INTRODUCTION

Background

After the Office of Technology Assessment (OTA) released its report Serious Reduction *of Hazardous Waste,*[1] the Environmental Protection Agency (EPA) delivered its mandated report *Minimization of Hazardous Waste*[2] to Congress. Congressman Mike Synar, the Chairman of the Subcommittee on Environment, Energy, and Natural Resources of the House Committee on Government Operations subsequently requested OTA to analyze the EPA report and to describe "how EPA's findings and conclusions differ from those of OTA" with the emphasis on "differences that either implicitly or explicitly support different congressional actions" on waste reduction. This OTA special report not only compares the OTA and EPA reports but also provides Congress with new information on waste reduction and a sense of the quickening national interest in it.

Both previous reports portray waste reduction as: 1) an option with many environmental and economic benefits compared to management and regulatory options that deal with waste that is already generated, 2) technically and economically feasible with current science and technology, and 3) in limited use by industry because of a number of obstacles in industry and government. Since this special report focuses on policy options, the policy summaries from the original reports have been reproduced. Box A is the summary of recommendations from the EPA report, and box B is the portion of the summary of the OTA report that deals with policy options.

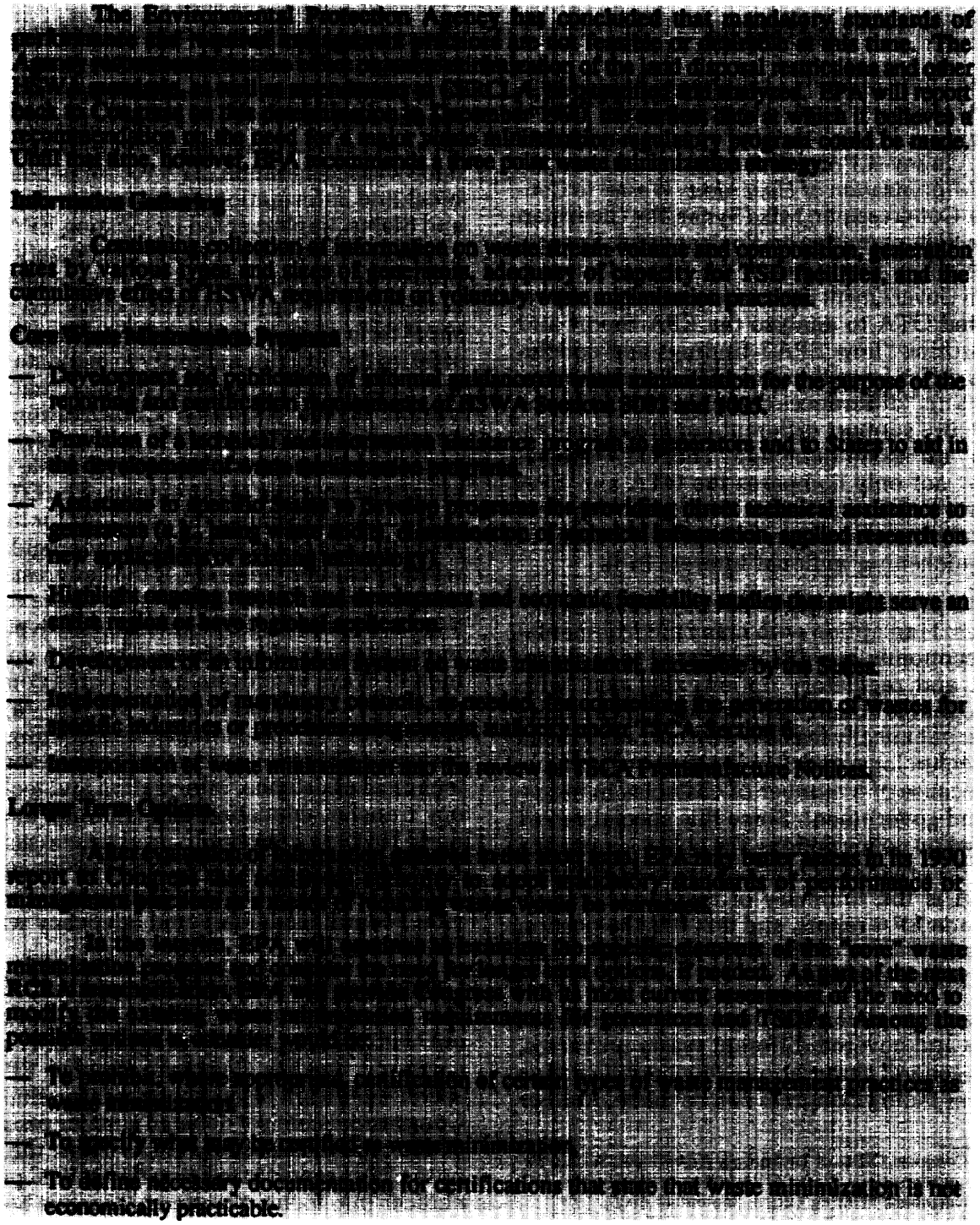
Even though the two reports used different terms and covered different waste universes, some general observations about public policy choices facing Congress can be made. Neither report supports the near-term use of a regulatory approach for waste reduction that would, in some way, prescribe industry actions. Both reports support the use of a nonregulatory technical assistance program to help industry reduce waste generation. EPA recommends technical and information assistance to industry and States, implemented by existing EPA programs, as its near-term waste minimization approach. In the long term, EPA recommends an assessment of the information collected in the short term so as to better inform Congress by 1990 on the need for authority to mandate ways to reduce wastes. As part of the next reauthorization of the Resource Conservation and Recovery Act (RCRA), EPA will suggest any necessary changes in the existing waste minimization reporting requirements. The OTA report provides specific policy options for the implementation of a major Federal nonregulatory waste reduction program, if the congressional goal is comprehensive and rapid waste reduction. It is based largely, but not exclusively, on in-plant technical assistance. The OTA options include ways to address institutional commitment and implementation at the Federal and State levels by, for example, establishing: 1) a Federal grants program to the States to support technical assistance, information and technology transfer, education and training, and generic R&D on commonly used processes and materials; and 2) an EPA Office of Waste Reduction with an Assistant Administrator to provide Federal leadership and advocacy within EPA.

