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Environmental Protection: Can We Afford It?

Terry A. Yonkers

Abstract

In the past two decades, annual U.S. expenditures for pollution control have increased dramatically. The trend is for even greater private and governmental expenditures as emphasis shifts from domestic to global environmental protection concerns. Intensive Congressional oversight coupled with elaborate governmental regulations and policies are making it difficult for businesses (and governmental entities) to meet strict environmental standards--compliance cost and environmental liability are becoming pivotal to business decisions. Our economic stability is weakening as businesses close down, cut back, or relocate. This paper looks at how much the U.S. is spending on environmental protection and considers the benefits derived from the dollars invested, discusses some of the impacts resulting from strict environmental regulation, and offers some options to alleviate the negative consequences of current U.S. environmental policies.

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Environmental Protection: Can We Afford It?

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Environmental Protection: Can We Afford It?

INTRODUCTION

Can the U.S. afford environmental protection? The answer to this question is no--at least as long as we continue to pursue policies which promote environmental protection without prudent regard for the true costs or impacts to our industrial base and economic stability. In the past two decades, annual U.S. environmental protection expenditures have escalated from $30 billion to over $130 billion. Pollution control costs are projected to increase even more in the future consuming a greater proportion of our Gross National Product.

Until a few years ago, it was unthinkable to challenge environmental protection policies. For over twenty years, government and business leaders alike, successfully guided the nation to phenomenal improvements in our environment and our quality of life. During this same period, America remained the pre-eminent, global industrial leader--there were few who could challenge our technological savvy, productivity, or market position. Aside from a few ups and downs, our economy was strong. In general, there appeared to be a closer relationship between government and industry; our environmental policies seemed to be more in line with our industrial policies and goals.

Today, this situation has changed dramatically. U.S. economic growth has slowed substantially--our productivity now stands at 0.9% (down from 3% during the 1970's).[1] We are just now beginning to recover from a long recession exemplified by high unemployment, low capital investment, reduced consumer spending, but higher government spending; in 1991 the U.S. spent $268 billion more than it took in.[2] Even now there is considerable debate as to whether President Clinton's economic plan, with its emphasis on deficit reduction and unprecedented tax increases, will send the economy into another tailspin.

In international markets, the U.S. is losing ground to Japan, Germany, and the Asian Tigers. Closer to home, Mexico, with its abundant work force, low wages, and slack environmental enforcement is an appealing alternative for industrial investment, particularly with the incentives provided for under the North American Free Trade Agreement (NAFTA). Industries (e.g., automotive, electronics, aerospace, steel and iron, etc.) traditionally dominated by U.S. firms, are now being seriously challenged by foreign competitors.[3] To enhance their competitive

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[1] United States. Council of Economic Advisors. Economic Report of the President. Washington GPO, Feb. 1992, p. 91.

[2] United States. Department of Treasury, Internal Revenue Service. 1992 Income Tax Instructions-Form 1040. GPO, Washington, 1992.

[3] United States. Report of the President's Commission on Industrial Competitiveness. Global Competition: The New Reality. Washington, GPO. January 1985.

position, American companies are forming multi-national conglomerates and relocating to more favorable business environments outside the United States.

Despite these alarming trends, U.S. policies continue to discourage industrial development--environmental protection policies more than others. U.S. pollution control laws are tougher and more restrictive now than anytime in the past. Not only do these laws (and attending regulations) add significantly to operational expenses, but they impose onerous long-term liabilities which impact profitability and may even drive companies out of business. In some parts of our nation, environmental standards have become so strict that they are limiting industrial expansion. The outlook is for increased oversight, tighter regulation, and stricter standards.

These trends pose at least three important policy questions:

- How should U.S. environmental policies be modified to encourage industrial development while optimizing protection of human health and the environment? (For consideration are ways to eliminate barriers to development, solving the long-term liability issue, settling on firm environmental standards, simplifying compliance processes, and making all "stake-holders" accountable for their decisions.)

- How should we optimize environmental investments to enhance profitability and competitiveness in global markets? (For consideration are more prudent policies focusing on environmental costs versus benefits--the objective being to reduce the price of American products to make us more competitive.)

- How can environmental policies be changed to more closely complement our economic/industrial goals? (Industry is the foundation of a stable U.S. economy and integral to our

national security. Our environmental policies must balance the public good in terms of environmental quality with jobs and economic stability).

This paper strives to answer these questions. We begin by reviewing how much the U.S. spends for pollution control as compared to our foreign competitors and other domestic programs. Second, we consider why environmental costs are increasing and discuss what the taxpayers are getting for their money. Next, we look at U.S. environmental protection trends and analyze their implications with regard to other national policies and goals, especially economic. Finally, we return to the topical question of whether we can afford environmental protection and look at some alternatives which may help alleviate the negative consequences of current environmental protection policies.

HOW MUCH DOES THE U.S. SPEND ON POLLUTION CONTROL?

From available information, it is apparent that the United States spends more on environmental protection and pollution control than other nations. Figure 1 shows U.S. expenditures compared with those of other industrialized nations. As seen, in 1985, we spent nearly 1.7% of our Gross Domestic Product (GDP) for pollution control. West Germany spent about 1.5% of its GDP on the environment with Finland, the Netherlands, and the United Kingdom spending about 1.3%. While these data are somewhat

outdated and limited (i.e., collected in 1985 and then, for only several European nations), it is reasonable to assume that the U.S. out-spends other countries as discussed below.

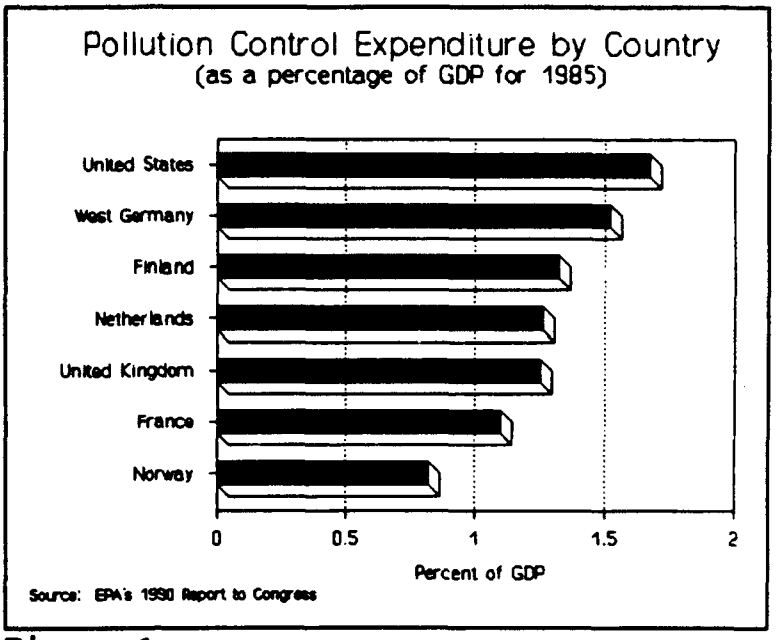

Figure 1.

