Protection Agency's *Guidebook of Financial Tools: Paying for Environmental Systems* – http://www.epa.gov/efinpage/guidebook.htm – environmental finance is the use of financial mechanisms to achieve more sustainable environmental protection. There are two overriding considerations: (1) how to make environmental protection more affordable and/or available for fiscally constrained governments; and (2) who should bear the cost.

According to the University of Maryland's Environmental Finance Center, developing an effective financing strategy involves more than securing funding. Rather, the center advises that it is a process that begins with determining goals, understanding the costs associated with putting needed programs in place to achieve those goals, assessing the existing capacity to pay for those efforts, and identifying what additional resources will be needed to attain the goals. To this end, the center argues that diversity is the key to achieving stability in a financing strategy. First, the center asserts that the least expensive method of financing environmental programs is to reduce implementation costs through collaboration, effective and enforced regulation, and leveraging community priorities to make goals more attainable. Second, the center notes that any funding gap that remains after reducing costs needs to be addressed with new revenue streams (which can be borrowed against and leveraged into significantly greater funding pots, if desired). Finally, the center recommends that market-based efforts be pursued.

Financing Categories and Mechanisms

Using the center's suggested strategy as a guide, this paper discusses five categories of environmental finance: revenue generation; capital financing; market-based regulation; incentive programs; and private sector cooperation. Each of these categories will be briefly discussed below with specific mechanisms discussed later in this chapter. It is important to keep in mind, however, that these categories are neither exhaustive nor mutually exclusive as several financial mechanisms straddle multiple categories.

Revenue Generation

The main tools of revenue generation for all levels of government are general taxes, selective taxes, and fees. One key principle of revenue generation involves the nexus between revenues and expenditures. For certain types of government programs, fiscal policy encourages a close connection between the beneficiary of a government service and the party who must pay for that service. In the realm of environmental finance, this suggests that the party responsible

for pollution ought to pay for the remediation. However, there is also a need to ensure that those who benefit the most from a resource protection activity also contribute.

While selected taxes and fees can be imposed on polluters to generate some of the revenue needed for environmental programs, generalized taxes and fees imposed on the public to finance the remainder of these environmental costs can often be made less burdensome through revenue-neutral taxation – in the realm of environmental finance, this is called "green tax shifting." Under this concept, if existing general funds are expended on environmental protection programs then new environmental taxes or fees could be imposed to displace a portion of those general fund expenditures. For example, if a carbon tax were levied on industry to discourage air pollution, corporate income taxes might be reduced to achieve a partial or full offset. Green tax shifting invokes the use of dedicated funds, which can both reduce strain on the general fund and target harmful environmental activities in a transparent manner.

Finally, the stability and sustainability of a revenue source must be considered. Thus, whereas sales taxes mirror highly variable macroeconomic cycles, user fees and fees levied on property and other long-lived capital are relatively constant. Since it is assumed that green taxes modify behavior, it is essential for policymakers to understand that these are inherently designed to be a declining revenue source. This is not a problem, however, if the revenue is used only to ameliorate the pollution from which the revenue is based. Voluntary programs (such as income tax check-off programs and license plate programs) can also be used to generate revenue; however, their voluntary nature can make income streams irregular and difficult to predict. Several environmental financing mechanisms relating to revenue generation will be discussed later in this chapter – **litter taxes, impact fees, transporter fees, and severance taxes.**

Capital Financing

The second category of environmental financing mechanisms discussed in this paper is capital financing. Capital financing for environmental projects includes the use of bonds, loans, and grants to purchase capital (fixed) assets with a useful life of several years. For environmental protection programs, examples of such capital assets include water and wastewater treatment plants, solid waste disposal facilities, and the acquisition of land/open space. Bonds, loans, and grants can be used in innovative combinations to finance a single project, such as issuing a bond that enables qualification for a matching grant. However, all three forms of capital finance have transaction costs and come with varying degrees of financial risk.

Because fiscal conditions constantly change, and because no two environmental projects are exactly alike, it is important for policymakers and program managers to acknowledge the full range of capital financing tools available to them and understand associated risks and benefits. Two capital financing mechanisms that are often overlooked and underappreciated are discussed later in this chapter – **double-barrel bonds and tax lien oriented financing programs.**

Market-based Regulation

Market-based regulation typically involves the use of price signals to affect the behavior of private firms or individuals in order to achieve environmental goals. This can be accomplished by placing a fee on a good that approximates the cost to remediate the damage rendered by its extraction, production, and/or delivery. Market-based regulation may also involve making a market for public goods, in which the supply consists of assigning property rights where previously none had existed, and demand is generated through the compliance with regulatory caps.

As revenues from traditional financing mechanisms have waned in recent years, it is important for policymakers to take into consideration market-based regulatory mechanisms. Four market-based regulation policies are discussed later in this chapter – **transferable development rights, pay-as-you-throw fees, cap-and-trade, and congestion pricing.**

Incentive Programs

Governments sometimes opt to incentivize behavior changes rather than regulate directly. Incentive programs can be in the form of cost-share programs, in which a government pays an individual, business, or other entity for a portion of their costs to install environmental controls or reduce environmental impacts. Tax policy, including tax credits, deductions, and special property tax assessments, can also be used to incentivize certain behavior.

Although incentive programs do result in short-term costs to the implementing government (in the form of cost-share payments and/or reduced tax revenue), ultimately, such programs may reduce the long-term costs associated with restoration activities. Two types of incentive programs are discussed later in this chapter – **rehabilitation and redevelopment tax credits and cost-share programs.**

Private Sector Cooperation

The final environmental financing category discussed in this paper is that of private sector cooperation. Private sector cooperation acknowledges the role the private sector can play in discovering and realizing value in environmental protection. Where scarce public funds are insufficient to achieve regulatory goals, the private sector may be allowed to bid for the right to provide these services, or the services may be fully outsourced. Private sector cooperation in environmental protection may also be achieved by conditioning government-required approvals on private sector projects.

