Roles for Environmental Cost Studies in Policymaking

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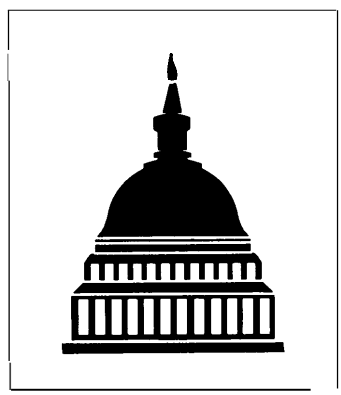
This chapter discusses the current state and federal policies that require the evaluation or use of environmental costs, and it outlines how environmental cost studies can be made more useful to federal policy makers. It explains some of the links between environmental cost studies and policy and some of the difficulties of applying current studies to federal policymaking. Although current studies are not being used extensively on the federal level, several new studies soon will be released, and there is likely to be increased debate over whether to consider the findings of these future studies when developing federal policy.[1] Increased use of environmental cost studies presents federal policy makers with both pitfalls and opportunities.

CURRENT LAWS AND REGULATIONS

Several policies at the federal and state levels involve explicit consideration of environmental costs. They demonstrate the variety of approaches to environmental costing and the ways current studies are used.



Federal Laws

The federal government incorporates environmental cost concepts into a wide variety of legislation and regulations.[2] These include the Energy Policy Act of 1992 (Public Law 102-486,

[1] For an excellent review of the stakeholders and their positions, see J. M. Fang and P. S. Galen, *Issues and Methods in Incorporating Environmental Externalities into the Integrated Resource Planning Process*, NREL/TP-461-6684 (Golden, CO: National Renewable Energy Laboratory, forthcoming).

[2] For a discussion of taxes and user fees that appear to consider environmental costs, see box 5-1.

BOX 5–1: Environmental Costs and Federal Revenue

Concerns about the federal budget deficit and the existing tax structure have prompted close examination of alternative methods of raising revenue, including environmental taxes. Such taxes could include energy-related policies such as carbon taxes and gasoline taxes, and nonenergy policies such as charges for municipal solid waste collection, congestion taxes on urban highways, and taxes on toxic chemical emissions.

Proposals for environmental taxes cite several advantages, First, they offer a source of federal revenue to address the budget deficit. Alternatively, they could be used in a revenue-neutral manner, to shift away from taxing "goods" (such as income) and toward taxing "bads" (such as pollution). In either case, the taxes would reduce emissions of the taxed pollutants (such as $C0_2$) or reduce consumption of the taxed goods (such as gasoline).

For example, the Clinton Administration proposed a BTU tax in early 1993. The proposal would have imposed a base rate of 25.7 cents per million BTUs on coal, natural gas, nuclear power, hydroelectricity, home heating oil, liquefied petroleum gases and imported electricity. An additional tax of **34,2 cents per** million BTUs would have been imposed on gasoline and other refined petroleum products, The measure was designed to raise $50 billion between 1994 and 1997, as well as **reduce emissions** of $C0_2$ and cut imports of oil.

Even prior to these measures, however, the federal government collected some revenue from environmental sources, in 1992, the federal government collected an estimated $7.6 billion in revenues from natural resources and environment-related sources (see table below), about half of one percent of the federal budget, While these federal revenues are not directly related to environmental damage, they do reflect charges for natural resource depletion (in the case of the leasing and land use fees) and indirect pollution (in the case of the environmental penalties and CFC taxes).

Sources of Federal Revenues from the Environment (1992)

Amount (billion $)	Source
2,8	Leasing and extraction of oil, natural gas, and minerals
2.0	Penalties and recoveries from environmental cleanup
1,6	Fees from timber harvesting, grazing, and other land use
0662	Taxes on chlorofluorocarbons

SOURCE Council on Environmental Quaility, *Environmental Quality: 23rd Annual Report of the Council on Environmental Quality* (Washington, DC: U.S. Government Printing Office, 1993).