Congress has not explicitly said that EPA's low priority for waste reduction is inconsistent with the regulatory programs EPA must carry out nor has Congress directed EPA to spend significant resources on waste reduction, Congress has not yet debated a major program of the type discussed by OTA, Thus, the purpose of this report is to bring the critical policy choices into focus. No attempt is made here to summarize the detailed technical results of the two studies; the original reports should be consulted for that purpose.

[1] U. S. Congress, Office of Technology Assessment, *Serious Reduction of Hazardous Waste,* OTA-ITE-317 (Washington, DC: U.S. Government Printing Office, September 1986).

[2] U.S. Environmental Protection Agency, *Report to Congress: Minimization of Hazardous Waste,* EPA/530-SW-033 (Washington, DC: EPA, Office of Solid Waste and Emergency Response, October 1986).

Box A.—Summary of Recommendations From EPA Report



economically practicable.

Box B.—Policy Excerpt From OTA Report Brief

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So far government has not required waste reduction. **OTA finds that it would be extraordinarily difficult for government to set and enforce waste reduction standards for a myriad of industrial processes.** The impact on industry, particularly on troubled manufacturing sectors, could be substantial. Alternatively, the United States could move to an economically sensible environmental protection strategy based on **both pollution control** (waste management) **and pollution prevention** (waste reduction) with the Federal Government providing leadership and assistance in the following ways.

First, **through policy development, education, and oversight, Congress could help industry and the Nation profit from seeing waste reduction not as some unique technology, but as a field ready for innovation engineering and management.** These opportunities are embedded in every part of the industrial production system, There is no way to predetermine the amount of waste reduction that is possible; its technical and economic feasibility depend on the characteristics, circumstances, and goals of specific waste generators. Success in reducing waste depends on the ability of organizations to modernize, innovate, and cut costs, thereby increasing profits and reducing long-term liabilities. Thus waste reduction could be used as a measure of performance as energy efficiency and productivity often are.

Second, there are a number of possible legislative actions that could clarify the definition of waste reduction, spur better collection of information on waste reduction, and encourage waste generators to devote more attention to the subject. If the Federal public policy goal is rapid and comprehensive hazardous waste reduction, then a strategy based on government leadership and assistance rather than on prescriptive requirements is likely to be the most effective. For example, Congress could: 1) create an Office of Waste Reduction with an Assistant Administrator within EPA, 2) create **a** grants program to develop generic or widely transferable technical support for waste reduction, 3) through new comprehensive waste reduction legislation require detailed reporting by industry on past reduction actions and plans for future efforts, 4) reward and facilitate waste reduction by offering industry concessions from existing pollution control regulatory requirements, or 5) create and use independent State Waste Reduction Boards to implement programs. Setting a national waste reduction goal of perhaps 10 percent annually could help convert the long stated importance of waste reduction into a true priority and reduce annual environmental spending substantially, ultimately by billions of dollars.

Definitions Used in This Report

Waste Reduction:

In-plant practices that reduce, avoid, or eliminate the generation of hazardous waste so as to reduce risks to health and environment. Actions taken away from the waste generating activity, including waste recycling or treatment of wastes after they are generated, are not considered waste reduction. Also, an action that merely concentrates the hazardous content of a waste to reduce waste volume or dilutes it to reduce degree of hazard is not considered waste reduction. This definition is meant to be consistent with the goal of preventing the generation of waste at its source rather than controlling, treating, or managing waste after its generation.

