Incentive-Based Environmental Regulation: A New Era from an Old Idea?

*Robert W. Hahn**
*Robert N. Stavins***

INTRODUCTION

During the twenty years since Earth Day in 1970, a host of environmental laws and regulations have been enacted, and substantial gains have been made in environmental protection. The United States and the world at large, however, continue to face major environmental threats — both ongoing problems, such as urban smog, groundwater pollution, and acid rain, and newly recognized problems, including the threat of global climate change. As the decade of the 1990's begins, political leaders are giving increased attention to a promising set of new policies that recognize the potential role of market forces in achieving sustained environmental progress.

Over the past several years, the nature and tone of the political debate has evolved rapidly, culminating with President Bush's proposal in June 1989 which called for a major overhaul of the Clean Air Act (CAA)[1] and Congress' subsequent passage of amendments to the Act.[2] A central feature of the administration's proposal was the introduction of a market-oriented approach for controlling acid rain and motor vehicle

* Resident Scholar, American Enterprise Institute; Adjunct Professor, Carnegie Mellon University.

** Assistant Professor of Public Policy, John F. Kennedy School of Government, Harvard University; University Fellow, Resources for the Future. Research assistance was provided by Darius Teter, Peter Condon, and Ilana Cohen, and helpful comments on an earlier version of this Article were provided by Paul Portney, Steven Kelman, and Darius Gaskins. The authors alone, however, are responsible for any remaining errors.

1. 42 U.S.C. §§ 7401-7642 (1988). On June 12, 1989, President Bush proposed a "tradeable permit system" for acid rain control and vehicle emissions as part of the administration's proposed amendments to the Clean Air Act. *The Greening of George Bush*, ECONOMIST, June 17, 1989, at 29, 29 (providing an overview of the struggles within the administration which produced the proposal, and the prospects for passage by the Congress). This proposal was sent to Congress on July 27, 1989 in the form of a bill introduced by Congressman John Dingell, H.R. 3030, 101st Cong., 1st Sess., 135 CONG. REC. H4448-52 (daily ed. July 27, 1989) [hereinafter Administration Bill]. Its companion piece in the Senate, S. 1490, 101st Cong., 1st Sess., 135 CONG. REC. S9936-01 (1989), was introduced by Senator John Chafee.

2. Clean Air Act Amendments of 1990, Pub. L. No. 101-549, 104 Stat. 2399 (1990).

emissions.[3] Many factors contributed to this rapid evolution of policy prescriptions. These factors included: strong interest within the Executive Office of the President;[4] aggressive participation by some segments of the environmental community, notably the Environmental Defense Fund (EDF);[5] and the release of a bipartisan study, initiated and sponsored by U.S. Senators Timothy Wirth of Colorado and John Heinz of Pennsylvania to find solutions to major environmental and natural resource problems.[6] The study coincided with interest in incentive-based approaches within the administration, the environmental community, and private industry, and proposed a series of measures that would enlist market forces to deter pollution and reduce waste of natural resources.[7] Partly in response to this study, the Administrator of the U.S. Environmental Protection Agency (EPA), William K. Reilly, established an Economic Incentives Task Force to investigate the potential application of market-oriented policies throughout EPA's jurisdiction.[8]

By early 1990, discussions of potential incentive-based policies had evolved into serious consideration both within the administration and Congress of actual policy mechanisms for addressing specific problems. As mentioned, the President proposed a tradeable permit system for acid rain control[9] which was incorporated in the final bill amending the CAA.[10] Meanwhile, the Congress considered bills that would apply eco-

3. Administration Bill, *supra* note 1, §§ 218 (mobile emissions sources), 401 ("Permits"), 501 (acid rain).

4. Hahn, *The Politics and Religion of Clean Air*, REGULATION, Winter 1990, at 21, 21.

5. Frederic Krupp, the Executive Director of EDF, has written about the emergence of a new approach to environmental activism which emphasizes cooperation with government and industry to formulate alternative means of development which advance legitimate social needs with a minimum of ecological harm. *See* Krupp, *New Environmentalism Factors in Economic Needs*, Wall St. J., Nov. 20, 1986, at 34, col. 3; Passell, *Sale of Air Pollution Permits is Part of Bush Acid-Rain Plan*, N.Y. Times, May 17, 1989, at A1, col. 1 (describing EDF as "free market enthusiasts").

6. PROJECT 88 — HARNESSING MARKET FORCES TO PROTECT OUR ENVIRONMENT: INITIATIVES FOR THE NEW PRESIDENT (R. Stavins ed. Dec. 1988) [hereinafter PROJECT 88]. For an overview of the findings of the Project 88 study, see Stavins, *Harnessing Market Forces to Protect the Environment*, ENVIRONMENT, Jan.-Feb. 1989, at 4.

7. Several other studies followed the Project 88 report. *See, e.g.*, J. MOORE, L. PARKER, J. BLODGETT, J. MCCARTHY & D. GUSHEE, USING INCENTIVES FOR ENVIRONMENTAL PROTECTION: AN OVERVIEW (1989) (Congressional Research Service Report No. 89-360 ENR, 1989); R. Anderson, L. Hoffmann & M. Rusin, The Use of Economic Incentive Mechanisms in Environmental Management (American Petroleum Institute Research Paper No. 51, 1990).

8. The final report of the Task Force was published in March 1991. OFFICE OF POLICY, PLANNING & EVALUATION, ENVIRONMENTAL PROTECTION AGENCY, REP. NO. 21P-2001, ECONOMIC INCENTIVES: OPTIONS FOR ENVIRONMENTAL PROTECTION (1991).

9. *See, e.g.*, Administration Bill, *supra* note 1, § 501 (adding a new section 503(c) to the CAA providing for the "trading of sulfur dioxide and nitrogen oxide allowances, including banking of nitrogen oxide regulations. . . ."). *See generally*, Passell, *supra* note 5.

10. Clean Air Amendments of 1990, Pub. L. No. 101-549, § 401, 104 Stat. 2399, 2584 (1990).

nomic-incentive mechanisms to problems as diverse as water pollution and hazardous waste management.[11] The administration is also examining a number of incentive-based policies to address the threat of global climate change.[12]

These innovations in environmental policy represent a departure from the conventional form of regulation of the past twenty years. Until now, environmental regulation has generally emphasized so-called command-and-control approaches, which specify uniform technologies or performance standards that give little flexibility to regulated firms. This is hardly the first time that market-based environmental protection ideas have been advanced: economists have recommended such approaches to environmental protection for over twenty years.[13] Until now, however, policymakers have largely ignored these suggestions.

Does the current round of incentive-based environmental proposals represent the beginning of a new era of environmental policy, albeit one based upon an old idea? Or are these proposals merely temporary blips on the policy scope? This Article addresses these questions by investigating the forces that affect the introduction of market-based approaches into the political debate. Part I provides a brief overview of conventional and alternative approaches to environmental regulation. Part II reviews previous U.S. experience with incentive-based policies. Part III chronicles how shifting attitudes among influential interest groups are leading to more serious consideration of market-based proposals at the federal level. Part IV seeks to explain why these changes are occurring. Part V identifies key factors that have affected the emergence of market-based approaches throughout the world. Finally, this Article concludes by looking at the likely future role of these policy mechanisms in addressing environmental issues.

---

11. Office of Policy, Planning & Evaluation, Environmental Protection Agency, Economic Incentives in Pending Environmental Legislation, 101st Congress (July 20, 1990) (describing 124 bills characterized by EPA as using economic incentives). Other specific examples are discussed in *infra* notes 137-40 and accompanying text.

12. The administration has suggested that consideration be given to the use of international market mechanisms for the management of global climate change, although it is apparently as yet divided as to the magnitude of the threat of global warming. G. Bush, Remarks at the Intergovernmental Panel on Climate Change (Feb. 5, 1990), *reprinted in* 26 WEEKLY COMPILATION OF PRESIDENTIAL DOCUMENTS 176, 178 (Feb. 12, 1990) (Office of the Press Secretary) ("Wherever possible, we believe that market mechanisms should be applied and that our policies must be consistent with economic growth and free-market principles in all countries."); Weisskopf, *Bush Pledges Research on Global Warming: Speech to U.N.-Sponsored Panel Endorses No Proposed Remedies*, Wash. Post, Feb. 6, 1990, at A1, col. 3; *see* Stewart & Weiner, *A Comparative Approach to Climate Change: Using the Market to Protect the Environment*, AM. ENTERPRISE, Nov.-Dec. 1990, at 75 (detailing market-based approaches); Materials for the Informal Seminar on U.S. Experience with 'Comprehensive' and 'Emissions Trading' Approaches to Environmental Policy (Feb. 3, 1990) (prepared for presentation at U.S. Department of State).

13. *See, e.g.*, J. DALES, POLLUTION, PROPERTY, AND PRICES (1968).

I
THE REGULATOR'S TOOL CHEST

It is convenient to view the policymaker's problem in two parts, one dealing with choice of an overall goal, and the other involving selection of a means or "instrument" to achieve that goal. In practice, of course, the two tasks tend to be inextricably linked within the political process, because both the choice of the goal and the mechanism for achieving that goal have important political ramifications.[14] Both tasks can affect the distribution of benefits and costs, and hence the attitudes of different interest groups. For example, interest group attitudes towards proposals for sharp cuts in sulfur dioxide emissions can vary dramatically depending on the mechanism that is selected to reach that goal.[15]

Economists and others have argued that economic criteria should play an important role in determining the overall target level of environmental quality. The argument rests on the observation that private firms, if left unregulated, do not choose a "socially efficient" level of environmental protection (pollutant emission reduction).[16] This is because private firms are rarely, if ever, required to pay the full social costs of their actions.[17] The economic paradigm calls for measuring the benefits of decreased pollution against the costs of control and choosing the level of pollution abatement at which the net social benefits are maximized.[18]

In order to maximize the net benefits (the difference between total benefits and total costs) of pollution control, the pollutant is controlled to the level at which the marginal benefits of control are equal to the marginal costs of control.[19] It is both theoretically reasonable and empirically observed that the marginal costs of pollution control efforts increase with

14. While discussion of goals typically precedes examination of alternative means for achieving goals, this is not always true. For example, the Bush administration's recent endorsement of cost-effective methods for addressing global climate change caused by the greenhouse effect was accompanied by statements that it is too soon to establish specific goals and standards regarding sources and sinks of greenhouse gases. *See* Weisskopf, *supra* note 12, at A4, col.1.

15. We assume that most firms care about how a particular proposal will affect profits. For example, a utility faced with a choice between one proposal requiring the installation of scrubbers for its smokestack without any compensation and another proposal offering a large number of tradeable emissions permits which it could buy at lower cost is likely to look favorably upon the latter proposal. Alternatively, if the costs of the scrubber were partly absorbed by taxpayers under the first proposal, this could change the utility's ranking of the two proposals.

16. *See, e.g.,* T. TIETENBERG, ENVIRONMENTAL AND NATURAL RESOURCE ECONOMICS 45-46 (2d ed. 1988).

17. W. BAUMOL & A. BLINDER, ECONOMICS: PRINCIPLES AND POLICY 621-22 (3d ed. 1985) (describing how firms "externalize," and thus avoid paying, the costs of the pollution they generate). *See generally* W. BAUMOL & W. OATES, THE THEORY OF ENVIRONMENTAL POLICY (2d ed. 1988).

18. T. TIETENBERG, *supra* note 16, at 33-34.

19. The marginal benefits of a given level of pollution control are the additional or incremental benefits associated with achieving an added unit of pollution control. Marginal costs are defined analogously.

greater levels of control, and that the marginal benefits of such efforts decrease with greater control levels. Therefore, if pollution control is below the level at which marginal benefits equal marginal costs, then a dollar spent on pollution control will yield more than a dollar's worth of benefit. In such a case, net benefits can be increased simply by increasing pollution control efforts. Likewise, if pollution control is carried out beyond the level where marginal benefits equal marginal costs of control, then a dollar spent yields less than a dollar's worth of increased control. In this case, net benefits can be increased by decreasing pollution control efforts.[20]

In addition to determining goals and standards, decisionmakers must select specific mechanisms for achieving those goals. This Article focuses exclusively on the latter task. This approach reflects the current emphasis that policymakers have given to the importance of achieving specific environmental goals in a more economical fashion, and thus differs from earlier proposals that emphasized the task of goal-setting.

Economists frequently divide instruments for achieving environmental protection into two broad categories. The first type, called command-and-control mechanisms, provide firms with relatively little flexibility in achieving goals. The second type, called incentive-based mechanisms, provide firms with incentives to look for more effective ways of making sustained environmental progress.[21] The following sections focus on actual instruments that are available to policymakers within these two broad classes of approaches. To understand the strengths and weaknesses of market-based approaches, it is instructive to begin with a brief review of command-and-control regulation, the dominant approach to environmental policy in most countries.

A. Conventional Command-and-Control Regulatory Mechanisms

Two policy mechanisms commonly used to control environmental pollution are uniform technology-based standards and performance standards. As the name suggests, technology-based standards identify particular equipment that must be used to comply with a regulation. For example, utilities may be required to install flue gas scrubbers to control sulfur dioxide emissions or electrostatic precipitators to remove particulates. Performance standards, on the other hand, attempt to achieve a specific goal. A performance standard typically identifies a specific goal

20. For a useful theoretical overview of these problems, see T. TIETENBERG, *supra* note 16, at 21-32.

21. There are several instruments of importance to policymakers which do not fall conveniently within these two categories, including monitoring and enforcement techniques, use of the courts, and use of information. In designing a system, including one based on economic incentives, these mechanisms should not be overlooked either as complements or substitutes in system design.

(for example, maximum allowable units of pollutant emitted per time period) and gives firms some latitude in meeting this target. These standards do not specify the means, and therefore, provide greater flexibility than technology-based standards.

Although uniform technology-based and performance standards may be effective in achieving established environmental goals and standards, they often do so at relatively high costs to society. Uniform emission standards, the dominant policy mechanism chosen to attack a number of environmental problems,[22] tend to lead to inefficient outcomes in which firms use unduly expensive means of controlling pollution.[23] The reason is simple: the costs of controlling pollutant emissions vary greatly among and even within firms. Indeed, the cost of controlling a unit of a given pollutant may vary by a factor of 100 or more among sources, depending upon the age and location of plants and the available technologies.[24] Any given aggregate pollution level can be met at minimum aggregate control cost if, and only if, firms control at the same *marginal cost*, as opposed to the same emission or control *level*.[25]

Theoretically, the government could achieve such a cost-effective allocation of the pollution control burden among sources if it could ensure by some means that all sources controlled at the same marginal control cost. However, such an approach would require the government to have detailed information about the cost functions of individual firms and sources — information that the government clearly lacks and could obtain only at great cost, if at all.

