

## 7. Subsidies for Pollution Control

### 7.1 Introduction

For the purposes of this report, subsidies of interest involve financial support by the government of activities believed to be environmentally friendly. The types of subsidies described in this report include grants, low-interest loans, favorable tax treatment, and procurement mandates for products believed to have environmental advantages. Research and development, information dissemination, and other services provided by the government that are below their true cost could also be considered subsidies. However, such services are too varied and numerous to be included in this report.

Subsidies are often funded by the fees charged on environmentally harmful products or activities. Advance disposal fees, for example, provide revenues to subsidize the proper disposal of products after their use. Although it could be argued that such disposal activities are not truly subsidized by the government if they are funded entirely by the fees on the product that are paid by industry or consumers, this chapter includes such mechanisms for the purposes of discussion.

Given the variety of subsidies used in environmental management at all levels of government, this chapter does not attempt to cover the topic in a comprehensive way. Its purpose is, instead, to provide an overview, with illustrative examples of the types of subsidies and how they have been used to address specific environmental problems.

The following areas are considered: pollution prevention and control, cleanup of contaminated industrial sites, farming and land preservation, consumer product waste management, citizen monitoring of environmental regulations, alternative fuels and low-emitting vehicles, and municipal wastewater treatment. The chapter concludes with a discussion of subsidies that have had the unintended effect of promoting environmentally harmful activities.

Table 7-1 summarizes various subsidy instruments, most of which are discussed in this chapter. Column 2 shows who pays for the various subsidies. The issue of whether the costs of subsidies are passed on to other businesses or consumers in some way is not addressed. Information on funding sources other than general revenues is also included in parentheses, where available. Column 3 lists the recipients of these subsidies. Whether these parties pass on the benefits of subsidies to their customers or others is also not assessed.

### 7.2 Pollution Prevention and Control

This section discusses the use of tax benefits and loans to promote pollution prevention and control. It also discusses an EPA program under which fines for environmental violations are reduced in exchange for pollution prevention and control activities.



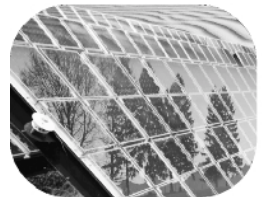
Pollution Charges, Fees, Taxes



Deposit-Refund Systems



Trading Programs



Subsidies for Pollution Control



Liability Approaches



Information Disclosure



Voluntary Programs

**Table 7-1. The Use of Subsidies in Environmental Management**

| SUBSIDY INSTRUMENT  | WHO PAYS?   | RECIPIENTS                              |
|---|---|---|
| <b>Grants</b>   |   |   |
| Brownfields development grants  | EPA, states   | Communities, property owners            |
| Cost sharing for land conservation  | Federal government  | Property owners                         |
| Conservation easements  | Federal, state, and local governments (Land transfer taxes)                       | Property owners                         |
| Environmental violation reporting rewards   | States of New Jersey, California  | Individuals and organizations           |
| Waste management and recycling grants   | Federal, state, and local governments (advance disposal fees (ADFs), waste taxes) | Public and private organizations        |
| Unit-based waste collection or reuse payments   | State governments (ADFs, waste taxes)   | Businesses                              |
| Unit-based payments for the use of alternative fuel vehicles (AFVs)                   | Federal government  | Public bus systems and small businesses |
| Municipal sewage treatment plant construction grants (replaced by loans)              | Federal and state governments   | Communities                             |
| <b>Loans</b>  |   |   |
| Pollution control loans   | State governments   | Small businesses                        |
| Brownfields development loans   | State governments (waste taxes)   | Property owners                         |
| Recycling business loans  | State governments (ADFs, waste taxes)   | Businesses                              |
| Municipal sewage treatment plant construction loans (replaced previous grant program) | Federal and state governments   | Communities                             |
| <b>Tax Benefits</b>   |   |   |
| Pollution control property  | State governments   | Private organizations                   |
| Louisiana environmental score-card deduction  | State of Louisiana  | Businesses                              |
| Brownfields development   | State governments   | Property owners                         |
| Land use credits  | State governments   | Property owners                         |
| Recycling benefits  | State governments   | Businesses                              |
| Credits for ethanol and compressed natural gas  | Federal and state governments   | Alternative fuel vehicle manufacturers  |
| Credits for alternative fuel vehicles and equipment                                   | Federal and state governments   | Alternative fuel vehicle purchasers     |
| Renewable electricity generation credits  | Federal government  | Businesses                              |
| Electric vehicle credits  | Federal government  | Businesses or organizations             |
| Interest exemption of pollution control investment debt                               | Federal government  | Businesses or organizations             |
| <b>Procurement Mandates</b>   |   |   |
| Public procurement of recycled products   | Federal, state, and local governments   | Recycled products manufacturers         |
| Public procurement of alternative fuel vehicles                                       | Federal, state, and local governments   | Alternative fuel vehicle manufacturers  |
| Recycled content requirements   | Private organizations   | Recycled products manufacturers         |
| Mandates for the use of alternative fuel vehicles                                     | Private organizations   | Alternative fuel vehicle manufacturers  |

| SUBSIDY INSTRUMENT  | WHO PAYS?                             | RECIPIENTS              |
|---|---------------------------------------|-------------------------|
| <i>Miscellaneous</i>  |                                       |                         |
| Reduced fines in return for supplemental environmental projects                                       | Federal and state governments         | Businesses              |
| Accelerated review of applications for new pesticides   | Federal government                    | Pesticide manufacturers |
| Relaxed regulatory requirements (e.g., ethanol Ried Vapor Pressure (RVP) waiver)                      | Federal, state, and local governments | Various organizations   |
| Research & development; public education (technical assistance to participants in voluntary programs) | Federal, state, and local governments | Various organizations   |

### 7.2.1 Tax Benefits

Numerous states offer favorable tax treatment for the construction and installation of pollution control equipment. In most states that have such tax incentives, the equipment must have pollution control as its primary purpose. In some states, equipment with other purposes receives tax benefits on a prorated basis. Some states also require environmental regulators to certify equipment that is eligible for tax breaks.

The benefits usually apply to property or sales/use taxes but can apply to income tax in a smaller number of states. Air and water pollution equipment is commonly given tax benefits. However, New York offers a property tax exemption for industrial waste treatment facilities, and Ohio offers benefits for noise abatement equipment. Tax exemptions for production machinery and products used directly in manufacturing also apply to pollution control equipment in many cases.<sup>148</sup>

In Texas, for example, a constitutional amendment approved by voters in 1993 provided for exemptions of certain pollution control property from property taxes. The purpose of the amendment was to ensure that investments made to comply with environmental mandates did not raise the property tax payments of businesses. The exemptions applied only to “devices, equipment, methods, or land used to prevent, monitor, control, or reduce air, water, or land pollution” purchased in 1994 to “meet or exceed state, federal, or local laws, rules, and regulations.” The vast majority of exemption requests were made for equipment that was used to comply with Clean Air Act requirements. The total value of the property for which businesses applied for exemptions was \$1.2 billion. A state official estimated that the applications would lead to a loss of \$26.6 million in tax revenue.<sup>149</sup>

One problem with such tax benefits is that they can erode state or local tax bases. In Texas, for example, the \$26.6-million revenue shortfall is expected to affect mainly school districts, but also cities and counties. One tax district appraiser predicted that homeowners would make up the shortfall.<sup>150</sup>

The incentive effect of such preferential tax treatment is difficult to assess, in part because of the simultaneous presence of other policies that affect behavior. If the benefits are offered merely to subsidize compliance with regulations, the regulations themselves probably have a stronger incentive effect than the benefits. However, the favorable tax treatment could provide an incentive to exceed requirements.

### 7.2.2 Louisiana Environmental Scorecard

Louisiana’s environmental scorecard program, which was in effect from October 1990 to January 1992, linked tax exemptions for companies to their environmental performance. The state’s Departments of Economic Development and Environmental Quality built the scoring system into an existing 10-Year Industrial Property Tax Exemption Program (IPTeP). In contrast to the previous practice of awarding 100% exemptions for 20 years from local property taxes for new equipment and other capital expenditures, the scoring system determined that companies would receive a base exemption of 50% and then rated their environmental behavior to determine how much of the remaining 50% they could obtain.

Companies earned points based on their environmental violation record and the amount of emissions they generated per employee. Table 7-2 shows how these factors influenced point totals. Points for environmental violation records were calculated by adjusting the values in Column 2 of Table 7-2 for the age of the violation, i.e., how many years ago the violation occurred. Next, the number of years was multiplied by coefficients ranging from 1 for violations in the past year to 0 for violations 6 years or older. The results were then subtracted from 25. Points for emissions per employee were calculated by dividing total payroll by \$25,000; then points were awarded as shown in Column 4. After the Department of Environmental Quality had assigned a preliminary score to an exemption request, a company that received fewer than 100 points could raise its score by developing an emissions reduction plan. Other criteria, such as recycling activities and creating jobs for high unemployment areas, could also increase point totals.

**Table 7-2. Points Under Louisiana Scorecard System**

| VIOLETION FINE                | POINTS AWARDED<br>(25 minus the value in this column,<br>adjusted for the age of the violation) | POUNDS OF EMISSIONS<br>PER EMPLOYEE | POINTS<br>AWARDED |
|-------------------------------|---|-------------------------------------|-------------------|
| \$0–\$3,000                   | 1   | 0–500                               | 25                |
| \$3,001–\$10,000              | 5   | 501–1,000                           | 20                |
| \$10,001–\$25,000             | 10  | 1,001–2,500                         | 15                |
| Over \$25,000                 | 15  | 2,501–5,000                         | 10                |
| Criminal or felony violations | 20  | 5,001–10,000                        | 5                 |

Source: Environmental Law Institute. 1993a, p. 119.

Data suggest that this program had a significant incentive effect. Final scores during the 15-month program averaged 94.9, which was significantly higher than preliminary scores. Twelve companies submitted emission reduction plans for bonus points worth \$7,030,249 in tax exemptions. This amount is slightly greater than the \$5.2 million of exemptions recovered by the state through the scorecard system. Since the system was built into an existing exemption, administrative costs were reasonably low. It also gave the state the opportunity to use the exemption “carrot” to promote not only economic but also environmental health.

Industry, however, opposed the program, perhaps in part because it attached conditions to what had previously been an unconditional tax exemption (the IPTeP). It was industry’s opposition that led the Governor of Louisiana to terminate the program in 1992.

### 7.2.3 Supplemental Environmental Projects

Supplemental environmental projects (SEPs) are “settlements negotiated by EPA and an environmental law violator in which the company agrees to do an alternative environmental project in return for an agency agreement to lower the proposed penalty.” Although such projects have existed since the early 1980s, their numbers have increased in the 1990s and they are now included in as many as 1-in-10 enforcement actions. More than 200 were approved in 1992. In the first six months of 1992, one EPA official estimated that EPA negotiated 164 SEPs worth approximately \$23 million. In 1995, EPA negotiated 348 SEPs valued at \$104 million.