For one thing, we spend more in real dollars than those countries shown in Figure I. For another, the U.S. GDP is about the same as Germany, Great Britain, Finland, Norway, France, and the Netherlands combined.

In its 1990 Report to Congress, the U.S. Environmental Protection Agency (EPA) looked at pollution control costs since 1972, as well as projected expenditures into the year 2000. EPA considered two compliance scenarios: one termed "costs of existing regulations" (which includes costs for complying with regulations in place before 1987) and the second termed "costs of full implementation" (which includes costs arising from full compliance with existing and future regulations.)[4] The data presented in the following charts and tables assume full

[4] United States. Environmental Protection Agency. Environmental Investments: The Cost of a Clean Environment--A Summary. EPA-230-12-90-084, December 1990.

implementation. Furthermore, to provide a more meaningful comparison, most cost data are presented in 1990 dollars.

Figure 2 shows the aggregate U.S. pollution control expenditures since 1972 and cost projections through the year 2000 in billions of 1990 dollars. Included are expenditures by federal, state, and local governments and private businesses. As seen, there has been a dramatic increase in the cost of pollution control from 1972 ($30 billion) to 1992 ($132 billion)--an increase of nearly 440% in twenty years. By 2000, pollution control costs are estimated to reach $185 billion (a 617% increase in twenty-eight years). This amounts to an annual cost of $500 for every man, woman, and child in the U.S. (assuming a present U.S. population of 256 million).

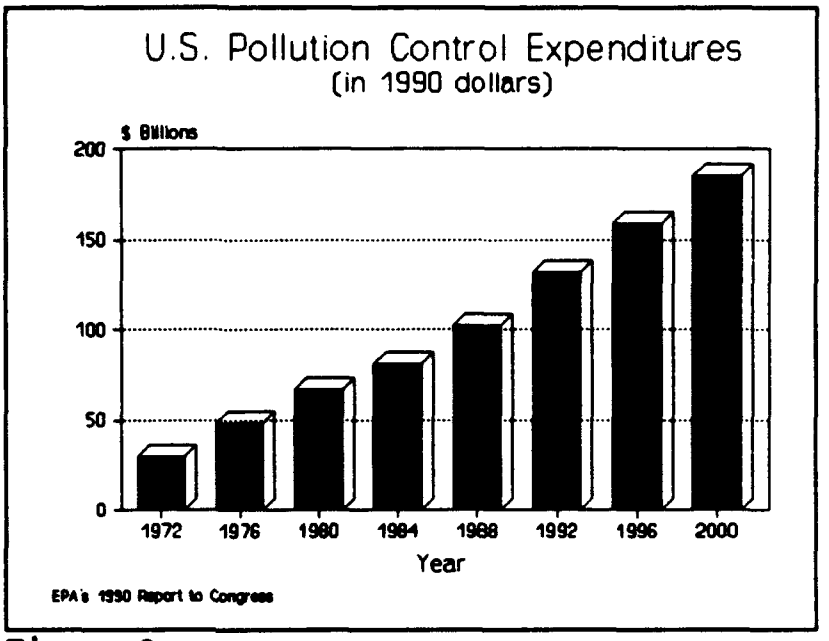

Figure 2.

The magnitude of our environmental protection expenditures is even more evident when we look at cumulative expenditures from 1972 to 1992 (Figure 3). Since 1972, the U.S. has spent $1.6

trillion on pollution control. By the year 2000, we will spend $3 trillion (or nearly two-thirds of our current national debt.)

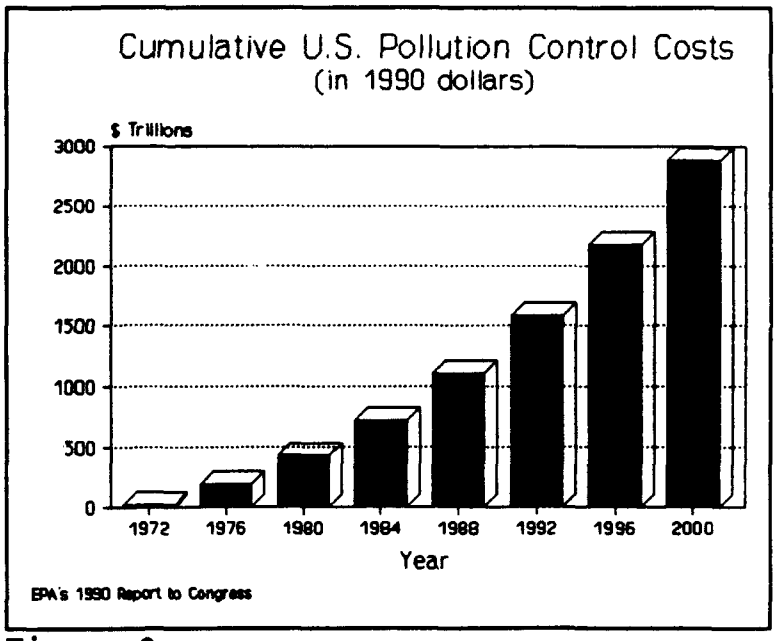

Figure 3.

Even more illustrative is the comparison between total annual U.S. expenditures for environmental pollution control and our Gross National Product (GNP). Figure 4 shows this comparison. In 1972, for example, we spent less than 1% of GNP for environmental protection. By 1992, this had grown to 2.3%. If this trend continues pollution control costs will reach 3% of GNP by 2000. At the end of the century, we may be spending as much for environmental protection as we do for defense (i.e., our 1993 Defense Budget is $225 billion and will

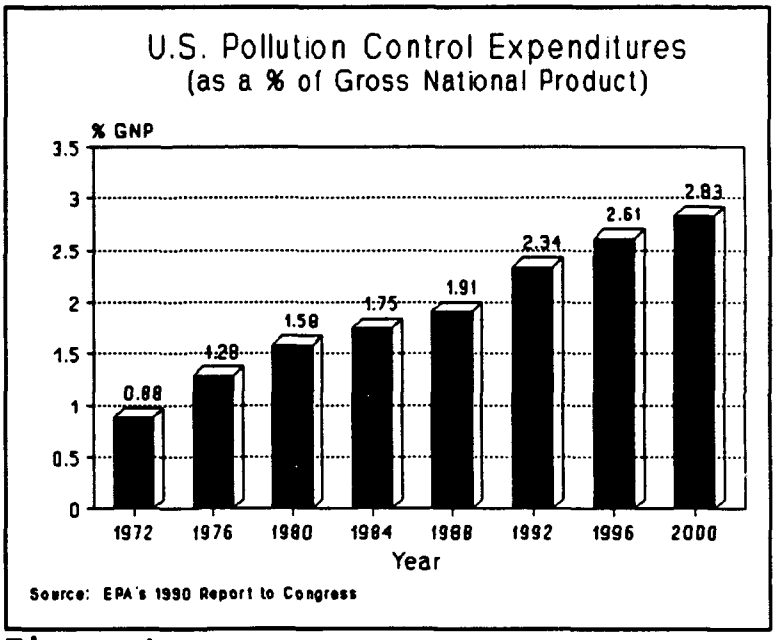

Figure 4.

likely decline in 1994.)