While not necessarily revenue-generating policies in their own right, private sector cooperation policies can be used to offset the need for public funds and could thus achieve the goal of mitigating fiscal stress on the general fund. Two examples of private sector cooperation

are discussed later in this chapter – **public-private partnerships (P3s) and land reclamation banks.**

Revenue Generation: Litter Taxes

Description: Litter taxes are imposed on businesses that produce, distribute, or sell consumer products that contribute to litter problems. According to the U.S. Environmental Protection Agency (EPA), such taxes can be levied by either state or local governments. The revenues from litter taxes are generally used to pay for litter removal and prevention programs and recycling programs.

Pros: The cost of litter removal and prevention and recycling programs can be offset with revenues from the litter tax, thereby reducing pressure on a government's general fund. In addition, to the extent that increased costs modify producer behavior, such as using less packaging material, the need for litter removal programs decreases.

Cons: As with the imposition of any new tax, one of the primary issues regarding imposing a litter tax is public opposition.

Example(s): Washington State levies on manufacturers, wholesalers, distributors, and retailers a litter tax of 0.015% on the value of certain goods including food for human or pet consumption; cigarettes and tobacco products; soft drinks; beer and wine; household paper and paper products; newspapers and magazines; glass and metal containers; plastic or synthetic containers; cleaning agents; and toiletries. Fifty percent of the revenue from the litter tax is distributed to certain state departments and agencies for litter collection programs; 20.0% is used to pay for local government waste reduction, litter control, and recycling activities; and 30.0% is distributed to the Department of Ecology for waste reduction and recycling efforts. In fiscal 2008, Washington's litter tax generated over $9 million.

The Commonwealth of Virginia levies a $10 annual litter tax on manufacturers, wholesalers, distributors, or retailers of certain products (the list of such products is very similar to the list of products taxed in Washington State). Virginia also levies an additional $15 annual litter tax on manufacturers, wholesalers, distributors, or retailers of groceries, soft drinks, carbonated waters, or beer or other malt beverages. Ninety-five percent of litter tax revenues is used for litter prevention and recycling grants, and the other 5% is used to administer the grant program. In fiscal 2008, Virginia's litter tax generated approximately $870,000.

Related Mechanism(s): Point-of-sale Surcharges (*e.g.*, fertilizer surcharges, prepared food and beverage surcharges); Green Taxes; Tire Recycling Fees; Bag Taxes; Electronic Waste Fees

Revenue Generation: Impact Fees

Description: Impact fees are frequently assessed on the construction of new buildings in communities across the country. Such fees enable governments to collect revenue from builders and developers for public facilities improvements that are necessary to serve the occupants of the new buildings. One example of an impact fee is an impervious surface fee, the proceeds of which generally go to fund stormwater management projects.

Pros: The major advantage of imposing an impact fee is that the burden of paying for improvements to public facilities is shifted to the developers whose buildings are necessitating the improvements and away from general taxpayers. Impact fees also provide financing upfront for the necessary infrastructure development. In addition, such fees can be used as a disincentive for further growth in areas where there is little additional capacity for development.

Cons: An impact fee may not be imposed simply to raise revenue to fund facilities for the general public since such a fee would actually be a tax. In Maryland, an impact fee must pass what is called the "rational nexus test" (89 *Opinions of the Attorney General* 212 (2004)). Under this test, a charge is considered an impact fee only if the government can show that the amount of the fee is proportional to the cost of providing facilities or services to the new development, and the revenue from the fee is earmarked for the substantial benefit of the properties charged. Impact fees also raise the cost of housing. Thus, they can encourage development outside the impact fee area.

Example(s): In fiscal 2008, eight Maryland counties imposed development impact fees, generating almost $24 million in revenue. While impact fees are generally a tool local governments use to offset the impact of development, a type of impact fee, known as an "impervious surface fee," has previously been proposed for statewide application in Maryland. Legislation (House Bill 1220/Senate Bill 901) was proposed during the 2007 legislative session that would have charged developers of new construction a fee based on the square footage of new impervious surfaces – both bills failed. The proceeds from the fee would have been used to help fund environmental programs, including implementing the State's Tributary Strategies and meeting the State's commitments under the Chesapeake 2000 Agreement.

The City of Takoma Park, Maryland currently charges an annual impervious surface fee on all properties within the city limits to pay for stormwater management programs, including drainage system maintenance and protecting streams and wetlands from erosion and pollution.

Related Mechanism(s): Building Excise Taxes; Exactions; Emissions Fees/Taxes; Fertilizer Surcharges/Taxes; Septic System Impact Fees; Green Taxes

Revenue Generation: Transporter Fees

Description: Transporter fees are charged by states to individuals and corporations for the right to transport solid waste, hazardous waste, petroleum products, and radioactive waste. Revenues received from such fees are used to offset the costs of hazardous waste monitoring, spill response, and other environmental protection initiatives.

Pros: The cost of monitoring hazardous waste and cleaning up spills is shifted from the government to the transporters of such waste.

Cons: Depending on the size and scope of the transporter fee, small businesses could be significantly impacted by increased overhead costs. Such fees could be passed along to customers; however, to the extent that passing along fees increases the price for services beyond the cost for similar services offered by larger transporter companies, these small businesses could be negatively impacted. In addition, an unintended consequence of imposing a transporter fee that is too high could be an increase in illegal dumping or other undesirable behavior on the part of those individuals or companies wishing to avoid paying such a fee.