Most SEPs have been pollution prevention activities that involve violations in the Toxic Substances Control Act (TCSA) or in the Emergency Planning and Community Right-To-Know Act (EPCRA). However, SEPs have also been negotiated for violations of other laws. In New England, for example, a sand blasting and paint company had its EPCRA fines reduced from \$50,000 to \$14,000 by agreeing to hire an environmental auditor and launch a five-year pollution reduction program. In Nebraska, a \$5,000 fine for supplying restricted-use pesticide to an uncertified user in violation of the Federal Insecticide, Fungicide, and Rodenticide Act was reduced to \$2,000 when the violating company agreed to install concrete containment dikes around its pesticide storage tanks and a shower/eye wash. The measures under the SEP were estimated to cost this company \$7,496.

In a RCRA case involving the improper characterization of waste streams, leakage of hazardous wastes from a sewer, and operation of an unpermitted incinerator, Eastman Kodak had its penalty reduced by approximately \$3 million in return for investing \$12 million in six SEPs. These SEPs were expected to reduce hazardous wastes at its Kodak Park facility by 2.3 million pounds by the year 2001. In a Clean Water Act (CWA) case, the City and County of Honolulu agreed to spend \$30 million on SEPs to treat and reuse wastewater and sludge. The Kodak and Honolulu SEPs are described in an EPA report.<sup>151</sup> Fines have also been reduced in cases in which businesses complied with existing environmental laws soon after being charged with a violation.

The advantage of SEPs for EPA is twofold: First, fines that would be paid to the Treasury are instead used for environmental protection activities; and second, the cost of these activities usually exceeds the negotiated reduction in the fine. Estimates place the cost of the SEP at one-half to one-sixth of the reduction in the fine. At the state level, on the other hand, SEPs have proven much less popular, in part because many states rely on the revenues from these fines to fund environmental activities.

Despite the high SEP-to-fine reduction ratio, SEPs can offer violators a number of potential advantages that are associated with improved environmental performance, including positive publicity, reductions in waste management costs, and early preparedness for increasingly stringent regulations. Another advantage is that, unlike fines, SEPs involve business expenditures that lower taxes. Since all SEPs represent voluntary agreements made by violators, the SEP mechanism appears to have a significant incentive effect.

### 7.2.4 Loans and Tax Exempt Bonds

The federal government exempts from taxation the interest on debt that is issued by state or local governments to finance pollution control or waste disposal facilities. This exemption cost the government an estimated \$625 million in 1995.<sup>152</sup>

Although it is beyond the scope of this report to describe all state financing programs, several mechanisms used in California are discussed here. The California Pollution Control Financing Authority (CPCFA) issues tax-exempt bonds to provide low-interest loans of \$1 million to \$20 million to small businesses for pollution control and solid waste recovery projects. Loans in excess of \$20 million are provided under a similar program for larger businesses. Repayment periods are usually longer than those of conventional bank loans. Proceeds from bonds issued by CPCFA on behalf of businesses are deposited into a fund held by the bond trustee. The borrower uses these funds for the project, making periodic repayments according to the terms of the loan agreement.

For example, about \$1 million in tax-exempt bonds were issued to finance a dry ash waste recovery investment at an electricity generating facility at the Eel River Sawmills. The equipment purchased through this financing arrangement reprocesses ash waste through the electrical generating facility. This reprocessing reduces the amount of ash waste sent to landfills by 60%, from 24 tons per day to 10 tons per day.

In addition to these tax-exempt bond programs, CPCFA offered loans for pollution control investments under the California Loans for Environmental Assistance Now (CLEAN) program. Under this program, CPCFA issued bonds and lent proceeds at interest rates that were roughly 2% higher than bond rates. CPCFA hoped to repackage and sell these loans to raise more capital but was unable to do so. In three years, 38 loans ranging from \$30,000 to \$500,000 were issued, totaling approximately \$3 million. Since CLEAN's subsidized interest rates attracted a number of businesses that could have obtained loans from commercial banks, it ended up financing many pollution control investments that would have been made without the CLEAN program. Moreover, CPCFA's loan disbursing process was slow, its loan marketing poor, and its administrative costs high. The program cost about \$1.40 for every \$1 lent.<sup>153</sup>

To address these problems, CLEAN was replaced by the California Capital Access Program (CalCAP), under which CPCFA sets up loan portfolio "insurance" to encourage banks to lend to small businesses. CPCFA matches the sum of premiums that are paid by the borrower and the lender and then puts that money into a loss reserve account for the lender. In case of default, the CPCFA account covers losses. The maximum individual loan is \$2.5 million. As a result of improved marketing and loan disbursing procedures and the leveraging of reserve funds under CalCAP, \$160 million has been lent in two years, as compared with only \$3 million in 3 years under CLEAN. Under CalCAP, every dollar contributed by CPCFA has resulted in \$23 in lending.

### **7.3 Brownfields Programs**

Various measures have been taken to subsidize the development of brownfields, which are contaminated industrial sites that pose a relatively low risk to the environment as compared to the most heavily polluted Superfund sites. The number of brownfields programs has grown at the federal and state level because they deal successfully with an unintended consequence of hazardous waste cleanup laws, that is, laws that discourage developers from reusing contaminated property. Brownfields programs have included a variety of incentives, including grants, loans, and tax benefits. Liability incentives are another important aspect of brownfields programs; they are discussed in Chapter 8.

### 7.3.1 EPA Pilot Grant Projects

Under the Brownfields Initiative, EPA has funded several types of pilot projects to states, tribes, and local governments to encourage the assessment, cleanup, and reuse of brownfields. EPA has awarded 362 grants of as much as \$200,000 each to assist communities in assessing contamination at brownfields; 104 grants of up to \$500,000 to establish revolving loan funds for cleanup; and 37 grants of as much as \$200,000 each to train local workers to assess and clean up brownfields. Through the Brownfields Initiative, communities report assessing almost 2,000 properties, leveraging more than \$2.3 billion in economic development funds and generating more than 7,000 jobs. For more information on the Brownfields Initiative, see EPA's brownfields Internet site at [www.epa.gov/brownfields](http://www.epa.gov/brownfields).

### 7.3.2 Tax Incentives and Loans

New Jersey offers both tax benefits and loans to encourage brownfields development. Under the Environmental Opportunity Zone Act, which became effective in January 1996, developers of contaminated sites could receive a 10-year property tax exemption if they remediate the site in accordance with state standards and return it to commercial or industrial use. In 1998, the period of tax exemption was extended to 15 years. Loans for cleanups are funded by a dedicated 5% portion of the state's Hazardous Discharge Site Remediation Fund.

To qualify for tax benefits and loans, the contaminated land must be on the state's list of hazardous discharge sites, be vacant or underused, and need cleanup because of an actual or potential pollution discharge. The sites must also be located in environmental opportunity zones designated by state municipalities. The property tax exemption gradually decreases from 100% in the first year of development to 0% in the tenth year.<sup>154</sup>

Pennsylvania's Land Recycling and Environmental Remediation Standards Act established an Industrial Sites Cleanup Fund of up to \$15 million to provide low-interest loans to help property owners clean up pollution that they did not cause.<sup>155</sup> Grants are available to finance activities by local governments and economic development agencies. These funds can cover up to 75% of cleanup costs. The Industrial Sites Environmental Assessment Act allows the U.S. Department of Commerce to make grants to municipalities and other local authorities, nonprofit economic development agencies, and similar organizations to fund environmental assessments of industrial sites in distressed communities. Up to \$2 million is provided annually for such funding.<sup>156</sup> A key feature of the program is its reliance on risk assessments to dictate remediation strategies at individual sites.

A January 2000 legislative report assessed the program's effectiveness.<sup>157</sup> After approximately \$20 million in expenditures, more than 650 sites have been cleaned up and over 300 additional sites are in the process of being cleaned. The program has received an award from the Ford Foundation as one of the 10 most innovative programs in government.

In 1995, Delaware added credits for brownfields development to its Blue Collar Jobs Tax Credit program.<sup>158</sup> Minnesota and Ohio offer loans to fund cleanups, and Ohio also provides tax incentives. Arizona and Tennessee pay for the cleanup of wastes that cannot be identified as to source or for which sources are no longer financially able to shoulder the cleanup cost burden.<sup>159</sup>

The Brownfields Tax Incentive was passed as part of the U.S. Taxpayer Relief Act of 1997. This federal tax incentive encourages the cleanup and redevelopment of brownfields by allowing the cleanup costs in certain areas to be fully deductible in the year expended, rather than capitalized

over time. The U.S. Treasury Department estimates that the \$1.5-billion incentive will leverage as much as \$6 billion in private investment and return as many as 14,000 brownfields to productive use.

**7.4 Farming and Land Preservation**

Subsidies used in farming and land preservation include grants, loans, and tax benefits that are offered in exchange for improved conservation practices. Multi-year contracts pay landowners to either take land out of cultivation or to manage it in a certain way. In addition, benefits that support farm programs have, since 1985, been linked to environmental performance in a program called “Conservation Compliance.” Table 7-3 shows the federal subsidy programs and the respective funding levels implemented expressly for conservation purposes. The conservation provisions achieved through cross-compliance are also described.

**Table 7-3. Funding for Conservation Subsidy Programs of the U.S. Department of Agriculture (FY 1998) in millions of dollars**

| PROGRAM                     | AGENCY WITHIN USDA | CONSERVATION | WATER RESOURCES | RECREATIONAL RESOURCES | POLLUTION CONTROL | TOTAL NATURAL RESOURCES AND ENVIRONMENT |
|-----------------------------|--------------------|--------------|-----------------|------------------------|-------------------|---|
| Conservation Reserve        | FSA                | 2,096        |                 |                        |                   | 2,096                                   |
| Agricultural Conservation   | FSA                | 44           |                 |                        |                   | 44                                      |
| Conservation Operations     | NRCS               | 644          |                 |                        |                   | 644                                     |
| Wetlands Reserve            | NRCS               | 38           |                 |                        |                   | 38                                      |
| Resource Conservation       | NRCS               | 33           |                 |                        |                   | 33                                      |
| Water Bank                  | NRCS               | 8            |                 |                        |                   | 8                                       |
| Wildlife Habitat Incentives | NRCS               | 8            |                 |                        |                   | 8                                       |
| Forestry Incentives         | NRCS               | 6            |                 |                        |                   | 6                                       |
| Colorado River Salinity     | NRCS               | 4            |                 |                        |                   | 4                                       |
| Great Plains Conservation   | NRCS               | 4            |                 |                        |                   | 4                                       |
| Resource Conservation       | NRCS               | 1            |                 |                        |                   | 1                                       |
| Rural Clean Water           | NRCS               |              | 279             | 1                      |                   | 280                                     |
| Watershed and Flood         | NRCS               |              | 57              |                        |                   | 57                                      |
| Conservation Operations     | NRCS               |              | 11              |                        |                   | 11                                      |
| State and Private Forestry  | FS                 | 59           |                 |                        |                   | 59                                      |
| Other                       | USDA               | 2,462        |                 | 125                    | 20                | 2,607                                   |
| <b>TOTAL</b>                |                    | <b>5,407</b> | <b>347</b>      | <b>126</b>             | <b>20</b>         | <b>5,900</b>                            |

Source: USDA. 2000. FSA is the Farm Service Agency, NRCS is the Natural Resources Conservation Service, and FS is the Forest Service.



This section concludes with a discussion of selected state subsidy schemes, including programs that allow the purchase of development rights to prevent the conversion of agricultural lands to alternative uses.