---

22. *See* R. HAHN, A PRIMER ON ENVIRONMENTAL POLICY DESIGN (1989); T. TIETENBERG, EMISSIONS TRADING: AN EXERCISE IN REFORMING POLLUTION POLICY (1985).

23. For estimates of actual cost savings resulting from tradeable permits programs, see Hahn & Hester, *Marketable Permits: Lessons for Theory and Practice,* 16 ECOLOGY L.Q. 361, 368-76, 374 table 2 (1989). One survey of eight empirical studies of air pollution control found that the ratio of actual, aggregate costs of the conventional, command-and-control approach to the aggregate costs of least-cost benchmarks ranged from 1.07 for sulfate emissions in the Los Angeles area to 22.0 for hydrocarbon emissions at all domestic DuPont plants. T. TIETENBERG, *supra* note 22, at 104-07.

24. For numerical examples of the variance of incremental costs of air pollution control, see Crandall, *The Political Economy of Clean Air: Practical Constraints on White House Review,* in ENVIRONMENTAL POLICY UNDER REAGAN'S EXECUTIVE ORDER: THE ROLE OF BENEFIT-COST ANALYSIS 205, 210-15 (V. Smith ed. 1984).

25. Recall that the marginal costs of pollution control are the additional or incremental costs of achieving an additional unit of pollution reduction. If these marginal costs of control are not equal across sources, then the same aggregate level of pollution control could be achieved at lower overall cost simply by reallocating the pollution control burden among sources so that the low-cost controllers controlled proportionately *more* and the high-cost controllers controlled proportionately *less*. Additional savings could theoretically be achieved through such reallocations until marginal costs were identical at all sources. Contrast this with the long established practice, discussed in Hahn & Hester, *supra* note 23, at 376.

B. Incentive-Based Policies

In contrast to traditional command-and-control approaches, policy mechanisms based on economic incentive systems ensure that firms "automatically"[26] undertake pollution control efforts in precisely the manner and degree which will result in the cost-effective allocation of the overall control burden. Moreover, economic incentive approaches generally provide firms with incentives to find cleaner and less expensive production technologies.

Most incentive-based approaches fall within one (or more) of five major categories: pollution charges, marketable permits, deposit-refund systems, market barrier reductions, and government subsidy elimination. These categories are discussed in the following sections.

1. Pollution Charges

Charge systems impose a fee or tax on pollution and *not* simply on pollution generating activities.[27] For example, a chemical manufacturer would be charged for every unit of pollutant that it discharged into a river rather than for the units of chemical produced or for the number of plants in operation or on a per firm basis. Pollution charges, by themselves, do not restrict the amount of pollutants that may be emitted; rather, they tax emissions. Such fees ensure that a firm will internalize the previously external pollution costs and be forced to perform a profit and loss calculation in order to respond efficiently to the fee. A firm has many options. It might decide that it is in its interest to pay the fee, completely eliminate the discharge, or partially reduce the emission.

Several European nations, including France, the Netherlands, and West Germany currently use water pollution charge systems.[28] Another potential application discussed frequently is a tax on carbon dioxide production to help control global warming.[29]

The advantage of the fee system is that all firms face the same incentive to control at the margin. A firm will control up to the point where the marginal cost of control just equals the fee. The result is that the

---

26. It is no coincidence that one is reminded of Adam Smith's characterization of individual market decisions operating in the collective interests of society, as if guided by an "invisible hand." *See generally* A. SMITH, THE WEALTH OF NATIONS (R. Campbell, A. Skinner & W. Todd eds. 1976) (1776).

27. A.C. Pigou is generally credited with developing the idea of a corrective tax to discourage activities which generate externalities, such as environmental pollution. *See* A. PIGOU, THE ECONOMICS OF WELFARE 192 (4th ed. 1952).

28. J. OPSCHOOR & H. VOS, ECONOMIC INSTRUMENTS FOR ENVIRONMENTAL PROTECTION 36-44 (1989).

29. Although policymakers began considering this idea only recently, it dates back at least to 1982. *See* Nordhaus, *How Fast Should We Graze the Global Commons?*, 72 AM. ECON. REV. 242 (1982). For a more recent analysis of carbon taxes, see CONGRESSIONAL BUDGET OFFICE, CARBON CHARGES AS A RESPONSE TO GLOBAL WARMING: THE EFFECTS OF TAXING FOSSIL FUELS (1990).

total costs of pollution control are minimized, as compared with other methods of allocating the pollution control burden across firms.[30] Charges, like other market-based mechanisms, also provide ongoing incentives for firms to develop and adopt newer, better pollution control technologies.

One problem with emission charge systems is that governments do not know in advance what level of cleanup will result from any given charge. This problem stems from a lack of knowledge about how firms will respond to a given level of taxation. Governments do not have the information to determine either an individual firm's pollution control costs or the distribution of costs across firms. This inability to specify a target level of pollution that will be achieved does not, however, alter the reality that charges achieve emission reductions in a cost-effective manner.

Charges have not been widely adopted in this country in part, probably, because industry has sound economic reasons to resist the implicit transfer of wealth involved in most effluent fee approaches.[31]

2. *Marketable Permit Systems*

Marketable or tradeable permits can achieve the same cost-minimizing allocation of the pollution control burden as a charge scheme, while also avoiding the problem of uncertain responses by firms.[32] Under a tradeable permit system, the allowable overall level of pollution is established and then allotted in the form of permits among firms. Firms which keep emission levels below the allotted level may sell or lease their surplus permits to other firms or use them to offset excess emissions in other parts of their own facilities.

As with a charge system, the marginal cost of control is identical across firms and thus the total cost of control is minimized for any given level of total pollution control.[33] In the case of local air pollution con-

30. *See generally* Bohm & Russell, *Comparative Analysis of Alternative Policy Instruments*, in 1 HANDBOOK OF NATURAL RESOURCE AND ENERGY ECONOMICS 395 (A. Kneese & J. Sweeney eds. 1985).

31. For discussion of the theory behind this transfer phenomenon and the expected industry resistance, see Buchanan & Tullock, *Polluters' Profits and Political Response: Direct Controls Versus Taxes*, 65 AM. ECON. REV. 139, 141-42 (1975) (concluding that "in terms of their own private interests . . . owners of firms will oppose the tax"); R. HAHN, *supra* note 22, at 25-32, 45-52 (discussing the economics and politics of charge mechanisms).

32. *See* Hahn & Noll, *Designing a Market for Tradeable Permits*, in REFORM OF ENVIRONMENTAL REGULATION 119 (W. Magat ed. 1982). Much of the literature on tradeable permits may actually be traced to Coase's treatment of negotiated solutions to externality problems. *See generally* Coase, *The Problem of Social Cost*, 3 J. L. & ECON. 1 (1960).

33. For purposes of simplicity, consider the case of an industry with only two firms — a high-cost controller and a low-cost controller. If we initially allocate permits uniformly to the two firms, the high-cost controller will have an incentive to purchase additional emission permits and to increase its emissions as long as the price of the permits is less than the firm's avoided (marginal) cost of pollution control. Likewise, the low-cost controller will have an

trol, for example, this approach could be substantially more efficient than current regulatory methods, both because its inherent flexibility takes advantage of differences in control costs,[34] and because it allows individual firms to decide where and how to make desired reductions.[35]

In the unlikely event that overall emission targets are viewed as too strict, the government may choose to increase the supply of permits.[36] In order to reduce allowable emissions, regulators could take the opposite stance and reduce the supply of permits.

Permit systems have been used primarily in the United States. Examples include the EPA's Emissions Trading Program[37] and the nationwide lead phasedown[38] which allowed fuel refiners to "bank" and "trade" lead content savings.[39] Congress recently passed legislation including marketable permit systems for controlling acid rain.[40] Permit systems might also be applied in other areas, such as local air pollution,[41]

---

incentive to sell additional emission permits and to decrease its emissions as long as the price of the permits is more than the firm's additional (marginal) cost of pollution control. These competitive forces will tend to lead to an equilibrium permit price and allocation of permits (and pollution control responsibility) in which each firm's marginal cost of pollution control equals the prevailing permit price. This indicates that the pollution control responsibility will be allocated in such a way that the two firms are controlling at the same marginal cost of control, rather than at the same level of control. Hence, the tradeable permit system, in theory, will achieve the cost-effective allocation of the pollution control burden among firms.

34. In 1981, for example, EPA's Office of Planning and Management estimated that the incremental costs of removing pollutants from existing sources could range from $1.00 per metric ton in the petroleum refining industry to $25,473 per metric ton removed in one phase of the iron and steel production process. The incremental costs of removing pollutants from new sources ranged from 50 cents per metric ton removed in petroleum refining to $27,387 per metric ton removed in one step of the iron and steel production process. Crandall, *supra* note 24, at 210-15. In this particular example, the firms with lower marginal control costs (for example, in the $500 to $1000 range) would be expected to reduce their pollution further in the presence of a market in tradeable permits. This pollution reduction would enable these firms to sell their surplus permits to firms with higher marginal costs (for example, $10,000 or more per ton). This, in turn, would allow the high-cost polluting firms to emit more, thus reducing their marginal control costs.

35. Differences in source location and seasonal factors mean that not all emission reductions are of equal value in terms of improving air quality. This problem also applies to command-and-control approaches. While it is, of course, theoretically desirable to take account of such differences, it must be recognized that in some cases it may not be practical to do so. *See* Hahn & Noll, *supra* note 32, at 121-22; Tietenberg, *Transferable Discharge Permits and the Control of Stationary Source Air Pollution: A Survey and Synthesis,* 56 LAND ECON. 391, 396-97 (1980).

36. Environmentalists would be reluctant to allow a standard or environmental goal to be relaxed unless they were given some tangible environmental gain in return. For a more detailed discussion of the interaction between environmentalists and industry, see R. HAHN, *supra* note 22, at 63-97.

37. *See infra* notes 78-91 and accompanying text.

38. Environmental Protection Agency, Regulation of Fuel and Fuel Additives: Lead Phase Down, 49 Fed. Reg. 31,032 (1984) (proposed rule).

39. *See* Hahn & Hester, *supra* note 23, at 366-67.

40. *See infra* note 136.

41. *See* Hahn, *Innovative Approaches for Revising the Clean Air Act,* 28 NAT. RESOURCES J. 171, 174 (1988).

point- and nonpoint-source water pollution,[42] chlorofluorocarbon (CFC) reduction,[43] and control of global warming through international trading in greenhouse gas permits and offsets.[44]

3. *Deposit-Refund Systems*

Under this approach, surcharges are paid when consumers purchase potentially polluting products. When the consumer returns the product to an approved center for recycling or proper disposal, his deposit is refunded. A number of states successfully use this system, through "bottle bills," to control litter from beverage containers *and* to reduce the flow of solid waste to costly landfills.[45] An advantage of deposit-refund systems is that they eliminate or reduce the incentive for illegal "midnight dumping" which exists under a simple waste end-tax or fee.[46]

Deposit-refund systems can be used for certain forms of hazardous waste and solid waste.[47] Lead-acid batteries, used motor vehicle oil, and vehicle tires are obvious candidates. Denmark has adopted such a plan for high mercury content and cadmium batteries, and Norway and Sweden have deposit-refund systems on car hulks.[48] Proposals applying the deposit-refund concept to new problem areas were considered during the last session of Congress.[49]

4. *Removal of Market Barriers*

In some cases, substantial gains can be made in environmental protection simply by removing existing government-mandated barriers to market activity. For example, measures that facilitate the voluntary exchange of water rights can promote more efficient allocation and use of scarce water supplies.[50] They may also curb the need for expensive and

---

42. *See* Hahn & Hester, *supra* note 23, at 391-96 (discussion of experiments with water pollution rights in Colorado and Wisconsin).

43. *See* Environmental Protection Agency, Protection of Stratospheric Ozone, 52 Fed. Reg. 47,486, 47,498-503 (1987) (final rule) (codified at 40 C.F.R. § 82.12 (1988)). Although the term CFC is often used to indicate the class of potential ozone depleting (POD) substances, it is misleading. Only three of the seven most important POD's are CFC's, and several of the proposed POD substitutes are themselves CFC's.

44. *See supra* note 12.

45. *See, e.g.,* P. BOHM, DEPOSIT-REFUND SYSTEMS: THEORY AND APPLICATIONS TO ENVIRONMENTAL, CONSERVATION, AND CONSUMER POLICY 110-11 (1981); Menell, *Beyond the Throwaway Society: An Incentive Approach to Regulating Municipal Solid Waste*, 17 ECOLOGY L.Q. 655, 678 (1990).

46. P. BOHM, *supra* note 45, at 18-19.

47. This hazardous waste must be capable of storage in containers. *See* Hahn, *An Evaluation of Options for Reducing Hazardous Waste,* 12 HARV. ENVTL. L. REV. 201, 218, 221 (1988); Russell, *Economic Incentives in the Management of Hazardous Wastes,* 13 COLUM. J. ENVTL. L. 257, 267-68 (1988).

48. J. OPSCHOOR & H. VOS, *supra* note 28, at 83-88.

49. *See infra* notes 137-40 and accompanying text.

50. Willey & Graff, *Federal Water Policy in the United States — An Agenda for Economic and Environmental Reform,* 13 COLUM. J. ENVTL. L. 325, 349-51 (1988).

environmentally disruptive new water supply projects.[51] A major market-oriented water exchange has recently taken place in Southern California based on this approach.[52] Other applications of this general concept include competitive bidding for solid waste management[53] and comprehensive least-cost bidding at electrical utilities.[54] The latter approach would promote economically rational energy generation and consumption.

5. *Elimination of Government Subsidies*

Subsidies are the mirror image of various kinds of taxes[55] and, in theory, can provide important economic incentives to address environmental problems. In practice, however, many subsidies promote inefficient and environmentally unsound development. A major example is the existence of below-cost timber sales, where the Forest Service does not recover even the full cost of making timber available for harvesting by private lumber companies.[56] These subsidies encourage excessive timber cutting, thereby leading to substantial loss of habitat and damage to

---

51. *See* R. WAHL, MARKETS FOR FEDERAL WATER: SUBSIDIES, PROPERTY RIGHTS, AND THE BUREAU OF RECLAMATION 197-269 (1989) (discussion of the environmental and monetary costs associated with Kesterson National Wildlife Refuge, the Central Arizona Project, and the Yuma desalination plant).

52. *See infra* note 117 and accompanying text.

