THE MANAGERIAL TURN IN ENVIRONMENTAL POLICY

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Over the last four decades, many aspects of environmental quality have improved in the United States. Nevertheless, existing environmental laws and regulations have often proven exceedingly costly, and some of the most vexing and significant environmental problems, such as climate change and nonpoint water pollution, still remain largely unaddressed. These twin challenges—excessive costs and untapped benefits—have prompted rightful and repeated calls for new approaches to environmental protection. One new approach self-consciously seeks to affect the way that businesses *manage* their environmental affairs. In the past, environmental law effectively treated firms themselves as "black boxes," imposing risk-based or technology-based emissions limits that simply directed regulated firms to control the pollution they emit. The ways firms managed their operations largely remained irrelevant to regulators as long as firms met their legal obligations. That old view is changing and the black box is beginning to open. Regulators and policy analysts increasingly recognize that firms' internal management is an important ingredient in combating the nation's environmental problems.[1]

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[1] *See, e.g.*, Richard B. Stewart, *A New Generation of Environmental Regulation?*, 29 CAP. U. L. REV. 21, 151 (2001) (noting how the importance of environmental management systems and other "reflexive" strategies is likely to grow "[a]s the pressure of heightening environmental standards and complexities increases and the limitations of command regulation [becomes] more apparent"); LEVERAGING THE PRIVATE SECTOR: MANAGEMENT-BASED STRATEGIES FOR IMPROVING ENVIRONMENTAL PERFORMANCE 6 (Cary Coglianese & Jennifer Nash eds., 2006) ("Policymakers and business leaders increasingly recognize that what goes on inside the black box of the organization is of critical importance for overall environmental quality."); KENNETH GEISER, MATERIALS MATTER: TOWARD A SUSTAINABLE MATERIALS POLICY 381–82 (2001) (arguing for "new management approaches that encourage and rely on continuous learning and organizational change" because attaining a "sustainable economy [requires that]

This "managerial turn" represents a notable, and potentially laudable, shift in regulatory focus relevant to future environmental policy reform. Governmental strategies to shape firms' internal management may well achieve environmental goals at lower costs. Such management-based strategies tend not to impose one-size-fits-all standards, but instead give firms responsibility for developing their own responses to environmental problems, thereby leveraging firms' superior knowledge about the risks they generate and the potential methods of reducing those risks. Given their promise, management-based environmental policies deserve greater attention. In this article, I examine several recent management-based strategies, consider the empirical evidence on their effectiveness in improving environmental performance, and assess their overall advantages and disadvantages. The evidence shows that, at least in some cases, management-based policy strategies can lead to improvements in industry's environmental performance by getting firms to sink additional costs into assessing and better managing their environmental aspects. As such, Congress and regulatory agencies should consider the role of management-based strategies in environmental policy's future.

I. MANAGEMENT SYSTEMS AND MANAGEMENT-BASED STRATEGIES

The managerial turn is reflected in the actions of both governmental officials and business leaders who focus on directly shaping private sector environmental management. Their interest in management-based strategies grows generally from a trend toward environmental management systems (EMSs) that started in the 1990s.[2] An EMS consists of a series of internal planning processes and operational procedures implemented by a firm both to ensure compliance with regulatory standards as well as to try to improve the firm's environmental performance.[3] Although the specific shape and structure of an EMS can vary across different firms, all management systems involve some kind of

corporations and other institutions will need to redesign their culture and reorganize their structures").

[2] *See* E. Donald Elliott, *Environmental TQM: A Pollution Control Program That Works!*, 92 MICH. L. REV. 1840, 1841 (1994).