U.S. Pollution Control Costs by Funding Source

So who's paying for all this environmental pollution control? Figure 5 shows expenditures during three typical years (1972, 1980, and 1987). Table 1 presents the actual cost data by funding source which includes:

- EPA
- State agencies
- Local governments
- Non-EPA agencies
- Private businesses

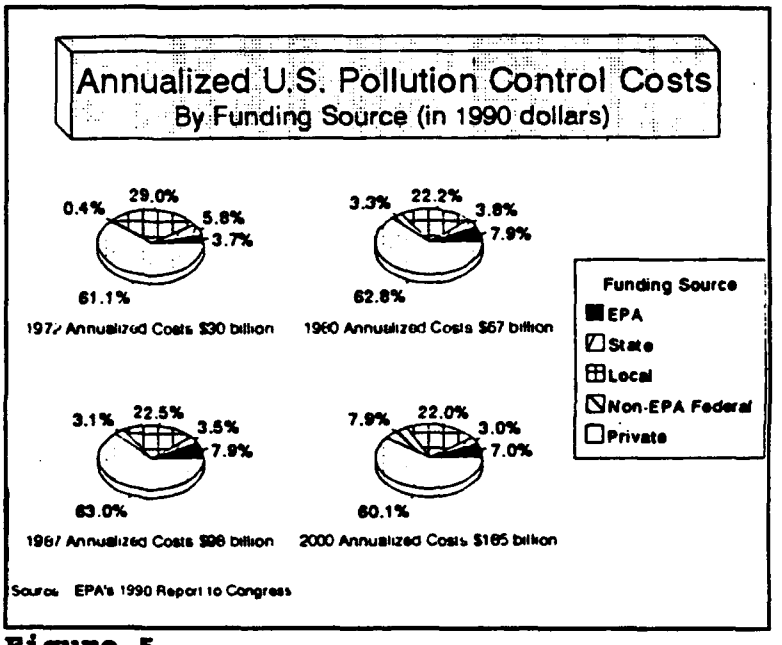

Figure 5.

It is apparent that businesses are paying the lion's share of environmental costs with over 60% of dollars expended in any year. In 1987, this amounted to almost $62 billion, in 1992 to $82 billion. By the year 2000, expenditures by companies are expected to exceed $111 billion.

TABLE 1: Annualized U.S. pollution control costs by funding source (in billions of 1990 dollars).

Source	1972	1980	1987	2000
EPA	1.1	5.3	7.7	13.0
Local	1.7	2.6	3.4	5.6
States	8.7	14.9	22.1	40.7
Non-EPA	0.1	2.2	3.0	14.6
Private	18.9	42.1	61.7	111.2
TOTAL	**30.5**	**67.1**	**97.9**	**185.1**

(Source: EPA's 1990 Annual Report to Congress)

Commitments by state governments are second accounting for more than 22% of total annual expenditures ($22 billion in 1987 and $29 billion in 1992, respectively.) As discussed later, state and local government revenues are severely inadequate to satisfy current public service demands. Without major adjustments or additional federal funding, municipalities (in particular) may not be able to fully comply with environmental standards.

A more dramatic increase is expected, however, in expenditures by federal agencies. By 2000, agencies other than EPA will spend nearly 8% of total outlays (i.e., $14.6 billion). The majority of the funds will be for the Department of Defense's (DOD) and Department of Energy's (DOE) efforts to cleanup inactive hazardcus waste sites. DOD estimates, for example, that cleanup of its 17,660 sites (identified to date) will cost $25 billion

starting in 1991.[5] Estimates for DOE's 4,000 sites range from $150 to $200 billion.[6] These figures are constantly being revised, however, as discussed below.

Expenditures by Environmental Media

So where are most of our pollution control dollars spent? EPA categorizes expenditures into five main (and several subordinate) media:

- Air & radiation (including mobile and stationary sources).
- Water (including point and non-point sources of pollution as well as drinking water).
- Land (including solid waste, hazardous waste, underground storage tanks, and inactive hazardous waste site cleanup).
- Chemicals (e.g., pesticides and toxic substances).
- Multi-media (e.g., community right to know, EPA research, overhead and management).

Figure 6 shows the increase in expenditures for these five media since 1972. Most expenditures have historically been for water pollution abatement, followed by air, land, and "other" media. From 1972 to 1992, costs for water pollution control increased

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[5] Baca, Thomas E. Deputy Assistant Secretary of Defense for Environment. "Testimony before the Senate Armed Services Committee," May 12, 1992.

[6] United States. Department of Energy. Posture Statement. DOE/CR-0011, January 1993, p. 47.

from $11 billion to nearly $54 billion (i.e., an average increase of about 40% per year). Until 1987, most costs were for control of point sources (90%) including pre-treatment of industrial effluent (costs which industry bore) or construction of municipal waste water treatment plants (costs typically paid by states or municipalities). A greater proportion of future costs will be for non-point sources such as runoff from urban areas and farmlands.[7] Water quality will continue to consume the majority of pollution control funds.

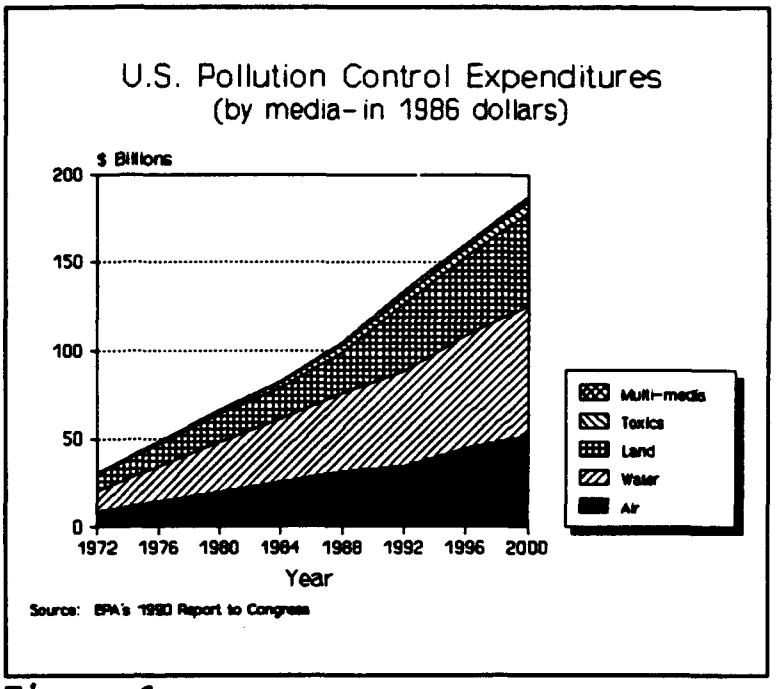

Figure 6.