53. If communities are to adopt efficient solutions to their solid waste management problems, they must consider all methods, including surface disposal, incineration, and recycling on an equal basis. The bidding process should be opened to all techniques, by mandating waste management outputs and results, rather than requiring specific methods of solid waste management.

54. Since an electrical utility's capacity problem is fundamentally one of expected demand exceeding expected supply, there is no reason to limit possible solutions to those that augment supply. Means of curtailing demand can also be effective. The more cost-effective approach is to utilize whatever solution is least expensive, be it on the supply side or the demand side. *See* Cicchetti & Hogan, Including Unbundled Demand Side Options in Electric Utility Bidding Programs (Harvard University, Energy and Environmental Policy Center Discussion Paper No. E-88-07, 1988). What is needed before utilities will have incentives to entertain such comprehensive least-cost bidding is permission from state regulatory agencies for utilities to write demand-side investments (such as wrapping customers' hot water heaters) into their rate bases. Senator Wirth's proposed National Energy Policy Act of 1989, S. 324, 101st Cong., 1st Sess. (1989), which would have amended the Public Utility Regulatory Policy Act of 1978 (PURPA), Pub. L. No. 95-617, 92 Stat. 3117 (codified in scattered sections of 15, 16, 30, 42 & 43 U.S.C.), proposed to authorize this approach.

55. Several authors note, however, that subsidies and fees provide different incentives for entry into a business and thus can have a different effect than taxes on the long-run equilibrium of an industry. *See, e.g.,* Page, *Failure of Bribes and Standards for Air Pollution Abatement,* 13 NAT. RESOURCES J. 677, 677-78 (1973).

56. M. BOWES & J. KRUTILLA, MULTIPLE-USE MANAGEMENT: THE ECONOMICS OF PUBLIC FORESTLANDS 16 (1989) (pointing to growing controversy over "apparently extensive" government subsidies for private exploitation of natural resources).

watersheds.[57] Gradual removal of these subsidies would foster environmental protection and, additionally, increase net federal revenues.[58]

Other subsidies that are both economically inefficient and environmentally disruptive include those associated with U.S. Army Corps of Engineers flood control projects,[59] U.S. Bureau of Reclamation projects,[60] Bureau of Land Management & Forest Service public lands grazing programs,[61] and agricultural price supports.[62] These subsidies, along with below-cost timber sales, should also be removed.

C. *Incentive-Based Versus Conventional Policy Mechanisms*

Incentive-based approaches have, for the most part, taken a back seat to a system of command-and-control regulation and subsidies. Despite the environmental progress that has been made using traditional approaches, however, there is increasing recognition that the current system may not be able to offer the kind of improvements that the public now demands.[63]

Incentive-based schemes can promote environmental protection at a cost lower than that of command-and-control approaches. Incentive schemes can also improve the international competitiveness of U.S. industry because they offer huge savings and increases in productivity relative to command-and-control regulation. For example, a market-based approach to acid rain reduction could save up to $3 billion per year,[64]

---

57. *See generally* H. ANDERSON & C. GEHRKE, 1 NATIONAL FORESTS, POLICIES FOR THE FUTURE, WATER QUALITY AND TIMBER MANAGEMENT (Wilderness Society, 1988); D. WILCOVE, 2 NATIONAL FORESTS, POLICIES FOR THE FUTURE, PROTECTING BIOLOGICAL DIVERSITY (Wilderness Society, 1988).

58. *See* Stavins, *Alternative Renewable Resource Strategies: A Simulation of Optimal Use*, 19 J. ENVTL. ECON. & MGMT. 143, 154 (1991) (describing Army Corps of Engineers projects as environmentally disruptive and, viewed as a whole, less than "socially optimal").

59. Stavins & Jaffe, *Unintended Impacts of Public Investments on Private Decisions: The Depletion of Forested Wetlands*, 80 AM. ECON. REV. 337, 338 (1990) (studying the effects of subsidies in the form of large-scale federal flood control and drainage projects).

60. *See* T. ANDERSON, WATER CRISIS: ENDING THE POLICY DROUGHT 47-52 (1983) (concluding that the Bureau projects it studied were both economically inefficient and environmentally unsound); R. WAHL, *supra* note 51, at 327-29 (identifying various "consumptive and polluting aspects of federal reclamation projects").

61. One estimate placed the annual net expense of the government's grazing program at $75 million. R. Nelson, An Analysis of 1978 Revenues and Costs of Public Land Management by the Interior Department in 13 Western States (1979) (unpublished paper prepared for the Office of Policy Analysis, U.S. Dep't of the Interior), *cited in* Godfrey & Pope, *The Case for Removing Livestock from Public Lands*, in CURRENT ISSUES IN RANGELAND RESOURCE ECONOMICS 6, 6 (Oregon State Univ. Extension Service Special Report No. 852, 1990).

62. *But see* Phipps, *The Farm Bill, Resources, and Environmental Quality*, RESOURCES, Winter 1986, at 4 (identifying two regulatory devices, "cross-compliance" and "conservation reserves," which the Food Security Act of 1985 used in conjunction with traditional price supports to help mitigate adverse environmental effects that subsidizing farmers might otherwise cause).

63. *See, e.g.*, Stavins, *supra* note 6, at 7, 28.

64. The savings would be in terms of compliance costs, and hence, in terms of costs to the

compared with the cost of a dictated technological solution.[65] Incentive-based approaches need not cost any more for the government to administer than conventional regulatory methods.[66] In fact, funds from tradeable permit auctions could help to finance an expanded EPA budget.[67] Moreover, such systems encourage firms to monitor each other's pollutant emitting activities[68] by harnessing the incentives inherent in a competitive market.[69]

Market-oriented policies can also provide powerful incentives for the private sector to develop new pollution control technologies. Investments in pollution control lead to increased profits under incentive-based systems. Market-oriented policies, therefore, provide significant inducements for firms to adopt new pollution control technologies. In turn, these policies create incentives for those same firms or others to carry out research and development of cheaper and better pollution abatement techniques.[70]

An added benefit of incentive-based approaches is their tendency to make the environmental debate more understandable to the general public. These approaches focus attention directly on what our environmen-

---

economy as a whole.

65. ICF Resources, Inc., Economic Analysis of Title V (Acid Rain Provisions) of the Administration's Proposed Clean Air Act Amendments (H.R. 3030/S. 1490) (1989) (prepared for EPA). More conservative estimates indicate that the marketable permit program for acid rain control could save between $13 and $16 billion by the year 2010, compared with a conventional approach. *See* R. Hahn, Designing Markets in Tradable Allowances for Reducing Acid Deposition 1-2 (1989) (draft manuscript), wherein the author himself arrives at what he deems a conservative estimate of the savings based on information provided by Bruce Braine and ICF Resources, *supra*.

66. *See, e.g.*, Ackerman & Stewart, *Reforming Environmental Law,* 37 STAN. L. REV. 1333, 1346 (1985) (outlining revenue and administrative advantages of incentive-based system which could save EPA "many billions of dollars a year").

67. For further discussion, see Ackerman & Stewart, *Reforming Environmental Law: The Democratic Case for Market Incentives,* 13 COLUM. J. ENVTL. L. 171, 181 (1988) (estimating that a tradeable permit system could raise $6-10 billion annually for EPA).

68. Under conventional command-and-control approaches, firms have an incentive to monitor other firms within their industry. If other firms do not comply, this could reduce their costs of production, thereby placing a complying firm at a competitive disadvantage. Under a system of tradeable permits, firms would *also* have an additional incentive to monitor firms outside of their industry. This incentive exists because they would want to identify others that are diluting the value of their tradeable permits by failing to comply.

69. This is not to suggest, however, that environmental protection can be achieved without significant government expenditures. No program of controls can be effective without monitoring and enforcement.

70. Incentive-based policies have been shown to be more effective in inducing technological innovation and diffusion of incentive-based approaches than conventional command-and-control approaches. Milliman & Prince, *Firm Incentives to Promote Technological Change in Pollution Control,* 17 J. ENVTL. ECON. & MGMT. 247, 247 (1989). Under certain circumstances, however, emission credit trading may reduce firms' incentives to adopt new technology. *See* Malueg, *Emission Credit Trading and the Incentive to Adopt New Pollution Abatement Technology,* 16 J. ENVTL. ECON. & MGMT. 52, 56 (1989).

tal goals should be, rather than on difficult technical questions concerning technological alternatives for reaching those goals.[71]

As we discuss below, a potential difficulty with incentive-based approaches is that such policies will require regulators to change the way they perceive their jobs.[72] Regulators will no longer have the task of evaluating different pollution-control technologies and strategies. Rather, firms will do that for themselves, driven by the cost of continued pollution. In this respect, regulators will have less control over the system, because actual pollution control decisions will be made by polluters, not by the government. However, market approaches can succeed only if decisionmaking is decentralized.

While market-oriented policies will not fit every problem, such incentive-based approaches seem virtually tailor-made for problems such as acid rain, where concern focuses on aggregate pollution levels within an airshed.[73] In this case, economic incentive mechanisms can allocate the pollution-control burden across firms to minimize total expenditures for any given level of aggregate control. However, command-and-control policies may be preferable for environmental problems which display both local and threshold effects.[74] In that case concern may focus on the level of pollution emitted by individual sources.

Other factors can tip the balance in favor of either conventional or incentive-based policy mechanisms. In some cases, the monitoring requirements of pollution charges or tradeable permit approaches can have a dramatic impact on cost effectiveness, compared with a conventional technology standard.[75] In other circumstances, the total number of pollution sources to be controlled could play an important role. For example, with a small number of sources there could be a risk that the market

---

71. *See* Ackerman & Stewart, *supra* note 67, at 171, 188-90 (stating that the "present regulatory system obscures [valuable democratic debate about environmental priorities] under a flood of technocratic mumbo-jumbo").

72. *See* Stewart, *Controlling Environmental Risks Through Economic Incentives*, 13 COLUM. J. ENVTL. L. 153, 162, 164 (1988).

73. *See generally* TRANSBOUNDARY AIR POLLUTION: INTERNATIONAL LEGAL ASPECTS OF THE CO-OPERATION OF STATES (C. Flinterman, B. Kwiatkowska & J. Lammers eds. 1986) (collection of articles, including a technical explanation of the causes of transboundary air pollution, focusing on certain wide-ranging environmental problems, especially acid rain, and international agreements for controlling them).

74. Threshold effects refer to a situation in which emissions of a pollutant are relatively benign up to a point. Beyond that critical point, however, the pollutant has significant adverse health and/or other environmental consequences. For an interesting discussion of this phenomenon in the context of cancer, see Cross, *Beyond Benzene: Establishing Principles for a Significance Threshold on Regulatable Risks of Cancer*, 35 EMORY L.J. 1 (1986).

75. *See* R. Axtell & R. Hahn, On the Presumed Superiority of Transferable Property Rights (Oct. 1990) (unpublished paper presented at the Stanford Conference on Environmental Economics, Stanford University) (discounting the possibility that markets will provide firms with "an additional mechanism for circumventing pollution control regulations").

for tradeable permits would become noncompetitive.[76] At the other extreme, however, a very large number of sources (as with CO_2 emissions) could mean that transaction costs associated with individual trades would reduce the program's cost effectiveness, relative to a system of emission charges, for instance.[77] Thus, alternative environmental policy mechanisms can be assessed along a variety of dimensions.

No single approach will be ideal for all problems. The real challenge is to identify the right policy for each specific situation. The best set of policies will typically involve a mix of market and more conventional regulatory processes. Design and implementation of improved policies will require policymakers to adapt, rather than abandon, present programs. Previous experience with the use of market-based incentives in the U.S. and in other industrialized nations offers useful guidance.

II
PREVIOUS U.S. EXPERIENCE WITH INCENTIVE-BASED ENVIRONMENTAL POLICIES

The United States and several European nations have implemented market-based approaches for environmental protection on a limited scale. We describe four of the U.S. experiences here in more detail, in order to provide a flavor of the potential strengths and limitations of these approaches.

A. EPA's Emissions Trading Program

Beginning in 1974, EPA experimented with "emissions trading" as part of the Clean Air Act's program for improving local air quality.[78] In this scheme, firms that reduce emissions below the level required by law are allowed to receive "credits" usable against higher emissions elsewhere.[79] Firms may employ the concept of "netting," or "bubbles," to "trade" emissions reductions among sources within the firm, so long as total, combined emissions comply with an aggregate limit.[80]

76. *See* R. Stavins, Transaction Costs and the Performance of Markets for Pollution Control (1990) (working paper, John F. Kennedy School of Government, Harvard University).

77. *Id.*

78. *See* Chevron v. Natural Resources Defense Council, 467 U.S. 837, 847 (1983) (discussing the origins of EPA's attempts to institute emissions trading); Environmental Protection Agency, Emissions Trading Policy Statement; General Principles for Creation, Banking, and Use of Emission Reduction Credits, 51 Fed. Reg. 43,814, 43,829 (1986) (final policy statement) [hereinafter EPA Emissions Trading Policy]. The policy statement describes a system of "[e]missions trading [which] includes bubbles, netting, and offsets, as well as banking (storage) of emission reduction credits (ERC's) for future use." The final policy statement replaces the original bubble policy as well as the interim guidance on emissions trading. *Id.* (citing 44 Fed. Reg. 71,119 (1979)).

79. EPA Emissions Trading Policy, *supra* note 78, at 43,832-36.

80. The "bubbles" or "netting" concept aggregates emissions from all the components of an industrial plant and considers them a single source for purposes of regulation. EPA Emis-

The "offset" program begun in 1976 goes further, allowing firms to trade emission credits.[81] Firms wishing to establish new sources in areas that are not in compliance with ambient standards must offset their new emissions by reducing existing emissions.[82] This can be accomplished with their own sources or through agreements with other firms.[83] Finally, under the "banking" program, firms may store earned emission credits for future use.[84] Banking allows for either future internal expansion or the sale of credits to other firms.[85]

EPA codified these programs in its Final Policy Statement on Emissions Trading in 1986,[86] but the programs have not been widely used.[87] States, which administer CAA programs, are not required to allow trading,[88] and uncertainties about the future course of the programs has made firms reluctant to participate.[89] Nevertheless, companies such as Armco, DuPont, USX, and 3M have traded emissions credits, and a market for transfers has developed.[90] Even this limited degree of participation in EPA's trading programs may have saved between $5 and $12 billion over the life of the program.[91]

---

sions Trading Policy, *supra* note 78, at 43,830; *see Chevron*, 467 U.S. at 840 (upholding EPA regulations which allowed states to adopt a plantwide definition of the term "stationary source" so that firms could institute a form of emissions trading within their facilities). An evaluation of EPA's Emissions Trading Program can be found in T. TIETENBERG, *supra* note 22. For an assessment of EPA's experiences with incentive-based policies, see generally Hahn, *Economic Prescriptions for Environmental Problems: How the Patient Followed the Doctor's Orders*, 3 J. ECON. PERSP. 95 (1989).