#### **7.4.1 Conservation Reserve Program**

The Conservation Reserve Program (CRP) was established by the U.S. Food Security Act of 1985 (also known as the “1985 Farm Bill”) and modified by the 1990 and 1996 Farm Bills. The CRP seeks to protect soil and water resources and wildlife habitat by taking land out of cultivation. Participating farmers receive annual payments of as much as \$50,000 per person to put land in the Conservation Reserve for 10 to 15 years. Applications to participate in this program must include conservation plans, which usually require the planting of grass cover). The federal government pays not only annual rents, so the land is not cultivated, but also one-half the cost of the required conservation measures.

Since landowners have offered more acres than the CRP can afford, they bid for enrollment. For the first nine opportunities to enroll through August 1989, bids had to be at or below the “maximum acceptable rental rate” for a given area. However, this approach did not actively target environmentally sensitive cropland. Consequently, farmers gradually increased their awareness of maximum rates and set their bids accordingly, often resulting in rental payments that were in excess of market value.<sup>160</sup>

The 1990 and 1990 Farm Bills shifted the emphasis of the CRP to protecting lands that were not only highly erodible but also important to water quality and wildlife habitat. The bidding system, as a result, has been changed several times, beginning with the 10th signup in May 1991. An Environmental Benefits Index (EBI) is used to evaluate bids at or below the market rental rate for comparable land. The EBI includes numerous factors relating to soil erosion, water quality, and the value of the land for wildlife habitat. Lands located in special Conservation Priority Areas are given additional preference, particularly if structural or land management practices proposed for the lands maximize environmental benefits per dollar expended. The EBI is compared with the bid amount to determine whether the parcel should be enrolled in the CRP.

Since August 1992, some 36.4 million acres, the maximum acreage allowed under the program, had been placed in the CRP. This figure is nearly 10% of the total U.S. cropland, an estimated 395 million acres. (See Table 7-4.) The first nine enrollments consisted mostly of land located in the Great Plains and Mountains states. Changing the program’s emphasis to water quality and wildlife goals has led to increased concentrations of land in the Midwest and Great Lakes regions being enrolled in the program.

In 1990, when 33.9 million acres were enrolled, USDA estimated the net social benefits of CRP at \$4.2 billion–\$9.0 billion over the life of the program. Table 7-5 shows the estimated dollar value of different types of social costs and benefits.

Statistics on the first nine enrollments indicate annual reductions in soil erosion of 700,000 tons, an average of 19 tons per acre. This figure represents a 22% reduction in cropland erosion since the program was established.

**Table 7-4. Conservation Reserve Acreage and Rental Payments**

| REGION          | NUMBER OF ACRES   | ANNUAL RENTAL PAYMENTS<br>(in millions of dollars) | RENTAL PAYMENTS<br>PER ACRE (\$) |
|-----------------|-------------------|--|----------------------------------|
| Appalachia      | 1,158,124         | \$62.5   | \$53.97                          |
| Corn Belt       | 5,603,333         | 416.1  | 74.26                            |
| Delta           | 1,248,403         | 55.3   | 44.31                            |
| Great Lakes     | 3,008,337         | 176.5  | 58.68                            |
| Mountain        | 6,687,264         | 265.3  | 39.67                            |
| Northeast       | 226,411           | 13.4   | 59.29                            |
| Northern Plains | 9,664,110         | 444.5  | 46.00                            |
| Pacific         | 1,791,182         | 88.8   | 42.71                            |
| Southeast       | 1,692,580         | 72.3   | 42.71                            |
| Southern Plains | 5,342,989         | 214.7  | 40.18                            |
| <b>TOTAL</b>    | <b>36,422,733</b> | <b>\$1,809.4</b>                                   | <b>\$49.70 on average</b>        |

Source: GAO. 1995b, p. 13.

The CRP could be more cost-effective by concentrating enrollment on land that is more environmentally sensitive, some critics claim. By concentrating on enrolling buffer zones alongside streams, rivers and lakes instead of entire fields, a GAO study claimed, only about 6 million acres would need to be enrolled in order to protect surface water, groundwater, air, and soil. However, protecting wildlife habitat would require significantly more acreage.<sup>161</sup> The buffers along streams can reduce sediment loadings by 50%<sup>162</sup> and nitrate concentrations<sup>163</sup> and herbicide concentrations<sup>164</sup> by 90%.

**Table 7-5. Estimated Social Benefits and Costs of CRP**

| SOCIAL BENEFITS                           | RANGE OF VALUES (\$billion) |
|---|-----------------------------|
| Increases in net farm income              | \$2.1–6.3                   |
| Value of future timber                    | 3.3                         |
| Preservation of soil productivity         | 0.6–1.7                     |
| Improved surface water quality            | 1.3–4.2                     |
| Lower damages caused by windblown dust    | 0.3–0.9                     |
| Wildlife enhancements                     | 1.9–3.1                     |
| <b>TOTAL BENEFITS</b>                     | <b>\$9.5–19.5</b>           |
| <b>SOCIAL COSTS</b>                       |                             |
| Higher food costs for consumers           | \$2.9–7.8                   |
| Existence of vegetative cover on CRP land | 2.4                         |
| USDA technical assistance                 | 0.1                         |
| <b>TOTAL COSTS</b>                        | <b>\$5.4–10.3</b>           |
| <b>NET BENEFIT</b>                        | <b>\$4.1–9.2</b>            |

Source: USDA. 1994a, pp. 180-1.

The 1996 Farm Bill and subsequent rules developed by USDA addressed this criticism in reauthorizing the CRP through 2002. While maintaining the maximum number of acres to be enrolled at 36.4 million, the new bill also allows contract holders to terminate contracts entered into prior to 1995, provided the contract has been in effect for at least 5 years and the land in question is not of high environmental value. The USDA Secretary was given the authority to

agree to future early terminations. The possibility that such terminations may be invoked will give USDA the opportunity to refocus enrollment in the program on land that is more environmentally sensitive.

Substantial bonus payments—including a 20% rental bonus, a \$100 per acre up-front payment, and other incentives—now encourage the enrollment of these stream buffers as well as certain other practices that are of high priority. More than a million acres of these buffer areas have been enrolled since farmers were offered the new incentives for buffer zones.

**7.4.2 Conservation Reserve Enhancement Program**

Part of the 1996 Farm Bill, the Conservation Reserve Enhancement Program is an enhancement of the Conservation Reserve Program that creates federal–state partnerships for conserving environmentally sensitive farmland. This program uses financial incentives to encourage farmers and ranchers to participate in removing lands from agricultural production for periods of 10 to 15 years. The status of this program in each state is shown in Table 7-6.

Payments in the Conservation Reserve Program average about \$50 per acre per year. The amount that farmers will be paid to participate in CREP is quite variable because it is tied closely to the rental rates of local land. The formula for calculating the amount to be paid to farmers includes base rental rates, the cost of installing conservation practices, annual maintenance costs, and any special incentives.

**Table 7-6. Status of Conservation Reserve Enhancement Programs**

| STATE | STATUS                              | ACRES   | TOTAL COST<br>(in millions of dollars) | INCENTIVES  | EASEMENT TERM                        | TARGET AREA  | ENVIRONMENTAL OBJECTIVE   |
|-------|-------------------------------------|---------|--|---|--------------------------------------|--|---|
| IL    | Agreement signed March 30, 1998.    | 100,000 | \$250                                  | 30% for buffers, wetland restoration, wildlife food plots, & shallow water areas; 20% all other practices | 100,000 acres, 15 yr. or permanent   | Middle Illinois River                              | Reduction of sedimentation and soil erosion – 85,000 acres riparian buffers, wetland restoration, emphasis on native species; 15,000 acres Highly Erodible Land (HEL).          |
| MD    | Agreement signed October 20, 1997.  | 100,000 | 195                                    | 70% for riparian buffers; 50% for filter strips and HEL   | 25,000 acres, permanent              | Chesapeake Bay                                     | Reduction of nutrient loading -- 70,000 acres riparian buffers; 20,000 acres HEL; 10,000 acres wetland restoration  |
| MN    | Agreement signed February 19, 1998. | 100,000 | 223                                    | 20% for all practices   | 100,000 acres, >20 yr. To perpetuity | Minnesota River                                    | Water quality benefits from sediment and nutrient reduction and mitigation of flood damage. Native grasses and hardwoods, wetland restoration, and filter strips.               |
| NY    | Agreement signed August 26, 1998.   | 5,000   | 10                                     | 150%  | N/A                                  | New York City watershed/ Catskill/ Delaware system | Risk reduction of nutrient, pathogen, and sediment inputs to streams/reservoirs that supply drinking water to NYC – riparian buffers, filter strips, and erosion control on HEL |

Continued on the next page.

## The U. S. Experience with Economic Incentives for Protecting the Environment

| STATE                      | STATUS                                      | ACRES   | TOTAL COST<br>(in millions of<br>dollars) | INCENTIVES  | EASEMENT<br>TERM | TARGET<br>AREA  | ENVIRONMENTAL OBJECTIVE  |
|----------------------------|---|---------|---|---|------------------|---|--|
| OR                         | Agreement<br>signed<br>October<br>17, 1998. | 100,000 | 250                                       | 25% for<br>filterstrips;<br>35% for riparian<br>buffers;<br>50% for wetland<br>restoration;<br>Cumulative<br>impact bonus<br>equal to four<br>times base rental<br>rate | N/A              | Streams<br>providing<br>habitat for<br>endangered<br>salmon and<br>trout<br>statewide | Restoration of salmon habitat<br>through enhancement of riparian<br>areas and wetland restoration.       |
| WA                         | Agreement<br>signed<br>October<br>19, 1998. | 100,000 | 250                                       | 50%, plus an<br>additional 10% if<br>designated under<br>State growth<br>management law   | N/A              | Salmon<br>spawning<br>streams<br>statewide  | Restore habitat for native<br>anadromous fish species using<br>riparian buffer conservation<br>practice. |
| NC                         | Agreement<br>signed<br>March 1,<br>1999     | .       | .   | .   | .                | .   | .  |
| DE                         | Agreement<br>signed<br>June 2,<br>1999      | .       | .   | .   | .                | .   | .  |
| WY, ID<br>WI, KY<br>MO, ND | Proposals<br>received                       |         |   |   |                  |   |  |

Source: USDA/FAS. CRP State CREP Information.

Maryland recently sweetened its CREP program by adding a one-time signing bonus of \$250 per acre in an attempt to increase enrollments to the program's goal of 100,000 acres. Under the Maryland program, participating farmers would plant trees and grasses along Maryland waterways to act as natural filters that absorb nutrients and chemicals before they entered the waters. When the Maryland program was launched in 1997, it was the first in the nation. In three years of operation, the program had enrolled only 20,000 acres, largely because farmers considered the rules complex and the reimbursement rate too low.<sup>165</sup>

### 7.4.3 Wetlands Reserve Program

Under the Wetlands Reserve Program (WRP), which was created by the 1990 Food, Agriculture, Conservation and Trade Act (a.k.a. the 1990 Farm Bill), farmed wetlands and agricultural land converted from wetlands as well as buffer zones and some riparian areas are eligible for 30-year easements or permanent easements. Participants in this program are required to implement conservation plans approved by the Natural Resources Conservation Service and the Fish and Wildlife Service. Agricultural activities on enrolled land must be compatible with wetlands protection. Participants receive a lump sum for permanent easements or 10 equal payments for 30-year easements. Payment amounts are limited to the loss of market value of the land as a result of the easement. In addition to paying for the easements, the government shares in the cost of approved conservation measures.