Example(s): The Massachusetts Department of Environmental Protection (MassDEP) issues hazardous waste transporter licenses. Such licenses are valid for five years, and cost $2,810 for a new license and $1,935 for renewals. With these licenses, transporters are authorized to transport all categories of hazardous waste. In addition, hazardous waste transporters must pay a fee to MassDEP based on the quantity of waste they collect and/or deliver in Massachusetts. The funds raised by this fee are used to help repay the Commonwealth's expenses for cleaning up hazardous waste sites and spills. According to MassDEP, transporters commonly bill their customers for this fee, which is currently set at $0.264 per gallon or $0.0264 per pound. In fiscal 2009, the Massachusetts hazardous waste transporter fee generated approximately $5.6 million.

Related Mechanism(s): Hazardous Waste Storage Fees

Revenue Generation: Severance Taxes

Description: Severance taxes are levied on resources extracted from a jurisdiction's natural environment. They can be set either on a flat, per-unit basis or based on the value of the resource. Traditionally, severance taxes were imposed by jurisdictions on the oil, gas, and mineral industries. However, a small minority of states have established severance taxes on renewable resources such as timber, oysters, and fish.

When levied on nonrenewable resources such as coal, a severance tax is designed to slow the extraction of the finite resource and encourage conservation. The revenue raised may be used to remediate the mining site and surrounding environment, ensure sufficient funds for future closure of the mine, and even to assist in the future transition of the local labor market once the resource has been fully extracted. A more recent and innovative application of severance taxes is on renewable resources. In this context, the excise may be set to increase as the natural resource stock declines, and to decrease once populations rebound. Biologists, economists, and other natural resource planners can thereby establish an artificial supply-demand curve that allows the market to promote conservation of delicate ecosystems.

Pros: The severance tax shifts the burden of conservation and environmental remediation to the producers/extractors and away from the general population. When applied to renewable resources, a severance tax allows the economy to apply price signals to biological factors affecting natural ecosystems.

Cons: Perhaps the greatest pitfall in devising a severance tax is setting the rate in a way that significantly disturbs the local industry. Several considerations include (1) prevailing rates in surrounding jurisdictions; (2) the industry's profit margin; (3) the cost of remediation or other goals for which the severance tax was established; (4) sensitivity of consumer demand; and (5) potential for creating a monopoly or barriers to entry.

Example(s): A licensed buyer of oysters caught within the natural oyster bars of Maryland waters must pay $1 per bushel to the Maryland Department of Natural Resources. All revenues are remitted to the Fisheries Research and Development Fund to support the repletion of the State's natural oyster bars.

Overall, 35 states collected a severance tax in 2007. In 19 states, severance tax revenue consisted of less than 1.0% of total state revenue. In the other 16 states with a severance tax, the tax as a percent of total state revenue ranged from 1.0% in Nevada to 64.6% in Alaska. At least nine states impose some sort of severance tax on renewable resources.

Related Mechanism(s): Closure and Post-Closure Performance Bonds; Mineral Royalties

Capital Financing: Double-barrel Bonds

Description: A double-barrel bond is secured by a pledge of two or more sources of repayment to bondholders. Traditionally, double-barrel debt involves a utility pledge of revenues from a specially created user fee, as well as the general credit of the issuing government backed by its authority to collect property tax. Sometimes, the user fee is set at a level necessary to cover the cost of either interest or principal, with the other pledge covering the remainder of the debt service.

Pros: By securing a second pledge of revenues for bondholders, an issuing jurisdiction can generally obtain a lower interest rate on a double-barrel bond security without having to establish a user fee large enough to pay for a project by itself. In addition, if the project to be financed is well-received publically due to its environmental or public health benefits, the separate user fee represents a direct and transparent tax that may receive greater political support.

Cons: In certain situations a jurisdiction is unable to issue a double-barrel bond security without affecting its credit rating. In addition, some jurisdictions will find that the double-barrel bond failed to attract interest rates as low as those for general obligation debt or as low as otherwise desired. Often the inability to obtain low rates is the result of the failure to persuade the debt market of the stability and security of the secondary pledge of revenues.

Example(s): Nationally, thousands of state and local infrastructure projects have relied upon the use of double-barreled bonds, including many environmental projects. Maryland uses double-barrel debt financing on highway infrastructure projects with a secondary pledge of federal transportation funding. As applied to environmental projects such as wastewater systems, a double-barrel bond would work as follows. A county desiring to build an advanced wastewater treatment facility to protect water quality establishes an environmental user surcharge on the property tax bill of the town residents. The surcharge is designed to be set at a level that is higher than it would otherwise be if it were only to cover the operating and maintenance expenditures of the plant. Revenues from the surcharge are deposited in a special enterprise fund linked to the project and listed in the bond covenant as the primary pledge of repayment. The secondary pledge is the county general fund supported by its ad valorem tax. Because the county guarantees repayment through its taxing authority, it receives a lower interest rate on the bond issuance, saving the government tens of thousands of dollars in debt service payments over the life of the 30-year bond.

Related Mechanism(s): Anticipation Notes; Appropriation Backed Bonds

Capital Financing: Tax-lien Oriented Financing

Description: Tax-lien oriented financing takes advantage of the savings generated by a renewable energy generator or energy efficiency improvement device. The resident obtains a loan to pay for the upfront cost to purchase and install an energy system and agrees to have a surcharge added to his or her property tax bill. This assessment charge acts as a lien and runs with the property even if the resident later decides to move. The very secure nature of the repayment allows the lender to provide very attractive interest rates on the loan. The lender may be a private bank agreeing to participate in the program or a public institution overseeing a pool of funds capitalized by the issuance of a bond. The sponsoring jurisdiction ensures that an energy audit is conducted prior to installation of the system to establish a baseline profile of the home's energy use. The auditor or other program associate may also provide the resident with information on the various state, local, and federal tax credits and other benefits for which he or she may qualify following the installation of the system.