81. Environmental Protection Agency, Emission Offset Interpretive Ruling of Dec. 21, 1976, 41 Fed. Reg. 55,524, 55,524-25 (1976) [hereinafter Emission Offset Interpretive Ruling].

82. 40 C.F.R. § 51.18(j) (1986); *see* EPA Emissions Trading Policy, *supra* note 78, at 43,830-31; R. LIROFF, REFORMING AIR POLLUTION REGULATIONS: THE TOIL AND TROUBLE OF EPA'S BUBBLE 23-24 (1986).

83. 40 C.F.R. § 51.18(j) (1986). For a description of the program in its current form, see Emission Offset Interpretive Ruling, 40 C.F.R. app. S (1989).

84. EPA Emissions Trading Policy, *supra* note 78, at 43,825.

85. *Id.*

86. *Id.* at 43,814.

87. Dudek & Palmisano, *Emissions Trading: Why is This Thoroughbred Hobbled?*, 13 COLUM. J. ENVTL. L. 217, 218 (1988) ("[W]idespread adoption of emissions trading has been handicapped by bureaucratic inertia and infighting, dogmatic opposition by environmentalists, hostility in Congress, as well as indifference by polluters.").

88. *See* EPA Emissions Trading Policy, *supra* note 78, at 43,814 (although "EPA endorses emissions trading and encourages its sound use," inclusion in state plans is not mandatory).

89. *See* R. LIROFF, *supra* note 82.

90. *See* Main, *Here Comes the Big New Cleanup*, FORTUNE, Nov. 21, 1988, at 102, 103.

91. *See* Hahn & Hester, *Where Did All the Markets Go? An Analysis of EPA's Emissions Trading Program*, 6 YALE J. ON REG. 109, 113-14 (1989) (description of program's permit-style approach); Hahn & Hester, *supra* note 23, at 374 table.

B. Lead Trading

EPA's lead trading program[92] contrasts with the emissions trading program for other types of air pollution and more closely approximates the economist's ideal of a freely functioning market. One of the first pollutants to be regulated under the CAA was lead, which EPA decided to phase out of gasoline in the early 1970's.[93] The purpose of the lead trading program was to allow gasoline refiners greater flexibility in meeting emission standards during a period when the amount of lead in gasoline was being reduced significantly.[94]

EPA authorized inter-refinery trading of lead credits in 1982.[95] If refiners produced gasoline with a lower lead content than was required by the standard, they earned lead credits.[96] In 1985, EPA initiated a program allowing refineries to bank lead credits,[97] and subsequently firms made extensive use of this program.[98] Unlike many other programs, the lead trading program had a fixed life from the outset.[99] EPA terminated the trading program at the end of 1987, when the lead phasedown was complete.[100]

The lead program was clearly successful in meeting its environmental targets,[101] although the benefits of the trading scheme are difficult to measure directly. The high level of trading between firms far surpassed levels observed in other environmental markets.[102] In 1985, over half of all refineries participated in trading with other firms.[103] EPA estimated savings from the lead trading program of approximately twenty percent over alternatives without lead banking.[104]

---

92. 40 C.F.R. § 80.20(d) (1988); Environmental Protection Agency, Control of Lead Additives in Gasoline, 38 Fed. Reg. 33,734 (1973) (final rule).

93. *See* 38 Fed. Reg. 33,734 (1973); R. MELNICK, REGULATION AND THE COURTS: THE CASE OF THE CLEAN AIR ACT 269-81 (1983) (providing an overview of EPA's nine-year struggle to reach a policy for regulating airborne lead).

94. *See* 40 C.F.R. § 80.20(d) (1988).

95. Environmental Protection Agency, Regulation of Fuel and Fuel Additives, 47 Fed. Reg. 38,078 (1982) (proposed rule); 47 Fed. Reg. 49,322 (1982) (final rule) (codified at 40 C.F.R. § 80.20 (1988)).

96. 40 C.F.R. § 80.20 (1988) (controls applicable to gasoline refineries and importers).

97. *See* 40 C.F.R. § 80.20(a)(1)(ii) (1988).

98. Hahn & Hester, *supra* note 23, at 380-91. By 1987, more than 60% of the lead added to gasoline was traded in the form of "lead rights." *Id.* at 386-87.

99. *See id.* at 381.

100. *Id.*

101. The program did experience some implementation difficulties related to the importation of leaded fuel. However, these difficulties were relatively minor, and it is not clear that a comparable command-and-control approach would have been superior in terms of environmental quality. U.S. GENERAL ACCOUNTING OFFICE, VEHICLE EMISSIONS: EPA PROGRAM TO ASSIST LEADED-GASOLINE PRODUCERS NEEDS PROMPT IMPROVEMENT 17, 24 (1986).

102. *See generally* Hahn & Hester, *supra* note 23 (concluding that lead trading markets were more successful than initial attempts at air and water emissions trading).

103. *Id.* at 385-86.

104. ENVIRONMENTAL PROTECTION AGENCY, COSTS AND BENEFITS OF REDUCING

C. *Tradeable Permits for Water Pollution Control*

The U.S. has had very limited experience with tradeable permit programs for controlling water pollution from nonpoint sources. These sources, particularly agricultural and urban runoff, now constitute the major American water pollution problem.[105] The program to protect the Dillon Reservoir in Colorado shows how tradeable permits can be used to reduce nonpoint-source water pollution.

Dillon Reservoir is the major source of water for the city of Denver.[106] Nitrogen and phosphorus loading threatened to turn the reservoir eutrophic, despite the fact that point sources from surrounding communities were controlled to best-available-technology standards.[107] Rapid population growth in Denver, and the resulting increase in urban surface water runoff, further compounded the problem. State policymakers developed a point/nonpoint-source control optimization program to reduce phosphorus flows mainly from nonpoint urban and agricultural sources.[108]

The point/nonpoint source trading plan began in 1984.[109] It allows publicly owned sewage treatment works to finance the control of nonpoint sources in lieu of upgrading their own treated effluents to drinking water standards.[110] EPA estimates that the plan could save over one million dollars per year.[111] The savings estimate reflects large differences in the marginal costs of control between nonpoint sources and the sewage treatment facilities. Although the structure of the trading program is in place, so far no trading has occurred.[112]

D. *Voluntary Water Exchanges*

Programs allowing voluntary exchange of water rights can alleviate the water supply problems which many Western states face. Such pro-

---

LEAD IN GASOLINE, FINAL REGULATORY IMPACT ANALYSIS VIII-31 (1985).

105. Peskin, *Nonpoint Pollution and National Responsibility,* RESOURCES, Spring 1986, at 10-11.

106. 5 COLO. CODE REGS. § 1002-17 (1984); NORTHWEST COLORADO COUNCIL OF GOVERNMENTS, POINT SOURCES-NONPOINT SOURCES TRADING IN THE LAKE DILLON WATERSHED FINAL REPORT (1984). For a more detailed discussion of this program, see Hahn & Hester, *supra* note 23, at 393-96.

107. OFFICE OF POLICY ANALYSIS, ENVIRONMENTAL PROTECTION AGENCY, CASE STUDIES ON THE TRADING OF EFFLUENT LOADS, DILLON RESERVOIR, FINAL REPORT 3-4, 3-5 (1984).

108. *See* Hahn, *supra* note 80, at 103.

109. R. Kashmanian, Beyond Categorical Limits: The Case for Pollution Reduction Through Trading (1986) (unpublished paper presented at the 59th Annual Conference of the Water Pollution Control Federation).

110. Hahn, *supra* note 80, at 103.

111. Hahn & Hester, *supra* note 23, at 395.

112. *Id.* at 395.

grams increase efficiency primarily by creating economic incentives for water conservation.

In the Imperial Irrigation District (IID) of California, farmers pay as little as $10 for water to irrigate an acre of cotton.[113] Just a few hundred miles away in Los Angeles, local authorities of the Metropolitan Water District (MWD) pay as much as $200 for the same quantity of water.[114] A free market in water rights, allowing voluntary exchanges, could benefit both parties. Farmers would have a financial stake in conserving water. At the same time, such a program would meet urban needs without shrinking agriculture or requiring the construction of new dams and reservoirs. Consequently, environmental quality would be protected.[115]

In March 1983, the Environmental Defense Fund published a proposal calling for MWD to finance the modernization of IID's water system in exchange for the use of conserved water.[116] In November 1988, after five years of negotiation, the two water giants reached agreement on a $233 million water conservation and transfer arrangement[117] that closely parallels EDF's original proposal. This Southern California water swap may be the harbinger of a more enlightened Western water policy. It demonstrates the possibility of executing such trades on a significant scale. Recent reports indicate greatly increased interest in water marketing in Colorado, New Mexico, Arizona, Nevada, Utah, and California.[118]

E. Other Examples

Experience with market incentives goes beyond the four examples we have briefly discussed. Other incentive-based environmental protection strategies include EPA's tradeable permit system for implementing the Montreal Protocol's stratospheric ozone depletion restrictions.[119] In addition, some states are experimenting with comprehensive least-cost

113. Stavins, *supra* note 6, at 4.

114. *Id.*

115. *See* Willey & Graff, *supra* note 50, at 345.

116. R. STAVINS, TRADING CONSERVATION INVESTMENTS FOR WATER: A PROPOSAL FOR THE METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA TO OBTAIN ADDITIONAL COLORADO RIVER WATER BY FINANCING WATER CONSERVATION INVESTMENTS (1983).

117. Morris, *IID Approves State's First Water Swap with MWD,* Imperial Valley Press, Nov. 9, 1988, at 1, col. 6.

118. *See, e.g.,* Atchison, *Where Water is Money in the Bank,* BUS. WK., Aug. 15, 1988, at 50.

119. 53 Fed. Reg. 30,566, 30,567 (Aug. 12, 1988); *see* Montreal Protocol on Substances that Deplete the Ozone Layer, *done* Sept. 16, 1987, *reprinted in* 52 Fed. Reg. 47,489, 47,515-19 (1987); *see also* Hahn & McGartland, *The Political Economy of Instrument Choice: An Examination of the U.S. Role in Implementing the Montreal Protocol,* 83 NW. U.L. REV. 592, 598-604 (1989).

bidding by electrical utilities.[120] Several European nations have also used economic-incentive mechanisms to address environmental and resource issues.[121] These programs will serve as a source of information and experience in what may be a new era of market-based incentives for environmental protection.

III
WINDS OF CHANGE FROM WASHINGTON

For the first time, economic incentive approaches for enhancing environmental quality have moved to center stage in Washington. The current policy debate looks very different from the time when economic incentives were characterized as a "license to pollute" or dismissed as completely impractical.[122] President Johnson's proposal for effluent fees[123] and President Nixon's recommendations for a tax on lead in gasoline and a sulfur dioxide emission fee were dismissed with little consideration.[124]

In this section, we focus on recent developments within the major relevant sectors of the Washington environmental policy community: the administration, Congress, environmental organizations, and private industry.

A. A Hearty Endorsement from the Bush Administration

Early in its term, the Bush administration highlighted the potential for market-based environmental reforms in its proposed amendments to the CAA.[125] The previous administration had generally embraced a market-oriented ideology, but demonstrated little interest in employing actual market-based policies in the environmental area.[126] The Bush ad-

120. Massachusetts, for example, requires all electric utilities to put out for least-cost bidding whenever the utility expands its generating capacity. Boston Bus. J., Oct. 8, 1990, § 1, at 8, col. 1; *see* Stavins, *Innovative Policies for Sustainable Development: The Role of Economic Incentives for Environmental Protection*, 7 HARV. PUB. POL'Y REV. 13, 15 (1990).

121. ORGANIZATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT, RENEWABLE NATURAL RESOURCES: ECONOMIC INCENTIVES FOR IMPROVED MANAGEMENT (1989); J. OPSCHOOR & H. VOS, *supra* note 28.

122. *See* Alm, *The Postregulatory Environmental Protection Regime*, 23 ENVTL. SCI. & TECH. 1338, 1338 (1989).

123. *Id.*

124. *Id.*

125. *See* Hahn, *supra* note 4, at 21-22 (overview of proposal for market-based restructuring of Clean Air Act); *supra* notes 1-3 and accompanying text.

126. To its credit, the Reagan administration endorsed a market-based approach for removing lead from gasoline. However, its energies were targeted primarily at development of a regulatory mechanism intended to foster a more efficient approach to standard setting itself. This was done through Executive Order No. 12,291, 3 C.F.R. 127 (1982), *reprinted in* 5 U.S.C. § 601 app. at 473-76 (1988), which essentially called for benefit-cost analysis of all major new regulatory initiatives. For an investigation of the impacts of the executive order, see generally ENVIRONMENTAL POLICY UNDER REAGAN'S EXECUTIVE ORDER: THE ROLE OF BENEFIT-

ministration, however, is rather enthusiastic about incentive-based strategies for environmental protection. In addition to proposing legislation, EPA Administrator William K. Reilly has established an Economic Incentives Task Force within his agency to identify new areas where market-based approaches can be utilized.[127]

There is strong resistance from some parts of the EPA bureaucracy, however. Some of this resistance is institutional in nature (policy staff versus program staff), while some is professional (economists versus lawyers).[128] Resistance has also come from some bureaucrats whose expertise in setting technology-based standards would become obsolete if the rules of the game were changed.[129] For example, incentive-based policies for controlling acid rain would not require the services of EPA engineers whose task in the current policy regime is to evaluate technologies for disparate sources of emissions across the country. Instead, the decision to elect particular technologies to control pollution would be left up to individual firms. Finally, some of the concern within the EPA bureaucracy may simply reflect skepticism towards new approaches which have not yet been applied on a large scale.

Surely the most important indication of the overall acceptance of these ideas by the administration is its clean air bill. This legislation included provisions for tradeable permits for controlling acid rain and motor vehicle emissions.[130] The President has also endorsed the application of market mechanisms to address concerns about global warming.[131]

COST ANALYSIS (V. Smith ed. 1984).

127. *See supra* note 8 and accompanying text.

128. Note that a number of legal scholars and practicing attorneys have been among the most eloquent spokespersons for economic-incentive strategies for the past two decades. *See, e.g.,* Krier, *Marketlike Approaches: Their Past, Present, and Probable Future,* in REFORMING SOCIAL REGULATION 151 (L. Graymer & F. Thompson eds. 1982); Levin, *New Directions in Environmental Policy: The Case for Environmental Incentives,* in PROCEEDINGS OF ANNUAL MIDWINTER MEETING, AMERICAN BAR ASSOCIATION, SECTION ON NATURAL RESOURCE LAW (1988) (conference in Keystone, Colorado, Mar. 18-20, 1988); Stewart, *supra* note 72.