Hazardous Waste:

All nonproduct hazardous outputs from an industrial operation into all environmental media, even though they may be within permitted or licensed limits. This is much broader than the legal definition of hazardous solid waste in the Resource Conservation and Recovery Act, its amendments, and subsequent regulations. Hazardous refers to harm to human health or the environment and is broader than the term "toxic." For example, wastes that are hazardous because of their corrosivity, flammability, explosiveness, or infectiousness are not normally considered toxic.

*Copies of the OTA report, *'Serious Reduction of Hazardous Waste: For Pollution Prevention and Industrial Efficiency," are available from the U.S. Government Printing Office. The GPO stock number is* 052-003-01048-8; *the price is $12.00. Copies of the report for* congressional use are *available by* calling 4-8996. Summaries of *reports are available at no charge from the Office of Technology Assessment.*

A discussion of agreement and differences between the two reports follows this introductory section. The third section analyzes some internal inconsistencies in the EPA report. The last section of this special report is a discussion of four critical policy choices confronting Congress. Included is an updated discussion of the same policy options presented in the OTA report.

Definitions

One important difference between the OTA and EPA reports needs to be understood at the outset. The OTA report on waste *reduction* defined that term as:

> in-plant practices that reduce, avoid, or eliminate the generation of hazardous wastes so as to reduce risks to health and the environment.

Waste reduction includes actions taken in industrial plants, such as changes in technology and processes, plant operations and procedures, and raw materials that reduce the amount and toxicity of waste *before* it is generated. The OTA definition excludes recycling as true waste reduction unless it occurs within the parameters of a specific process so that waste does not exit the operation. This in-process recycling, which is an integral part of a process or operation, is not what most people mean by waste recycling.

Congress directed EPA to report on *waste minimization.* EPA said that, for purposes of its report, waste minimization includes waste reduction plus recycling of wastes that have been generated whether on or off the site of waste generation. That is, conventional waste recycling includes the handling and transport of waste to a facility where the waste, or part of it, is used beneficially as a material or sometimes as an energy source. However, EPA has interpreted the Hazardous and Solid Waste Amendments Act of 1984 (HSWA, also called the 1984 RCRA Amendments) definition of waste minimization to include waste reduction, plus all forms of recycling and treatment (such as incineration or other processes that destroy, detoxify, or reduce the volume of waste streams) that occur after wastes have been generated. In OTA's report such post-generation actions (recycling and treatment) are waste management. It is generally accepted that even good, improved, and necessary waste management offers less certain environmental and public health protection than waste reduction. Such waste management is particularly better than land disposal of untreated waste. Waste reduction, however, prevents pollution instead of controlling how *much* hazardous substance is released into the environment.

In this special report, waste reduction is used exactly as the OTA report uses the term. Waste minimization is used in this special report as the national policy statement in HSWA defines it (see box C). That is, the majority of waste generators believe that waste minimization covers actions that include waste reduction plus the recycling and treatment of hazardous wastes after they have been generated. These terms and their different definitions lead to different decisions by waste generators and different policy goals and implications, which are discussed at length later in this report.

The Nature and Primacy of Waste Reduction

This special report does not address recycling and waste treatment extensively. In an earlier report[4] OTA supported the shift in policy away from land disposal toward better waste management, later adopted by Congress in HSWA. However, in that earlier study OTA acknowledged that waste reduction was the option generators should pursue first, and only waste reduction was examined in OTA's recent report. Both the EPA and OTA reports support, by analysis and information, the unique benefits of voluntary waste reduction by industry. In fact, no one disputes waste reduction's wide-ranging advantages in principle. The issues are

[3] EPA primarily used the term *source reduction;* its definition of the term appears in table 1.

[4] U.S. Congress, Office of Technology Assessment, *Technologies and Management Strategies for Hazardous Waste Control, OTA-M-196* [Springfield, VA: National Technical Information Service, March 1983).

Box C.—Waste Reduction and National Policy

"The Congress hereby declares it to be national policy of the United States that, wherever feasible, the generation of hazardous waste is to be reduced or eliminated as expeditiously as possible. Waste nevertheless generated should be treated, stored, or disposed of so as to minimize the present and future threat to human health and the environment."

From the ***Resource Conservation and Recovery Act,*** as amended by the U.S. Congress in November 1984. This policy statement is supported by ***waste minimization*** provisions also added to the act.

all about practice: How much waste reduction is going on now? How much could go on, and when? Slow, token, or narrowly applied waste reduction can lead to a false sense of accomplishment; obstacles remain unaddressed and opportunities are missed.