Environmental taxes can be an unstable revenue source, however. To the extent that environmental taxes discourage pollution, they also reduce the revenue that they generate. Unless the tax rate is proportionally increased, the tax receipts will decline. If this effect is relatively mild and temporary, it may represent more of a start-up problem than a long-term liability of environmental taxes. If, however, it is feasible to completely eliminate a taxed pollutant, then the revenue source will disappear entirely.

SOURCES: Robert Repetto et al,, *Green Fees: How a Tax Shift* Can work *for the Environrnent and the Economy,* (Washington, DC: World Resources Institute, November 1992); and Margaret Kriz, "A Green Tax?" *National Journal,* **Apr. 17,** *1993,* pp. 917-920,

the Clean Air Act Amendments of 1990 (Public Law 101-549, the Pacific Northwest Electric Power Planning and Conservation Act of 1980 (Public Law 96-501), and certain pending legislation.

The Energy Policy Act of 1992

This act requires the Secretary of Energy to develop a least-cost energy strategy to promote energy efficiency and limit the emission of carbon diox-

ide (CO_2) and other greenhouse gases. In developing the strategy, the Secretary is directed to "take into consideration the economic, energy, social, environmental, and competitive costs and benefits . . . of his choices."[3] Assumptions are explicitly identified as an important component of the least-cost energy strategy. The act states that" the Secretary shall include in the least-cost energy strategy an identification of all of the assumptions used in developing the strategy and priorities thereunder, and the reasons for such assumptions."[4]

The Clean Air Act Amendments of 1990

The 1990 Clean Air Act Amendments (CAAA) requires that the Environmental Protection Agency (EPA) conduct periodic, comprehensive analyses of the costs, benefits, and other effects of the act.[5] In considering benefits, the analysis is to include all economic, public health, and environmental benefits of efforts to comply with provisions of the act.[b] The amendments specifically reference quantitative studies of environmental benefits, noting that in cases where numerical values are assigned to the act's benefits, a default assumption of a zero value shall not be used, unless it is supported by specific data. This is intended to combat the practice of counting only the effects that can be quantified and assuming that all unquantified effects are unimportant (and thus have a zero value). EPA is also directed to assess how the benefits of the act are measured in order to ensure that damage to human health and the environment is accurately measured and taken into account.

The Pacific Northwest Electric Power Planning Act of 1980

This act requires that the Northwest Power Planning Council develop a methodology for determining quantifiable environmental costs and benefits, and apply it to help determine the total system cost of energy resources.[7] The act resulted in the studies commissioned by the Bonneville Power Administration (BPA), as well as the Shuman and Cavanagh study, which was supported by a set of environmental, citizens, labor, and ratepayer groups.

Pending legislation

In addition to the policies discussed above, Congress currently is considering some measures with a connection to environmental cost analysis. For example, much of the debate over whether to elevate the EPA to cabinet-level status has concerned whether the new agency would be required to perform cost-benefit analysis of proposed regulations. Proponents of a larger role for risk assessment in EPA decisionmaking argue it would help the agency set priorities and ensure that regulations are cost-effective. Opponents argue that requiring quantitative risk assessments will leave the agency inflexible and open to endless scientific debate.[8] Although environmental cost studies of electricity generation represent only a small subset of proposed EPA studies, they highlight some of the issues and controversies likely to surround broader use of cost-benefit analysis for evaluating regulations.

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[3] 42 U.S.C.§ 13382(@.

[4] 42 U.S.C.§ *13382(e).*

[5] 42 U.S.C.§ *7612(a)* and (b).

[6] The terminology here can be confusing. The amendments refer to the "environmental benefits" of the Clean Air Act, whereas most studies refer to the "environmental costs" of energy production. The terms are practically equivalent, although there is a subtle difference; environmental costs of energy production refers to those effects that could be avoided through additional pollution controls; environmental benefits of existing regulations refers to those effects that are already avoided with existing controls. In either case, the analytical approaches are similar.

[7] 16 U.S.C.§ 839.

[8] G. *Lee,* "Analyzing *Risk Assessment at EpA," The Washington Post,* Mar. *8, 1994, p.* A17.