Pros: This mechanism overcomes a significant market barrier, unlocking a tremendous amount of savings for consumers, demand reduction for utilities, and environmental protection for the public. By matching the savings created by the energy system with the repayment on the loan, consumers may pay little or nothing on an annual basis for the cost of an energy system that essentially finances itself. To the extent private banks are involved, these lenders enjoy a very secure and stable line of business, as well as the value of the goodwill created in the community. The program may also help states and local governments reach environmental or renewable energy goals, such as a state renewable portfolio standard or the federal Clean Air Act.

Cons: Although alternative energy systems create savings and usually receive widespread public support, some landowners may find some systems unsightly. Additionally, the extra cost of the charge on the annual property tax assessment is an encumbrance on the property that may inhibit the ability of the property owner to later sell the property.

Example(s): There were at least six municipal tax-lien oriented financing programs for alternative energy systems nationwide in July 2009. One program of particular interest is the Long Island Green Homes Program in Babylon, New York. What makes this program unique is that the pool of funds supporting the program is a public revolving loan fund that is self-sufficient and does not create a drain on public finances. Because the loan fund does not need to make a profit, the interest rates offered are well below market rates. In addition, this program does not have a fixed term for the loan, instead allowing the duration of repayments to be determined by the estimated amount of time necessary for the system to pay for itself. New programs can take advantage of federal energy-related stimulus funds to capitalize a revolving loan fund rather than floating a bond or turning to other means to raise revenue.

Related Mechanism(s): Special Assessment Bonds; Value-Capture Bonds

Market-based Regulation: Transferable Development Rights

Description: Transferable Development Rights (TDRs) are legal instruments created in association with a comprehensive land use plan that steer building development into selected areas. These areas may be selected to keep development in locations with existing infrastructure, for economic revitalization purposes, or to promote transit-oriented development. Once a local legislative body authorizes TDRs by ordinance, planners begin work mapping out areas to be restricted "sending areas" and priority "receiving" areas. Generally, property owners in the newly restricted areas have their right to build on the property frozen or face down-zoning to prevent any change in the use or dwelling unit density of their land. To compensate these owners who have had rights incidental to their property ownership restricted, TDRs are granted. TDRs may then be sold from owners in sending areas to developers in receiving areas.

Pros: The use of TDRs compensates property owners for the loss of certain property rights, and finances conservation, smart growth, and other desirable land use policies. Although TDRs do not directly measure the value of natural land's ecological services, the price of a TDR does reflect the increasing scarcity of natural land as a jurisdiction faces urbanization. Ultimately, the TDR uses market forces to promote the conservation of open spaces, to increase density in urban areas, and to create savings for state and local governments equal to the amount that would otherwise be expended for transportation, water, and other infrastructure.

Cons: Developing a TDR program is a complex process requiring significant land use planning resources and assistance from environmental and perhaps economic development and transportation authorities. Factors present in successful TDR programs are not always able to be duplicated in other jurisdictions that face unique local circumstances. Whether due to political or natural geographic forces, in some jurisdictions it is difficult to develop a viable and active market for TDRs. Nevertheless, many small and rural counties have successful TDR programs.

Example(s): Although King County in Washington State has been a relative newcomer in the development of TDRs, it has modeled its program after several of the older and more successful programs in the United States, including that of Montgomery County, Maryland. Two features in particular make King County's TDR program exemplary. First, the program has successfully implemented an intergovernmental TDR exchange in a county with 39 cities and a population and land area greater than Rhode Island. Thus, land use planners have successfully channeled development in urban Seattle and other cities and constrained the sprawl to within their existing Urban Growth Areas, while preventing further deforestation in unincorporated areas. Second, much of this success is made possible with the creation of a Development Credit Bank. Together, the private exchange of TDRs and public purchase of development credits have helped protect more land than any other local program in the country.

Related Mechanism(s): Environmental Trading

Market-based Regulation: Pay-as-you-throw (PayT) Fees

Description: Pay-as-you-throw (PayT) fees are charged for the collection of ordinary household trash, based on the amount of trash generated. Generally, PayT fees are assessed by individual communities and are charged based on the number of bags or cans of waste disposed of, although some communities charge residents based on the weight of the trash. The proceeds from PayT fees generally go to cover solid waste management costs. According to EPA, communities with PayT programs have reported significant increases in recycling and corresponding reductions in waste.

Pros: The major benefit of PayT is the economic incentive for residents to recycle more and reduce waste, thus reducing pressure on landfills and assuaging the environmental issues associated with them. In addition, by encouraging individuals to recycle more, the amount of material and energy required to generate new raw materials could decrease, thereby reducing greenhouse gas emissions. Furthermore, economies of scale could be realized by the commercial recycling sector, improving the economics for commercial recyclers. PayT programs are considered equitable because households that generate less waste pay less in fees.

Cons: If the PayT program is administered per bag, rather than based on trash weight, then there may be an incentive for households to compact trash or dump illegally as opposed to reducing the amount of trash generated. This concern can be alleviated by administering PayT by weight instead and by stepping up enforcement of illegal dumping. PayT may be considered regressive because it is a flat fee per unit for all customers despite differing abilities to pay.