Waste reduction is the best choice, when it is technically and economically feasible. As the environmental option of choice, waste reduction should be examined first. We need to create the climate in which the best mix of waste reduction and waste management will grow. The problem is that generators often assume rather than ascertain that waste reduction is infeasible and jump to recycling, the next solution to consider, or treatment, the third option in the hierarchy of choices. Demand for public accountability for decisions on waste reduction

Photo credit' Copyright 1985 Greenpeace/Lawrence (used with permission)

Example of public's concerns about toxic waste and reduction

is bound to increase because the issue is now on the agenda of many grassroots public interest groups. Waste reduction is an opportunity for public policy to combine the environmentalism of the 1960s with the economic sensibilities of the 1980s.

Waste reduction accomplishes one of the basic objectives of regulatory reform because it cuts industry's costs and reduces the amount of materials and situations that have to be regulated. Widespread waste reduction alleviates the negative environmental effects of technical inadequacies of regulations, loopholes in regulations, and poor compliance with regulations. It also alleviates private and public inefficiencies caused by a complicated web of different and sometimes inconsistent environmental statutes and programs. These problems are found in all environmental programs but are particularly acute for the RCRA program which every recent examination has found to be in trouble.[5] Problems in the regulatory system limit its ability to induce waste reduction as an alternative to increasing regulatory costs and liabilities. If the regulatory system is not meeting its stated environmental protection goals effectively, then it is unlikely to be effective in causing generators to comprehensively reduce waste generation. Decisionmaking often ignores the economic benefits of waste reduction, partly because they seem uncertain. A potential benefit is not necessarily an effective incentive for waste reduction. Generators stay in the regulatory system not only because they have to but also because they do not understand how to leave it, even if only partially, through waste reduction.

Waste reduction does not imply either outright or incremental elimination of the current environmental regulatory system or of hazardous waste and pollution. Waste reduction makes it easier to achieve environmental goals. Still, waste reduction has received little attention within the context of RCRA (or other environmental programs) by Congress, by EPA, or by critics. Except for a few pioneering companies, industry seems largely unaware of the immediate feasibility of waste reduction and the need to reexamine how it can be best used. Individual cases of successful waste reduction often cited today do not prove comprehensive waste reduction on a company or industry basis. And, the movement away from land disposal has not necessarily resulted in a broad or large shift to waste reduction. Despite some favorable conditions in the marketplace, waste reduction faces stiff competition from other responses to rising costs and regulations. **These other responses include building incinerators and not complying, or delayed compliance, with regulations.**

Waste reduction is more than just another environmental protection option. It offers American industry a positive return on investments that reduce environmental costs in the short term and large liabilities in the long term, but only if costs and liabilities are used correctly in decisionmaking. A few pioneering companies have shown waste reduction to be an effective way to modernize plants, to improve profitability and competitiveness, and to enhance the public perception that industry can act proactively to solve environmental problems. Dow Chemical, for example, in its new WRAP—Waste Reduction Always Pays—program sends a simple, unambiguous message to its employees: waste can be reduced, *you* can reduce waste, and you will be rewarded if you do. But waste reduction is a new public policy concept in the arena of industrial competitiveness.

Although it is not possible to accurately quantify current waste reduction or forecast future waste reduction, OTA, EPA, and several other major recent reports[6] conclude that substan-

[5] See U.S. Environmental Protection Agency, *Report to Congress—EPA Activities and Accomplishments Under the Resource Conservation and Recovery Act: Fiscal Years 1980 to 1985, EPA/530-SW-86-027* (Washington, DC: EPA, Office of Solid Waste and Emergency Response, July 1986); U.S. Congress, General Accounting Office, *Hazardous Waste: EPA Has Made Limited Progress in Determining the Wastes To Be Regulated,* GAO/RCED-87-27 (Gaithersburg, MD: U.S. General Accounting Office, December 1986); and James E. McCarthy and Mark E. Anthony Reisch, Library of Congress, Congressional Research Service, "Hazardous Waste Fact Book," 87-56 ENR, Jan. 30,1987.

[6] National Academy of Sciences, *Reducing Hazardous Waste Generation* (Washington, DC: National Academy Press, 1985); David Sarokin, et al., *Cutting Chemical Wastes (New* York: INFORM, 1985); The Environmental Defense Fund, *Approaches to Source Reduction* (Berkeley, CA: EDF, June 1986).

tial amounts of waste reduction are possible in the near term. However, with few exceptions, everybody in industry and government is so busy trying to manage wastes that are generated that they have little time and money to try to generate less. Although the environmental regulatory system contributes to this misplaced priority, it also results from insufficient focus on waste reduction by industry as an element of strategic planning, cost-cutting, and modernization. Government has not been as helpful as it could, Congress has not established the primacy of waste reduction, even though the HSWA national policy statement is consistent with it (see box C). There seems to be a feeling that waste reduction will happen on its own.