[3] *See* Cary Coglianese & Jennifer Nash, *Environmental Management Systems and the New Policy Agenda*, *in* REGULATING FROM THE INSIDE: CAN ENVIRONMENTAL MANAGEMENT SYSTEMS ACHIEVE POLICY GOALS? 1 (Cary Cognlianese & Jennifer Nash eds., 2001).

environmental planning and internal policymaking. To create an EMS, managers begin by establishing environmental goals and creating a specific plan to achieve those goals. Managers and workers are assigned responsibilities for implementing parts of the plan, and they are trained in what they need to carry out these responsibilities. They keep records that document their compliance with the plan and periodically the firm (or an outside auditor) reviews these records and assesses the firm's performance in meeting its goals and following its internal procedures. These periodic reviews are supposed to feed into revisions and continuous improvements in the firm's overall system. When auditing turns up deficiencies or problems, managers take remedial action and, as needed, amend their plan, returning to the start of what is commonly referred to as the "plan-do-check-act" cycle.[4]

Trade associations and other non-governmental organizations have developed various standards or guidelines for EMSs. The American Chemistry Council (ACC), the chemical industry's most prominent trade association, requires its members to implement internal systems that accord with specific ACC environmental management principles.[5] The most widely recognized EMS standards are found in "ISO 14001," a series of certifiable principles established by the non-governmental International Organization for Standardization (ISO).[6] ISO 14001 does not require firms to achieve any specific level of environmental performance, but rather calls on them to engage in "a holistic, strategic approach to the organization's environmental policy, plans and actions."[7] Hundreds of thousands of companies around the world—and tens of thousands of firms in the U.S.—have voluntarily certified that their EMSs meet the ISO standards.

Government officials share the business community's interest in EMSs. The U.S. Environmental Protection Agency (EPA) has concluded that "EMSs can help facilities achieve significantly

[4] *See* Cary Coglianese & Jennifer Nash, *Policy Options for Improving Environmental Management in the Private Sector*, ENV'T, Nov. 2002, at 11.

[5] Joseph Rees, *Development of Communitarian Regulation in the Chemical Industry*, 19 LAW & POL'Y 477, 479–80 (1997).

[6] *See* ASEEM PRAKASH & MATTHEW POTOSKI, THE VOLUNTARY ENVIRONMENTALISTS: GREEN CLUBS, ISO 14001, AND VOLUNTARY ENVIRONMENTAL REGULATIONS 25 (2006).

[7] INT'L ORGANIZATION FOR STANDARDIZATION, ISO 14000 ESSENTIALS, http://www.iso.org/iso/iso_14000_essentials (last visited July 18, 2008).

improved environmental results" and the agency has decided to promote their "widespread use . . . to achieve improved environmental performance and compliance, pollution prevention through source reduction, and continual improvement."[8] For years, government prosecutors have included EMS requirements in consent decrees or given leniency to firms that have in place compliance-oriented EMSs.[9] EPA and its counterparts in the states have established still more formal programs to encourage firms to develop EMSs, and in some cases government has even required outright that firms engage in specified management actions.

The most prominent example of a program that encourages firms to adopt EMSs is the EPA's National Environmental Performance Track.[10] Established in 2000, Performance Track is a voluntary, facility level program designed to recognize and reward environmental facilities that the EPA considers to be environmental leaders. According to Carol Browner, the EPA Administrator at the time of Performance Track's creation, this program signaled "a new kind of environmental leadership that will make the 21st century an age of both continued environmental prosperity and environmental health."[11] The program works by having private sector facilities apply to become "members" of Performance Track. As members, facilities receive special recognition from EPA as well as more tangible forms of benefits, such as a reduced inspection frequency and additional flexibility in meeting certain regulatory requirements.

To qualify for membership in Performance Track, a facility

[8] U.S. ENVTL. PROT. AGENCY, POSITION STATEMENT ON ENVIRONMENTAL MANAGEMENT SYSTEMS (EMS) (2005), *available at* http://www.epa.gov/ems/docs/positionstatement-20051215.pdf.