Example(s): There were about 100 PayT programs in the United States in the late 1980s. As of 2006, the number of PayT communities had grown to almost 8,000, including 49 in Maryland. The City of Sacramento has implemented an aggressive PayT program and is on its way to being a "zero waste" city. Upon implementing the program, Sacramento's recycling increased from 12 tons of recyclables per day to 36 tons per day – currently it is collecting over 300 tons of recyclables per day. As of 2007, Sacramento charged $10.15 for a 32-gallon cart, $12.35 for a 64-gallon cart, and $14.95 for a 96-gallon cart. Additional charges are levied for additional carts up front and for each additional bag of trash collected out on the route. In contrast, the recycling fee was $3.50 for a 96-gallon commingled container, creating the incentive necessary to spur recycling.

Related Mechanism(s): Water and Sewer Capacity Credits; Utility Connection Fees; Billing Surcharges; Demand Side Management

Market-based Regulation: Cap-and-trade

Description: Cap-and-trade is an administrative approach used to control pollution by providing economic incentives for achieving reductions in the emissions of pollutants. A central authority (usually a government or international body) first sets an aggressive cap, or maximum limit, on emissions. Sources covered by the program then receive authorizations to emit in the form of emissions allowances, with the total amount of allowances limited by the cap. Each source can design its own compliance strategy to meet the overall reduction requirement, including sale or purchase of allowances, installation of pollution controls, and implementation of efficiency measures, among other options. Individual control requirements are not specified, but each source must surrender allowances equal to its actual emissions in order to comply.

Pros: A cap-and-trade program allows market forces to work to fix environmental problems efficiently. By establishing a market for a pollutant, a cap-and-trade program imposes a cost on emitters proportional to the amount of damage that is done to the environment from the activity. This encourages the research and development of new, cleaner technologies. If allowances are sold, a cap-and-trade program can generate a significant amount of revenue for governments for related programs. Establishing a cap that decreases over time guarantees that specified emissions reductions targets will be met. This market-based mechanism has gained popularity in recent years and is now the near universal approach to climate change mitigation, making it more politically feasible than some alternative approaches such as a carbon tax.

Cons: Firms operating under cap-and-trade are at a competitive disadvantage. Because such a program establishes a price on pollution, firms will attempt to pass on the cost of the allowances to consumers. With respect to greenhouse gas cap-and-trade programs, for example, critics argue that establishing a price on carbon dioxide emissions will result in an increase in electricity prices, impacting low-income individuals disproportionately. Large fluctuations and unpredictability in allowance prices makes investment decisions difficult, and the complexity of a trading system can foster delay and make enforcement difficult. Finally, if allowances are given away (rather than sold), this provides windfall profits to polluters.

Example(s): Maryland is one of 10 states that participate in the Regional Greenhouse Gas Initiative, which initiated its first auction of carbon dioxide allowances in September 2008. To date, the states have auctioned more than 110 million allowances, generating $366.5 million in proceeds ($72.4 million for Maryland). The states are using these funds to weatherize low-income homes, hire and train energy efficiency auditors, and subsidize energy efficiency upgrades for small businesses, among other things. In Maryland, most of the proceeds have thus far been dedicated to low-income energy bill assistance and rate relief. The European Union has been operating its European Trading System since 2005, while Canada, the United Kingdom, Australia, New Zealand, Taiwan, and the Western and Midwestern regions of the United States are all in various stages of planning or implementing their own cap-and-trade systems.

Related Mechanism(s): Nutrient Trading; Bay Bank; Chesapeake Fund

Market-based Regulations: Congestion Pricing

Description: Congestion pricing is defined as any pricing structure in which motorists pay a user fee in exchange for driving on a roadway or into a particular region. The goal of congestion pricing on public roads is to set tolls for travel during congested periods that would make the price that the driver pays for such a trip equal or close to the total cost of that trip (including external costs such as the increase in travel time experienced by other drivers as well as the pollution emitted by the vehicle). Surcharges are intended to reduce congestion and the demand for road space at peak periods by providing incentives for travelers to share rides, use transit, and travel at less congested times or on less congested routes. The most common type of congestion pricing uses high-occupancy toll (HOT) lanes. HOT lanes are limited-access, normally barrier-separated highway lanes that provide free or reduced cost access to high-occupancy vehicles (HOVs), and also provide access to other paying vehicles not meeting passenger occupancy requirements. Most HOT lanes are created within existing general-purpose highway facilities and offer potential users the option of using the general-purpose lanes or paying for premium conditions on the HOT lanes.

Pros: Studies have shown that HOT lanes are likely to provide environmental benefits by reducing emissions caused by stop-and-go traffic and by encouraging commuters to use mass transit and carpools. HOT lanes also have the potential to keep HOV lanes at their optimum utilization; can help to reduce congestion in the general-purpose lanes; generate revenues for transportation corridor improvements; provide a premium travel option for drivers who have a special need to reach their destination on time and are willing to pay for better service; and increase the reliability of a transportation network by increasing the predictability of travel times.

Cons: One of the major criticisms of congestion pricing is that it is unfair to certain groups of people. The argument is that HOT lanes favor the rich because the poor are unable to afford toll charges.

Example(s): The SR 91 Express Lanes are a 10-mile, four lane, HOT facility in the median of a section of SR 91 in Orange County, California. The facility opened in 1995 and was the first example of HOT lanes in the United States. Toll rates are collected electronically and vary according to a predetermined toll schedule. HOV-3+ vehicles travel for free during all periods except weekdays from 4:00 to 6:00 p.m. in the eastbound direction. The Orange County Transportation Authority has stated that the SR 91 Express Lanes have allowed them to move more vehicles and people through the 91 corridor. Additionally, average vehicle occupancy counts have increased.