As shown in Table 7-7, the number of acres for which bids were made was roughly five times the acreage enrolled in WRP during its first enrollment. In 1994, WRP was expanded to several other states.

**Table 7-7. Wetland Reserve Program's First Enrollment (1992)**

| STATE          | BID OFFERS<br>(in 1,000 acres) | ENROLLED LAND<br>(in 1,000 acres) | TOTAL COST<br>(in thousands of<br>dollars) | COST PER ACRE (\$) |
|----------------|--------------------------------|-----------------------------------|--|--------------------|
| California     | 34.3                           | 6.0                               | 10,768                                     | 1,787              |
| Iowa           | 27.9                           | 5.1                               | 5,951                                      | 1,168              |
| Louisiana      | 69.9                           | 14.1                              | 9,882                                      | 702                |
| Minnesota      | 13.1                           | 0.7                               | 764  | 1,082              |
| Mississippi    | 65.0                           | 14.9                              | 10,764                                     | 723                |
| Missouri       | 14.6                           | 2.7                               | 2,753                                      | 1,032              |
| New York       | 0.5                            | 0.1                               | 212  | 2,934              |
| North Carolina | 15.3                           | 4.7                               | 3,675                                      | 780                |
| Wisconsin      | 8.5                            | 1.6                               | 1,287                                      | 782                |
| <b>TOTAL</b>   | <b>249.1</b>                   | <b>49.9</b>                       | <b>46,056</b>                              | <b>923</b>         |

Source: USDA. 1994a, p. 194.

The 1996 Federal Agriculture Improvement and Reform Act (a.k.a. the 1996 Farm Bill) reauthorized WRP through 2002 while capping total enrollment at 975,000 acres. Beginning October 1996, land enrolled in this program was to be divided in the following way: one-third (33%) will be given permanent easements; one-third, 30-year easements or less; and one-third, wetland restoration agreements with cost sharing. Seventy-five thousand acres of land in less-than-permanent easements must be placed in the program before additional permanent easements are placed. The Act provides cost-sharing assistance to landowners of 75%–100% for permanent easements and 50%–75% for 30-year easements and restoration cost-share agreements.

#### 7.4.4 Compliance Provisions

Under the 1985 Farm Bill, farmers must adhere to two compliance provisions before they become eligible for farm support programs such as price support loans and technical assistance. First, they must implement approved conservation plans on highly erodible land (HEL). Second, they must refrain from draining wetlands. Considering the large amounts of financial support at stake—some \$24 billion in support payments in 1999—compliance provisions have had a strong incentive effect.

#### 7.4.5 Highly Erodible Land Conservation and Sodbuster Provisions

To ensure farmers' eligibility for receiving support under the highly erodible land conservation compliance provision, farmers are required to develop and implement approved conservation plans for designated "highly erodible" land that was farmed between 1981 and 1985. The plans typically entail adjustments in farming practices and rotations and could include measures such as the maintenance of crop residues on fields in winter, contour plowing, minimum tillage, and shelterbelts. The sodbuster provision is similar to the highly erodible land conservation compliance provision, except in two respects. One, it applies to highly erodible land that was *not* farmed between 1981 and 1985. Two, it is more stringent in that it requires the adoption of a

conservation system that reduces erosion to a level above which long-term soil productivity may be depleted.<sup>166</sup>

This cross-compliance rule appears to have a strong incentive effect. Implementation costs for the conservation compliance provisions are estimated at \$7–\$17 per acre depending on the region, whereas a loss in farm support benefits would cost farmers between \$37 and \$62 per acre.<sup>167</sup>

As shown in Table 7-8, the estimated net benefit of the conservation compliance provision varies substantially across regions. The air quality benefits listed in the table are limited to household wind damage. Although the estimates show costs exceeding benefits in the Northern Plains, the benefits might exceed costs if air quality benefits were more broadly defined.

**Table 7-8. Economic Benefits and Costs of Conservation Compliance**

| REGION               | PER-ACRE BENEFIT (in \$) FROM: |             |              | PER-ACRE COST (in \$) TO: |                    | NET ECONOMIC BENEFITS (in \$) | BENEFIT/COST RATIO |
|----------------------|--------------------------------|-------------|--------------|---------------------------|--------------------|-------------------------------|--------------------|
|                      | Water Quality                  | Air Quality | Productivity | Producers                 | Federal Government |                               |                    |
| Northeast            | 35.63                          | 0           | 0.16         | 3.57                      | 3.43               | 28.80                         | 5.12               |
| Lake States          | 21.99                          | 0           | 0.12         | 0.32                      | 3.43               | 18.37                         | 5.90               |
| Corn Belt            | 15.61                          | 0           | 0.25         | 8.90                      | 3.43               | 3.53                          | 1.29               |
| Northern Plains      | 3.47                           | 3.00        | 0.19         | 3.35                      | 3.43               | -0.11                         | 0.96               |
| Appalachia           | 23.58                          | 0           | 0.24         | 3.51                      | 3.43               | 16.89                         | 3.43               |
| Southeast            | 25.63                          | 0           | 0.12         | 8.18                      | 3.43               | 14.15                         | 2.22               |
| Delta                | 35.50                          | 0           | 0.12         | 1.97                      | 3.43               | 30.22                         | 6.60               |
| Southern Plains      | 5.26                           | 4.63        | 0.33         | 2.34                      | 3.43               | 4.45                          | 1.77               |
| Mountain             | 5.10                           | 4.01        | 0.15         | 0.20                      | 3.43               | 5.63                          | 2.55               |
| Pacific              | 31.83                          | 1.09        | 0.14         | 2.23                      | 3.43               | 27.40                         | 5.85               |
| Entire United States | 13.81                          | 1.93        | 0.21         | 3.78                      | 3.43               | 8.74                          | 2.21               |

Source: USDA. 1994a. p. 186.

### 7.4.6 Swampbuster Program

Under the Swampbuster Program, program benefits are denied to farmers who plant crops on wetlands that were converted after 1985 or who drain or otherwise convert designated wetlands. Conversion is allowed if its impact on the hydrological and biological value of the wetland is limited or if the farmer restores wetlands of equivalent value.

The 1996 Farm Bill made several changes to provisions in the Swampbuster Program. According to USDA, these modifications “will give farmers more flexibility in complying with wetland conservation requirements while protecting natural resources.”<sup>168</sup> The bill expands wetland mitigation areas and options, allowing mitigation through restoration, enhancement, or creation, provided that wetland functions and values are maintained. In addition, the bill also stipulates that conversion activities authorized by a Clean Water Act permit will be accepted for Farm Bill purposes if the conversions are adequately mitigated. The bill also establishes a pilot program for mitigation banking. (See Chapter 6 for information on mitigation banking.)

#### 7.4.7 Subsidies Created Under the 1996 Farm Bill

In addition to modifying several existing programs in ways that USDA believes will simplify them and enhance their efficiency and flexibility, the 1996 Farm Bill created a number of new programs. The largest of these programs in terms of funding is the Environmental Quality Incentives Program. Others include the Farmland Protection Program, the Conservation Farm Option, and the Wildlife Habitat Incentives Program.

As shown in Table 7-3, Conservation Subsidy Programs of the U.S. Department of Agriculture (FY 1998), USDA has implemented a large number of conservation programs. A 1995 GAO study stressed the need to consolidate these programs, stating that “they frequently promote identical resource conservation purposes, use similar financial incentives, serve the same population, and finance the application of the same set of technical practices.” The study asserted that program overlap made it more difficult for farmers to identify and apply for financial and technical assistance and increased the administrative burden on USDA.<sup>169</sup>

**Environmental Quality Incentive Program (EQIP):** This program replaced several programs, all of which were phased out in 1996: the Agricultural Conservation Program, the Colorado River Basin Salinity Control Program, the Water Quality Incentives Program, and the Great Plains Conservation Program. EQIP assists farmers and livestock producers with making environmental and conservation improvements. Participating landowners agree to establish conservation plans and implement them for periods of 5 to 10 years. In doing so, they receive cost-share or incentive payments for as much as 75% of their costs for adopting these conservation practices. Payments are limited to \$10,000 per person per year or a total of \$50,000 for any multi-year agreement.

The legislation and rules developed by USDA requires the Department to select projects that maximize the environmental benefits per dollar spent under EQIP. Priority areas must be targeted. Plans must be developed that identify both the main problems being addressed and the practices capable of solving these problems with available resources. These provisions effectively make watershed planning a major activity for the Natural Resource Conservation Service.

EQIP has placed added emphasis on livestock as a pollution problem. One-half of the program’s funding is reserved for livestock-related conservation problems, and one-half for other conservation problems. The program was funded at \$130 million in FY 1996 and \$200 million annually from 1997 to 2002, although Congress subsequently reduced funding levels to \$170 million a year. Most farmers attempting to enter the EQIP program are turned away due to the targeting process described in the previous paragraph and current budgetary limitations.

**Farmland Protection Program:** Under this \$35 million program, USDA will work with state and local governments to purchase conservation easements on 170,000 to 340,000 acres of farmland of special interest. To be included in this program, land must be subject to a pending offer from a state or local government for the purpose of protecting topsoil by limiting nonagricultural uses.

**Conservation Farm Option:** Under this pilot program for producers of cotton, rice, feed grains, and wheat, producers may consolidate payments from three programs— CRP, WRP, and EQIP—into one annual payment. They can do so only in exchange for entering into 10-year contracts and implementing conservation plans that address water, soil and related resources as

well as wildlife habitat. The incentive effect of being able to consolidate program payments is unknown. A total of \$197.5 million will be provided for this program through 2002.

**Wildlife Habitat Incentives Program:** This program is intended to offer cost-sharing assistance to landowners to encourage them to plan and adopt approved management practices that ameliorate wildlife habitat. Total funding from FY 1996 to FY 2002 is \$50 million.