[9] *See, e.g.*, Memoranda, John Peter Suarez, Assistant Administrator, U.S. Environmental Protection Agency, Guidance on the Use of Environmental Management Systems in Enforcement Settlements as Injunctive Relief and Supplemental Environmental Projects (June 12, 2003), *available at* http://www.epa.gov/Compliance/resources/policies/incentives/ems/emssettlementguidance.pdf (describing EMSs as a potentially valuable tool for promoting compliance with environmental standards).

[10] *See generally* Cary Coglianese & Jennifer Nash, *EPA's National Environmental Performance Track: What Is It Tracking? What Role Is It Performing?* (unpublished manuscript, on file with journal) (describing the Performance Track program and assessing how it attracts members).

[11] Daniel Fiorino, *Performance Track Places Trust in the Carrot over the Stick*, ENVTL. QUALITY MGMT., Spring 2001, at 9, 22 (quoting Administrator Browner).

must show EPA that it meets the following four criteria: (1) implement an independently audited EMS; (2) sustain a track record of compliance with environmental regulations; (3) make a commitment to achieve self-declared environmental goals that exceed what is currently required by existing regulations; and (4) demonstrate some engagement in community outreach concerning the environment.[12] Prospective members can apply for membership during application periods held twice each year. Those facilities that are admitted must file annual reports, and every three years members must re-apply for membership. Now in its eighth year of operation, Performance Track boasts over five hundred facilities as members.[13]

In addition to EPA's national Performance Track program, over the past decade about twenty states have developed similar programs that offer recognition and regulatory benefits to facilities that meet stated, management-related entry criteria.[14] For example, the Commonwealth of Virginia has created an Environmental Excellence program that has three membership levels: E2, E3, and E4.[15] Facilities that join at the E2 need to express interest in implementing an EMS, while E3 facilities must have implemented such a system and E4 facilities must have these systems certified by a third party and commit to meeting environmental and community outreach goals. Over 250 facilities have become members at the E2 level, about 135 at the E3 level, and about a dozen at the E4 level. Virginia has the largest state incentive program, but programs similar to Virginia's can be found across the country, from Georgia to Idaho, Maine to New Mexico.[16]

In other contexts, state and federal regulators have gone further and have actually mandated that companies implement management practices. In mandating that firms engage in analysis and management practices, regulators leave it to the firms to select

[12] *Id.* at 13.

[13] U.S. ENVTL. PROT. AGENCY, NATIONAL ENVIRONMENTAL PERFORMANCE TRACK, http://www.epa.gov/performancetrack/ (last visited Sept. 1, 2008).

[14] Jonathan Borck, Cary Coglianese & Jennifer Nash, *Environmental Leadership Programs: Toward an Empirical Assessment of their Performance*, ECOLOGY L. Q. (forthcoming 2008) (manuscript at 5, on file with journal).

[15] *Id.* at 71.

[16] *Id*.

concrete measures to address the risks they create.[17] The most prominent federal example of such a management-based regulation is the "risk management planning" (RMP) rule under the Clean Air Act.[18] The RMP rule requires firms that use high volumes of chemicals to implement a multi-step management practice to assess risks of chemical accidents, develop procedures designed to reduce those risks, and take actions to ensure that procedures are carried out in practice. These firms must first conduct a hazard analysis to identify what could potentially go wrong in their facilities' processes and what steps must be in place to prevent such accidents from occurring. Firms must rank their different processes according to factors such as how many workers could potentially be affected or the operating history of the process, including any previous incidents involving the process. They must next identify both actual and potential interventions to reduce hazards associated with each process, including control technologies, monitoring and early warning systems, training, and safety equipment. Based on their analyses, firms must then develop written operating procedures both for normal operating conditions and emergency situations. In addition, firms must continuously review these procedures and update them as necessary to reflect process changes, new technologies, or new knowledge. By tracking process and incident data in a systematic way through RMP, firms are continuously supposed to seek ways to prevent environmental accidents.[19]

Another prominent example of management-based regulation can be found in the regulations of over a dozen states that require high volume users of hazardous chemicals to engage in pollution prevention planning.[20] Rather than mandating pollution control, state pollution prevention regulations require businesses to engage in a management process aimed at preventing pollution from occurring in the first place. The Massachusetts Toxic Use

[17] *See* Cary Coglianese & David Lazer, *Management Based Regulation: Prescribing Private Management to Achieve Public Goals*, 37 LAW & SOC'Y REV. 691, 694 (2003).