In Maryland, two projects currently under construction will be the first to utilize congestion pricing in the State – the InterCounty Connector (scheduled to be completed in 2011), and the Express Toll Lanes currently being constructed on I-95 north of Baltimore (scheduled to be completed in 2016).

Related Mechanism(s): User Fees; Full Cost Pricing; Green Taxes; Urban Congestion Fees

Incentive Programs: Rehabilitation and Redevelopment Tax Credits

Description: A tax credit is one type of tax policy that seeks to incentivize changes in behavior. What makes tax credits particularly favorable to the taxable entity is that it allows a dollar-for-dollar reduction in tax liability. In other words, for every dollar spent on the targeted activity – in this case the rehabilitation of certain existing buildings or redevelopment of brownfields property – the responsible person can reduce his/her final tax bill by the same amount (capped at a certain amount or percentage of costs). In fact, a tax credit can also be made refundable or "non-wastable" so that if the amount expended exceeds a person's total tax liability, the person can receive a payment in the amount of the excess. Because tax credits may represent a significant cost to a state treasury, however, they are usually only granted for highly desirable activities. Rehabilitation and redevelopment qualify as such because of the potentially overlapping environmental, land-use, and economic benefits created.

Pros: Rehabilitation and redevelopment tax credits focus development in preferred areas to prevent sprawl, encourage revitalization in economically distressed areas, promote the beneficial and productive use of vacant property, and/or cause polluted lands that are hazardous to the environment and public health to be remediated. In effect, these credits can bootstrap the development of an uneconomic and environmentally hazardous property into a profitable venture that raises surrounding property values and supports the local property tax base.

Cons: Granting tax credits, whether refundable or not, is an expensive way of financing environmental improvements. As such, it is important to construct the credits in such a way to ensure that the only properties to receive credits are those that provide multiple benefits or a favorable cost-benefit result over the long-term. In addition, if the credit is refundable and the cap is set low enough, there is a risk that a single project will encumber the entire appropriation.

Example(s): Massachusetts and New York provide both a rehabilitation and redevelopment tax credit. In these states, a property developer may not only receive state (and federal) tax credits for some or all of the cost of remediating contaminated property, but also additional tax credits for developing the previously vacant land into a habitable or profitable residential or commercial/industrial project. In New York, additional credits and benefits are conferred if the property is located in zones specified by the Commissioner of Economic Development. In each of these states, there are numerous examples of private parties that not only utilized tax financing to clean up polluted land or rehabilitate an existing structure, but also took advantage of multiple tax credit programs to convert vacant and contaminated land into environmentally neutral and economically revitalized land that produce a profit for developers, taxes for local government, and an aesthetically pleasing landscape for the community. Additional tax credits may be available for meeting green building standards and generating renewable energy on site.

Related Mechanism(s): Conservation Tax Credits; Investment & Production Tax Credits; Tax Credits for Redeveloping Existing Impervious Surfaces

Incentive Programs: Cost-share Programs

Description: A cost-share program is a program in which the government (federal, state, or local) gives grants or makes loans to nonprofit organizations, businesses, individuals, or other government entities to help defray the costs of implementing environmental controls or practices.

Pros: By sharing the costs of environmental projects, state funds can be used to leverage private funds or other monies in order to pay for environmental improvements more cheaply than if the state were to pay for the improvements itself.

Cons: Cost-share programs require start-up costs. In addition, they can send incorrect price signals, potentially favoring more expensive solutions. Also, once a cost-share program has been started, it may be difficult to discontinue. As with most incentive programs, however, the long-term benefit of any environmental improvements implemented under these programs may outweigh these costs.

Example(s): An example of a cost-share program is one for nonpoint source pollution control. Under this type of cost-share program, landowners are provided with cost share funds to implement best management practices in an effort to reduce nonpoint source pollution. One of the areas in which this type of cost-share program is common is for the implementation of best management practices (such as conservation buffers and cover crops) on agricultural land to reduce nutrient runoff and soil erosion. EPA notes that these types of programs are usually administered at the state level and sometimes leverage federal funds.

One specific example of a cost-share program is the Rhode Island Aqua Fund, which is used to fund projects to improve the water quality of Narragansett Bay. Under this program, the Rhode Island Department of Environmental Management issues grants and loans from the Aqua Fund to cities, towns, universities, nonprofit organizations, government agencies, and businesses. According to EPA, the funds from the Aqua Fund are used for projects designed to help stop pollution of the bay and its tributaries, including wastewater treatment projects and urban runoff abatement. Grants are given for up to 90% of the costs of projects under $500,000; for projects with a cost exceeding $500,000, grants may be given for up to 50% of the costs.

Private Sector Cooperation: Public-private Partnerships (P3s)

Description: P3s, in general, take the form of contractual relationships between a government and a private entity in which the financial, technical, and/or operational risks of a project or service is shared.

P3s come in a variety of forms. Some examples of P3s include contractual services for operations and maintenance of a service; turnkey arrangements, in which the private sector uses expedited building techniques to construct a facility for the government; design/build/operate/maintain partnerships, in which the private sector designs, builds, operates, and maintains a facility through a single contract with financing secured by the public sector and in which the public sector retains ownership and oversight of operations; build/operate/transfer partnerships, in which the private partner builds a facility to the specifications agreed to by the public agency, operates the facility for a specified period of time under a contract with the agency, and then transfers ownership of the facility to the agency at the end of that period; and build/own/operate partnerships, in which the contractor constructs and operates a facility without transferring ownership to the public sector.

Pros: By shifting some of the costs and risks to the private sector, P3s can reduce total government spending. P3s may leverage financial resources or technical expertise not available to the government and can be financially lucrative for contracting firms.