EPA's Present and Future Commitment

The OTA study found that the Federal Government spends very little money on waste reduction, less than 1 percent of its environmental budget. Almost all spending goes, instead, to controlling pollutants that are generated. And within the context of waste minimization, most of EPA's resources go to treatment and recycling as alternatives to land disposal, instead of supporting waste reduction. Industry follows EPA's lead,

The definition of waste minimization used by EPA (waste reduction and recycling) for the purposes of its report to Congress differs from previous EPA actions and from HSWA (waste reduction, recycling, and treatment). This dual definition can cause confusion, Waste minimization can include up to three distinctly different activities, and people in industry and government naturally give more attention to familiar treatment technologies and recycling than to waste reduction. A critical but often overlooked fact is that waste reduction must be implemented by production people and not by those with environmental responsibilities. But, not all production people feel pressured or required or are willing and able to tackle waste reduction, They are more familiar with treatment and recycling, which are marketed commercially as services or equipment. Production people focus on the product not on waste, and they find pollution control at the end **of the process more convenient than waste reduction in the middle.** Moreover, production people are reluctant—with good reason—to modify processes that are operating profitably. Only education and training and better information about the ways to reduce waste generation can overcome this inertia and fear.

Because waste minimization means many things, people in industry and government are not necessarily committed to waste reduction. EPA's future actions would be clearer if the EPA report had stated whether a *major* Federal waste reduction program is necessary because industry is not doing enough or if it had explicitly requested new statutory authority, funding, and organizational change in EPA to implement a waste reduction program.

Although EPA did not explicitly say that a major Federal waste reduction program was not necessary, the EPA report's recommendations are not consistent with a major program. Moreover, in the absence of a new congressional mandate, EPA is unlikely to undertake a major waste reduction program with the funding, institutional commitment, and organizational importance that would make it successful. To some extent this impression may be caused by the direction HSWA gave to EPA for the waste minimization study. Congress seemed concerned primarily with whether to use a traditional prescriptive regulatory approach for waste minimization (e.g., best production technology or percentage waste reduction requirements). HSWA said nothing explicitly about setting up a major nonregulatory Federal program to encourage and assist waste reduction or to identify how some government programs and industrial practices may hinder waste reduction. OTA, guided by specific committee requests for its study, examined these issues closely. EPA, however, guided by HSWA did not.

In its fiscal year 1988 budget request, EPA allocates only $398,000 for waste minimization. This amount is about 0.03 percent of EPA's total operating budget of $1.5 billion and is less than the approximate $550,000 that EPA spent in fiscal year 1986 on its waste minimization

report.[7] EPA first noted the environmental primacy of waste reduction (using that term) in 1976, but it has relied on the marketplace to implement the concept.

Although it has recognized the importance of State efforts, EPA has not concluded that a separate, comprehensive Federal waste reduction grants program is necessary to support and enhance those efforts. OTA examined State efforts and concluded that for them to be effective nationwide in reducing the generation of hazardous waste, there should be more of them, they should receive more financial support, and they should be focused on waste reduction rather than good waste management. State nonregulatory programs recognize important obstacles facing waste generators but would benefit from a Federal policy framework that provided national leadership focused on waste reduction.

To sum up, a major Federal program that addresses public and private obstacles to waste reduction could lead to more expeditious and comprehensive waste reduction. Many of the findings in EPA's report are consistent with results of other studies and could support a serious waste reduction effort.

Policy Issues

Congressional Action

Although waste minimization was added to RCRA in 1984, not much attention has been paid to waste reduction. From a public policy perspective, waste reduction is in the issue development stage at the Federal level, even though it has moved considerably beyond that at the State level—at least in a few States. No major Federal environmental statute or program has ever paid much attention to waste reduction.

Neither Congress nor EPA has integrated waste reduction with other tactics to achieve a balanced environmental protection strategy. There has been no congressional discussion of whether the Federal Government needs to design waste reduction policy differently from pollution control policy. In the recent reauthorizations of RCRA (HSWA, 1984) and Superfund (The Superfund Amendments and Reauthorization Act of 1986, or SARA), Congress directed EPA and the States to assess the Nation's future waste *management* capabilities. Congress did not, however, direct them to recognize or examine the potentially significant contribution of waste reduction.

The most significant Federal actions to date are the strong policy statement in HSWA on the merits of waste reduction (see box C) and several minor actions required of EPA and industry. Waste reduction is nearly entirely in the hands of the private sector, except in a few places where local or State governments have acted to persuade and assist industry to reduce waste generation.