Air pollution control expenditures show similar trends--increasing almost 400% from 1972 to 1992 (i.e., from $9.1 billion to $34.7 billion). From 1972 to 1987 the majority of costs (i.e. 67% and 74%, respectively) were for control of stationary pollution sources (e.g., emissions from coal and oil fired electrical generating plants, petroleum refineries, iron and

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[7] Op cit. EPA's 1990 Report to Congress, p. 5-4.

steel plants, etc.) which were born primarily by industries. In the future, most expenditures will be for point source control (about 67%), but a greater proportion (32% in 2000 as compared to 27% in 1987) will go for mobile source controls[8] (e.g., emission reductions from cars, trucks, busses, planes, etc.).

Furthermore, EPA believes future air pollution costs could be significantly higher than those presented in its 1990 Report to Congress due to the more stringent requirements imposed in the Senate and House bills for tailpipe emissions, reformulated gasoline, and oxygenated fuels.[9] One source estimates that the 1990 Clean Air Act amendments could cost an additional $29 to $36 billion above current, projected expenditures.[10]

The point to this discussion is that a major proportion of future costs will fall to industry (e.g., automotive, pulp and paper, iron and steel, oil and gas, etc.). The American Iron and Steel Institute, for example, expects their member companies to be hit particularly hard by the 1990 Clean Air Act amendments over the next 10 years, but can not estimate the impact until EPA and the

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[8] Op cit. EPA's 1990 Report to Congress, p. 3-2.

[9] Ibid.

[10] Portney, Paul R. "Economics and the Clean Air Act," Journal of Economic Perspectives, Vol. 4, No. 4, Fall 1990.

states establish risk-based standards.[11]

Land pollution control expenditures have also increased significantly--from $9.7 billion in 1972, to $38 billion in 1992. Nearly all costs until 1987 were for solid waste management, specifically domestic refuse collection and disposal (i.e., 100% in 1972, and 87% in 1987). By 2000, the proportion of solid waste management expenditures (domestic refuse) is expected to drop (i.e., to 48%) as expenditures for hazardous waste management, underground storage tanks (USTs), and inactive hazardous waste site cleanup increase. Hazardous wastes, USTs, and Superfund-type cleanups are expected to account for 43% of land pollution control costs by 1995, and by more than 50% by 2000.[12]

Table 2. Cost of Pollution Control by Media (in billions of 1990 dollars.)

Media	1972	1976	1980	1984	1988	1992	1996	2000
Air	9.1	14.6	20.2	25.6	31.7	34.7	44.7	51.6
Water	11.4	20.0	28.4	36.0	44.3	53.9	64.2	73.7
Land	9.7	12.0	15.6	17.3	23.4	38.0	44.1	53.0
Toxic	0.1	0.5	1.0	0.8	1.0	2.4	3.0	3.3
Multi	0.1	0.8	1.0	0.8	1.4	3.3	2.5	2.8
TOTAL	**30.4**	**47.9**	**66.0**	**80.5**	**101.8**	**132.3**	**158.5**	**184.4**

(Source: EPA's 1990 Report to Congress)

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[11] American Iron and Steel Institute, Public Policies of the American Iron and Steel Institute, 1101 12th Street, N.W., Washington D.C., 1992 edition, pp. 22-23.

[12] Op cit. EPA's 1990 Report to Congress, p. 3-4.

Ancillary Costs of Environmental Protection

Aside from the direct costs for pollution control which EPA does report, there are some "indirect" costs which it omits. One example is the cost paid by insurance companies to settle personal liability and property damage claims as well as "transaction costs" associated with the cleanup of inactive hazardous waste sites. Transaction costs include two types:

- Costs of coverage to settle disputes.
- Costs to defend policy holders.

A study conducted by RAND concluded that these costs may be substantial.[13] RAND estimated, for example, that the insurance industry spent about $470 million in 1989 on hazardous waste claims of which $410 million entailed transaction costs.

The trend is for insurance outlays and transaction costs to increase. For example, between 1984 and 1989, annual insurer spending rose from an average $9 million to $17 million. From 1986 to 1989, claims against insurers rose from 650 to 2,240 per company--the average number of policy holders filing claims increased from 200 to 1,000.

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[13] Acton, Jan Paul and Lloyd S. Dixon. "Superfund and Transaction Costs--The Experiences of Insurers and Very Large Industrial Firms". RAND. The Institute for Civil Justice, 1992, p. 60.

While the focus of the RAND study was on National Priorities List (NPL) sites (those sites EPA believes represent the greatest threat to human health and the environment), similar trends were seen at non-NPL sites. The possibility that this may only be the tip of the iceberg is highlighted by a 1987 General Accounting Office (GAO) report which estimated that there are as many as 425,400 hazardous waste sites (NPL and non-NPL) in the nation.[14]

CAUSES FOR INCREASED ENVIRONMENTAL PROTECTION COSTS

There are at least four causes contributing to the increasing cost of environmental protection:

- Public demand for greater health/environmental protection
- Growing complexity of regulatory processes
- Jurisdictional redundancy and lack of accountability
- Progressively stricter pollution standards

Public Demand for Environmental Protection

As the public becomes more aware of past environmental practices

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[14] United States. General Account Office. SUPERFUND: Extent of Nation's Potential Hazardous Waste Problem Still Unknown. December 1987, p. 13.

and the relationship between pollution and public health they are demanding greater protection. A survey conducted for EPA (by Roper) in 1991, showed that 85% of Americans thought environmental protection was the #1 problem facing the nation; 67% considered cleanup of hazardous waste sites to be of primary importance. Further, nearly all respondents believed that polluters should be made to pay regardless of the cost.[15]

As public pressures mount, state and federal legislatures have become more active in the environmental arena. In 1992, over 300 pieces of legislation dealing with the environment were introduced at the national level alone.[16] Each year, Congress conducts extensive oversight hearings covering every aspect of environmental protection and compliance. Private and governmental entities alike find it difficult to keep track (let alone comply) with the myriad of new environmental protection laws.

Growing Process Complexity

Prompted by continued public pressure as well as efforts to

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[15] Kelly, Thomas E. Director, Office of Regulatory Management, U.S. EPA. "The Environment". Lecture presented at the National Defense University, February 8, 1993.

[16] McCowan, William, Col, USA. "Environment and National Defense". Presentation--Military Law Course, Industrial College of the Armed Forces, Ft. McNair, Washington, D.C., 16 Mar 93.

"improve" environmental protection, regulations and processes have become tremendously complex and lethargic. The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) is one example. When CERCLA was enacted in 1980, it contemplated a relatively simple and straightforward process to identify hazardous waste sites and clean them up. The process consisted of four major steps:

- site identification
- site characterization
- analysis of alternative actions
- implementation of the preferred action

From start to finish it took 2-3 years to cleanup a site.