### 7.4.8 Impacts of Conservation Programs

Table 7-9 presents some of the effects of USDA conservation programs. Activities of the Water Quality Program consist mostly of educational and technical assistance, but they also include some financial assistance. Monetary values of some of these impacts have been estimated. For example, the benefits of reducing salt loads under the Colorado River Salinity Control Program have been estimated at \$61 per ton a year.<sup>170</sup>

**Table 7-9. Impacts of Conservation Programs**

| PROGRAM AND IMPACTS   | IMPACTS   |      |      |      |      |      |      |      |
|---|---|------|------|------|------|------|------|------|
|   | 1988  | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 |
|   | <b>Reductions of Erosion (in 1,000,000 tons)</b>          |      |      |      |      |      |      |      |
| Conservation Reserve Program  | 514   | 596  | 644  | 654  | 672  | 692  | 692  | 692  |
| Conservation Compliance Provisions                                      | 0   | 0    | 0    | NA   | 236  | 458  | 465  | 527  |
| Agricultural Conservation Program                                       | 40  | 34   | 33   | 34   | 30   | 29   | 9    | 18   |
| Conservation Technical Assistance and Great Plains Conservation Program | 463   | 353  | 353  | 282  | 298  | 321  | 325  | 284  |
| Annual Acreage Reduction Program  | 107   | 62   | 55   | 60   | 39   | 46   | 29   | 40   |
|   | <b>Reductions (in 1,000,000 pounds)</b>                   |      |      |      |      |      |      |      |
| Water Quality Program: Reduction in Nitrogen Application                | NA  | NA   | NA   | 10.7 | 53.3 | NA   | NA   | NA   |
| Water Quality Program: Reduction in Phosphorus Application              | NA  | NA   | NA   | 6.1  | 70.5 | NA   | NA   | NA   |
|   | <b>Reductions of Active Ingredients (in 1,000 pounds)</b> |      |      |      |      |      |      |      |
| Water Quality Program: Reduction in Pesticide Load                      | NA  | NA   | NA   | 239  | 528  | NA   | NA   | NA   |
|   | <b>Reductions (in 1,000 Tons)</b>                         |      |      |      |      |      |      |      |
| Colorado River Salinity Control Program: Reduction in Salt Load         | 62  | 75   | 92   | 105  | 127  | 163  | 191  | 212  |

Source: USDA, ERS: Agricultural Resources and Environmental Indicators, Ch. 6.1

### 7.4.9 State Initiatives

In addition to the federal programs described in this chapter, various types of subsidies have been used to promote land preservation on the state level. A 1994 USDA report found that, as of 1990, 25 states had cost-sharing programs, 6 offered tax credits, and 5 offered low-interest loans to encourage the preservation of land.<sup>171</sup>

In Lake Okeechobee, Florida, phosphorus contained in the waste of dairy cattle has posed a threat to water quality. The “Dairy Rule” that entered into effect in June 1987 required Florida dairy farmers to use specific techniques to prevent discharges from barn wash water. The Florida State Legislature provided the Florida Department of Agriculture and Consumer Services



(DACs) with cost-share funds to facilitate the implementation of this policy. Of the 49 dairy operations in the state that were affected by the Dairy Rule, 18 chose to participate in a buyout program under which they received \$602 for every cow they permanently removed from the basin. The buyout program took 14,039 cows out of the basin.

A survey of wildlife management programs in the 20-state region of the Northeast found that 5 states had cost-sharing programs, 5 offered equipment loans, 4 offered property tax incentives, 1 offered state income tax benefits, and 8 had tie-ins with federal programs. In Indiana, the Wildlife Habitat Cost-Share Project pays up to 90% of the cost of establishing permanent wildlife habitat, windbreaks, brush piles, vegetation management, and wetland improvement. Property tax assessments are lowered for landowners who adopt measures that enhance or preserve existing wildlife habitat.<sup>172</sup>

Minnesota has a property tax exemption for undisturbed wetlands and ungrazed prairie.<sup>173</sup> The state also has a Pheasant Habitat Improvement Program under which landowners can receive cost-sharing assistance of up to 75% of their costs as well as technical assistance in return for improvements such as food plots, nesting cover, and woody cover.<sup>174</sup> In Texas, the Galveston Bay Comprehensive Conservation and Management Plan approved by the EPA in April 1995 called for economic incentives, such as tax breaks, for private landowners. The tax incentives are intended to encourage owners to preserve wetlands.<sup>175</sup>

In November 1995, voters in Texas approved a constitutional amendment to allow open-space land that is used for wildlife management to be taxed in the same manner as open-space agricultural land. Consequently, taxes will be based on the land's productive capacity rather than its higher market value. The Sierra Club lauded the measure, which it said "will allow landowners to take lands out of traditional agricultural production without penalizing them for protecting their property for wildlife."<sup>176</sup>

#### **7.4.10 Purchase of Development Rights Programs**

A number of states (11 as of April 1996) and several counties and local governments have purchase of development rights (PDR) programs in place under which landowners are paid *not* to convert farmland to commercial or residential uses. (Such rights are also known as "conservation easements.") As shown in Table 7-10, such programs are especially common in the Northeast and have covered more than 400,000 acres at a cost of almost \$730 million. In addition to objectives of food security and agricultural production, PDR programs have several environmental objectives, including the maintenance of habitat and resting places for wildlife and the aesthetic value of open space. Among the advantages of PDRs are their voluntary nature, which helps avoid the legal conflicts that can arise from zoning laws, and the low cost of this form of land protection for state and local governments as compared to outright land purchase.

The funding mechanisms for PDR programs vary from state to state and include general revenues, land transfer taxes, property taxes, and bonds. Criteria used to select the land parcels that are to be purchased include cost, threat of conversion, and location. Many programs prefer to purchase development rights on parcels that are near each other.

**Table 7-10. Purchase of Development Rights Programs in States**

| STATE           | YEAR STARTED | NO. OF FARMS IN PROGRAM | NO. OF ACRES AFFECTED | STATE FUNDS SPENT (in thousands of dollars) | STATE FUNDS AVAILABLE (in thousands of dollars) |
|-----------------|--------------|-------------------------|-----------------------|---|---|
| California*     | 1980         | 72                      | 47,992                | \$46,515                                    | \$23,100  |
| Connecticut     | 1978         | 164                     | 25,042                | 73,430                                      | 8,800   |
| Colorado*       | 1986         | 6                       | 1,904                 | 3,254                                       | 2,800   |
| Delaware        | 1995         | 31                      | 8,561                 | 12,000                                      | 0   |
| Maine           | 1990         | 1                       | 307                   | 380   | 0   |
| Maryland        | 1977         | 809                     | 117,319               | 125,099                                     | 8,100   |
| Massachusetts   | 1977         | 398                     | 35,907                | 86,109                                      | 6,000   |
| Michigan        | 1993         | 2                       | 79                    | 709   | 10,000  |
| New Hampshire   | 1979         | 57                      | 9,148                 | no data                                     | 0   |
| New Jersey      | 1981         | 189                     | 27,924                | 88,463                                      | 107,000   |
| New York*       | 1976         | 154                     | 6,941                 | 46,000                                      | 4,950   |
| North Carolina* | 1987         | 21                      | 1,255                 | 1,785                                       | 0   |
| Pennsylvania    | 1989         | 596                     | 74,500                | 148,000                                     | 31,000  |
| Rhode Island    | 1982         | 30                      | 2,428                 | 14,000                                      | 0   |
| Vermont         | 1987         | 140                     | 45,511                | 26,304                                      | 2,000   |
| Washington*     | 1979         | 187                     | 12,600                | 58,000                                      | 1,500   |
| <b>TOTAL</b>    |              |                         | 417,418               | 730,048                                     | 205,250   |

\*Denotes county or other local programs

Source: American Farmland Trust.

## 7.5 Consumer Product Waste Management

Managing the waste from consumer products is one area in which traditional regulatory measures may be *less* likely than incentives to protect the environment. It is difficult, if not impossible, to monitor the behavior of millions of consumers. For example, bans on the disposal of used motor oil or containers in landfills are hard to enforce. Consumers are more likely to respond positively to factors such as more convenient collection service—which subsidies make possible—or refunds.

Various types of subsidies, including grants, loans, payments, and tax incentives, have been used extensively in consumer product waste management. Also included in the following discussion are preferential procurement and recycled content policies, both of which encourage recycling by stimulating demand for recycled products. Most of these measures have been implemented at state and local levels. Table 7-11 identifies the various state subsidies that help manage the disposal of one consumer product, used tires.

### 7.5.1 Advance Disposal Fees

As noted in Chapter 4, advance disposal fees (ADFs) on consumer products generate revenues that subsidize the otherwise unprofitable activity of disposing of specific products after they have been used. In Rhode Island, for example, fees on “hard-to-dispose material,” such as motor oil, tires, antifreeze, and solvents, are used to fund centers that collect these products after their use as well as research and public education on the disposal and reuse of these products.

**Table 7-11. State Subsidies for Used Tire Management**

| TYPE OF SUBSIDY                                | NUMBER OF STATES |
|--|------------------|
| Tax benefits                                   | 13               |
| Payments based on the number of tires recycled | 7                |
| Public procurement                             | 28               |
| Grants and loans                               | 34               |

Source: *Scrap Tire News*, January 1996, p. 18.

In Virginia, an ADF of \$0.50 per tire that has been in effect since January 1990 generates revenues for the state's Waste Tire Trust Fund. The fund finances several efforts: cleanup of used tire disposal sites, activities in several regions that manage the current flow of used tires, and subsidies of \$22.50 per ton for the conversion of waste tires to other end uses such as blasting mats, fuel and rubberized surfaces. By 2000, the program had processed about 27 million tires at a cost of \$11.6 million.<sup>177</sup> Similar programs are in effect in several other states.

### 7.5.2 Deposit Handling Fees

In most states that have mandatory bottle deposits, distributors are required to pay handling fees to retail outlets and other used bottle collection centers. In California and Maine, for example, handling fees are 3 cents per bottle. Such handling fees have encouraged the collection of used bottles to such a degree that many redemption centers have been created voluntarily by the private sector to earn profits. Chapter 5 has further details on deposit-refund systems in California, Maine, and other parts of the United States.

### 7.5.3 Recycling Loans and Grants

At least 24 states have grant or loan programs that promote the recycling industry.<sup>178</sup> Under Washington State's Model Litter Control and Recycling Act, grants are awarded to individuals who develop recycling programs. Under a state Litter Control and Recycling Act, Rhode Island provides grants to communities and organizations for creating litter and recycling initiatives.<sup>179</sup>

As shown in Table 7-12, Wisconsin offers both loans and grants to promote recycling. The largest program provides grants to municipalities and counties to fund various recycling activities. Recycling rebates can be of two types. One, they can be general rebates that are offered for as long as five years in order to offset the increased cost of making or processing recyclable materials that are generated in the state. Two, they can be property rebates that cover 5%–25% of the cost of qualified property. In 1993–94, 17 qualified property rebates worth \$1,136,805 and 10 general rebates worth \$4,599,334 were awarded.

Under the Waste Tire Reimbursement Grant Program, Wisconsin businesses receive payments of \$20 per ton for using waste tires in any of the following ways: in energy recovery, including the production of combustible byproducts; as road base in highway improvement projects; in recycling to make a new product; and in other uses that are approved by the state's Department of Natural Resources (DNR). Other uses must be approved in advance by DNR. Businesses receive payments that are based on documented tire use over the course of a given calendar year. Wisconsin's expenditures under this program for 1990–94 totaled approximately \$5.5 million.<sup>180</sup>

**Table 7-12. Financial Assistance Programs in Wisconsin that Promote Recycling (1994–95)**

| STATE PROGRAMS                                     | REBATES<br>(in thousands of dollars) |
|--|--------------------------------------|
| Municipal and County Recycling Grants              | \$29,200                             |
| Waste Reduction and Recycling Demonstration Grants | 1,750                                |
| Recycling Loans                                    | 2,519                                |
| Minority Business Recycling Grants and Loans       | 400                                  |
| Recycling Rebates                                  | 5,100                                |
| Recycling Market Development Board Assistance      | 2,892                                |
| Waste Tire Reimbursement Grants                    | 750                                  |
| Waste Tire Management or Recovery Grants           | 250                                  |
| <b>TOTAL</b>                                       | <b>\$42,861</b>                      |

Source: Bonderud and Shanovich, p. 11.

As shown in Table 7-13, at least 16 states had loan funds in 1995 for businesses that recycle used products. In Iowa, for example, loans have included \$485,000 for a project that converts waste gypsum into new wallboard; \$145,000 for efforts to convert used electrical wire into padding for use in the dairy cattle industry; and \$245,000 for a project to make rubber mats from used tires.