I State Laws and Regulations

Estimates of environmental costs are important 10 a variety of state energy policies. Many state policies require that electric utilities consider environmental costs in some way when they choose among electricity supply options (see figure 5-1).[9] Nineteen states require utilities to use quantitative estimates of environmental costs, including such measures as adding monetary amounts to prices based on emissions per ton of pollutant.[10] An additional 10 states and the District of Columbia require the use of qualitative criteria that attempt to account for environmental costs.[11] Qualitative requirements include such measures as listing various environmental impacts in proposals for new generating capacity. Three other states have legislative or regulatory activities in process that may lead to requirements for quantitative or qualitative consideration of environmental costs. [12]

MAKING STUDIES MORE USEFUL IN FEDERAL POLICYMAKING

When environmental cost studies are used in future federal energy policy, they will be subject 10 continuing disputes over methodology and results. Among these disputes are those over which methods are preferable in theory and which are possible in practice. Such disputes are responsible for some, although not all, of the controversy over using control cost approaches rather than damage cost approaches, using average rather than marginal costs, and assessing the degree of internalization (see chapter 4 for an extended discussion).

More importantly, however, disputes will continue because of differing assumptions about goals, strategies, and methods. As described in chapter 4, many of the most contentious issues surrounding current environmental cost studies can be traced back to differences in underlying assumptions. These assumptions are more likely to be *reflected in,* rather than *resolved by,* current studies. Consequently, users of environmental cost studies need to evaluate the studies' assumptions carefully, lest they unintentionally accept assumptions that do not match their own.

Technical and methodological critiques of social cost studies are important, but they are not the only important critiques. A study may be technically excellent, yet not meet the needs of Congress and executive branch agencies. The values and assumptions of any particular study may or may not overlap with those of particular policy makers. If a study's values and assumptions differ radically from those of the relevant decisionmakers, they may reject the study on those grounds alone. Such an action would not be "ignoring science" but would constitute the legitimate exercise of these policymakers' public responsibilities.

I Moving Beyond Evaluation

Consideration of the assumptions that underlie environmental cost estimates is particularly important for federal policymakers because the assumptions of some current studies may not be relevant to their needs. Some current studies assume a context of state public utility commissions (PUCs) and their regulation of utilities. In many cases, PUCs have funded the studies, or their actions prompted other organizations such as utilities, utility groups, and environmental groups to fund them.

As a result, existing studies tend to be cast largely in an evaluative role—that is, they help decisionmakers choose among a fixed set of alterna-

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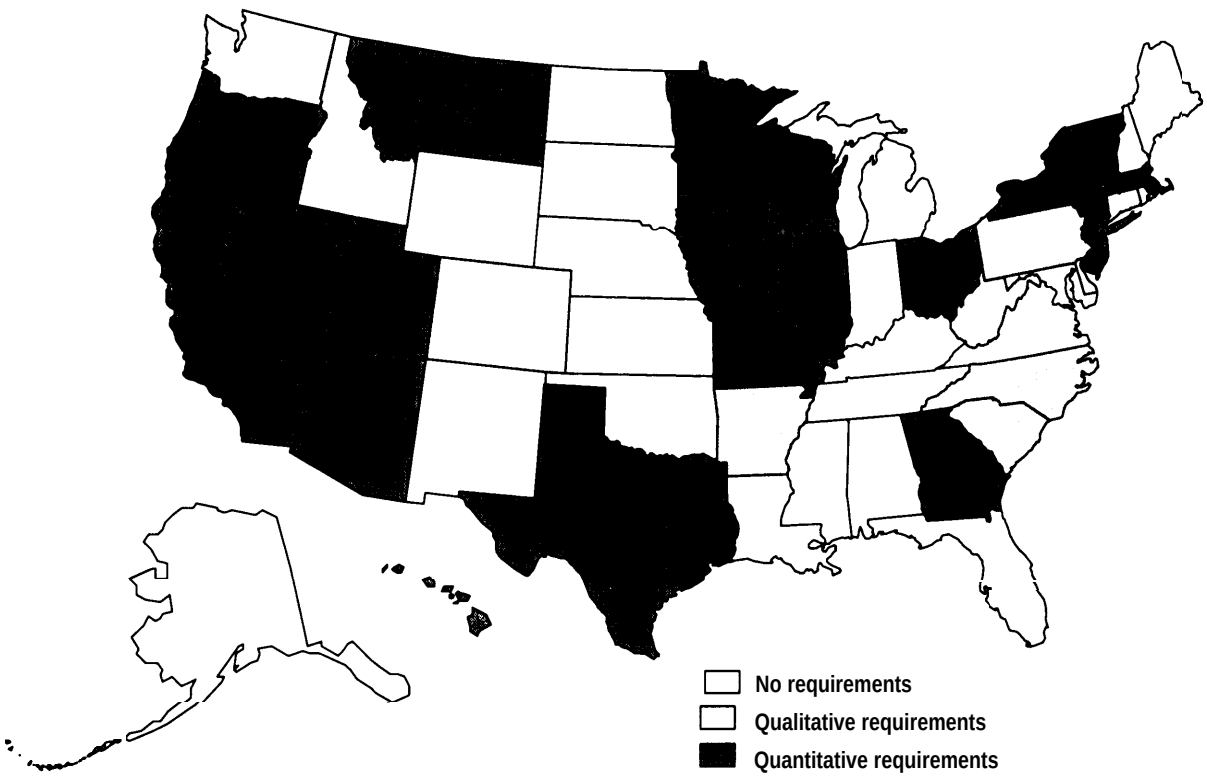
[9] Information about specific state regulations is drawn from Fang and Galen, op. cit, footnote 1.