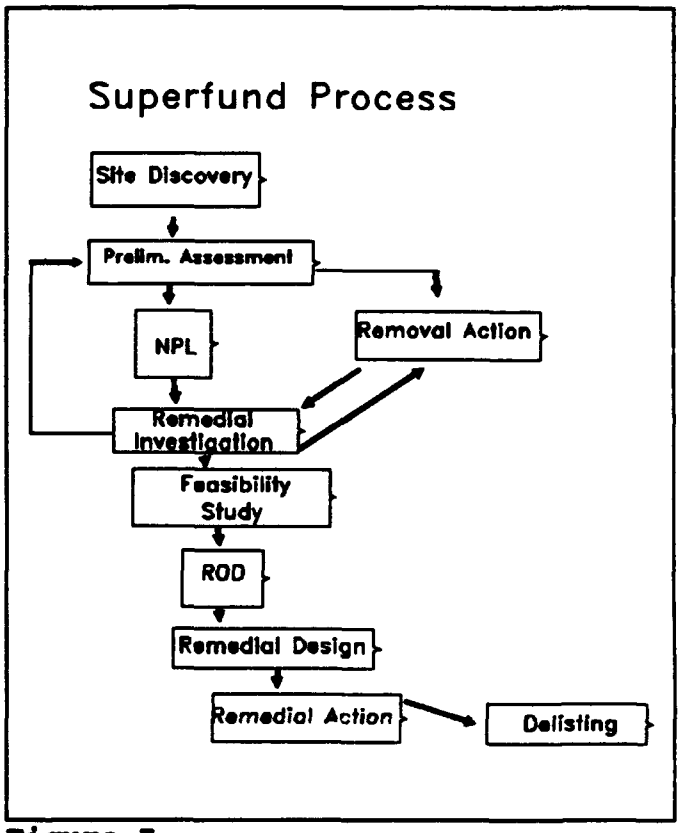

Figure 7.

Since 1980, the process has become more "sophisticated". As seen in Figure 7, it now consists of ten main steps with numerous sub-steps and phases. At each sub-step as many as three reports (i.e., preliminary, draft, and draft final) are prepared and reviewed by regulators. The public is also invited to comment on the final draft reports or during public meetings. As a consequence, the process now takes 8-10 years before the cleanup can even begin.

Regulatory Redundancy

Instead of a single regulatory authority having jurisdiction over environmental compliance the EPA, states, counties, municipalities, and the public may all be involved. Take, for example, the cleanup of hazardous waste sites. EPA, the states, and counties often have different regulations and standards for cleanup. Though the parties (i.e., usually companies or governmental agencies) responsible for the hazardous waste site theoretically decide on the solution, EPA (or states) ultimately decide if the remedy is protective of human health and the environment; each using its own standards and procedures. Private citizens can make their objections known to EPA or state regulators and seek solutions through administrative processes. Failing this, they may bring suit against the responsible parties.

Due to the diverse interests, diluted decision authority, and risk aversion by the regulators, reaching consensus is very time consuming and difficult. Because, regulators are typically unwilling to agree on a course of action until sites are "fully" characterized (i.e., until the source of the contamination and its concentration profile, extent, and rate/direction of movement are precisely known), they often demand additional investigations and analyses creating a "do loop" within the remedial investigation step. Each added phase requires separate reports followed

by review, comment, and re-evaluation.

Stricter Cleanup Standards

Not too many years ago, analytical instruments could detect contaminant concentrations in parts per million. Today, they can detect to parts per trillion. Because of this capability, coupled with public pressure and their unwillingness to make risk based decisions, regulatory agencies are ratcheting down cleanup standards--often without regard for costs or measurable benefits in terms of improved protection of public health or the environment. California's recent requirement to clean ground water to "background" conditions (i.e., the condition of the ground water before any man-induced changes) is one of a number of examples.

The real difficulty, however, is that standards are not static, but change. Thus, companies (and government entities) may invest millions of dollars in pollution controls only to find the remedial equipment installed no longer meets new standards.

SO, WHAT IS THE PUBLIC GETTING FOR ITS MONEY?

This is a hard question to answer primarily because health and environmental benefits are difficult to quantify. None-the-less,

before the public can decide if the billions of dollars being spent on pollution control are worth it, they need some measure of effectiveness--some tangible result such as, fewer cases of cancer, fewer workdays lost to sickness, extended lifetimes, or reduced loss of food crops to compare costs to benefits.

Under certain statutes (such as CERCLA), EPA in conjunction with the Agency for Toxic Substances and Disease Registry (ATSDR) are mandated to investigate the effects of toxic substances on human health and the environment prior to establishing control standards. Unfortunately, such studies are often limited by time, cost, research techniques, and by the complexity or human and biological systems which make it difficult to attribute specific health or environmental problems to particular contaminants. As a compromise, EPA scientists analyze the effects of toxic substances in the laboratory (on rats and mice, for example) then extrapolate the results to human populations or ecosystems.

For health studies, "risk-of-illness" extrapolations are only rough estimates of the possible effects. To "hedge" its bets, EPA adjusts risk-of-illness calculations so as not to under-estimate the health effects from exposure to toxic substances, thus, adding an extra level of protection of human health.[17]

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[17] United States. Environmental Protection Agency. Understanding Environmental Health Risks and Reducing Exposure. Washington: EPA #230-09-90-082. September 1990, p. 4.

While EPA's objectives are admirable, there are several drawbacks. First, there is the tendency to be overly conservative. If cancer in rats is caused by high chemical concentrations, then setting standards at very low concentrations will ensure adequate protection of human health.

An analysis of the research done on the health effects of exposure to trichloroethylene (TCE), an industrial solvent, by the MITRE Corporation shows the folly of such a conservative approach.[18] MITRE's analysis found that while TCE caused cancer in mice and rats at concentrations of 1,000 mg/kg/day over a two year period, such data could not be used to predict harmful effects to humans exposed to much lower doses. MITRE concluded that a ten-fold increase in the existing TCE drinking water standard (i.e., from 5 to 50 parts per billion) would not meaningfully increase risks to human populations. Instead of relaxing TCE standards, however, states like California are adopting regulations requiring removal of TCE to "background" levels.

Secondly, Americans end up spending much more for pollution control than is otherwise necessary or justifiable. Government costs go up as do those capital investments in new equipment and operational expenses which businesses must make. As discussed later, the effect is to increases the price of goods and decrease

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[18] Mavis, Richard D., PhD. Personal interview. 16 Oct. 1992.

U.S. competitive advantage in international markets especially as compared to nations where pollution controls are less stringent.

One benefit being realized are measurable decreases of certain pollutants. As noted earlier, we have made considerable progress in environment cleanup, particularly air and water media. Industrial discharges of key water pollutants declined over 90% from mid-1970 to mid-1980.[19] Air emissions were also significantly reduced. As Figure 8 shows, lead emissions have dropped 97%, total particulates 59%, sulfur oxides 25%, carbon monoxide 41%, and volatile organic compounds (VOCs) 31% since 1970.[20]

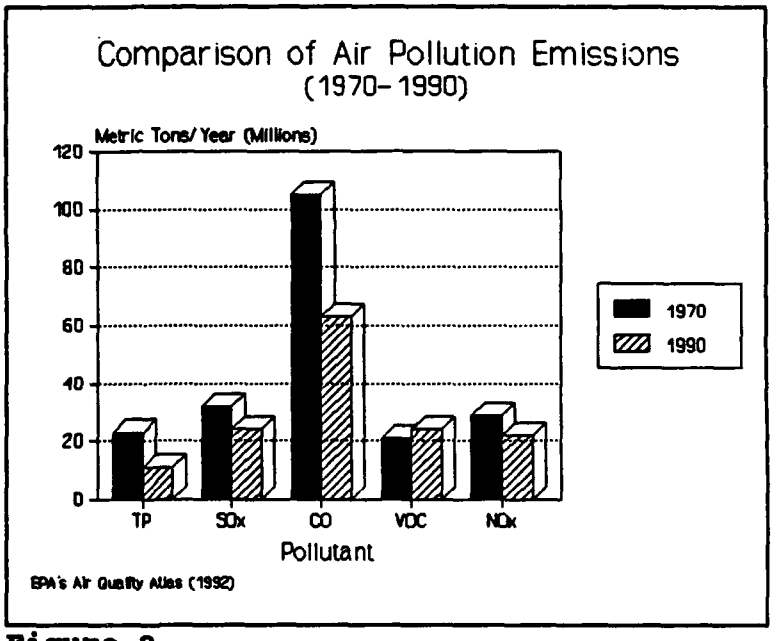

Figure 8.