129. For an early (and critical) exposition of the dynamics of bureaucratic pollution control strategies, see BUREAUCRACY VS. ENVIRONMENT: THE ENVIRONMENTAL COSTS OF BUREAUCRATIC GOVERNANCE (J. Baden & R. Stroup eds. 1981). *See also* R. MELNICK, *supra* note 93 (discussing the role of the EPA bureaucracy in formulation of air pollution regulatory policy).

130. *See supra* notes 1-3, 9-10 and accompanying text. While calling for a market-based approach for reducing pollution from automobiles, the administration's approach also had a strong "hammer" in the form of a clean fuel vehicle program. Critics interpret this clean fuel vehicle program as a mandate for alternative fuel vehicles. For an assessment of political factors affecting the evolution of the Administration's Clean Air bill, see Hahn, *supra* note 4, at 25-30.

131. The President did not suggest that a specific policy was needed to limit greenhouse gas emissions at the time, however. Thus, the policymaking process separates means and ends. *See* Weisskopf, *supra* note 12, at A1, col. 3.

B. *Increasing Curiosity and Interest in Congress*

Regarding environmental legislation, the congressional stance is more important than the position of the executive. An interest and new openness to debate economic incentives is evident in Congress. Significantly, the center has shifted — if only slightly — in the direction of greater use of incentive-based approaches. For example, during the last session of Congress, Congressman Henry Waxman, a leading proponent of environmental issues in the House of Representatives, characterized his own clean air proposals as including the use of economic-incentive mechanisms.[132]

More to the point, legislation introducing market-based approaches for clean air has recently been signed into law. In early April 1990, the Senate passed its version of the clean air bill with a tradeable-permit system patterned after the one proposed in the administration's bill.[133] The House of Representatives did likewise in late May.[134] In November 1990, President Bush signed a compromise between the House and Senate bills[135] which calls for a market-based approach to reducing sulfur dioxide emissions by ten million tons.[136]

---

132. Although Congressman Waxman's decision to characterize his policy proposals as market oriented is evidence of the increased credibility of such approaches, it should also be recognized that his policy proposals should *not* really be described as "market-based." The phrase "market-oriented environmental policy" may itself be coming to assume some political value. Congressman Waxman's remarks are found in SUMMARY OF PROCEEDINGS OF HARVARD UNIVERSITY'S JOHN F. KENNEDY SCHOOL OF GOVERNMENT/PROJECT 88 CONFERENCE (R. Stavins ed. 1989) (Energy and Environmental Policy Center Discussion Paper No. M-89-02, 1989). Congressman Waxman was the person primarily responsible for killing the vehicle emissions trading proposal sent up by the administration. The Congressman argued that the administration's emissions averaging scheme would not achieve reductions commensurate with his command-and-control approach, which focused on reducing tailpipe emissions.

133. S. 1630, 101st Cong., 2nd Sess. (1990).

134. H.R. 3030, 101st Cong., 2nd Sess. (1990).

135. *See supra* note 2.

136. For the new acid rain provisions, see Clean Air Act Amendments of 1990, Pub. L. No. 101-549, §§ 401-413, 104 Stat. 2399, 2584-2634 (1990), which added new sections to the Clean Air Act and prescribed various measures to be taken to reduce acid rain. The law also contains several provisions allowing for increased flexibility in the regulation of fuels and vehicles. These include provisions for meeting production requirements for reformulated and oxygenated fuels in selected nonattainment areas where ozone and carbon monoxide problems exist. *Id.* § 219 (amending CAA § 211, 42 U.S.C. § 7545 (1988) by adding subsection (k) directing the EPA Administrator to promulgate regulations establishing requirements for reformulated gasoline in certain nonattainment areas). In addition, provisions governing vehicle fleets allow for tradeable credits for fleet owners that acquire more than their required share of clean fueled vehicles or who acquire cleaner vehicles than the standards require. *Id.* § 229 (amending the CAA to include a new section (§ 246 "Centrally Fueled Fleets")). In addition, there are provisions that enable the EPA Administrator to grant tradeable credits to manufacturers whose sales of clean fueled vehicles exceed the requirements of the California pilot test program. *Id.* § 229 (amending the CAA to include a new section (§ 249 "California Pilot Test Program")). California also can establish a credit system for clean alternative fuels. *Id.* All of the trading proposals aimed at reducing vehicle emissions are narrower in scope than the ini-

Beyond the Clean Air Act, members of Congress are developing new incentive-based legislative initiatives for a diverse set of problems. For example, the Battery Recycling and Research Act of 1989 would have required motor vehicle battery wholesalers and retailers to accept old batteries from purchasers of new ones and expressly would have allowed for (although would not have mandated) adoption of motor vehicle battery deposit-refund systems at the state or local level.[137] The Consumer Products Recovery Act of 1989, introduced in the Senate by John Heinz and Timothy Wirth, and in the House by Esteban Torres and others, focused on municipal solid waste problems.[138] This bill would have combined recycling targets with tradeable permits and thus allocated the recycling burden among firms in a cost-effective manner.[139] Despite the fact that many of the proposals touched upon here have problematic elements, most contain fundamentally sound market-oriented mechanisms.[140]

C. *Environmental Advocacy Groups*

Congressional opportunities for implementing incentive-based schemes are enhanced by changes in the positions of the major environmental advocacy organizations. The cooperation of these organizations, or at least their tacit support, is virtually essential if there are to be major changes in national environmental policy.

---

tial trading programs proposed by the administration.

137. H.R. 2853, 101st Cong., 1st Sess., 135 CONG. REC. H9211, H9214 (daily ed. Nov. 20, 1989) (later appended as § 107 of the Waste Materials Management Act of 1989, H.R. 3735, 101st Cong., 1st Sess. (1989)).

138. H.R. 2648, 101st Cong., 1st Sess., 135 CONG. REC. H3684 (1989); S. 1181, 101st Cong., 1st Sess., 135 CONG. REC. S6636 (1989).

139. H.R. 2648, *supra* note 138.

140. At the state level, California was considering implementing an emissions averaging scheme for controlling air pollution from motor vehicles. An averaging scheme specifically designed to promote cleaner fuels was also under active consideration. The details of these approaches have yet to be defined. *See* California Air Resources Board, Draft Technical Support Document for Low Emission Vehicles, Clean Fuels, and Gasoline (May 1990) (unpublished working draft). While early proposals made sense in theory, a very real danger existed that they would leave little flexibility in meeting clean air targets. For example, if the averaging scheme for fuels had limited viable options which could be cost-effective, such as reformulated gasolines, then the scheme might have led to outcomes more expensive than necessary for achieving air quality goals. At this time, the use of flexible market mechanisms for the fuel side of the dual standard regime appears to be undergoing substantial reconsideration. *See* B. Sessa & J. Martin, Ultra Clean: Cars and Fuels (Sept. 1990) (press release from the California Air Resources Board) (stating that "Manufacturers have the flexibility of making more cars in stricter categories in exchange for fewer cars in more lenient groups, provided that their overall emissions meet minimum requirements," but failing to mention such provisions in connection with fuel standards). Other proposals are under consideration in California's South Coast Air Quality Management District (metropolitan Los Angeles) which use economic incentives to control air pollution from mobile sources. *See* Mahoney, *South Coast Weighs Marketable Air Emissions Permits,* 1 Cal. Env't Rep. (BNA) 129 (Feb. 18, 1991); Passell, *Sticky Traffic, Slick Fixes,* N.Y. Times, July 25, 1990, at D2, col. 1.

Since the start of the modern environmental period in the early 1970's, most environmentalists — both as individuals and through their organizations — have opposed economically oriented reforms of environmental policies.[141] This may partly reflect the same kind of resistance to incentive-based schemes shown by some federal bureaucrats. Fundamental shifts away from conventional regulatory schemes would change the kind of expertise needed by staff members of the major environmental organizations.

Generalizations offer only limited assistance in understanding the changing positions among members of the environmental community. The environmental movement is heterogeneous in a number of important ways. Perspectives on the appropriate role for incentive-based strategies vary tremendously even among the relatively small set of major national groups that constitute the so-called Group of Ten Plus. For example, as early as 1986, the Executive Director of EDF, Frederic Krupp, spoke in glowing terms of the potential for economic-incentive environmental policies.[142] At the same time, John Adams, Executive Director of the Natural Resources Defense Council (NRDC), seemed to dismiss economic approaches altogether.[143]

Five years later, it appears that a broad array of environmental groups may indeed support market-based reforms. First and foremost, EDF has become an enthusiastic proponent of these ideas.[144] EDF was a major participant in the Project 88 effort and worked closely with White House staff to develop the administration's Clean Air Act proposal.[145] Other environmental groups which count economists among their senior staff members, such as the Wilderness Society and the National Wildlife Federation, have been supportive, although less vocal.[146] A number of other prominent environmental organizations, including the National Audubon Society, the Sierra Club, and NRDC now support at least selective use of economic-incentive mechanisms.[147] NRDC's endorsement

141. *See* R. LIROFF, *supra* note 82, at 8-12.

142. *See supra* note 5.

143. Taylor, *Group's Influence on Environmental Laws, Policies Earns It a Reputation as a Shadow EPA,* Wall St. J., Jan. 13, 1986, § 1, at 50, col. 1.

144. *See* Passell, *supra* note 5, at A1, col. 1.

145. In particular, Environmental Defense Fund economist Daniel Dudek cooperated with key personnel at the Council of Economic Advisers and the Office of the President's Counsel.

146. For a discussion of the National Wildlife Federation's support for market-based approaches to controlling water pollution and waste, see K. JEFFREYS, HOW MARKETS FOR WATER WOULD PROTECT THE ENVIRONMENT (Heritage Found. Backgrounder No. 713, 1989) (available on NEXIS).

147. Support from environmental groups for economic-incentive approaches first materialized in the natural resources area. *See, e.g.,* Rheem, *The Great "Tap Water Rebellion,"* Christian Sci. Monitor, Jan. 14, 1987, at 16, col. 1 (quoting Sierra Club political director Carl Pope saying that "incentives and disincentives work better than rules. Environmentalists have been far too cautious about adopting strategies that use taxes, fees, and similar methods, and far too

of a tradeable-permit system for acid rain control[148] has been particularly important because this organization is a leader on clean air issues.

D. Private Industry

Not surprisingly, the business community has long endorsed cost-effective, market-oriented approaches to environmental protection. However, now that these ideas are no longer simply the province of academic discourse or business discussions, some industry lobbyists are displaying a curious resistance. This contrasts with the largely positive reception from senior management at corporate headquarters.[149] Part of the explanation is associated with a principal-agent phenomenon: private sector lobbyists, like government bureaucrats and environmental advocates, wish to preserve the value of their expertise. Hence, these individuals feel wedded to the status quo. Having learned to fine-tune the regulatory system, they are understandably reluctant to allow any major changes in the rules of the game.[150]

We also note that the private sector recognizes that certain incentive-based instruments can actually cost it more than command-and-con-

---

enamored of complicated regulations."). California's initiatives with least-cost electrical utility planning in the early 1980's and the state's foray into water marketing in the late 1980's met with gradual acceptance from a variety of environmental groups. In both cases, the Environmental Defense Fund led the way, with the Natural Resources Defense Council later becoming aggressively involved. At that time, most environmental groups were still opposed to the use of incentive-based mechanisms, such as tradeable permits or emission taxes, for pollution problems.

148. *See* Wald, *Searching for Incentives to Entice Polluters,* N.Y. Times, Oct. 8, 1989, § 3, at 8, col. 3.

149. For example, General Motors endorsed the adoption of a broad-based carbon fee to limit emissions of greenhouse gases. At a conference held by the United Nations Economic Commission for Europe and the U.S. Environmental Protection Agency in Washington, D.C., George C. Eads, a Vice President and Chief Economist for General Motors Corporation, commenting on a paper by Robert Stavins, said, "[K]eeping up with the needs of the expanding worldwide economy will require . . . steady, but geometric progress [in economic growth linked with pollution control]. . . . That is why we [at GM] have proposed consideration of a carbon fee for dealing with the greenhouse gas phenomenon." G. Eads, Written Comments of George C. Eads (Jan. 25, 1990) (unpublished prepared comments given during workshop on "The Economics of Sustainable Development") (obtained from the author's offices, General Motors Corp., Detroit, Michigan).

150. A classic example in automobile regulation is the fight between the petroleum industry and the automobile industry over whether it is cheaper to control gasoline vapor emissions by installing a device in the car or on the gas pump. The new 1990 Clean Air Act Amendments require both in highly polluted areas, even though imposing both controls makes little sense from an economic point of view. Clean Air Act Amendments of 1990, Pub. L. No. 101-549, §§ 103 (adding CAA § 182(b)(3) ("Gasoline Vapor Recovery") requiring at-the-pump recovery in ozone nonattainment areas), 202 (amending CAA § 202(a)(6), 42 U.S.C. § 7521(a)(6) (1988), to require onboard vapor recovery systems for all light-duty vehicles), 104 Stat. 2399, 2423, 2473 (1990). For an economic analysis of the issue, see L. Lave, W. Wecker, W. Reis & D. Ross, Control of Refueling and Evaporative Emissions from Motor Vehicles (Nov. 9, 1989) (unpublished mimeograph).

trol approaches.[151] Market-based approaches provide a given level of environmental protection at minimum cost for society as a whole. But some incentive-based schemes involve substantial financial transfers between various sectors.[152] In particular, an emission fee or tax is much more costly to the polluting sector than is an equivalent tradeable permit mechanism,[153] because the tax itself is a transfer from that segment of private industry to the government.[154]

Individual businesses are concerned primarily with the immediate impact of new and proposed legislation on profits. Industry may acknowledge deficiencies in the current regulatory approach, but it has learned to live with these shortcomings. In addition, some members of the business community are skeptical about whether the actual implementation of specific market-based approaches will, in fact, lead to greater flexibility. Despite such concerns, however, the overall picture from industry indicates widespread support for a switch to economic-incentive approaches for environmental protection.

IV
WHAT EXPLAINS THESE OBSERVED CHANGES?

The previous discussion illustrates growing support for incentive-based policies among various groups involved in the policy process. This shift in perspective is not self-explanatory, however. This section explores some of the reasons behind the change in attitudes toward the use of economic incentives to control pollution.