**Table 7-13. State Loan Funds for Recycling Enterprises**

| STATE        | MAXIMUM LOAN AMOUNT (in \$) | INTEREST RATE       | FUND SIZE (in \$)      | FUNDING SOURCE             |
|--------------|-----------------------------|---------------------|------------------------|----------------------------|
| California   | \$1 million                 | 5.8%                | \$25 million by 1996   | Landfill tipping fees      |
| Colorado     | 150,000 initially           | Prime Rate          | 1-1.5 million per year | 1 tire fee                 |
| Florida      | Unknown                     | <Prime Rate         | 3.5 million            | ADFs                       |
| Illinois     | 750,000                     | 5%                  | 1-3 million per year   | Landfill tipping fees      |
| Indiana      | 500,000                     | <Prime Rate         | 3-4 million per year   | Landfill tipping fees      |
| Iowa         | 2 million                   | 0%                  | 4 million per year     | Landfill tipping fees      |
| Kentucky     | None for cities             | 3.4%                | 4 million              | General revenues           |
| Louisiana    | 600,000                     | Unknown             | 2 million              | Tire fees                  |
| Maine        | 100,000                     | 4%-8%               | About 100,000 per year | Brown goods disposal fee   |
| Michigan     | 500,000                     | 0%                  | 4 million              | Landfill tipping fees      |
| Minnesota    | 500,000                     | 2% below Prime Rate | 4 million              | General revenues           |
| Mississippi  | 200,000                     | 2% below Prime Rate | Unknown                | Unknown                    |
| New Jersey   | 500,000                     | 3% below Prime Rate | 21 million             | Landfill tipping fees      |
| New York     | 500,000                     | <Prime Rate         | 5 million              | Petroleum overcharge funds |
| Pennsylvania | 300,000                     | 3%                  | 5 million              | Landfill tipping fees      |
| Vermont      | To be determined            | To be determined    | To be determined       | To be determined           |
| Wisconsin    | 750,000                     | 4%                  | 5.6 million            | Business tax               |

Sources: Trombly, 1995, p. 38; Louisiana Department of Environmental Quality; California Environmental Protection Agency.

The California Integrated Waste Management Board offers loans to organizations located in the state's 40 Recycling Market Development Zones. Zones range in size from a portion of a city to

areas encompassing several counties. Loans are repayable within 10 years with a 5.8% interest rate and can be used to cover as much as 50% of the cost of a project, up to \$1 million. In the three years leading up to March 1996, 67 loans totaling \$28 million were approved, of which 42 totaling over \$16 million have closed. The California Environmental Protection Agency has stated that these 42 loans have diverted nearly 1.4 million tons of waste from landfills annually. Recent loans include \$1 million to finance the production of custom packaging out of shipping boxes and \$475,000 to finance equipment for producing fire logs out of paraffin-saturated cardboard from grocery stores and sawdust from a local sawmill.<sup>181</sup>

Louisiana's used tire subsidy program combines a loan program with rebate payments that are based on the number of tires recycled. Loans of up to \$600,000 are available for efforts to process waste tires. Each loan is limited to 25% of the value of the processing facility. The loan is repayable to the state, with interest, at a rate of \$0.15 per tire processed. The state also offers rebates of \$0.85 per tire processed.

#### **7.5.4 Tax Incentives**

Twenty-eight states have offered tax incentives for businesses that recycle used products. Idaho, for example, enacted a tax credit in 1994 for the purchase of equipment needed to manufacture post-consumer paper.<sup>182</sup> "An Act Concerning Solid Waste Management" in Kansas allows "up to \$100,000 of income tax deductions determined at a rate of 20% of purchase price of new equipment that uses recycled materials to produce products or energy and expands the taxpayer's ability to use recycled goods."<sup>183</sup>

#### **7.5.5 Preferential Procurement of Recycled Products**

One type of policy measure that could be considered a subsidy is the preferential procurement of recycled products. By stimulating demand for recycled products, such policies are intended to promote recycling. This section of the chapter considers only government procurement practices as opposed to private-sector procurement practices. Mandates governing the private-sector use of recycled materials are discussed in the next section, Section 7.5.6, Recycled Content Policies.

Preferential procurement can take one of at least two forms: one, price preferences and two, set-asides and goals. In this context, price preferences refer to the public sector's willingness to pay a higher price for recycled products. Set-asides and goals refer to the rules or targets established by the public sector regarding the total percentage of products they purchase that must contain recycled materials.

Paper is the product most commonly subject to procurement policies on recycled goods. A 1993 survey conducted by the Northeast Maryland Waste Disposal Authority found that all 50 states and the District of Columbia (DC) favored recycled products, compared to only 13 states in 1986.

In the 38 states (including DC) that had price preference policies, 15 states were willing to pay 5% more for products that had recycled content than for comparable products that did not contain recycled materials, and 20 states had preferences that were 10%. Oregon had a preference of 12%, and two other states had preferences between 5% and 10%. In 21 of these states, the preferences applied not only to paper but also to other recyclable products. Vermont used life-cycle costing in deciding what to purchase, buying recycled products "where the added

cost of using waste materials rather than virgin materials is less than the cost avoided by not having (that waste) in the waste stream.”

The same survey found that 30 states had set-asides or goals, mostly for paper. Iowa, Montana, and Nebraska had the most stringent set-asides. By January 1, 2000, 90% of the printing and writing paper purchased by Iowa’s public sector had to have recycled content, and two years later all the tissue paper products it purchased had to have recycled content. Montana had a set-aside of 95% by 1996. Nebraska bought only recycled paper and was considering similar purchasing policies for plastic bags, motor oil, and carpets. North Carolina required the use of recycled paper for all state government reports, memoranda, and other documents, unless written authorization was obtained from the head of the agency.

The 1993 survey also identified 186 local governments that favored recycled products, with some cities adopting price preferences as high as 20% and some having set-asides. The City of Newark, New Jersey, required its agencies to use recycled products if available, regardless of price.

In Florida, for example, prison industries reprocess tires for sale to state, county, and local governments, and state grants to counties are used to purchase products made from waste tires. The Florida State Department of Transportation uses 10,000 tons of crumb rubber (made from two million waste tires) annually in rubber-modified asphalt for roads. As a result of these initiatives and other market development activities, the percentage of tires dumped in Florida landfills has decreased since 1989.

### 7.5.6 Recycled Content Policies

Recycled content policies as defined here refer only to requirements that private-sector organizations use a percentage of recycled products. Recycled content rules applied to government purchases, such as the aforementioned executive order on paper purchases, have been placed under the heading of public procurement policies. Consequently, they have been discussed in the previous section, Section 7.5.5, Preferential Procurement of Recycled Products.

Although there is a large element of traditional regulation in policies that require a minimum recycled content for certain products or containers, such policies also create incentive effects by stimulating demand for recycled products. If manufacturers are forced to use a certain amount of recycled product, they or their suppliers are more likely to offer consumers better access to recycling services.

At least 13 states have passed laws mandating the use of recycled content in newspapers, and 15 states have created voluntary agreements for the same. (The voluntary agreement in Massachusetts is described in Chapter 10.) A typical example is the 1990 Wisconsin Recycling Law, which requires newspapers to use recycled content in newsprint. The minimum content requirements increased from 10% in 1992 to 45% in 2000. Publishers failing to meet these requirements are subject to fees that are based on the extent of non-compliance. In this respect, the law could be considered to act as a product charge on non-recycled newsprint. However, the Wisconsin Department of Natural Resources sometimes exempts publishers from these fees if they can show that they could not obtain recycled newsprint at a reasonable cost.

In 1992 and 1993, more than 90% of the 78 newspaper publishers in Wisconsin exceeded the state’s minimum content requirement of 10%. Only one failed to meet the requirement. In 1994,

however, when the minimum content standard was increased to 25%, 14 of the publishers in the state failed to meet the standard. Five of them paid the fee and the others were exempted.

## 7.6 New Jersey's Information Awards Program

Under this program, which became effective in 1990, New Jersey citizens who report illegal dumping to environmental authorities receive 10% of any civil penalty or \$250, whichever amount is larger. Information leading to criminal convictions is rewarded by 50% of the collected penalty. The identity of those seeking rewards is protected.

Four other New Jersey statutes also contain provisions for monetary awards that are given to individuals who report violations.

1. The Major Hazardous Waste Facilities Siting Act awards 50% of any criminal penalty collected for the illegal treatment, storage, or disposal of hazardous waste.
2. The Regional Low Level Radioactive Waste Disposal Facility Siting Commission awards 50% of any penalty collected for the illegal treatment, storage, or disposal of low-level radioactive waste.
3. The Comprehensive Regulated Medical Waste Management Act awards 10% of any civil or criminal penalty collected for violations or \$250, whichever amount is larger.
4. The Ocean Dumping Enforcement Act awards 10% of any criminal penalty collected for violations.

This scheme differs from most subsidies and other incentive mechanisms featured in this report. These programs seek to affect the behavior of citizens and businesses by making monetary awards to those individuals or organizations that notify authorities of acts of noncompliance, thus allowing those who report violations to benefit from the successful efforts of law enforcement. As of May 1996, three penalties had been collected as a result of information provided by citizens. One payment of \$50,000 and two payments of \$250 were awarded in these three cases. (The payments equaled 10% of the penalties collected in each case.) Other rewards are pending.<sup>184</sup>

A similar source of monetary support for environmental organizations is the fees awarded to attorneys who have won citizen suits against environmental violators. As noted in Chapter 8, these fees appear to create stronger incentives for private parties to initiate lawsuits under California's Proposition 65 than the so-called "bounty hunter provision." Under the bounty hunter provision, the person who brought the lawsuit can receive 25% of any fines collected.

It is possible for citizens or organizations to obtain rewards for reporting potential environmental violations or initiating lawsuits under other state and federal laws. However, it is beyond the scope of this report to determine their extent or their effects on environmental behavior.

## 7.7 Alternative Fuels and Low-Emitting Vehicles

Various levels of government subsidize alternative fuels (AF) and alternative fuel vehicles (AFV) through measures such as tax incentives, rebates, and preferential procurement. The annual costs of federal programs alone have been estimated at more than \$1 billion. Some of these subsidies result in environmental improvements, but, as noted in the following section, alternative fuels are also subsidized for other reasons.

### 7.7.1 Federal Subsidies

As shown in Table 7-14, the largest subsidy in the area of cleaner fuels is the exemption of ethanol blends from \$0.054 of the \$0.184-per-gallon gasoline tax. Since ethanol blends of 10% receive this deduction, the exemption for ethanol is the equivalent of \$0.54 per gallon.

The category of “other direct subsidies” shown in Table 7-14 includes preferential taxation of compressed natural gas (CNG) and payments to subsidize purchases of AFVs and AFV infrastructure. The CNG tax deduction is equivalent to \$0.128 per gallon. Although this subsidy is small compared to ethanol tax deductions, it is expected to increase in importance by the year 2000 as the number of CNG vehicles increases. The federal government also subsidizes the purchase of alternative fuel mass transit buses and school buses, state AFV planning, and the purchase of alternative fuel vehicles by small businesses.