In actuality, total reductions have been ever greater considering that population and pollution sources have also increased over the last 20 years.[21] EPA has attempted to estimate these actual reductions by comparing measured emissions

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[19] Op Cit. GAO Report, June 1991, p. 13.

[20] Op cit. EPA's 1990 Report to Congress, p. 5-3.

[21] Op cit. EPA Air Quality Atlas, pp. 6-7.

in 1988 with what they would have been absent pollution controls (see Figure 9).

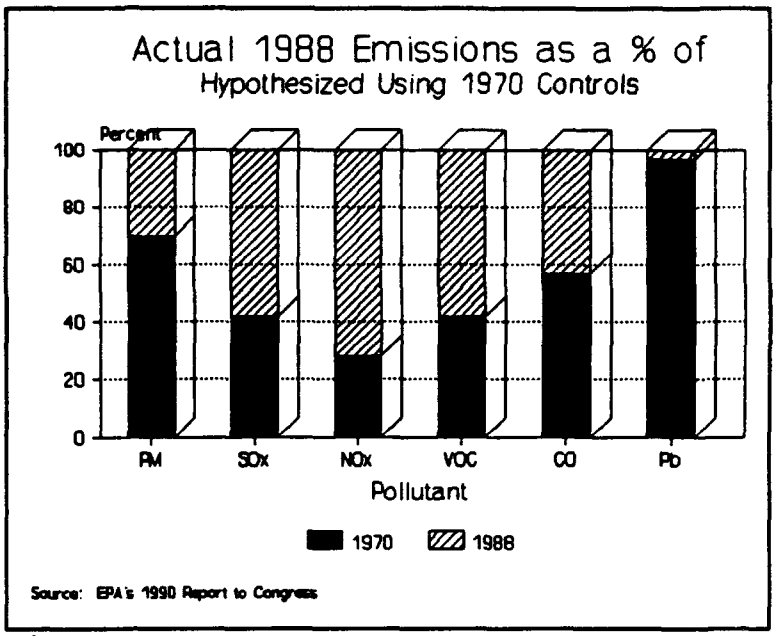

Figure 9.

In contrast, few economists have attempted to quantify the social or health costs due to degradation of environmental quality. In 1968, Knesse did estimate the total annual cost from diseases associated with air pollution (such as respiratory cancer, chronic bronchitis, pneumonia, emphysema, asthma, and the common cold) to be about $2 billion.[22] In a 1991 report, the General Accounting Office (GAO) noted that annual benefits from reduced air pollutants resulting from the 1990 Clean Air Act could range from $6 billion to $25 billion (in 1989 dollars). At the same time, annual costs could range from $29 billion to $36 billion. Comparing costs to benefits, it is apparent that what the U.S. may eventually spend for improvements in air quality outweighs the benefits by at least $11 billion (and as much as $30 billion) annually.

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[22] Kneese, Allen V. Economics and the quality of the environment--some empirical experiences. Washington D.C., Resources for the Future, April 1968, p. 173.

The same GAO report estimated that benefits from improved water quality due to the Clean Water Act ranged from $3.8 billion to $18.4 billion (in 1978 dollars).[23] A crude cost/benefit analysis can be made by comparing the $18.4 billion benefit to the dollars spent for water quality in Table 2. Using a 7% annual discount rate, the break even point was reached in 1986, when water quality expenditures were $40 billion. From 1986 through 1992, costs for water quality exceeded benefits by more than $50 billion. Taking the lower figure of $3.8 billion, the difference over the same six year period would be almost $90 billion. Again, it is clear that the costs outweigh the benefits.

Comparison of Environmental with other Government Expenditures

Another way to look at what taxpayers are getting for their money is to consider the opportunity costs of environmental protection by comparing how much government spends on other major programs. In 1991, federal income was $1,054 billion while federal expenditures were $1,323 billion. Figure 10 shows the percentage of 1991 federal outlays by major program area.

We get an even better feel for opportunity costs by separating

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[23] United States. General Accounting Office. Environmental Protection--Meeting the Public Expectations with Limited Resources, GAO/RCED-91-97, June 1991, p. 13.

these major categories into more specific program areas. Table 3 shows these program areas in greater detail. Defense, social security, and interest on the debt consumed nearly 70% of the budget in 1991. Of the remaining program areas, more was spent on environmental protection than on science and technology, law enforcement, community development or energy programs. Environmental expenditures were nearly one half of what we spent for education, social services, and employment and more than half of what we spent for transportation.

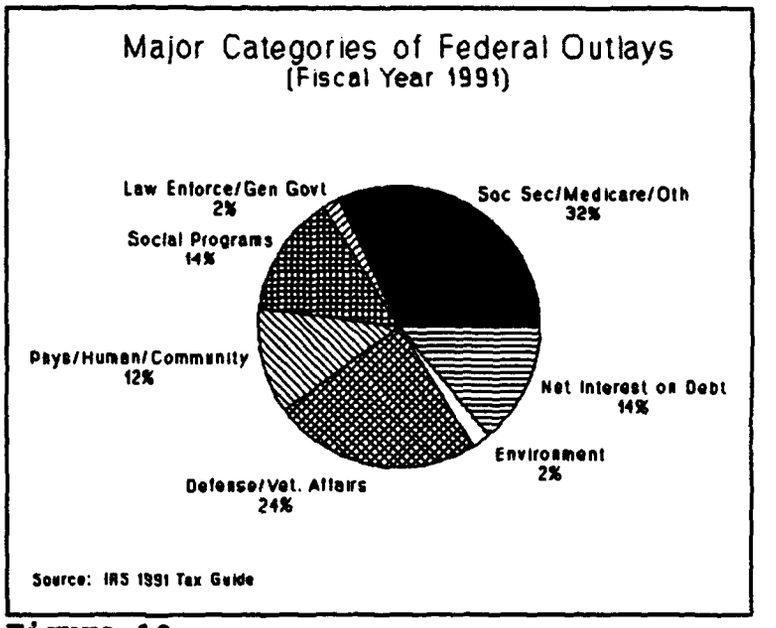

Figure 10.