Nearly ten years ago, political scientist Steven Kelman investigated the positions held by Congressional staff members regarding economic-incentive approaches to environmental protection.[155] He discovered that Democrats generally did not favor these approaches, and moreover, that they did not really understand the ideas behind them.[156] When Kelman

151. S. KELMAN, WHAT PRICE INCENTIVES? ECONOMISTS AND THE ENVIRONMENT 120 (1981). Kelman's 1978 survey of the representatives of trade associations concerned with air and water pollution revealed deep-seated hostility to charge-based systems. However, in Kelman's view, few if any of the industry representatives he interviewed displayed sufficient knowledge of incentive-based instruments to compare the alternatives with precision. *Id.*

152. Each such transfer is a "wash" in terms of contributing to overall societal costs.

153. "Equivalent" in the sense that a specific tax and a specific tradeable permit system can achieve the same amount of environmental protection. The lower cost of the trading scheme assumes that the permits are distributed free of charge. If the permits are auctioned or in some other way sold to recipients, there is a consequent financial transfer from the private sector to the government, as in the case of taxes.

154. Even so, incentive schemes still achieve a given level of pollution control at a lower cost to society as a whole, compared with command-and-control regulation. The distribution of costs may differ, however, depending on the particular mechanisms used. *See* T. TIETENBERG, *supra* note 16, at 306-32.

155. Kelman focused on emission charges, as opposed to marketable permits, because the former were more frequently discussed at the time. S. KELMAN, *supra* note 151, at 94-99.

156. *Id.* at 100-01.

spoke with Republicans, he found that they *did* support incentive-based approaches, although they did not understand them either![157]

What would we find if we were to redo Kelman's survey today? As indicated above, we would find more support among both Democrats and Republicans, but would we find more understanding? The likely answer is that there is not enough of an increase in understanding to fully account for the magnitude of change in the degree of support. What else has happened to explain this shift in opinion?

A. Increased Costs of Pollution Control

First, some political liberals and environmentalists now question whether conventional command-and-control regulations can reasonably produce further gains in environmental quality. The costs of environmental control continue to rise as we move further up the marginal cost-of-control curve. Costs of compliance with environmental regulations in the U.S. have reached about ninety billion dollars per year, which is an increase of nearly forty percent since 1984.[158] As a result, many in the policy community are beginning to seriously consider the possibility that alternative means of achieving national environmental goals may be more cost-effective than the conventional command-and-control approaches.

B. Changes in the Macroeconomy

The current economic climate in the U.S. is dramatically different from that of twenty years ago. Today, both domestic productivity and international competitiveness are matters of great concern.[159] Furthermore, the reality of chronic, large federal budget deficits means that there is considerably less support for spending more government resources on existing policy approaches. Consequently, regulatory approaches that exact a high economic price are generally viewed unfavorably. The larger economic trends are by no means irreversible. Interest in cost-effective environmental policies may diminish significantly if the U.S. regains the unique position of strength it previously held in the international economic arena or if federal budget deficits cease to be of pressing concern. Neither development seems very likely, however, suggesting

157. *Id.*

158. In 1984, total U.S. expenditures on pollution control amounted to about $65 billion: 63% by businesses, 21% by all levels of government, and 16% by consumers. Total pollution-control expenditures were about 1.8% of GNP. *See* Farber & Rutledge, *Pollution Abatement and Control Expenditures,* 66 SURV. CURRENT BUS., July 1986, at 94, 97.

159. For an analysis of the impact of environmental regulation on domestic productivity, see Jorgensen and Wilcoxen, *Environmental Regulation and Economic Growth,* 21 RAND J. ECON. 314-340 (1990).

that there is little prospect for a return to environmental policymaking that disregards efficiency.

C. New Environmental Concerns

The set of environmental problems needing policy solutions has also changed. Some emerging problems, like acid rain and the control of CFC emissions, have neither a bureaucratic nor industrial constituency wedded to the current policy.[160] Similarly, EPA accomplished the nationwide phasedown of leaded gasoline with an incentive-based mechanism (lead credits tradeable between refineries)[161] in the face of only moderate resistance from environmentalists. Neither public-sector nor private-sector constituencies depended upon preexisting policy mechanisms.[162]

D. Political Realignment

Changes in attitudes toward the use of economic policy instruments for environmental regulation naturally reflect political realities. The current regime is a moderate Republican administration and "fiscally responsible environmental protection" does have the sound of the quintessential moderate Republican issue. The Bush administration perceives an opportunity to woo many moderate voters by taking an aggressive, although cost-effective, approach to addressing environmental concerns.[163]

Beyond this, over the past decade and a half there has been increasing support across the political spectrum for market-oriented solutions to various social problems. Committee deliberations regarding deregulation of the airline, telecommunications, trucking, and banking industries evi-

---

160. Obviously, utilities opposed acid rain legislation and CFC producers and users resisted limitations on their behavior. However, once it was clear that significant action would be taken, the field was relatively wide open to choose among policy instruments.

161. *See supra* text accompanying notes 92-104.

162. Compare the reception given to President Bush's proposal in 1989 for vehicle emissions trading and the analogous program developed years earlier for "Corporate Average Fuel Economy" (CAFE). The two policies embraced very similar approaches to the problems of mobile source air pollution and motor vehicle fuel efficiency. The CAFE standards were enthusiastically supported by the environmental community as the first attempt by the government to affect the fuel efficiency of motor vehicles. For a discussion of the evolution of the CAFE standards, see generally R. CRANDALL, H. GRUENSPECHT, T. KEELER & L. LAVE, REGULATING THE AUTOMOBILE 117-40 (1986). However, vehicle emissions trading, which averages emissions across models from a single manufacturer, was successfully and vigorously opposed by environmental interest groups as an attempt to roll back controls for some models. For a discussion of the history of conventional attempts to regulate emissions, see *id.* at 85-116.

163. *See* Hahn, *supra* note 4, at 22.

dence this change.[164] This change in political attitudes has created openings for incentive-based policies in environmental regulation.[165]

E. Modest Proposals for Supplementing Existing Policies

Contemporary recommendations for environmental policy reform, such as the proposed marketable permit system for acid rain control, do not call for abandoning environmental policies developed over the past twenty years. For example, the administration's proposed acid rain tradeable-permit plan allotted annual sulfur dioxide allowances based upon emission standards defined under the previous, conventional approach to air pollution control.[166] Furthermore, trading in areas which have not yet acheived local, ambient standards for concentrations of sulfur dioxide would be subject to the approval of the Administrator of EPA.[167]

Recent calls for policy change recognize that incentive mechanisms are *not* appropriate for all environmental problems. Rather, substantial gains can be made by *selectively* supplementing conventional, command-and-control policies with market-based strategies. The current round of proposals is not really a call for deregulation, but for new and improved regulation.

F. Separating Means and Ends

Separation of goals and standards from the means of achieving those goals and standards holds symbolic importance. Implicit within the current round of incentive-based recommendations is the notion of using the conventional deliberative process to establish goals and standards, while achieving those standards by the least-cost means.[168] This is precisely

164. *See generally* Garland, *Deregulation and Judicial Review*, 98 HARV. L. REV. 507, 508 (1985).

165. As we noted earlier, the change in rhetoric has sometimes been greater than the change in reality. *See supra* note 132 and accompanying text.

166. Administration Bill, *supra* note 1, § 501 (which would have added §§ 502, 504 to the CAA establishing baselines based either on 1985-87 fuel consumption or on the "level specified for that unit in the 1985 National Acid Rain Precipitation Assessment Program (NARPAP), Emissions Inventory, Version 2"); *cf.* Clean Air Act Amendments of 1990, Pub. L. No. 101-549, § 401, 104 Stat. 2399, 2635 (1990) (adding CAA § 403 following a similar approach). For a basic description of a different new approach, calling for an "Acid Rain Reduction Credit Program," see PROJECT 88, *supra* note 6, at 30-34.

167. Administration Bill, *supra* note 1, § 501 (which would have added § 504(c) (regarding interpollutant trading)). *But see* Clean Air Act Amendments of 1990, Pub. L. No. 101-549, § 401, 104 Stat. 2399, 2584 (1990) (adding CAA § 403(c) which calls for EPA merely to conduct a study on the subject of interpollutant trading). On the other hand, there can be severe limitations associated with attempting to graft an incentive-based approach onto an existing command-and-control structure. This is one of the lessons of EPA's emissions trading program. *See* Merrifield, *A Critical Overview of the Evolutionary Approach to Air Pollution Abatement Policy*, 9 J. POL'Y ANALYSIS & MGMT. 367 (1990).

168. There are, of course, limitations to the wisdom of separating means and ends, since

the approach that was taken during the past year with acid rain control. A political consensus had emerged by President Bush's January 1989 inauguration for a ten-million ton reduction in annual sulfur dioxide emissions. The subsequent congressional debate focused on the means of achieving that goal. Likewise, in the case of leaded gasoline, Congress and the administration reached agreement on the goal of substantial phase-down in the lead content of motor vehicle fuels prior to deliberations on the tradeable permit mechanism which refineries eventually adopted and successfully applied.[169]

By separating means and ends, the current round of incentive-based policy proposals do not require the use of cost-benefit analysis. Thus, there is no need to evaluate environmental amenities in purely economic terms, something which has traditionally been most vigorously opposed by virtually all environmental organizations and by most others in the policy community.[170]

G. *Coincidence and the Policy Process*

We summarize a number of our observations by saying that there are circumstances which enhance the appeal of certain policy goals and mechanisms. Periods of high income are conducive to moves toward stricter environmental goals, due to positive income elasticity of demand for environmental amenities. However, periods of concern regarding domestic productivity and international competitiveness favor consideration of cost-effective policies. Of course, there is an element of chance which brings forth the "right person at the right time." Specific individ-

---

we risk designing the proverbial fast train to the wrong station. Hence, each individual environmental problem must be examined independently so that an informed judgement can be made regarding the wisdom of designing and advocating a cost-effective mechanism for achieving what may not be a truly efficient solution. Libertarian environmental economists, it should be noted, have *not* been satisfied by such a caveat. They have consistently argued against cost-effective policies, and have advocated instead a singular focus on achieving efficient solutions through complete reliance on systems of private property rights. A concise statement of this position is found in Smith, *"Let's-Pretend" Markets,* POL'Y REV., Summer 1989, at 94, 95. *Cf.* Stavins, *Robert Stavins Responds,* POL'Y REV., Summer 1989, at 95, 96 (response to Smith's position). Smith's statement is a critique of Stavins, *Clean Profits: Using Economic Incentives to Protect the Environment,* POL'Y REV., Spring 1989, at 58. For one recent exposition of the libertarian position (which characterizes cost-effective policy mechanisms as "market socialism"), see J. GWARTNEY & R. STROUP, ECONOMICS: PRIVATE AND PUBLIC CHOICE (4th ed. 1987), or, more recently, R. Stroup, Market Approaches to Environmental Policy: Usefulness and Limitations (July 19, 1990) (paper presented at the Political Economy Research Center Conference, Gallatin Gateway, Montana).

169. As mentioned previously, the administration takes a similar approach of separating goals and mechanisms for achieving those goals in its internal deliberations on global climate change. *See supra* note 12.

170. F. Krupp, Remarks Presented at EPA Annual Meeting (Kansas City, Missouri, Nov. 14, 1989). The current round of proposals call for "cost-effectiveness" or minimizing the cost of achieving a given standard or goal. There is *not* necessarily a call for "efficiency," which maximizes net benefits or the difference between benefits and costs.

uals in key positions at the White House, EPA, and environmental organizations contributed significantly to the observed policy outcomes of the past two years.[171] The following sections explore the conditions for change in greater detail.

V
IDENTIFYING THE CONDITIONS FOR CHANGE

Any further decisions by policymakers to use economic incentive approaches will depend on a variety of factors. In this section, we offer a parsimonious account of key factors motivating actual decisions to use economic instruments to address environmental problems. Based upon the observations of the previous section, we draw generalizations regarding the future adoption of economic-incentive measures. We conclude that economic approaches are a function of a number of variables and will be utilized more frequently in response to increases in:

(1) the political demand for environmental quality;
(2) the incremental cost of providing additional improvements in environmental quality;
(3) the potential of incentive-based policies to improve environmental quality, while also sustaining industry profits, compared with available alternative policies;
(4) the influence of bureaucrats who will implement incentive-based programs;
(5) the absence of concentrated "losers";
(6) understanding of how economic instruments work in theory and in practice; and
(7) the level of confidence in actual applications of economic instruments.

The first two factors relate to the overall provision of environmental quality. The third, fourth, and fifth factors help to nurture support from key special interest groups. Finally, the sixth and seventh factors affect attitudes towards economic instruments among policymakers, the business community, key interest groups, and the general public. Differences in acceptance of various market-based proposals result from alternative values of the seven "variables." The following sections discuss each of these enabling factors in greater detail.

171. Were one to analyze quantitatively the factors contributing to observed policy outcomes it would be necessary to consider the role played by these individuals. To do otherwise would be analogous to omitting consideration of the role of management when investigating the factors affecting production of private goods and services.

A. *Political Demand for Environmental Quality and the Cost of Pollution Control*

Politicians are willing to devote greater resources to environmental concerns as the political demand for environmental quality increases. Public concern about the environment has increased dramatically over the last few years; in many developed countries the environment could be a key issue in national elections.[172] The dilemma of how to meet this increased demand for environmental protection confronts politicians throughout the world.[173] This explains, in part, why President Bush, EPA Administrator Reilly, and Senators Wirth and Heinz have taken the lead in promoting incentive-based policies.[174] The growing demand for environmental quality may thus translate into increasing acceptance of market-based regulatory schemes.

The demand for innovative, cost-effective responses increases as the cost of controlling pollution rises. Incentive schemes also become more attractive as the cost of command-and-control approaches increases *relative to* market-based approaches. Many of the relatively low-cost fixes for controlling pollution have already been implemented, at least in the U.S.[175] Markets, therefore, present an attractive alternative for enterprising politicians who wish to identify alternative paths that could lead to greater environmental quality at lower cost.[176]

---

172. Public opinion polls indicate that public concern over environmental quality has remained strong during energy crises, economic downturns, and tax revolts. *See* Dunlap, *Polls, Pollution, and Politics Revisited: Public Opinion on the Environment in the Reagan Era,* ENVIRONMENT, July-Aug. 1987, at 7, 7; Ladd, *Clearing the Air: Public Opinion and Public Policy on the Environment,* PUB. OPINION, Feb.-Mar. 1982, at 16, 16; Lamm & Barron, *The Environmental Agenda for the Next Administration,* ENVIRONMENT, May 1988, at 17, 17.

173. Although environmental policy remains *the* priority issue for only a handful of members of either house of Congress, the environment is one of the three or four major issues for a substantial number of members.