The founder and director of the National Roundtable of State Waste Reduction Programs has addressed the need for Federal action:

> The states are clearly the leaders in this [waste reduction] effort and require high-level, well-funded and focused programs at the federal level. EPA has not met that challenge, . . . waste reduction] cannot be approached as a panacea for zero wastes and should not be entered into without a firm commitment to change the traditional pollution control mentality in recognition of reduction options. Government's role in this regard requires an innovative shift in environmental protection to include positive technical assistance and financial incentives in addition to regulations and enforcement. The need for this shift is particularly acute at the federal level.[8]

[7] 0TA estimated in its report that EPA spent a total of $1,8 million on waste minimization in fiscal year 1986. That amount included the cost of the EPA report, plus research funds spent by the Office of Research and Development or granted to outside research organizations and States, not all of which were officially labeled "waste minimization" funds. Of this total for waste minimization, OTA estimated that about $800,000 was spent by EPA on waste *reduction*.

[8] Roger N. Schecter, "Summary of State Waste Reduction Efforts," *Hazardous and Solid Waste Minimization and Recycling Report,* March 1987, p. 12.

Legislative Approach

Should Congress now decide to emphasize waste reduction, the important issues are whether to consider a legislative initiative and, if so, whether to do it within the context of RCRA or through a new statute,

New legislation may be appropriate because waste reduction is distinctly different from activities currently authorized and carried out under existing environmental statutes. Waste reduction is:

- an upstream or front-end pollution prevention strategy different technically from the end-of-pipe pollution control actions required by existing statutes;
- most effective when it applies to all hazardous wastes and pollutants, whether they are regulated or not, otherwise opportunities arise to shift waste among environmental media (air, water, and land) or out of the regulatory system;
- best addressed by policies aimed at assistance, persuasion, and institutional commitment since—as both OTA and EPA agree—it is not amenable to traditional regulatory or prescriptive approaches; and
- a bridge between environmental and industrial competitiveness issues and goals.

Timing of Waste Reduction v. Waste Treatment

The OTA report and—to a lesser extent—the EPA report draw attention to the importance for policy makers to unambiguously define waste reduction and its primacy over other options that manage and control hazardous wastes and pollutants, There is a choice to be made; whether to devote essentially all the government's environmental resources to fix inherent problems in the traditional pollution control system or to use some of those resources to pay significant attention to waste reduction. Congress, EPA, and industry worry a lot about a potential shortfall of waste management capacity because of the current shift away from land disposal practices under RCRA. As the EPA and OTA reports recognize, waste reduction could lower waste management needs in the near term, if it is given a high priority by government and industry. But what does high priority mean for waste reduction? Waste reduction has always had high *theoretical* priority, but its priority has never been made evident by industrywide actions. Industry by itself cannot overcome all the obstacles to waste reduction. Government's regulatory programs cause some of the critical ones. Other obstacles center around limited industrial resources and management's short-term perspectives and strategies.

A window of opportunity is opening for a historic shift in focus on environmental protection. Government programs dealing with clean air and water are maturing but have yet to deal effectively with such problems as air toxics, nonpoint sources of pollutants (e. g., pesticide use), and marine wastes.[9] The RCRA hazardous waste management program is in a particularly problematic state of flux. Congressional actions in 1984 directed EPA to move the hazardous waste management system away from land disposal. However, Congress did not give EPA specific instructions to move as forcefully toward waste reduction.

Industry is investing in waste *management* techniques (particularly incineration) which are familiar and which are marketed aggressively by vendors. Treatment equipment often requires large amounts of waste to operate efficiently, and capital investments in treatment facilities can take many years to amortize. Present public policy, therefore, is driving large investments in waste management facilities that can preclude, limit, or delay waste reduction.

This incremental strategy of first addressing waste management needs in order to satisfy regulatory land disposal deadlines appears reasonable at first. However, it could severely and permanently limit waste reduction and the more certain benefits it offers. Moreover, as important as regulatory deadlines that limit the use of land disposal are, they are less important *in the long term* than encouraging waste reduction. Enough flexibility could be introduced into

[9] See, for instance, U.S. Congress, Office of Technology Assessment, *Wastes in Marine Environments, OTA-O-334* (Washington, DC: U.S. Government Printing Office, April 1987).

the regulatory system to accommodate and encourage more waste reduction without compromising the environmental benefits of reducing the use of land disposal.

Siting and permitting difficulties, however, pose great barriers and long delays to new waste treatment facilities. Shortages in waste treatment capacity—even with increased investment in treatment facilities—might result. This situation could lead to pressures from within industry to restore greater use of land disposal or to engage in actions that might sacrifice environmental protection in order to build new waste management facilities. Serious Federal assistance for waste reduction could help to head off this potential problem.