[18] *See* Chemical Accident Prevention Provisions, 40 C.F.R. § 68 (2007).

[19] For further discussion of the RMP rule, see Paul R. Kleindorfer, *The Risk Management Program Rule and Management-Based Regulation*, *in* LEVERAGING THE PRIVATE SECTOR, *supra* note 1, at 87–109.

[20] *See* Lori S. Bennear, *Evaluating Management-Based Regulation: A Valuable Tool in the Regulatory Toolbox*, *in* LEVERAGING THE PRIVATE SECTOR, *supra* note 1, at 51–52.

Reduction Act (TURA)[21] represents one such effort at management-based regulation designed to promote pollution prevention rather than just pollution control. Under TURA, regulated firms must analyze the use and flow of toxic chemicals throughout their facilities, develop plans to reduce their use and emissions of toxics, and submit reports of their planning to state environmental agencies. Massachusetts also requires that a state-authorized "pollution prevention planner" certify each plan as having met the law's criteria for what pollution prevention plans should contain. Interestingly, although firms are required to go through the planning process and develop systems for reducing the use and emissions of toxic substances, TURA does not require firms to reduce toxics use or emissions, nor even to comply with their own plans. The Act just imposes the managerial requirement: "plan."

II. MANAGEMENT MATTERS

Management-based regulations and incentive programs are premised on the notion that a firm's internal management critically shapes its impact on environmental quality. This underlying assumption is gaining support in a growing body of academic research. Recent ethnographic studies have shown that what goes on inside companies can make an important difference in shaping their environmental behavior and outcomes.[22] A survey by Richard Florida and Derek Davison revealed that the companies adopting formal EMSs tended to be more cutting-edge firms that adopted innovative manufacturing processes more generally.[23] Of course, the survey could not untangle the causal direction of the relationship; it seems likely that progressive management would lead firms to adopt EMSs more than the reverse.

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[21] MASS. GEN. LAWS ch. 21I, §§ 1–23 (2002).

[22] JENNIFER HOWARD-GRENVILLE, CORPORATE CULTURE AND ENVIRONMENTAL PRACTICE: MAKING CHANGE AT A HIGH-TECHNOLOGY MANUFACTURER (2007); ASEEM PRAKASH, GREENING THE FIRM: THE POLITICS OF CORPORATE ENVIRONMENTALISM (2000). For a strategic account of how environmental management can pay off for firms, see FOREST L. REINHARDT, DOWN TO EARTH: APPLYING BUSINESS PRINCIPLES TO ENVIRONMENTAL MANAGEMENT (2000).

[23] Richard Florida & Derek Davison, *Why Do Firms Adopt Advanced Environmental Practices (and Do They Make a Difference)?*, *in* REGULATING FROM THE INSIDE: CAN ENVIRONMENTAL MANAGEMENT SYSTEMS ACHIEVE POLICY GOALS? 88 (Cary Coglianese & Jennifer Nash eds., 2001).

In a major study of environmental behavior in the pulp and paper industry, Neil Gunningham, Robert A. Kagan, and Dorothy Thornton closely examined facilities operating in several countries and concluded that management styles played a key role in their varied environmental performance.[24] Traditional external factors such as regulatory enforcement and economic conditions affected compliance with environmental law, but when it came to explaining why some pulp and paper mills went further and kept their pollution below permitted levels, the authors concluded that management mattered most. They argued that management styles ranged from the "true believers"—firms that voluntarily invested in state-of-the-art equipment and proactively searched for ways to go beyond legal requirements—to the "environmental laggards"—those that resisted even basic legal compliance.[25]

Another recent study reinforced the importance of factors internal to organizations' management in explaining their environmental behavior.[26] Using a matched case study design of facilities across several sectors, Jennifer Howard-Grenville, Jennifer Nash, and I compared participants in a voluntary, management-based environmental program with similar facilities facing similar external pressures but that did not participate. We found that facilities' participation decisions corresponded with the kinds of organizational identities and managerial incentives that prevailed within their operations.