174. *See The Greening of George Bush, supra* note 1, at 29 (outlining the scope of Reilly's and Bush's support for market-based policies). In the summer of 1990, Senators Wirth and Heinz initiated Round II of Project 88. This extension of the original Project 88 effort focuses on design and implementation issues associated with three problem areas: global climate change, hazardous and solid waste, and resource management issues. *See* Project 88 — Round II, Incentives for Action: Designing Market-Based Environmental Strategies (R. Stavins ed. March 1991) (draft of a public policy study sponsored by Senator Timothy E. Wirth, Colorado, and Senator John Heinz, Pennsylvania).

175. *See* PROJECT 88, *supra* note 6, at 1-2 (the incremental costs of pollution control can only increase in the future). As to the expense of these fixes generally, see Stavins, *supra* note 6, at 7, 28.

176. President Bush's appreciation of incentive-based approaches dates back to his chairmanship of the Task Force on Regulatory Relief during the early days of the Reagan administration. *See Reagan Holds Firm on Clean Coal Program, Plans to Request $2.5 Million in Funding,* B.N.A. Daily Report for Executives, Jan. 27, 1988 (available on LEXIS) (discussing the task force's proposals for incentive-based mechanisms in coal-burning cleanup efforts). *See generally* R. LITAN & W. NORDHAUS, REFORMING FEDERAL REGULATION (1983). In a variety of regulatory spheres and applications, such as the phasedown of leaded gasoline, the President recognizes the importance of industry flexibility in the means of meeting social policy

B. Support from Key Special Interest Groups

Key special interest groups[177] have played important roles in promoting or, alternatively, retarding resistance to incentive-based policy innovations. This involvement reflects broader forces affecting interest groups and their role in the policy process.[178]

Outside interest groups fall into two broad categories — industry and environmental. Both are special interest groups, although industry trade associations are typically labelled "private interest groups" and environmental organizations are usually described as "public interest groups." This nomenclature is reasonable only in the sense that industry associations represent special interests associated with "private goods," whereas environmental groups represent special interests concerned with the provision of "public goods."

Incentives exist for both groups to avoid endorsing specific market-based approaches. On the one hand, industry representatives generally want *low levels* of control (relatively weak environmental standards) and are hence afraid of endorsing any policy mechanism (including cost-minimizing ones) for fear that they may open the way to stricter standards.[179] On the other hand, environmental advocacy groups care mainly about achieving *high levels* of control and, therefore, are disinclined to devote attention to the implementation of cost-minimizing strategies for achieving given goals and standards.[180] At best, the result is a form of benign neglect from both groups.

For environmental groups to support these approaches, they need assurances that the level of environmental quality achieved using a market approach will be at least as high, if not better than, that likely to be achieved under other systems. Similarly, individual industries must be persuaded that profits will generally be higher than under alternative ap-

---

goals.

177. We use this term neutrally, not disparagingly: special interest groups play important and often useful roles in a representative democracy.

178. For a discussion of the impact of such groups on the use of alternative instruments for environmental protection, see Buchanon & Tullock, *supra* note 31; Hahn, *The Political Economy of Environmental Regulation: Towards a Unifying Framework*, 65 PUB. CHOICE 21 (1990); Maloney & McCormick, *A Positive Theory of Environmental Quality Regulation*, 25 J.L. & ECON. 99 (1982).

179. There are obvious exceptions in cases where an incentive-based approach is clearly in a particular industry's relative economic interest. For example, the American Gas Association was an early proponent of a tradeable permit approach to acid rain control because of the incentive it would give electrical utilities to choose clean fuels, such as natural gas. *See, e.g.*, Planning and Analysis Group, American Gas Association, An Evaluation of Alternative Control Strategies to Remove Sulfur Dioxide, Nitrogen Oxides, and Carbon Dioxide at Existing Large Coal-Fired Facilities (Jan. 13, 1990) (unpublished paper available from the AGA, Arlington, Virginia, 22209).

180. There is the important exception, which we noted previously, of the Environmental Defense Fund, which has been outspoken on behalf of incentive-based environmental policies. Other environmental groups have been far less vocal, although they may be tacit supporters.

proaches. Although unanimous support from all industries or environmental groups is not required to implement market-based approaches, significant coalitions of industry or environmental groups can block legislative action or regulatory initiatives.[181]

Private industry typically is reluctant to endorse any environmental policy mechanism for fear of implicitly endorsing the related environmental goal. Nevertheless, once it becomes clear that some form of pollution control is forthcoming, industry has an incentive to lobby for the least burdensome policy approach. In this regard, private industry will, in most cases, tend to favor tradeable permit systems over pollution taxes because taxes involve the "double penalty" of the cost of compliance plus the tax.

Likewise, environmental organizations typically have supported command-and-control approaches. These groups, given the choice between marketable permits and emission taxes, may also prefer permit schemes. The reasoning is different than that of industry, of course. Environmental groups will tend to avoid or disfavor policy instruments that make the costs of environmental protection highly visible to consumers. The tax approach makes this *cost of environmental quality* more explicit to consumers than the permit approach.[182] Consumer support for environmental policies may wane as costs become more apparent. Tradeable

181. Significant coalitions of industry and environmental groups can also be a proactive force for new environmental policies. For example, in the Los Angeles area, the draconian regulations proposed last year to bring the South Coast Air Quality Management District in line with Federal guidelines have prompted a regional alliance of private industry and environmentalist forces such as the Environmental Defense Fund, to develop counter-proposals for a diversified set of economic-incentive policy mechanisms to reduce air pollution. *See* Passell, *supra* note 140, at D2, col. 1. Another example is the Conservation Foundation's National Wetlands Policy Forum, through which William K. Reilly, then President of the Conservation Foundation, brought together representatives of government, private industry, and environmental organizations. One result of that effort is the Bush administration's enunciated policy of "no net-loss" of wetlands. *See* R. Stavins, The Decline of American Wetlands (March 25, 1990) (working paper, John F. Kennedy School of Government, Harvard University). A final example of the potential effect of such multisector coalitions is the Project 88 effort of Senators Wirth and Heinz, which brought together leaders from government, environmental groups, private industry, and academia. This coalition provided heightened visibility and, thus, credibility for the general notion of incentive-based approaches to environmental protection. *See* Passell, *Private Incentives as Pollution Curb,* N.Y. Times, Oct. 19, 1988, at D2, col. 1; *The Greening of the Invisible Hand,* ECONOMIST, Dec. 24, 1988, at 107.

182. For precisely this reason (i.e., because the impact of emission taxes is more visible to consumers than is the impact of equivalent tradeable permits), private industry may strategically choose to endorse a pollution tax approach, in the hope that consequent public opposition will result in a *less stringent goal* being established. This may have happened in the closing days of the 1990 Clean Air debate in the U.S. Senate. When it became clear that a 10-million ton sulfur dioxide tradeable permit program was about to be passed, electrical utilities proposed a sulfur dioxide tax as an alternative policy mechanism. *See* D. Gaskins & B. Stram, A Meta Plan: A Policy Response to Global Warming (May 8, 1990) (unpublished paper presented at John F. Kennedy School of Government, Harvard University). Gaskins and Stram propose a worldwide carbon tax scheme as a policy response to global warming and discuss the cost-revealing advantages of taxes. *Id.* at 47.

permit approaches also have other advantages over taxes that tend to garner support from environmental groups. Permit schemes specify the *level* of environmental protection that will be achieved. Moreover, the effect of tax schemes depends on uncertain responses from polluting firms.

Market-oriented approaches, like their command-and-control counterparts, require government commitments to monitoring and enforcement. Hence, one means of gaining support from environmental groups is to increase outlays for monitoring and enforcement activities. Apparently, environmental groups insisted on continuous emission monitors as a *quid pro quo* for obtaining their tacit support for the tradeable permit proposal for acid rain.[183]

C. *Support from the Bureaucracy*

Support from bureaucrats charged with implementing programs is critical. First, these individuals are often well connected with their legislative counterparts and thus can influence policy formulation and execution.[184] Second, these officials will not implement a program effectively unless they are committed to it.[185]

The bureaucracy supporting environmental interests generally has concerns similar to those of the environmental community.[186] This segment of the bureaucracy may also worry that a particular proposal will diminish their influence or affect their prospects for employment. Because market-based environmental policy approaches require that the bu-

183. Environmental groups have frequently applied a different and more rigorous standard in measuring market-based systems against their command-and-control counterparts, possibly because of their belief that market-based systems are in some sense immoral, because they validate pollution by purporting to sell the right to pollute. *See, e.g.,* Hahn & Hester, *supra* note 23, at 397.

184. *See* D. HENNING & W. MANGUN, MANAGING THE ENVIRONMENTAL CRISIS 51 (1989) ("The values of the individuals who implement the decisions are important. . . . This is so because they can have a powerful effect on the shape of ultimate policy after the normative tasks of setting objectives and ranking options have been completed at higer levels."); Rosenbaum, *The Bureaucracy and Environmental Policy,* in ENVIRONMENTAL POLITICS AND POLICY: THEORIES AND EVIDENCE 212 (J. Lester ed. 1989).

185. *See* D. HENNING & W. MANGUN, *supra* note 184, at 51-55; Rosenbaum, *supra* note 184.

186. The program offices within EPA exist primarily to further the environmental goals set by Congress. Environmentalists typically exercise a great deal of influence over how those laws are written. Indeed, in many instances, environmental lawyers from lobbying groups do the actual drafting of key parts of environmental legislation, as do the representatives of many private sector lobbies for other legislation. Because members of the program offices are interested in expanding their power, there is a natural overlap between their interests and those of the environmental lobbying groups. In addition, people in the program offices tend to "self-select" on the basis of their commitment to federal regulation of industrial activity. Thus, their interests and policy preferences tend to coincide with those of mainstream environmental lobbying groups. *See* D. HENNING & W. MANGUN, *supra* note 184, at 59-60; Rosenbaum, *supra* note 184.

reaucracy engage in new and different functions, one might expect some bureaucratic resistance to a large-scale move toward market-based approaches proposed in isolation. Indeed, this may help explain why policymakers have not presented such large-scale proposals as distinct pieces of legislation but, rather, tend to link them with broader programs. For example, the administration's proposals for acid rain were part of a much larger package that also increased the traditional functions of the bureaucracy.[187]

As the bureaucracy has grown more aware of the reasoning behind market-based approaches, it has responded to them more favorably. Younger staff members in particular have been influenced by the growth over the past decade of the "law and economics" movement within major law schools and the proliferation of professional schools of public policy. As a consequence, these younger officials have a better understanding of economic approaches to regulation. This understanding does not translate automatically into greater support for incentive schemes, but does foster greater openness to debate.

Perceptions that incentive-based policies originate from initiatives within the EPA bureaucracy itself also enhance the appeal of these proposals. For example, in the past, the EPA's Office of Air Quality Planning and Standards (OAQPS) was instrumental in retarding the evolution of emissions trading.[188] Part of that resistance may be explained by a "not invented here" syndrome because the initial impetus for the emissions trading program came primarily from within the Office of Planning and Management. This situation reversed itself, however, with the introduction of the President's market-based acid rain initiative. The OAQPS came to promote the limited use of markets to reduce the sulfur dioxide emissions that cause acid rain. At that point, the OAQPS had a vested interest in promoting the idea.

D. Public Perceptions and Interest Group Attitudes

The level of support for market-based approaches among interest groups and the general public will reflect the degree of understanding about how these instruments work in theory, as well as perceptions about how they have performed in practice. Although interest groups have a better understanding of these issues at present, it is doubtful that the general public finds it worthwhile to learn about these "details." Voters

187. The administration's clean air proposals for air toxics, ozone nonattainment, and general permitting called for dramatic increases in federal regulatory authority and responsibility. *See, e.g.,* Administration Bill, *supra* note 1, §§ 301 (amending CAA § 112, 42 U.S.C. § 7412 (1988), to include a dramatically expanded list of regulated "Hazardous Air Pollutants"), 103 (adding a new subpart 2 to CAA tit. I, pt. D, expanding and specifying provisions to combat ozone in nonattainment areas).

188. R. MELNICK, *supra* note 93, at 40.

may choose to remain "rationally ignorant"[189] on such issues, or they may simply lack the expertise to engage in substantive consideration of the issues, preferring instead to make decisions based on broad ideological views. Selected interest groups, on the other hand, have a vested interest in assessing how market-based instruments have performed in the past. Some environmental groups have assiduously attempted to discredit the performance of environmental markets. In the past, several groups sued to stop the evolution of markets, arguing that such markets gave firms licenses to pollute.[190] Perceptions are changing, however, in part due to new political and economic realities.

Factors affecting the introduction of economic instruments also affect their likely shape and performance. For example, there is a tendency in marketable permit schemes to grandfather[191] permits and in effluent fee systems to recycle revenues to selected polluters. Both of these approaches represent an implicit recognition of the political importance of the existing distribution of wealth. Moreover, existing approaches generally build on databases and regulations that are already in place. Actual incentive-based policies, therefore, tend to depart quite dramatically from the economist's textbook definition of cost-effective markets for pollution control.

Some environmental problems are more likely than others to be addressed through the use of economic instruments. In general, emerging environmental issues are better candidates than problems that are already regulated. This is because the constituencies that are being regulated are often comfortable with the status quo, and thus, are more likely and able to resist change. For example, we would expect that, all other

189. According to what has come to be called the rational voter model, citizens in a representative democracy may choose to be well informed on some issues, less than "perfectly informed" on other issues, and quite *uninformed* on others. A. DOWNS, AN ECONOMIC THEORY OF DEMOCRACY (1957) (one of the first works investigating the various degrees of voter awareness). This occurs because information gathering is costly. Among the factors which may make a difference are individuals' perceptions of the likelihood of their votes affecting the outcome and their perceptions of the importance of the given issue or interest in a given campaign. D. MUELLER, PUBLIC CHOICE II 205-06, 349-61 (1982). It is clear, however, that much more is involved than opportunity costs of voting or information gathering or the likelihood of affecting outcomes. *See generally* Riker & Ordeshook, *A Theory of the Calculus of Voting,* 62 AM. POL. SCI. REV. 25 (1968). Indeed, one particularly comprehensive study concluded that "[t]he theory of voting that is best supported by our results is that which posits a sense of duty or obligation as the primary motivation for voting." Ashenfelter & Kelley, *Determinants of Participation in Presidential Elections,* 18 J. L. & ECON. 695, 724 (1975).

190. *See* R. LIROFF, *supra* note 82, at xv ("To its critics, however, emissions trading poses a threat to the environment, one that allows industries to avoid needed controls and take advantage of loopholes in the regulatory system.").