Waste Reduction and Competitiveness

Waste reduction is more than an environmental issue; it is a way to improve industrial competitiveness. More environmental regulations and more effective enforcement raise environmental costs and increase liabilities (from Superfund, civil and criminal prosecutions, lack of adequate insurance, and limits on real estate transactions). From 1985 to 1986 there was a 20-percent increase in the number of pages of Federal environmental regulations to a total of 8,500 pages. The increase was the largest annual increase in history. These increased burdens, added to other conditions (e.g., higher wage rates), can contribute to permanent plant closings and relocation of plants to foreign countries. If it occurs early enough, waste reduction can help modernize industry and provide environmental protection while reducing these burdens and thus increase corporate net income.

Data from the Organization for Economic Cooperation and Development (OECD) on industrial environmental spending by the United States and its competitors seem to indicate a competitive disadvantage for the United States. Japanese manufacturing industries' capital spending in 1974 on pollution control was 100 percent more than that of American manufacturing industries. By 1977 these environmental investments were the same in Japan and the United States, but in 1978 and 1979 the United States was spending slightly more than the Japanese manufacturing industries.

In 1980, total industrial investments in pollution control as a percent of gross industrial domestic product were nearly four times greater for the United States than for Japan or France and nearly three times greater than for West Germany.

What data are available on relative reductions in environmental pollution indicate that our industrialized competitors have done as good or better than the United States.[10] In terms of economic efficiency, environmental protection in the United States appears more costly than in other industrialized nations. The reason seems to be not merely greater government regulation but less flexible environmental regulations in the United States that block effective and more economical and technologically advanced solutions. (Regulatory flexibility to encourage waste reduction is discussed later in this special report.) The environmental competitive disadvantage of the United States relative to newly industrializing nations, such as South Korea and Brazil, is even greater because such countries have fewer environmental requirements.

Another OECD report on the connection between technological innovation and environmental protection is quite significant .[11] OECD concluded that waste reduction is the only environmental protection tactic that *directly* benefits industry in the broader context of industrial efficiency and technological change but that so far none of the industrialized nations had adopted it in a big way. The report also highlights the results of a French study on waste reduction that revealed benefits not initially expected, such as, energy savings (in 51 percent of the 200 cases examined), savings in raw materials (47 percent), and improved working conditions (40 percent). At the present time, most industrial managers focus only on savings associated with waste management, pollution control, and regulatory compliance costs and lia-

[10] Organization for Economic Cooperation and Development, *OECD Environmental Data–Compendium 1985* (Paris: OECD, June 1985).

[11] Organization for Economic Cooperation and Development, *Environmental Policy and Technical Change* (Paris: OECD, 1985).

bilities. From a public policy perspective, the conclusion of the OECD report concerning the role of government is important, The report said:

> [waste reduction] may turn out to become increasingly an essential part of environmental protection. Public authorities have an important role to play in the management of this evolution for the best environmental protection.[12]

It is difficult for Congress to discuss the link between waste reduction and industrial competitiveness because the two are provinces of different committees and subcommittees. Moreover, environmental protection objectives have often been seen as counter to economic interests and a dragon society. However, a Federal program that helps industry to reduce its environmental costs and liabilities through waste reduction might avert some decline in the industrial sector. Marginal plants may be in particular need. They already have trouble dealing with production problems and may not have the technical or economic ability to evaluate and implement waste reduction options. As a means of improving industrial competitiveness and helping to renovate the American production system, waste reduction offers a low-cost legislative option that does not sacrifice environmental protection.

Policy Options

While the OTA report provides Congress with three different, detailed broad strategies for a Federal waste reduction program, the EPA report outlines two parallel efforts, one near term and one long term, for waste minimization.

The OTA policy analysis examined how to shift the emphasis in environmental protection toward waste reduction without adding expensive new programs and how to address the obstacles to waste reduction within government and—just as importantly-within industry. Public policy must address both sets of obstacles to be effective in achieving national environmental protection goals.

EPA examined the incentives for and disincentives to waste reduction from the current waste regulatory and management system. EPA said that regulatory conditions are strong driving forces for waste reduction. But it did not recognize their indirect character, their role as obstacles, and that they can easily lead industry to responses other than waste reduction, such as changing waste management technology, taking advantage of opportunities within the regulatory system to avoid or delay compliance, or, in extreme cases, closing plants.

EPA's view of past waste reduction seems to have affected its policy analysis. OTA believes that EPA has overestimated the amount of waste reduction that has occurred in the past and thus underestimates the need for a major Federal effort to assist industrial waste reduction. New data on RCRA waste that was not available for use in the EPA or OTA reports show a higher level of annual generation; from the 250 million metric tons reported by various studies in the early 1980s to 569 million metric tons. *a This does not necessarily mean that waste generation has increased, but by basing its findings on the lower figures, EPA could have underestimated the potential targets for waste reduction. Some State data given later support OTA's less optimistic interpretation of past waste reduction.