**Table 7-14. Alternative Fuel and Vehicle Subsidies**

| TYPE OF SUBSIDY                               | 1994<br>(in millions of dollars) | 2000 (PROJECTED)<br>(in millions of 1994 dollars) |
|---|----------------------------------|---|
| Research & Development                        | \$348                            | \$350   |
| Ethanol credit                                | 573                              | 914   |
| Other direct subsidies                        | 53                               | 76  |
| Preferential procurement                      | 6                                | 614   |
| Tax credits for AFVs and equipment            | 20                               | 100   |
| Reid vapor pressure waiver for ethanol blends | 95                               | 120   |
| <b>TOTAL</b>                                  | <b>\$1,095</b>                   | <b>2,174</b>                                      |

Source: Anderson. 1994, pp. 18-21.

At present, tax credits for AFVs and refueling stations amount to roughly \$20 million each year. However, they are predicted to rise to \$100 million annually by the year 2000. The federal government also subsidizes a number of research and development activities.

The RVP (Reid vapor pressure) waiver entitles ethanol blends to an extra pound of vapor pressure beyond the limits imposed on conventional gasoline. (Adding ethanol to gasoline raises vapor pressure about 1 lb. in a 10% ethanol blend.) This waiver is worth approximately \$0.09 per gallon of ethanol, based on the additional costs incurred by refiners to produce an ethanol blend stock with lower vapor pressure.

Table 7-14 also shows that another type of subsidy, preferential procurement, is expected to rise significantly in value by the year 2000. This trend is due to the fact that many procurement requirements are only now entering into effect, and they are scheduled to become more stringent over time. Table 7-15 shows these requirements, many of which will eventually be applied to privately owned fleets of vehicles.

The federal government also provides income tax deductions of \$2,000 to \$50,000 to businesses, organizations, and citizens who purchase clean-fuel vehicles. Electric vehicle purchases are eligible for income tax credits of 10%, or up to \$4,000. The cost to the government in 1995 of the electric vehicle credits has been estimated at \$65 million.<sup>185</sup>



**Table 7-15. Federal Procurement Requirements for Alternative Fuel Vehicles by Model Year**

(percent of all vehicle purchases, except as noted)

| MODEL YEAR      | FEDERAL AGENCIES | STATE AGENCIES | SUPPLIERS OF ALTERNATIVE FUELS | OWNERS OF PRIVATE FLEETS |
|-----------------|------------------|----------------|--------------------------------|--------------------------|
| 1993            | 5,000 vehicles   |                |                                |                          |
| 1994            | 7,500 vehicles   |                |                                |                          |
| 1995            | 10,000 vehicles  |                |                                |                          |
| 1996            | 25%              | 10%            | 30%                            |                          |
| 1997            | 33%              | 15%            | 50%                            |                          |
| 1998            | 50%              | 25%            | 70%                            |                          |
| 1999            | 75%              | 50%            | 90%                            |                          |
| 2000            | 75%              | 75%            | 90%                            |                          |
| 2001            | 75%              | 75%            | 90%                            |                          |
| 2002            | 75%              | 75%            | 90%                            | 20%                      |
| 2003            | 75%              | 75%            | 90%                            | 40%                      |
| 2004            | 75%              | 75%            | 90%                            | 60%                      |
| 2005            | 75%              | 75%            | 90%                            | 70%                      |
| 2006 and beyond | 75%              | 75%            | 90%                            | 70%                      |

Source: Anderson. 1994, p. 10.

### 7.7.2 State Subsidies

In addition to the federal purchasing requirements for AFVs that are imposed on state governments—shown in Table 7-15—several states, including New York and Massachusetts, have their own vehicle purchasing requirements. Furthermore, most states offer tax benefits or grants for AF or the purchase of AFVs.<sup>186</sup>

In Connecticut, for example, vehicles powered by natural gas, propane, or electricity; vehicle conversion equipment; and equipment for AF refueling stations are exempt from the state's 6% sales and use taxes. In addition, businesses are entitled to 50% tax credits for the investments they make in vehicle conversions and refueling stations. Companies that derive at least 75% of their income from alternative energy sources are exempt from income tax, and natural gas sales are exempt from gross earnings taxes of 4%–5%.

The California Air Resources Board (CARB) requires that vehicle sales by the seven largest vehicle manufacturers in the state include at least 5% alternative fuel vehicles in 2001 and 10% in 2003. The direct incremental and infrastructure costs of this mandate have been projected at \$19.5 billion through 2010. This figure accounts for almost 80% of the expected costs of all the state's activities to promote the purchase and use of alternative fuel.<sup>187</sup>

A number of cities use AFVs in their mass transit systems. In Los Angeles, for example, the Board of Directors of the Metropolitan Transit Area has adopted a policy that requires all buses purchased by the transit agency in the future to be AFVs.

Table 7-16 focuses on the Ozone Transport Region (OTR), which consists of 12 Mid-Atlantic and Northeastern states as well as the District of Columbia. The table shows that state subsidies for AF and AFVs are expected to rise significantly over the next 15 years.

**Table 7-16. Alternative Fuel and Vehicle Subsidies in the Ozone Transport Region**

| TYPE OF SUBSIDY<br>(excluding federal mandates) | 1995<br>(in millions of dollars) | 2000<br>(in millions of dollars) | 2005<br>(in millions of dollars) |
|---|----------------------------------|----------------------------------|----------------------------------|
| AFV procurement requirements                    | \$0                              | \$153.3-930.5                    | \$719.0-5,875.5                  |
| State and local tax incentives                  | 4.3-4.8                          | (44.8)-12.0                      | Unknown                          |
| Other state and local incentives                | 2.9-10.5                         | 0.0-4.0                          | Unknown                          |
| <b>TOTAL</b>                                    | <b>\$7.2-15.3</b>                | <b>\$108.5-946.5</b>             | <b>\$719.0-5,875.5</b>           |

Source: Perkins. September 1995, p. 9.

Some of the subsidies actually involve net costs. State and local tax incentives could range from a net cost of \$44.8 million in 2000 to a positive subsidy of \$12.0 million. The incentive effect of some of the AF and AFV subsidies is likely to be significant. Preferential tax treatment has played a large role in the rise in ethanol production in recent years. A 1995 GAO report found that without the partial excise tax exemption for ethanol, its use would fall by 50%-90%.<sup>188</sup> The purchase of AFVs has also stimulated demand for methanol and CNG.

The environmental impact of such incentive effects is unclear. Some alternative fuels are cleaner than gasoline. Alternative fuels are promoted for several reasons: to improve the environment, to help increase U.S. energy security, and (in the case of ethanol) to provide a market for part of the country's large agricultural surpluses.

### 7.7.3 Car Buyback Schemes

In a number of states, programs have been implemented that offer cash payments to motorists if they turn in old, high-emitting automobiles. In the RECLAIM program described in Chapter 6, the South Coast Air Quality Management District (SCAQMD) allows emission reduction credits to be generated if citizens scrap old vehicles and lawnmowers, both of which are blamed for significant quantities of air pollution.

In 1990, Unocal Corporation in Los Angeles purchased and scrapped 8,376 vehicles that were manufactured before 1971 for \$700 per vehicle. SCAQMD estimated the per-ton cost of the combined reductions in oxides of nitrogen (NO<sub>x</sub>) and reactive organic gas (ROG) emissions at \$4,900 through the scrapping of pre-1972 vehicles. This figure is much less than the \$10,000 to \$20,000 per-ton cost for traditional control methods. The SCAQMD concluded that its vehicle-scraping program was relatively cost-effective.<sup>189</sup>

### 7.8 Renewable Energy and Conservation

Renewable energy and conservation are subsidized by tax benefits. Renewable electricity generation earns income tax credits of 1.5 cents per kWh, adjusted for inflation. For 1995, the credit was 1.6 cents per kWh. It applies to closed-loop biomass and wind energy sources. The estimated cost of these credits to the government was approximately \$970 million in 1995.

Conservation subsidies paid by utilities are also partly or fully excluded from income tax. Since 1992, subsidies to residential consumers have been fully deductible, and 65% of subsidies to non-residential consumers have been deductible. The annual cost to the government of this exclusion has been estimated at approximately \$100 million.

In cooperation with the U.S. Department of Energy, the U.S. Department of Housing and Urban Development created the Energy Efficient Mortgages (EEM) Program to help homebuyers and homeowners finance new homes or the cost of adding energy-efficiency features to an existing home as part of their Federal Housing Administration-insured home purchase.<sup>190</sup> EEM makes mortgage credit available to borrowers who otherwise would not qualify for conventional loans or for affordable loan terms and to residents of disadvantaged neighborhoods. In FY 1996, 3,500 loans were approved under this program. In FY 1997, 4,700 additional loans were approved.

### 7.9 Municipal Sewage Treatment Plant Construction

The federal government has subsidized the construction of municipal sewage treatment plants since the 1956 Water Pollution Control Act Amendments. The subsidies took the form of cost-sharing grants in which the federal government’s contribution was limited to 55% in 1956, raised to 75% by the Federal Water Pollution Control Act of 1972, then decreased back to 55% by the 1981 Municipal Wastewater Treatment Construction Grant Amendments.

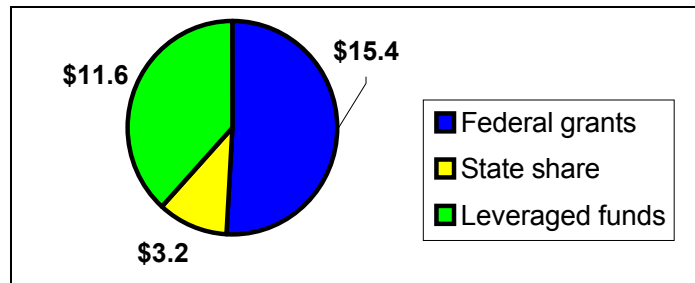
During the 1970s and 1980s, the Construction Grants Program provided more than \$60 billion for the construction of public wastewater treatment projects: sewage treatment plants, pumping stations, and collection and intercept sewers; rehabilitation of sewer systems; and the control of combined sewer overflows.<sup>191</sup>

The 1987 Water Quality Act (commonly referred to as the “Clean Water Act”) established 1990 as the last year for appropriating construction grant funds. With the phaseout of the Construction Grants Program and the initiation of the State Revolving Fund (SRF), Congress significantly reduced the amounts of funding available. They also provided for a transition from grants to loans.<sup>192</sup>

The grants undoubtedly encouraged construction activities that increased public access to sewage treatment. However, these grants have been criticized for giving municipalities “only weak incentives to hold the line on capital costs by seeking cost-effective design and technologies or by matching more carefully the designed capacity of the plant to projected need.” This effect was compounded by state grants that covered part of the non-federal share, which effectively lowered communities’ share of construction costs to 10%–25%.<sup>193</sup>

Under the Clean Water Act, grants were phased out by 1991 and replaced by federal contributions to state-managed revolving loan funds in what is known as the Clean Water State Revolving Fund (SRF) program.<sup>194</sup> SRFs in all 50 states and in Puerto Rico are capitalized by federal government grants. States are required to provide 20% matching funds for all federal grants, effectively making the state share 16.6% and the federal share 83.3%. By 1998, the SRF program was capitalized at approximately \$30 billion.<sup>195</sup> (See Figure 7-1.) When loans are paid back, additional funds become available for new lending. FY 2000 appropriations for the SRF amount to \$1.325 billion.

**Figure 7-1. Cumulative SRF Investments**  
(in billions of dollars, 1988–1999)



Source: EPA. 1999a.