A growing research literature on EMSs also generally supports the conclusion that management makes a difference. Numerous case studies showcase firms that have improved their environmental performance after implementing an EMS. A broader study of S&P 500 companies suggests that EMS adoption typically precedes a reduction in toxic emissions when normalized

[24] NEIL GUNNINGHAM, ROBERT A. KAGAN & DOROTHY THORNTON, SHADES OF GREEN: BUSINESS, REGULATION, AND THE ENVIRONMENT (2003); *see also* Neil Gunningham, Robert A. Kagan & Dorothy Thornton, *Social License and Environmental Protection: Why Businesses go Beyond Compliance*, 29 LAW & SOC. INQUIRY 307 (2004).

[25] GUNNINGHAM ET AL., SHADES OF GREEN, *supra* note 24, at 99–102.

[26] *See generally* Jennifer Howard-Grenville, Jennifer Nash & Cary Coglianese, *Constructing the License to Operate: Internal Factors and Their Influence on Corporate Environmental Decisions*, 30 LAW & POL'Y 73 (2008) (providing interview-based evidence that internal factors such as managerial incentives, organizational culture, and organization identity can influence a firm's decision to go beyond compliance with environmental regulations).

for production.[27] The most rigorous analysis to date of ISO 14001 adoption in the United States finds that firms that implement ISO-certified EMSs show small, but statistically significant, improvements in measures of both environmental compliance and releases of toxic emissions.[28]

III. CAN MANAGEMENT-BASED STRATEGIES WORK?

If management plays a role in improving environmental quality, as the evidence indicates that it does, can government effectively induce firms to improve their environmental management (and thereby their environmental performance) through management-based incentives or regulations? One might naturally predict such management-based strategies should work. But some healthy skepticism is warranted. The actions firms voluntarily adopt are not necessarily a valid basis for inferring what they will do when encouraged or required by government. The firms that voluntarily adopt an EMS presumably have a different, and stronger, type of commitment to environmental protection than firms that do not volunteer. Moreover, since by definition, management-based strategies encourage or require *management practices*—not necessarily improvements in *environmental outcomes*—it is possible that some firms will respond to government incentives or rules by gaming the regulators, that is, creating documents and procedures that look good on paper but do not reflect the (dirty) reality of actual, day-to-day operations.

These are not unreasonable concerns. Nevertheless, management-based strategies might well lead some firms truly to improve their environmental performance. Management-based strategies call upon firms to invest in the production of information about the environmental risks they create, about alternatives to reduce or mitigate those risks, and about procedures for continued monitoring and information collection. The information generated through an EMS may ultimately prompt behavioral change either by (a) providing feedback directly to decision makers within firms about ways to reduce potential liabilities, or (b) giving information

[27] Wilma Rose Q. Anton, George Deltas & Madhu Khanna, *Incentives for Environmental Self-Regulation and Implications for Environmental Performance*, 48 J. ENVTL. ECON. & MGMT. 632, 652 (2004).

[28] PRAKASH & POTOSKI, *supra* note 6, at 150.

to government officials and other interested parties, who in turn bring pressure to bear upon the firms' decision makers.