[10] Seven states (California, Massachusetts, Minnesota, Nevada, New York, Oregon, and Wisconsin) specify monetary values by emission. One state (New Jersey) specifies a monetary amount by energy type (e.g., electricity or gas). Two states (Iowa and Vermont) specify percentage values by energy type. Nine states (Arizona, Georgia, Hawaii, Illinois, Missouri, Montana, Ohio, Texas, and Utah) require a quantitative approach without specifying the method.

[11] I Arkansas, Colorado, Connecticut, Delaware, Idaho, North Carolina, Pennsylvania, South Carolina, Washington, and West Virginia.

[12] Kansas, Oklahoma, and New Mexico.

FIGURE 5-1: State Public Utility Commission Requirements for Utility Consideration of Environmental Costs



NOTE: Iowa, Oklahoma, and New Mexico have requirements under consideration. The District of Columbia has qualitative requirements.

SOURCE: Adapted from J.M. Fang and P.S. Galen, *Issues and Methods in Incorporating Environmental Externalities into the Integrated Resource Planning Process*, NREL/TP-461-6684,Golden, CO: National Renewable Energy Laboratory, forthcoming.

tives for electricity generation. PUCs are largely concerned with influencing utilities' decision-making processes, and environmental cost studies have been used to inform PUC efforts. In some cases, this influence is explicit; some states require utilities to add certain monetary values, derived from environmental cost studies, to the estimated production costs of new facilities when the utilities consider capacity expansion. In other cases, this influence is implicit; some states require utilities to derive and use their own cost values. In both situations, the emphasis has been on deriving a total cost figure that is used to choose among electricity generating technologies.

The characteristics of energy technologies are substantially more malleable than implied by the current use of environmental cost studies. Choices about pollution control technologies, mining and transportation safety, power plant siting, waste disposal, and impact mitigation approaches all affect the overall environmental costs of particular energy sources. All these ways to affect the design and management of energy technologies are open to federal (and state) legislators and regulators, although current studies generally are not oriented toward informing such approaches. Because of this, existing environmental cost studies may give a mistaken impression of the opportunities for minimizing the environmental costs of electricity generation.

For example, risks to workers in energy-related industries can contribute to high overall figures

for the environmental cost of electricity generation. These figures may indicate that an energy source relies on inherently hazardous operations, but it also may indicate that safety practices in those industries are not as well developed as in others. The appropriate policy decision may be not to reduce use of the energy sources that rely cn the hazardous industry, but instead to increase efforts to understand and control the industry's hazards. [13]

In the past, the breadth of policy opportunities has not been lost on federal legislators and regulators. During the past two decades, Congress and federal regulatory agencies have become active] y involved in the technological design of electrical.y generating technologies-particularly by mandating air pollution control equipment and by funding research in improved technologies. This approach to federal regulation has alarmed some observers and is partly responsible for the increased interest in alternatives to command-and-control regulations. This, in turn, has increased interest in economic approaches to environmental control and in studies of environmental costs.