191. Grandfathering refers to the practice of distributing transferable property rights on the basis of actual allocations at a specified time, either past or present. Thus, if firms were emitting 100 tons of emissions and the goal was to reduce emissions by 50% using a tradeable permit approach, then firms would be given roughly 50 tons worth of emissions permits under grandfathering.

things being equal, markets for reducing acid rain and chlorofluorocarbons would be more amenable to regulation through the use of economic incentives than the achievement of ambient standards for conventional air pollutants.[192] Once command-and-control is in place, it is difficult to supplant because it has a great deal of political appeal.

The world of public policy formulation is, of course, inherently dynamic. The factors influencing the types of policies that receive serious consideration are themselves likely to change over time. For example, perceptions of past performance of economic incentive mechanisms are likely to vary as more research is conducted and as new mechanisms are implemented. Whether these perceptions change in a positive or negative direction will influence whether market approaches are more or less likely to be utilized in the future.

E. The Role of Equity Considerations

We have focused our attention throughout this Article on the notion of cost-effective policies, that is, policy mechanisms which can enable us to achieve environmental goals and standards at the least overall cost to society. As we indicated previously, economists have dedicated much attention to the possible use of economic reasoning to help establish environmental goals and standards. In those cases, we are searching for efficient policies which provide for the greatest net benefits, rather than simply cost-effective ones. But efficiency or cost-effectiveness constitute only one of a number of criteria which policymakers need to consider when evaluating existing and proposed public policies. Prominent among those other criteria[193] is the notion of fairness or equity.

Market-oriented environmental policies bring some good news and some bad news. The good news is that environmental goals can be achieved at lower aggregate cost to society, often much lower than with conventional command-and-control approaches. Thus, society as a whole is better off than it would otherwise be. The bad news is that some individuals may "lose," even though society gains as a whole.[194] In other words, even though the aggregate benefits of a policy greatly exceed its aggregate costs, for some individuals or firms, benefits will be *less* than costs. Even the best of policies, whether conventional or incentive-based, inevitably cause some individuals to be in a worse position than they were in previously.[195]

---

192. Also, as indicated previously, the uniformly mixed, common-property nature of the acid rain and stratospheric ozone depletion problems makes them more amenable to effective control with incentive-based means than are highly localized problems with threshold health effects, such as some forms of hazardous air and water pollution.

193. For a list of nine criteria of improved environmental policy, see Stavins, *supra* note 6, at 28.

194. This is also true of conventional command-and-control policies.

195. For comparisons of incentive-based and conventional environmental policies in terms

The distributional implications of environmental policies certainly raise legitimate concerns. In the political context, it is particularly important to consider the impacts of alternative policies on interests that are *concentrated,* i.e., which significantly affect a relatively small number of individuals or firms.[196] Short-run cost effects of most environmental policies are concentrated on the affected firms and their shareholders and employees.[197] But most analyses of the distributional implications of environmental laws and regulations have focused on the relatively diffuse effects on various income classes,[198] regions,[199] or groups of consumers of particular products.[200] These studies explore the distribution of the benefits and costs of environmental regulations.[201]

Available evidence provides substantial support for the notion that, overall, environmental protection policies redistribute welfare to higher income groups from lower income groups.[202] However, there is no evidence that incentive-based policies, in general, tend to be any more or less regressive than conventional, command-and-control approaches.

---

of their differential equity or distributional impacts, see Buchanan & Tullock, *supra* note 31 (comparing direct regulation to penalty taxes and charges); Dewees, *Instrument Choice in Environmental Policy,* 21 ECON. INQUIRY 53, 53-54 (1983); Harrison & Portney, *Who Loses from Reform of Environmental Regulation?,* in REFORM OF ENVIRONMENTAL REGULATION (W. Magat ed. 1982); Leone & Jackson, *The Political Economy of Federal Regulatory Activity,* in STUDIES IN PUBLIC REGULATION 231, 231 (G. Fromm ed. 1981).

196. *See* Dewees, *supra* note 195, at 53. Earlier analyses of the political significance of concentrated interests were provided in Peltzman, *Toward a More General Theory of Regulation,* 19 J. L. & ECON. 211 (1976); Stigler, *The Theory of Economic Regulation,* 2 BELL J. ECON. & MGMT. SCI. 3 (1971).

197. Examples of examinations of the incidence of pollution control costs on individual industries include Koch & Leone, *The Clean Water Act: Unexpected Impacts on Industry,* 3 HARV. ENVTL. L. REV. 84 (1979); Maloney & McCormick, *supra* note 178 (focusing on OSHA cotton dust standards and EPA's prevention of significant deterioration program and its impact on certain industries). The following authors examine the distributional consequences of environmental regulation for labor: Yohe, *The Backward Incidence of Pollution Control—Some Comparative Statics in General Equilibrium,* 6 J. ENVTL. ECON. & MGMT. 187, 187-88 (1979); Yu & Ingene, *The Backward Incidence of Pollution Control in a Rigid-Wage Economy,* 9 J. ENVTL. ECON. & MGMT. 304, 310 (1982).

198. *See* W. BAUMOL & W. OATES, *supra* note 17; D. HARRISON, WHO PAYS FOR CLEAN AIR: THE COST AND BENEFIT DISTRIBUTION OF AUTOMOBILE EMISSION STANDARDS (1975); Asch & Seneca, *Some Evidence on the Distribution of Air Quality,* 54 LAND ECON. 278 (1978); Dorfman, *Who Will Pay for Pollution Control? The Distribution by Income of the Burden of the National Environmental Protection Program, 1972-1980,* 28 NAT'L TAX J. 101 (1975); Giannesi, Peskin & Wolff, *The Distributional Effects of Uniform Air Pollution Policy in the United States,* 93 Q.J. ECON. 281, 293-98 (1979).

199. *See* W. BAUMOL & W. OATES, *supra* note 17; D. HARRISON, *supra* note 198; Giannesi, Peskin & Wolff, *supra* note 198.

200. For a survey of such studies, see Christainsen & Tietenberg, *Distributional and Macroeconomic Aspects of Environmental Policy,* in HANDBOOK OF NATURAL RESOURCE AND ENERGY ECONOMICS 345 (A. Kneese & J. Sweeney eds. 1985).

201. *See id.*

202. For summaries of the evidence, see W. BAUMOL & W. OATES, *supra* note 17; Christainsen & Tietenberg, *supra* note 200.

These objections to proposals for environmental reform appear to be little more than convenient "red herrings."[203]

Changes from the status quo to an incentive-based policy, while increasing aggregate welfare, may result in losses of welfare to some members of society. But in a realistic political context, the existence of powerful "losers" frequently means that a proposed policy will remain only a proposal. Hence, in some cases, a need may exist for second-best, cost-effective policies which provide some compensation for negatively affected parties.[204] Two caveats are important. First, such compensation could conceivably eliminate the welfare gains provided by the policy, as a result of inefficient redistributive policies and mechanisms. Second, establishing the precedent of compensating affected parties involves clear risks.[205]

F. The Problem of Constituency

We have identified some of the strong forces which will likely work against the adoption of cost-effective environmental policies. The political system gives much greater weight to distributional concerns than to issues of relative efficiency. For example, consider the tradeable permit systems contained in both the Senate and House acid rain bills. Substantial pressures existed to allow less fuel-switching from high-sulfur to low-sulfur coal (and, instead, require more costly scrubbing) in an effort to benefit areas dependent upon mining of high-sulfur coal.[206] Because such a provision would have actually increased costs of compliance for midwestern high-sulfur coal-burning utilities,[207] it would have encouraged

203. In a speech at EPA's Annual Meeting in Kansas City, Missouri on Nov. 14, 1989, Frederic Krupp, Executive Director of the Environmental Defense Fund, noted that: "Inequities are a legitimate concern but not a veto. . . . [E]nvironmental problems often hurt low income areas. Solving these problems solves some of the inequities. Using tax dollars more efficiently helps everyone and frees more money for more cleanup or other needs."

204. For a discussion of efficiency-equity tradeoffs and the potential role of compensation in environmental policy, see D. Burtraw & P. Portney, Implementing Market-Based Environmental Policies: The Role of Compensation (Jan. 9, 1991) (paper prepared for Project 88/Round II, *supra* note 174 (forthcoming)). The recently enacted amendments to the Clean Air Act were to establish a program to provide compensation for workers displaced by the new law, but the program was moved into a different piece of legislation at the President's insistence during eleventh-hour bargaining. Weisskopf, *Conferees Complete Sweeping Clean-Air Revision*, Wash. Post, Oct. 23, 1990, at A10, col. 1. It is estimated that it will cost $250 million over the initial five-year period. *Id.*

205. For a discussion of the risks of a redistributive policy, see generally D. Burtraw & P. Portney, *supra* note 204.

206. Wald, *A New Geography of the Coal Industry*, N.Y. Times, Nov. 25, 1990, § 1, at 5, col. 1.

207. Forced scrubbing would indeed protect high-sulfur coal mining jobs, while sacrificing a smaller number of jobs in the less labor-intensive low-sulfur coal mining industry. According to the Congressional Budget Office, a net loss of 7000 mining jobs nationwide would result under a cost-effective approach in which fuel-switching is allowed, when compared to a forced scrubbing approach. *See* CONGRESSIONAL BUDGET OFFICE, CURBING ACID RAIN: COSTS,

political maneuvers to mandate nationwide cost-sharing. This compromise would drive a wedge into the heart of the polluter-pays principle. Such changes would have greatly reduced the cost-effectiveness of the system, and moved it much closer to a conventional, command-and-control approach.[208]

In this way, individual constituencies, fighting for their own version of "equity," typically negate efficiency or cost-effectiveness. In the interest of obtaining nicely shaped pieces of the proverbial pie, we often end up with a systematically smaller pie.[209]

Can "policy entrepreneurs" or economists serve as effective lobbyists for efficiency? Although in selected applications, economists and others have played important roles in helping market approaches become reality, they generally play a more limited role by designing and explaining systems that are then considered within the broader political process. In short, having some lobbyists for efficiency is advantageous and probably necessary, but is hardly a sufficient condition for success. The number of such lobbyists on any issue is likely to be small because the direct rewards for such activities are very limited indeed.

CONCLUSIONS

As economists concerned about environmental policy, we are quite naturally bullish on the use of economic-incentive approaches. We do not mind being labeled "lobbyists for efficiency."[210] At the same time,

---

BUDGET, AND COAL-MARKET EFFECTS 38 (1986). With an annual aggregate cost *difference* of about $1.74 billion, forced scrubbing saves mining jobs at an annual cost of about $250,000 each. *Id.* at 48. It is safe to assume that with a flexible approach to acid rain control, an equitable program of retraining and direct welfare payments could be established at a fraction of this cost. There is, of course, substantial political resistance to granting *direct and explicit* welfare payments to any group, and those same groups exert similar forces which resist such transfers taking a *direct and explicit* form. Hence, Congress grants, and farmers are happy to receive, agricultural price supports and payments for removing land from production. However, a welfare system for "family farms" is supported neither by Congress nor by the farm lobby. Only politically disenfranchised groups in society, such as the chronically poor, are subject to direct welfare payments and the consequent stigma.

208. In the final acid rain legislation that was signed into law, several provisions were introduced that will adversely affect the performance of the allowance market. These included special bonus allowances for firms that use scrubbers, extensions of deadlines for firms that use clean-coal technologies, and additional allowances for firms that reduce emissions through energy conservation. All of these "bells and whistles" tend to reduce the amount of cost savings that would result from effective implementation of the allowance market, and were introduced to address "equity concerns" raised by special interest groups.

209. Charles Schultze, President Carter's top economic advisor, described a major reason for this occurrence when he noted that there is no constituency in Washington for efficiency. C. SCHULTZE, THE POLITICS AND ECONOMICS OF PUBLIC SPENDING 2-3 (1968) (observing that the advocacy process at work in Washington leads to decisions which often gain consensus at the expense of meeting criteria of efficiency). *See generally* Haveman, *Policy Analysis and the Congress: An Economist's View*, 2 POL'Y ANALYSIS 235 (1965).

210. We recognize that the assumed desirability of Pareto-efficiency (or cost-effectiveness) is itself part of the particular ideology which is implied by neoclassical economics. As such,

we are sensitive to the fact that there are very good reasons that the rest of the world has been slow to embrace the use of economic incentive approaches to environmental protection. Some of these reasons include the way economists have tried to package and sell their ideas (for example, not divorcing means from ends, and tending to exaggerate the worth of their proposals),[211] and a general lack of understanding of how these instruments work in practice.

Much of the resistance to incentive-based proposals can be explained by the nature of the political process and the relative benefits to elected representatives and special-interest lobbyists of using command-and-control methods instead of market-based policies. Thus, while we are personally aggressive about our proposals, for both selfish and altruistic reasons, we believe that the use of economic-incentive policies which actually work will increase only on the margin and will likely remain limited in scope. Incentive-based approaches simply do not provide politicians with the opportunity to affect systems in ways that give selected interest groups the protection they desire.

Despite the fact that such practical political considerations will continue to limit the design and implementation of environmental policy, economic-incentive mechanisms will receive a warmer reception in the years to come. For the first time, big name politicians are leading the charge. Proponents of incentive-based environmental policies should be guardedly optimistic, precisely because demand is high and other proposed solutions might result in severe economic dislocation.

For those interested in seeing these ideas become reality, the work has just begun. The next steps will involve the design of market mechanisms that are politically acceptable. Potentially important applications include such diverse problems as global climate change, critical habitat loss, and hazardous waste generation and disposal. While improved policy design and understanding will not necessarily lead to widespread application of economic-incentive approaches, these approaches are destined to remain only a theoretical curiosity without it.

---

economic efficiency as a policy goal has no particular claim to uniqueness or objectivity. As analysts of policy choices, however, we and other economists can at least strive to conduct unbiased investigations. *See* Bromley, *The Ideology of Efficiency: Searching for a Theory of Policy Analysis,* 19 J. ENVTL. ECON. & MGMT. 86, 103 (1990).

211. There are three aspects of economists' tendency to claim too much for their proposals to reform environmental policy. First, they have frequently failed to note the limited applicability of incentive-based proposals. For example, economists *in their public testimony* have given little attention to the problems of using incentive-based mechanisms for non-uniformly-mixed pollutants with threshold health impacts. Second, few economists have given serious attention to the real-world problems associated with the transition from command-and-control to incentive-based systems. Third, as indicated in the text, academic economists have for many years tended to depict environmental problems as little more than an "externality which calls for a corrective tax." Because they focus primarily on simplistic *efficient* policies, their ideas have not received a warm reception in policy circles.