It has sometimes been argued that, even in the absence of regulation, socially responsible behavior yields bottom line results for businesses—what has come to be known as "win-win theory."[29] For example, Forest Reinhardt has shown that making investments in social goals can advance a company's profits if doing so enables the company to lower production costs, differentiate its products from competitors, or manage liability risks better.[30] Yet despite these reasons for businesses to act in socially responsible ways, a continued need for some form of governmental intervention indicates that firms generally do not find enough private benefits to act in ways that are privately costly but socially optimal. As economists caution, if there was money simply lying on the floor in terms of profits from corporate responsibility, companies would have picked it up already.[31]

These considerations about win-win theory help illuminate three complementary accounts of how management-based strategies might actually work to improve the environment. The first explanation might be called a theory of "sunk search costs." This account, like win-win theory, recognizes that firms can reap private rewards from investing in actions that deliver positive social outcomes. But it also recognizes that firms face opportunity costs associated with identifying socially beneficial actions that also yield private actions. In other words, to extend the economist's analogy, firms do not find money simply lying on the floor waiting to be picked up by taking socially responsible action. Rather, such money lies hidden underneath the floor tiles and behind the shop equipment—if only managers can find it. Since finding these cost savings and competitive advantages from socially responsible behavior is costly, rational firms will only expend the necessary search costs when the expected net benefits exceed the search costs. Since firms have naturally not yet found

[29] *See, e.g.*, Michael E. Porter & Claas van der Linde, *Towards a New Conception of the Environment-Competitiveness Relationship*, J. ECON. PERSP., Autumn 1995, at 97 (arguing that properly designed environmental regulation may lead to improved competitiveness).

[30] *See* REINHARDT, *supra* note 22, at xii–xiii, 13–14.

[31] *See, e.g.*, Karen W. Palmer, Wallace E. Oates & Paul R. Portney, *Tightening Environmental Standards: The Benefit-Cost or the No-Cost Paradigm*, J. ECON. PERSP., Autumn 1995, at 119 (arguing against the "false premise of cost-free controls").

their unidentified cost savings, they may well view their expected net benefits of doing so as being quite small, discounted by a perceived low probability estimate of finding anything worthwhile. Firms' managers would then conclude they are better off dedicating their time and resources elsewhere.[32] For this reason, firms might be said to be rationally ignorant of potential win-win opportunities. However, when management-based strategies either mandate or encourage firms to engage in planning and analysis, firms assume search costs that they otherwise would have avoided. Search costs at that point become sunk costs to the firm, and profit-enhancing actions the firm identifies along the way will be adopted as long as they prove to be net beneficial to the firm.[33]

A second explanatory account focuses on the complementarity between planning and the achievement of social goals.[34] Lori Bennear has shown that for management-based strategies to deliver social benefits, there must be a direct connection between the management activities required or encouraged and the desired social outcomes. This complementarity is most readily apparent with problems that arise due to poor management. Accidents in chemical plants, for example, could be expected to occur more frequently in facilities with poor oversight and coordination. At the limit, entirely untrained workers who mix chemicals on their own accord, without supervision, would clearly be expected to be more likely to cause an accident. Therefore, to the extent that there are management-based *problems* that generate environmental consequences, then management is clearly complementary and management-based *strategies* will make sense. For these types of problems, strategies to encourage or require management would yield beneficial results if firms are not already engaging in a socially optimal level or quality of analysis, planning, and other complementary management activities. The lack of good planning itself can be a type of market failure.

Finally, mandatory management-based strategies (particularly, regulations) may prove effective due to the background threat of tort liability or other regulatory liability. If

[32] *See* Bennear, *supra* note 20, at 54–55.

[33] This does not mean, of course, that a firm's adoption of environmentally beneficial actions found after an investment of search costs in an EMS will necessarily be net beneficial to society.

[34] *See* Bennear, *supra* note 20, at 55.

firms face a risk of liability when they discover problems but do nothing to solve them, then once they discover problems during a mandated management-based planning process, they have a pre-existing background incentive to take action to solve them. On this account, it is not solely the management-based regulation that operates to induce firms to make costly investments that follow from management-based regulation, but the interaction between management-based regulation and other legal norms. However, under this account, incentives that merely *encourage* better environmental management will probably prove less effective, because many firms will probably not voluntarily engage in planning and management activities that could later expose them to legal liability.