Cons: Significant concerns regarding P3s include the loss of government oversight and the possibility that the profit motive of the private sector may mean a less than favorable deal for the public. In addition, tax-exempt and other low-cost financing typically available to a government may not be available for P3s. Finally, to the extent a P3 replaces an existing public sector service, there may be resistance from public employees concerned about job loss.

Example(s): In general, P3s have been used primarily for transportation projects and the construction of buildings. Examples of their use for environmental and natural resource protection include water and wastewater treatment plant operations, photovoltaic power system installation, sustainable forest management, and conservation easement/land purchases. A number of nonprofit organizations work with government to conserve land. For example, according to the Lincoln Institute of Land Policy's *Land Conservation Through Public/Private Partnerships (1993)*, at that time, nearly half of the 6.3 million acres in the United States protected by the Nature Conservancy had been preserved in cooperation with federal, state, and local government agencies.

Related Mechanism(s): Mitigation Banks; Performance Bonding; Developer Financing; Joint Private Ventures

Private Sector Cooperation: Land Reclamation Banks

Description: Land reclamation banks are nonprofit institutions capitalized with public funds in order to remediate brownfields. Land reclamation banks, usually public trusts, conduct all the necessary steps to either bring brownfield properties to the market or return them to natural "greenfields." Properties may be obtained through outright purchase, tax foreclosure, eminent domain, or gifting. Property acquisition may be funded with tax-increment financing, land transfer taxes, land registration fees, or property sales and leases. If land is not developed for productive use, but merely returned to natural use, land trusts may seek federal brownfield grants, or use proceeds from a public bond issuance. Good governance means seeking the lowest cost of site acquisition and the highest use of land in order to perpetuate the land reclamation bank as a self-sustaining revolving loan fund.

Pros: A one-time capitalization as well as minimal ongoing support from public revenue sources allow the institution to sidestep the higher interest rates charged by private banks for the perceived risk associated with brownfields redevelopment and other nonprofit public policy goals. By consolidating all steps of brownfields redevelopment, a land reclamation bank can reduce transaction costs. The land reclamation bank can also take a community-wide focus and aggregate land for community redevelopment planning, which in turn may improve resale opportunities by bringing private developers together and presenting them with a coherent development vision. Finally, to the extent that brownfields are in urban cores, land reclamation banks also are a smart growth tool that concentrates growth where infrastructure is present and increases tax revenues.

Cons: Land reclamation banks may have difficulty becoming self-sustaining where there is insufficient demand for residential or commercial development. If the bank over-invests in development that does not recycle money back to the fund, then it may be necessary to supply a continuous public revenue source.

Example(s): There are very few current examples of land reclamation banks in the United States. In fact, the concept has largely evolved from the activities of some land banks or land trusts – institutions designed to revitalize blighted areas or conserve open space. As these institutions encountered contaminated properties within their communities, including federally designated Superfund sites, brownfields redevelopment became incorporated into their mission. For example, the Genesee County Land Bank Authority serving in and around Flint, Michigan now operates a brownfields program. The program has used federal funds, revolving loan funds, and proceeds from bond issuances to remove over 600 tons of waste. These sites are usually acquired at low cost through tax foreclosure. The title is cleared and the properties are then either sold and developed or are preserved as open space.

Related Mechanism(s): Community Development Financial Institutions; Land Trusts

Chapter 3. Conclusions and Recommendations

As described in the first two chapters, Maryland has taken many steps to reduce costs and generate additional revenue in order to meet its various environmental, natural resource, and energy conservation goals. However, it is clear that more needs to be done if the State's goals are going to be accomplished.

Collaboration and Coordination

The Office for a Sustainable Future within the Department of Natural Resources should work with the University of Maryland's Environmental Finance Center, other relevant State agencies, and local governments to engage in a discussion regarding innovative environmental financing strategies. According to the University of Maryland's Environmental Finance Center, in the end, a coordinated approach that focuses on performance and efficiency, through measures similar to BayStat, will ensure that State resources are spent only on those projects that provide the greatest return on investment.

Reducing Implementation Costs

Next, the agencies involved in the delivery of the State's environmental, natural resources, and energy conservation programs could consider reducing the State's costs by:

- Encouraging more stringent zoning by local governments, encouraging the development of additional local transfer of development rights (TDR) programs, and authorizing State level oversight of local TDR programs to achieve greater coordination among jurisdictions, including the potential development of inter-jurisdictional TDRs as has been accomplished in several other states;

- Requiring changes through direct regulation (such as requiring all new and failing septic systems in the State to incorporate best available technology for nitrogen reduction), rather than merely incentivizing changes;

- Implementing a statewide nutrient trading program that incorporates both point and nonpoint sources. In August 2009, the Maryland Department of Agriculture announced that it has received a $512,000 federal grant to implement a nutrient trading program between point and nonpoint sources in the Upper Chesapeake Bay. Efforts to establish a nitrogen offset market are already underway by the Chesapeake Fund, a nonprofit that provides individuals and businesses the ability to purchase nitrogen offsets that are used to pay for cost-effective projects in targeted watersheds. In addition, the Pinchot Institute is in the process of developing a Bay Bank to link landowners and buyers of ecosystem

services to increase participation in regulatory and voluntary ecosystem markets. The Bay Bank will initially focus on carbon sequestration, habitat conservation, water quality protection, and forest conservation markets. Finally, BayStat has identified this concept as one part of its contingency plan if the 2011 milestones for bay restoration are not met. The University of Maryland's Environmental Finance Center indicates that the potential cost savings could be significant if a tradable permit system were established for the entire bay watershed. Accordingly, the nutrient trading concept should continue to be explored and implemented to the extent feasible;