In many ways, the use of environmental cost studies is analogous to the use of another type of environmental assessment that has recently gained popularity-life-cycle assessment (LCA). LCAs attempt to quantify the total environmental damage attributable to a particular product because of its production, use, and disposal. They allow two products to be compared based on their environmental characteristics. For example, LCAs have been conducted for disposable and cloth diapers, paper and styrofoam cups, and plastic and paper shopping bags. After several years of debate, recent reports have concluded that LCAs are more useful as a tool for examining and improving design and production processes than they are as a method of selecting products with superior environmental characteristics. 14 Similarly, one important role for environmental cost studies is to suggest how electricity generating technologies can be changed so they are more acceptable to society, rather than merely to indicate they should be used to a greater or lesser degree.

| Emphasizing Nonquantitative Results

The impact of the assumptions and values implicit in different estimates is large enough that isolated quantitative estimates of environmental cost are nearly meaningless. Such estimates become meaningful only in the context of a study's assumptions and of the environmental effects that are included and excluded. This conclusion indicates that isolated quantitative estimates of environmental cost studies should not be presented as the final results of a study. This practice improperly focuses attention on the numerical results, rather than on the study's assumptions.

Analysts themselves are often aware of the limitations of their methods, but that awareness does not always affect how studies are reported and used. For example, most environmental cost studies to date have emphasized the tentative nature of their own quantitative estimates, the classes of effects they did not consider, and the importance of additional research. After the studies are published, however, their results are often stripped of this important context and merely portrayed in numerical form.

Environmental cost studies often focus on what appears to be the "bottom line' '—the monetary value of environmental effects. In many cases, this is the most speculative and controversial aspect of the study, and effects that are not monetized are often ignored. In contrast, focusing on the earlier components of the study (e.g., the emissions and impacts stages) would emphasize aspects that are most amenable to scientific and technical resolution.

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[13] John P. Holdren, "Energy Hazards: What To Measure, What To Compare," Technology *Review*, April 1982, P. 74.

[14] U.S. Congress, Office of Technology Assessment, *Green Products by Design: Choices for a Cleaner Environment*, OTA-E-541 (Washington, DC: Government Printing Office, September 1992).

This does not imply that monetization is a fundamentally flawed enterprise. However, by its very nature, monetization allows results of environmental cost studies to be reported in a highly aggregated form. This encourages use of results without full understanding of the assumptions and values that underlie them. Placing greater emphasis on reporting results of earlier phases of the analysis (e.g., emissions and impacts assessments), and on clearly explaining the assumptions and values that underlie estimates of monetary damages, would help make the studies more valuable for use in federal policymaking.

Informing Legislative Decisionmaking

A focus on disaggregated results and on explaining assumptions and values is important for reasons beyond mere accurate reporting or analytical convenience. Decisions about values are not the province of technical analysis. Instead, they belong in a public arena to be debated and decided by citizens and their publicly elected officials. Only when quantitative analyses clearly identify their underlying assumptions and values can they inform and enlighten public debate.

If the assumptions and embedded values of environmental cost studies are explained carefully, and if summary results present both quantitative and qualitative aspects, they can be useful for legislative purposes. Quantitative aspects include not only final environmental cost estimates, but also disaggregated results showing the relative importance of various factors to the final estimate, sensitivity analyses showing how the results vary when important inputs are varied, and an analysis of the uncertainty associated with important quantitative values. Qualitative aspects include identifying emissions that account for the majority of the impacts in specific impact categories, identifying alternative assumptions that will substantially alter the quantitative results, and identifying how the results compare with other similar studies. Clearly, this approach to analyzing and presenting environmental cost estimates poses a substantial challenge. However, without such an approach, environmental cost studies may prove to be of little use to policymakers.