Ultimately, the question of whether management-based strategies are effective—and if so, what best explains their success—is an empirical one. Getting empirical leverage on these matters, though, is not always easy. When it comes to voluntary programs like Performance Track, government officials often tout the significant reported improvements achieved by participating facilities.[35] But given the voluntary nature of these programs, we cannot easily know whether participants' improvements would have occurred anyway. Perhaps facilities that improve their performance for other reasons also seek out membership in management-based incentive programs in order to gain recognition and reward for progress they would be making anyway. At present, the lack of available data on facilities before they participated in performance track programs, as well as on facilities not involved in these programs, inhibits the ability of researchers and government decision makers to discern whether incentive-based environmental management programs actually work.[36]

The available research of other kinds of voluntary programs might suggest that, at their best, programs like Performance Track will yield only modest results. After reviewing the results of seven case studies of voluntary environmental programs in the U.S., Europe, and Japan, Richard Morgenstern and William Pizer found that "none of the case study authors found truly convincing

[35] *See, e.g.*, U.S. ENVTL. PROT. AGENCY, PERFORMANCE TRACK FIFTH ANNUAL PROGRESS REPORT 3 (2007), *available at* http://www.epa.gov/perftrac/downloads/PTPRreport_05final.pdf (citing conservation numbers of Performance Track members).

[36] *See* Borck et al., *supra* note 14.

evidence of dramatic environmental improvements."[37] Aseem Prakash and Matthew Potoski, in the best available study of the impact of voluntary adoption of ISO 14001 certification in the U.S., characterized these effects as rather "modest."[38] Once Prakash and Potoski had controlled for other factors, they found that ISO-certified "facilities spent on average one week less time out of compliance with government regulation."[39] In terms of toxic emissions, their results were "difficult to interpret" but nevertheless showed "not a very large improvement difference."[40] On the assumption their data were normally distributed, Prakash and Potoski found that ISO-certified facilities ranked at most only 3 percentiles better than non-certified facilities in terms of toxic releases.

When it comes to management-based *regulation*, as opposed to voluntary management-based incentives, some data suggest that regulation can result in environmental gains. Insurance claims in the chemical industry declined by 40% in the decade after the introduction of federal risk management planning requirements.[41] In the state of Massachusetts—the first state to adopt mandatory pollution prevention planning laws—the use of toxic chemicals declined by about 40% in the decade following the law's adoption in 1989, with a decline of nearly 90% in the emissions of toxic chemicals.[42] Of course, data such as these also need to be approached with caution. Other factors unrelated to the introduction of management-based regulation can potentially explain at least some of the changes in reported outcomes, whether for the worse or for the better. Pollution could decrease for reasons other than management-based regulation; it could also increase, even if management-based regulation worked successfully, if other factors overwhelmed any achieved improvements from improved management.

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[37] RICHARD D. MORGENSTERN & WILLIAM A. PIZER, REALITY CHECK: THE NATURE AND PERFORMANCE OF VOLUNTARY ENVIRONMENTAL PROGRAMS IN THE UNITED STATES, EUROPE, AND JAPAN 184 (2007).

[38] PRAKASH & POTOSKI, *supra* note 6, at 166.

[39] *Id*.

[40] *Id*.

[41] Coglianese & Lazer, *supra* note 17, at 724.

[42] Cary Coglianese & Jennifer Nash, *The Massachusetts Toxics Use Reduction Act: Design and Implementation of a Management-Based Environmental Regulation* (Harv. Univ. Reg. Pol'y Program Rep. No. RPP-07-2004, 2004) (on file with journal).