- Expanding upon its effort to encourage the development of local tax lien oriented financing programs. Recently, the Maryland Energy Administration (MEA) announced as part of its EmPOWERing Financing (EF) Initiative that it is seeking to partner with a statewide nonprofit – perhaps the Maryland Clean Energy Center – to create a "program in a box" to facilitate the development of tax-lien oriented financing energy programs. This initiative will offer start-up assistance such as model local ordinances, standard contracts, and development of application and marketing processes to new local initiatives. MEA envisions a minimum of $4 million of federal stimulus loans and grants being allocated to this initiative. As part of this initiative, and in conjunction with its efforts to assist local governments in using federal Energy Efficiency and Conservation Block Grants money, MEA should consider holding workshops for local governments on how to establish additional tax-lien oriented financing programs. Furthermore, MEA could allocate unencumbered federal stimulus money as matching funds as an incentive for local governments to use their allocation of block grants to help capitalize local revolving loan funds for tax-lien oriented financing. Currently, MEA's goal for its EF initiative is to finance the acquisition of energy efficiency and renewable energy systems for 350 homes, thereby offsetting the need for 6,000 megawatt-hours of electricity, avoiding 5,300 tons of carbon dioxide, and saving about $900,000 per year. These benefits could be enhanced by establishing new tax-lien oriented financing programs for local governments across Maryland, each supported by self-sustaining loan funds; and

- Expanding the use of private sector cooperation, including the establishment of public-private partnerships and land reclamation banks, as appropriate.

Estimating Funding Gaps and Identifying New Revenue Streams

Next, the State should identify the remaining long-term costs associated with its objectives in order to have a clearer picture of the funding gaps that exist. Finally, the State and local governments should identify additional funding sources in order to close those funding gaps. Among the various environmental financing mechanisms described in this report, the State could, at a minimum, consider:

- Establishing a litter tax or other point-of-sale surcharge such as a fertilizer surcharge or green tax. Depending on the magnitude and structure of the litter tax, revenues from such a tax could be significant. For example, in fiscal 2008, Virginia's litter tax generated approximately $870,000, while Washington State's litter tax generated over $9 million. One reason for the variation in revenue is because Virginia charges an annual flat tax (depending on the type of business), while Washington State imposes its litter tax based on the value of the goods produced or sold by certain businesses. Similarly, the State could impose a tax on fertilizer. Should such a tax be imposed, the University of Maryland's Environmental Finance Center recommends that the most appropriate structure for a fertilizer tax would be to assess the tax on licensed fertilizer dealers or distributors so as not to unfairly burden any one segment of fertilizer purchasers. In addition, a tax such as this should be levied based on nutrient level, rather than by bag or raw tonnage, so that the tax is proportional to the product's impact on nutrient loading. According to a 2007 study conducted by the center, Iowa's fertilizer tax generated approximately $800,000 annually between 1988 and 2005;

- Establishing a statewide impervious surface fee on new and/or existing development and directing the fee revenue to the Maryland Department of the Environment's Chesapeake and Atlantic Coastal Bays Nonpoint Source Fund to be used to provide financial assistance for urban and suburban stormwater management practices and stream/wetland restoration. Although the amount of revenue that could be generated from such a fee would depend on how a fee is structured, a 2007 report by the University of Maryland's Environmental Finance Center entitled *Chesapeake Bay Financing Strategy* suggests that combining a fee on new development with one on existing development could potentially generate over $200 million annually;

- Increasing the bay restoration fee. Because this is an existing fee with an already established collection mechanism, an increase in the fee would be relatively easy to implement administratively. Based on fiscal 2008 collections, doubling the fee (from $30 to $60 annually) would generate nearly $70 million annually for additional wastewater facility upgrades, septic system upgrades, and cover crop activities. Because it is anticipated that there will be a significant fund deficit beginning in fiscal 2012, increasing the fee is one option the Bay Restoration Fund Advisory Committee will likely consider;

- Requiring all local governments to establish Pay-as-you-throw (PayT) fees or, alternatively, establishing a statewide solid waste management fee. PayT fee revenue could support local solid waste and recycling programs, and a specified percentage of fee revenue could be directed to the Maryland Department of the Environment (MDE) to support its solid waste and recycling activities. Alternatively, a statewide solid waste management fee could be remitted by solid waste acceptance facilities directly to MDE. In either of these scenarios, fees would ultimately be borne by those who generate waste. Currently, there is no State refuse disposal permit fee; thus, costs for MDE's permitting activities are largely borne by the general fund. Legislation was introduced in 2002 (Senate Bill 243/House Bill 299) that

would have established a solid waste management fee of $1 per ton of solid waste accepted for disposal. The fiscal note for those bills estimated annual revenues from such a fee at approximately $6.8 million, based on the generation of approximately 6.8 million tons of waste per year. Depending on the magnitude of the fee, the statewide adoption of a fee based on the amount of waste generated could encourage recycling, reduce the amount of solid waste disposed of, and thus reduce the amount of revenue that ultimately could be generated from such a fee; and

- Expanding the use of congestion pricing and directing revenues to the Transportation Trust Fund to encourage and promote transit-oriented development. While efforts are underway to implement congestion pricing on two Maryland roadways, Maryland should continue to explore the feasibility of expanding this concept to other roads.

Final Thoughts

In summary, while Maryland has taken numerous steps to establish a diversified financing strategy for its environmental, natural resources, and energy conservation programs, this report has identified a number of innovative financing mechanisms that could be implemented or expanded to help the State meet its goals.