States are responsible for fund management. Interest rates vary from 0% to a market rate, the average being about 3%. Repayment periods are as long as 20 years, with reimbursement beginning one year after project start-up.

Data collected by the State of Ohio indicate that as of June 30, 1995, states collectively had lent \$14.6 billion, or 77%, of the \$18.9 billion available to them. The percentages of funds that were loaned varied significantly from state to state, with 8 states having loaned more than 90% of their funds; 11 states, less than 60%; and 3 states, less than 40%.

A GAO (1996c) study found that various obstacles had limited states' lending, including the lack of states' experience in managing revolving loan funds. In addition, the requirement that loans be repaid has discouraged applications from some small communities with a limited number of ratepayers to support project costs. In at least two states, the possibility of obtaining grants from other federal programs appears to have discouraged loan applications for SRF.

Eight federal agencies manage 17 different programs that may be used by rural areas for the construction, expansion, or repair of water and wastewater facilities. Some states report that larger communities with solid credit ratings may be able to borrow money at more favorable conditions from private-sector sources than from the SRF program.

Unlike the Construction Grant Program it replaced, the SRF program funds a number of initiatives other than municipal wastewater treatment, including projects that address stormwater; combined (sanitary and storm) sewer overflows; and agricultural runoff. Over 150 loans worth more than \$1 billion have financed investments to control combined sewer overflow. In addition, approximately 100 loans worth about \$100 million have financed measures to control agricultural and urban runoff.

Although it is beyond the scope of this report to provide an evaluation of the grant and SRF programs, the population served by modern sewage treatment has doubled over the past 30 years. EPA has stated that "the SRF is probably the most efficient program of its kind in the federal government."<sup>196</sup>

In addition to the SRF program, a number of other initiatives support the construction of sewage treatment works and related activities. A sampling of these initiatives follows.

- EPA's Public-Private Partnerships (P3) initiative tries to identify opportunities for municipalities to cooperate with the private sector to finance public wastewater treatment operations.
- The Hardship Grants Program for Rural Communities helps small, disadvantaged rural communities deal with their wastewater treatment needs. EPA provides funding for either the planning, design, and construction of wastewater treatment facilities or technical assistance on the operation and maintenance of such facilities. To qualify for this program, communities must meet the following criteria, among others:
  1. It must be located in a rural area.
  2. It must have a population of fewer than 3,000.
  3. It must have no centralized wastewater treatment facilities.
  4. It must have a per capita income that is 80% or less than the national average.
  5. It must have an unemployment rate that is at least 1% above the national average.

- Section 106 Water Pollution Control Program Grants help establish and implement ongoing water pollution control programs, including permitting, pollution control activities, surveillance, monitoring, enforcement, advice and assistance to local agencies, and the provision of training and public information. These grants provide federal assistance to states, territories, the District of Columbia, Native American Indian Tribes, and interstate agencies. Increasingly, Section 106 grants are focusing on basin-wide approaches to water quality management.
- Section 104(b)(3) Water Quality Cooperative Agreements are grants that promote the coordination of environmentally beneficial activities, including stormwater control, sludge management, and pretreatment. These grants provide federal assistance to state agencies that seek to control water pollution; interstate agencies; and other nonprofit institutions, organizations, and individuals.

### **7.10 Accelerated Review of New Pesticide Formulations**

When a pesticide manufacturer makes application to EPA to register a new pesticide, that pesticide may move closer to the front of the queue if the new pesticide can be demonstrated to substantially reduce risk to human health and the environment relative to the pesticide that is currently available. EPA articulated this policy in the *1994 Annual Report of the Office of Pesticide Programs*.<sup>197</sup> OPP further clarified the policy on reduced risk in the staff paper that is part of the OPP public participation process. In that document, OPP described how registration actions are ranked in the queue.<sup>198</sup> Accelerated review for lower risk formulations is an important benefit to the manufacturer of the new product for two reasons. First, pesticide registration can take a number of years. Second, the patent protection clock generally is running during the period when the registration application is being evaluated by EPA. This open policy has incentives that are clear and recognized by all parties. It has been successful in communicating the benefits of generating new research on safer pesticides to pesticide registrants.

### **7.11 Subsidies That May Harm the Environment**

Some subsidies are widely believed to have the unintended effect of encouraging environmentally harmful activities. In many cases, such subsidies were not designed as environmental policy instruments, but they have had adverse environmental consequences. This section briefly discusses a few examples of such subsidies.

#### **7.11.1 Subsidies for Timber, Minerals, and Water Extraction**

It has been widely asserted that timber, minerals, water, and public grazing land have been priced below their true social cost and, in many cases, even below their private cost. For all of these resources, user fees such as those described in Chapter 4 have been assessed. However, to the extent that these fees are lower than the private cost of the resources or services on which they are charged, such resources and services are actually being subsidized to the detriment of environmental protection.

As mentioned in Chapter 4, for example, livestock grazing fees on federal lands that are imposed according to a formula established by the 1978 Public Rangelands Improvement Act (PRIA) are widely believed to be below market value. Fees have been between \$1.35 and \$1.98 per animal unit month (AUM) since 1986. However, the Bureau of Land Management (BLM) and the

Forest Service estimated that fair market values in 1992 were \$4.75 per AUM for sheep. Furthermore, they estimated that these market values varied across regions and ranged from \$4.68 to \$10.26 per AUM for cattle and horses. The costs of the grazing programs were \$2.40 to \$3.24 per AUM for the Forest Service and \$2.18 to \$3.21 per AUM for BLM.

The low end of the cost range applies only if the funding directly linked to the livestock grazing program is considered, while the high end considers all range management funding. Moreover, state and private fees are significantly higher than PRIA fees. Data from the National Agricultural Statistics Service indicate that, in 1993, private fees in 17 Western states averaged \$9.80 and state government fees averaged \$4.58. The PRIA fee that year was \$1.86.

Table 7-17 shows that estimated irrigation water subsidies provided by the U.S. Bureau of Reclamation in selected areas ranged from 57% to 97% of the Bureau's full cost for water delivery. Excessive irrigation has been associated with a number of environmental problems, including water shortages and the contamination of water with natural pollutants and agricultural inputs.

**Table 7-17. Water Subsidies of the U.S. Bureau of Reclamation**

| IRRIGATION DISTRICT  | IRRIGABLE ACRES | SUBSIDY PER ACRE<br>(in dollars) | SUBSIDY AS %<br>OF FULL COST |
|----------------------|-----------------|----------------------------------|------------------------------|
| Oroville-Tonasket    | 9,500           | \$417                            | 82                           |
| Black Canyon #2      | 53,200          | 762                              | 89                           |
| East Columbia Basin  | 134,500         | 1,619                            | 97                           |
| Cachuma Project      | 38,700          | 1,378                            | 81                           |
| Truckee-Carson       | 73,000          | 931                              | 83                           |
| Glen                 | 152,300         | 101                              | 91                           |
| San Luis Unit        | 571,900         | 1,422                            | 85                           |
| Coachella Valley     | 78,500          | 1,000                            | 70                           |
| Wellton-Mohawk       | 65,800          | 1,787                            | 89                           |
| Imperial Valley      | 519,500         | 149                              | 74                           |
| Moon Lake            | 75,300          | 58                               | 57                           |
| Grand Valley         | 23,300          | 1,623                            | 85                           |
| Elephant Butte       | 102,100         | 363                              | 64                           |
| Lugert-Altus         | 47,100          | 675                              | 90                           |
| Malta                | 42,400          | 812                              | 92                           |
| Lower Yellowstone #1 | 34,500          | 507                              | 73                           |
| Farwell              | 50,100          | 1,446                            | 93                           |
| Goshen               | 52,500          | 416                              | 74                           |

Source: U.S. Department of Interior, *Acreage Limitation*, Interim Report, Government Printing Office, Washington, DC, March 1980, pp. 38-41, as cited in Kanazawa (1994), p. 114.

Historically, the mining industries—which include the oil and gas industries—and timber industries have benefited from preferential taxation of their income. The effect of subsidizing mineral and timber production through the tax code is to favor virgin material use over secondary (recycled) materials. Two types of adverse environmental effects may result from such subsidies: (1) the destruction of natural areas as minerals and timber are harvested; and (2) the excessive disposal of materials that otherwise might be recycled.

Percentage depletion allowances for petroleum and other minerals, for example, allow companies to write off arbitrary percentage reductions in mineral deposits that result from their operations as expenses. The value of these allowances for the oil and gas industries was estimated at more than \$2 billion annually from 1980 to 1982. Its value has since decreased to insignificant levels. One reason for the decrease is that only independent oil and gas companies (which account for about 30% of total U.S. oil and gas consumption) are now entitled to allowances. Moreover, only 25%–40% of these independent companies pay the standard tax (rather than the alternative minimum tax) required to maintain their eligibility for percent depletion allowance claims. Many of these companies are excluded from claiming percent depletion by other criteria under the tax code.

Percentage depletion allowances for other minerals were worth over \$500 million annually for much of the early 1980s. These allowances, however, fell in value after the 1986 Tax Reform Act. Oil, gas, and other mineral extraction companies also have the advantage of being able to expense (rather than capitalize) exploration and development costs.

In the past, timber companies were allowed to consider certain income from timber as capital gains, which are subject to lower tax rates. This practice, worth about \$800 million a year in the first half of the 1980s, was eliminated by the 1986 Tax Reform Act. However, the elimination of this practice led timber companies to increase their use of other previously underused tax advantages: (1) provisions that allowed timber management and reforestation costs to be expensed rather than capitalized; and (2) tax credits and accelerated amortization for reforestation activities. The federal government's construction of roads to facilitate the harvesting of timber is another form of subsidy for this industry.

### 7.11.2 Agriculture

The effect of the price support program for sugar on the Florida Everglades is frequently cited as an example of an environmentally harmful subsidy. The federal government subsidizes the sugar industry by guaranteeing a floor price of \$0.18 per pound, which is almost twice the price on world markets. This U.S. policy is further supported by tariffs of \$0.16 per pound on imported sugar that is in excess of quota levels. In 1992, this support program resulted in \$161.5 million in benefits for sugarcane farmers and \$107.7 million for processors.

The increases the amount of water diverted to sugarcane fields as well as the amount of runoff. The diversion and the runoff, which is contaminated with pesticides and fertilizers that sugarcane growers apply to maximize production, damage the ecosystem of the Everglades. Agricultural subsidies appear to be having similar adverse effects elsewhere in the United States. A Competitive Enterprise Institute study found that the use of pesticides and fertilizers in several Midwestern states was higher on subsidized fields than elsewhere. The study concluded that “the complete elimination of subsidies could result in a 35% reduction in chemical use per acre and a 29% reduction in fertilizer use per acre.”

USDA's peanut subsidy program has also been accused of promoting environmental degradation. It requires farmers to grow peanuts on the same land so they can retain their production quotas. Thus, critics charge, the program results in the increased use of pesticides in order to counteract the negative effects of the lack of crop rotation.<sup>199</sup>

### **7.11.3 Mortgage Interest Tax Deduction**

Although most interest deductions from personal income tax were eliminated by the 1986 Tax Reform Act, the deduction of mortgage interest remained in place. This deduction in effect subsidizes the construction and purchase of large homes. To the extent that larger homes use more building materials, take up more space, and require more energy, the deduction has a negative impact on the environment.