The EPA report concludes that large companies can and will reduce waste but that smaller firms will not because of lack of information, technical knowledge, and access to capital. If this were the case, large companies should be able to show evidence of comprehensive waste reduction. But, by and large they cannot. Firm size, variations in corporate structure and culture, and the variable nature of production—inputs, processes, and products—affect what companies can do to cut waste generation. The OTA report shows that various obstacles exist

[12]Ibid., p. 95

[13]U.S. Environmental Protection Agency, "1986 National Screening Survey of Hazardous Waste Treatment, Storage, Disposal, and Recycling Facilities: Summary of Results for TSDR Facilities Active in 1985," prepared for the Office of Policy, Planning, and Information (Office of Solid Waste) by the Center for Economics Research by Research Triangle Institute, Research Triangle Park, NC, December 1986.

for all sizes of companies and that Federal waste reduction efforts can be designed to assist all of American industry. Individual facilities of large companies often face the same problems as small businesses when it comes to carrying out waste reduction.

The EPA report says that aggressive action and institutional advocacy are necessary to promote further waste minimization but provides no insight as to how EPA will provide either. The agency's fiscal year 1988 budget request of $398,000 for waste minimization and its longstanding low priority for waste reduction suggest that it is not prepared to be that advocate without congressional direction.

In the OTA report three broad policy approaches, each with many specific congressional actions, are described. If the Federal public policy goal is rapid and comprehensive hazardous waste reduction, then Policy Option III—to establish a new, highly visible waste reduction program–would be the most likely to attain that goal without harm to American industry. That approach would assist industry with voluntary waste reduction and would develop a planning and reporting system to track industrial progress. It would acknowledge the primacy of waste reduction over pollution control and would attempt to raise the use of waste reduction to a parity with pollution control. While this kind of a Federal program would firmly establish national policy, provide leadership, and give institutional priority and commitment to waste reduction, the States would be called on to do most of the work. In order of importance, major activities supported by Federal grants would be in-plant technical assistance, information and technology transfer, education and training, and generic R&D. [14]

As discussed later, a new Federal program might be funded by reallocating a small percent of EPA's operating budget specifically for waste reduction. This approach is consistent with waste reduction's priority which justifies shifting resources from less effective strategies for environmental protection. Two percent of EPA's operating budget would equal $3o million in fiscal year 1988—easily the cost of one Superfund cleanup. This level is low enough not to threaten or diminish the effectiveness of ongoing pollution control regulatory programs. However, this amount, which is almost 100 times that requested by EPA for waste minimization, would allow the creation of an effective grants program to be implemented at the State level. From a cost-benefit perspective encouraging and assisting waste reduction can pay in improved environmental protection, increased tax revenues, reduced or slower growth in governmental spending on regulatory programs, and avoided future Superfund cleanup costs. Information dissemination on alternative technologies for waste reduction and direct technical assistance to industries will increase regulatory compliance, reduce waste generation, and increase industrial efficiency.

Another point to consider is that, with no major Federal commitment to waste reduction, EPA could come under pressure to take shortcuts in siting, permitting, and delisting RCRA hazardous wastes to match waste generation with available waste management capacity. If this happened, public confidence in government environmental programs—already shaken—could worsen.

Finally, although congressional action on waste reduction would be a major change in environmental policy, it is also a logical next step in the development of a comprehensive environmental protection-waste management system. Governor James J. Blanchard of Michigan recently described the historical nexus of waste reduction:

> It is time for a revolution in our thinking about protecting the environment from pollution . , , The successful state and federal environmental legislation of the 1960s and 1970s attacked conventional pollutants by regulating their release into the environment. This forced the development of new pollution control technologies, but still permitted some discharge of materials . . . To meet the emerging challenge of toxic pollutants, we must realize

[14] The OTA study concluded that it was not feasible to give money to companies for waste reduction, as waste reduction is linked to so many industrial activities with broader objectives than waste reduction that government assistance could skyrocket.

> that it is far more effective and cheaper to prevent them from ever entering the environment than it is to clean up our mistakes . . . Our business economy, too, will benefit from the reduced material costs, slashed disposal fees, and increased efficiency that result from innovative waste reduction technologies . . . I will charge this [Waste Reduction Program] with designing programs for providing technical and financial assistance and information to businesses to reduce toxic pollutants, focusing initially on hazardous waste reduction , . . We will press for federal action setting national goals for pollution reduction and prompting this country to advocate pollution reduction as an international priority .15

[15]Governor James J. Blanc hard, *The Michigan Strategy: Report to the People of Michigan and the Legislature, 1987,* pp. 39-43.