1991 Federal Outlays by Program Area
(In $ billions)

Program Description	Outlays	Budget %
Social Income Security	439.9	33.3
National Defense	273.3	20.3
Interest on Debt	194.5	14.7
Medicare	104.5	7.9
Commerce & Housing	75.6	5.7
Health	71.2	5.4
Education & Employment	42.8	3.2
Veterans Benefits	31.3	2.4
Transportation	31.1	2.3
Environment	18.5	1.4
Science & Technology	16.1	1.2
International Affairs	15.8	1.2
Agriculture	15.2	1.1
Law Enforcement	12.3	.9
General Government	11.7	.9
Community Development	6.8	.5

Table 3. Source: 1991 Presidents Economic Report

These proportions will shift if the Clinton Economic Plan is

adopted by Congress.[24] As it stands now, over the next four years, outlays will change as shown in Table 4. For environmental protection outlays are planned to increase by $17.5 billion. Much of this will likely be for increased regulation of domestic pollution sources to meet international commitments. In his book "Earth in the Balance", Vice President Gore highlights a number of global environmental concerns, none-the-less of which are: 1) depletion of the ozone layer, 2) global warming, 3) loss of critical biological communities such as wetlands and tropical rain forests, and 4) contamination of the oceans. Closer to home, we have commitments with Canada to reduce acid rain by cutting back sulphur dioxide emissions (primarily from industry). Given the Vice President's strong environmental record and concern about global problems, we can expect even more of the federal budget being expended for environmental protection in the future.

Changes in Federal Outlays
Under the Clinton Plan

Program Description	Change ($ billions)
Transportation	+15.0
Environment & Energy	+17.5
Science & Technology	+14.6
Education & Training	+32.3
Children (e.g. Headstart)	+31.7
Health Care	+18.4
Federal Salaries	-47.2
Defense	-111.8
Agriculture	-9.9
Veterans Affairs	-4.8
Health & Human Services	-51.6

Source: Newsweek (March 1, 1993)

Table 4.

[24] "Clinton's Revolution." **Newsweek** 1 Mar 1993: 32-34.

ANALYSIS OF ENVIRONMENTAL PROTECTION TRENDS

For the most part, the trends in environmental protection will continue toward increased oversight, tighter regulation, stricter standards, and increased personal and corporate liability. There are a number of reasons for concern:

- Businesses are spending a greater proportion of income for environmental compliance which increases the price of goods and reduces competitive advantage in world markets.

- In some instances, environmental regulations create significant barriers to entry or prohibit companies from expanding or upgrading their operations.

- Pollution control costs are increasing at a much faster rate than GNP, hence the capacity of federal, state, and local governments to finance these costs is lagging behind.

The following section looks at these trends and their effects.

Oversight and Regulation Will Increase

So long as environmental protection is a priority and the public remains skeptical that protection efforts are "not enough", Congressional oversight will continue to increase and regulatory processes will become more complex. As noted, the Congress considered over 300 separate environmental initiatives last year alone. With public interest and the very environmentally "pro"

Clinton Administration, we can expect this trend to continue.

Emphasis will shift, however, from purely domestic pollution control to more global concerns. One area of emphasis will be reducing sulphur dioxide emission to fulfill U.S. commitments under the Montreal Protocols; another will be control of carbon dioxide and chloroflurohydrocarbons (CFCs) to deflect growing criticisms about the U.S. contribution to global warming and depletion of the ozone layer. At the same time, it is reasonable to expect that new regulatory regimes will be established to meet our international environmental commitments.

Pollution Control Standards Will Get Tougher

Along with increased oversight, we can expect regulatory standards to become even more stringent. This issue has at least two dimensions:

- Cost
- Technological feasibility

First, the public will continue to insist that their health and the environment be protected, especially so long as they perceive that costs are being paid by industry or indirectly through departmental budgets (e.g., DOD or DOE.) and not by them. It

will be politically unpopular for Congress or state legislatures to oppose this public support. The trend will not change until the real costs and benefits of environmental protection are known and the public understands how much they actually do pay.

Corporate expenditures for environmental protection will rise as standards tighten. As seen from Figure 5, the private sector is paying about 63% of total U.S. pollution control costs. The effects have been substantial for some industries in terms of increased prices for consumer goods. Federally mandated environmental and safety and health requirements, for example, increased the average cost of an automobile by $666 in 1978.[25] Starting in 1993, electric bills for customers of the Southern California Edison Company (SCE) will increase about $100 per year.[26] Edison estimates that it will spend $1.4 billion between 1993 and 1997 to control NOx emissions and to underground electrical distribution lines and at least $45 million to cleanup 43 hazardous wastes sites.

Second, some environmental standards are becoming so onerous that it may not be feasible to meet them. A number of states, for example, are enacting standards requiring return of ground water

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[25] Weidenbaum, Murray L. The Impacts of Government Regulation. Prepared for the Joint Economic Committee-U.S. Congress, July 1978, p. 2.

[26] Southern California Edison Corporation. 1992 Annual Report. 2244 Walnut Grove Ave, Rosemead, California. 1992.

to "pristine" conditions. Analytical methods and equipment in use today can measure contaminates, such as TCE in ground water to parts per trillion. Remedial technologies, however, are effective in removing TCE only to parts per billion (ppb). As we saw from the MITRE study, there may be no marginal health benefit for removing TCE in ground water below 50 ppb.

Other regulatory schemes are causing businesses to close down or relocate. The South Coast Air Quality Management District (SCAQMD) of Southern California, for example, has created an air quality ceiling establishing the maximum quantity of pollutants which can be emitted within the regional air shed. New sources must achieve a two for one reduction in emissions if they wish to operate within the region. These allowances aside, the real barrier remains--only a finite number of businesses can be accommodated because of the pollution emissions ceiling. The overall effect has been a migration of businesses out of Southern California to localities which meet national air quality standards--locales where it is easier to obtain air pollution permits.

One of the concerns with the North American Free Trade Agreement (NAFTA) is that businesses will relocate to Mexico because of its slack environmental enforcement. The concern has prompted President Clinton to specify that policies (or laws) will be

established to keep American industries in the U.S.[27] Even so, businesses will actively seek other locations as they find it more difficult and expensive to meet U.S. pollution control regulations.

U.S. Competitive Advantage Will Continue to Dwindle

Recently, there has been much concern about America's dwindling competitiveness in world markets. Many reasons have been cited for the malady: slowing of U.S. productivity, extremely high U.S. wages, foreign government subsidies, price supports and quotas, and government over-regulation. As we have seen, environmental protection costs also impact a company's operational expenditures (e.g., for pollution control equipment, insurance premiums, etc.), hence, its ability to compete in world markets.

We saw earlier (Figure 1) that, on the whole, U.S. companies spend more for pollution control than their foreign competitors. How this actually affects competitive advantage is not well understood, however, because companies typically do not analyze the per unit cost increase in goods due to capital investment and operation of pollution control equipment. Also, such information

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[27] Clinton, William. The President's Economic State of the Union Address to the U.S. Congress, February 17, 1993.

is usually not available for foreign competitors. Hence, comparisons tend to be qualitative, not quantitative.

A superficial analysis may, none-the-less, help illustrate the point. Bethlehem Steel Works at Sparrows Point, Maryland produces 2.9 million tons of steel per year.[28] A ton sells for around $200. Bethlehem's annual sales should then be $580 million. The company has invested over $1 billion in environmental equipment in the last decade--it costs $40 million annually to operate this equipment. Doing the simple math, we see that just these environmental operation costs alone constitute 2% of Bethlehem's annual sales.

The reader can draw his own conclusions, but it is apparent that American steel producers are at a considerable disadvantage as compared to companies in the less environmentally conscious countries of Eastern Europe, Asia, or even Japan. And as we discussed before, the industry has not yet felt the full impact of the 1990 Clean Air Act Amendments, but expects air pollution control costs to increase substantially. These new rules will further bite into the industry's profitability. The Iron and Steel industry is not unique; aerospace companies, automobile manufactures, petroleum producers, paper mills, etc. are similarly affected.

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[28] Bethlehem Steel Company. Public Affairs Brochure. 1992.

States and Local Governments Will Eliminate Services

As federal funding is cut a greater portion of pollution control cost is shifting to the states and local governments. By the year 2000, for example, local governments will have to spend nearly $13 billion (or 65%) more than they did in 1987 just to maintain the same level of environmental quality and an additional $3.6 billion to meet new regulations.[29]

The question is: "Where will communities get the money to fund these needed investments?" Typically, such funds would be raised through the selling of bonds or increased taxes. However, according to the Environmental Financial Advisory Board:

> Even if state and local governments could borrow enough to pay for capital investments, annual cash flow requirements to repay their debts will outstrip their financial capacity. Between now and the end of the century, local governments will need to raise 32% more money to cover operating and debt service costs.[30]

This amounts to a 3.5% increase in cash requirements each year. GNP over the same period is estimated to increase only 2.4%.

Most local governments have not yet recovered from the recent

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[29] United States. Environmental Financial Advisory Board. Narrowing the Gap-Environmental Finance for the 1990s. EPA, Washington D.C., May 1992, p. 5.

[30] Ibid, p. 5.

recession and continue to have serious financial problems. Employees have been laid off and services cut. Layoffs further burden the state coffers as more and more workers submit claims for unemployment insurance. The upshot is that communities will be faced with harder resource management decisions including reductions in environmental protection services.

Environmental Liabilities Will Influence Business Decisions

Businesses also have hard choices to make with regard to long-term liabilities associated with some environmental laws. Under CERCLA, for example, companies have "joint and several liability" for hazardous substances they generate and dispose of. In essence, a company can be held liable for the entire cost of cleaning up a disposal site regardless of the amount of waste they put there.

Furthermore, the rule applies to past as well as future practices independent of the circumstances. For example, if a company disposes of wastes in a landfill which has been licensed by the appropriate regulatory agency(s) and the landfill fails, the company may still be liable for the entire cleanup. It doesn't matter if it happens today or 40 or 50 years from now, the company's liability remains the same--it is "perpetual."

The cost of cleaning up sites, such as public landfills, is not trivial. Adolph Coors Company, for example, contributed about 20 percent of the wastes in the Lowry Landfill (an NPL site) located near Denver, Colorado. Current cost estimates for cleaning up the site range from $150 million to $4.5 billion.[31] Under ordinary circumstances, Coors' fair share would be $1 billion (still a substantial cost even for a company with annual sales of $2.1 billion). However, because of the joint and several liability rule, Coors could be held liable for the entire $4.5 billion cleanup. (Not included in this example are personal liability claims which could run into millions of additional dollars.)

The full impact of environmental liabilities such as those imposed under CERCLA have not yet been felt (evidence the 425,000 sites referred to in the GAO report above). The trend, however, is toward greater liability and civil litigation (reference the RAND study discussed earlier). Faced with these possibilities, businesses will be inclined to divest themselves of those industrial operations which create environmental liability. Overall, we could predict a shift from manufacturing to "environmentally benign", service-oriented businesses. Such a shift would undercut our industrial capability and economic foundation.

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[31] Adolph Coors Company. 1991 Annual Report to Stockholders. Golden, Colorado. 1991.

Conclusion

At the outset, I posed the question of whether the U.S. could afford environmental protection. The arguments I have presented in this paper lead to the conclusion that we can not--at least if we continue to adhere to our current policies! There are alternatives which will reduce costs, encourage industrial development, and adequately protect human health and the environment.

Many of these are not novel. They have been discussed in many forums on many occasions. None-the-less, little has been done to solve the problems posed above. There have been discussions about a comprehensive "National Industrial Policy." The following proposals should be given serious consideration if we chose to embark on such an aggressive task.

First, the public must be given a more balanced view of the costs and benefits of environmental protection. It is doubtful that most comprehend the full effect pollution control costs have on increasing the price of consumer goods, reducing competitive advantage, or increasing federal expenditures which add to the national deficit. Furthermore, most are somewhat callous because they see businesses as the culprits--business created the

problem, they should clean it up. These impacts will not become real until the public sees how much of their income actually goes for environmental protection.

Second, there must be closer cooperation between government and business. All too often, a law is passed because it seems like the responsible thing to do only to find that it works contrary to other objectives. It is up to legislatures to pass sensible environmental laws which are consistent with national goals, especially our economic goals. Further, Congress must stop legislating by exception. Laws should incorporate broad policy objectives and, once passed, given sufficient time to work.

Third, regulatory authorities must be held accountable for the environmental decisions they drive, but which businesses (and other government entities, hence, taxpayers) pay for. Though cost is a primary decision criteria for environmental pollution control remedies, it is all too often overlooked in favor of more "effective" solutions. To force accountability, EPA and state agencies should be required to analyze and report costs and benefits in their annual reports to legislatures.

Fourth, the question of "how clean is clean enough" must be answered. A single set of pollution control standards needs to be established nation-wide and provisions which allow states or local governments to adopt more stringent standards, abolished.

Fifth, regulatory redundancy must be eliminated. It makes little sense for two or three levels of bureaucracy to review the same plans and studies, then hopefully reach consensus on possible solutions. A more efficient method would be to assign specific decision authority to a single agency and hold it accountable.

Sixth, environmental compliance processes must be simplified and streamlined. Steps which are unnecessary or add no value to the final decision should be eliminated. Compliance milestones must be established at the outset along with clear, regulatory acceptance criteria. Responsible parties should be judged on the results of their compliance efforts, not hindered at each turn by unnecessary bureaucratic oversight.

In conclusion, while there is a national imperative to improve our environment and our national health, we are not being prudent or reasonable in administering environmental programs to achieve this end. We seem too enmeshed in "process" while striving for improvements which are marginal, at best. At the same time, pollution control has added a substantial burden to businesses which has the undesirable effect of increasing the price of U.S. goods and reducing our competitive advantage. In the worst case, companies are being forced to cut back, close down, or move their operations elsewhere. State and local governments are having

difficulty finding the resources to meet existing (and new) environmental standards--the gap between their revenues and compliance costs is widening.

If we hope to reverse these trends, we must re-evaluate our policies and find a better "match" between our economic and environmental goals. To coin a phrase: "Now is the time for change".