Furthermore, the introduction of management-based regulation does not always occur in isolation of other regulatory changes. Massachusetts's reported declines in toxic emissions, for example, might have been affected by changes in conventional regulations, such as the contemporaneous performance-based hazardous air pollutant requirements in the 1990 Clean Air Act Amendments. After all, toxic emissions declined 46% across the entire United States during the same period.[43] Moreover, compared with neighboring states in New England, where toxic emissions also declined an average of 87% during the same period, the 88% decline in toxic emissions in Massachusetts does not look nearly as striking.[44] The declines reported during the same period in New Hampshire (93%), Connecticut (92%), and Rhode Island (91%) were somewhat larger than experienced in Massachusetts, even though none of these other states had adopted a management-based pollution prevention law.[45]

Statistical analysis needs to take account of potential confounding effects. Lori Bennear has tested the effects of the pollution prevention planning laws using longitudinal data on toxic emissions from more than 30,000 facilities throughout the United States, both those located in the fourteen states that had adopted pollution prevention planning laws similar to TURA as well as facilities in other states.[46] These laws only require that firms plan—not necessarily that they implement their plans. Using a differences-in-differences statistical strategy, Bennear compared the trends in toxic emissions across both the "experimental" group of states with management-based regulation and the "control" group of states having no management-based regulation. Emissions declined everywhere, but to determine whether changes came about due to the introduction of management-based regulation, Bennear analyzed how the trends in management-based regulation states fared against other states when controlling for a variety of other factors correlated with toxic emissions. She found that the presence of a management-based regulation in a facility's state was associated with about a 30 percent decrease in toxic air

[43] *Id.*

[44] *Id.*

[45] *Id.*

[46] *See* Lori S. Bennear, *Are Management-Based Regulations Effective? Evidence from State Pollution Prevention Programs*, 26 J. POL'Y ANALYSIS & MGMT. 327 (2007).

emissions—over and above what otherwise would have occurred in the absence of the management-based law.[47] Bennear's study is the strongest evidence to date that management-based laws like TURA can help reduce pollution.

That said, it is one thing for a management-based regulation to achieve improvements in the near term, shortly following its introduction. It is another for regulation to sustain long term and continual improvements over time. Can management-based regulation continue to spur firms to make improvements in the long term? Interestingly, the statistically significant effects in the Bennear study (at the 5 percent level) occurred within two to four years after the imposition of a planning mandate. The statistical significance dropped for years five and six (10 percent level). After six years, mandatory planning requirements showed no statistically significant effect on toxic emissions.[48] These declines in statistical significance may be an artifact of the data, resulting from a small sample size due to the fact that there the states with oldest management-based regulations are also the least in number. But it is not inconceivable that the returns from management-based regulation diminish over time. According to interviews with facility managers subject to Massachusetts's Toxic Use Reduction Act, facilities achieved most of their gains in the first few years after TURA's planning requirement took effect. Managers reported that with the passage of time they found fewer opportunities (or fewer low-cost opportunities) to make further improvements. After the so-called low-hanging fruit gets picked, some managers treat mandatory pollution prevention planning as little more than a paperwork exercise.[49]

IV. THE ROLE FOR MANAGEMENT-BASED STRATEGIES

There is surely no single way to fix all that ails the environmental protection system in the United States. Management-based strategies likewise are no cure-all. But the managerial turn in environmental policy appears to have taken hold and will not likely disappear any time soon. Management-based strategies find support in a compelling logic that ultimately the private sector's compliance with environmental law and its

[47] *Id*. at 340.
[48] *Id*. at 341–42.
[49] *See* Coglianese & Nash, *supra* note 42.

actual progress in protecting the environment will be a function of choices made by companies' managers. Furthermore, as society's environmental problems grow more complex, and conventional solutions appear less tractable, management-based strategies' adaptability and flexibility only serve to increase their attractiveness as cost-effective alternatives to traditional forms of regulation.

Management-based strategies might be also thought of as a first line of defense in addressing new environmental risks. According to self-reported responses to one recent survey, the use of management systems correlates with reported improvements in *un*regulated aspects of business—such as avoiding spills or conserving energy—but not with reported improvements in regulated aspects, such as air and water emissions.[50] The most promising role for management strategies, then, could be to push environmental progress on fronts not being addressed by existing regulation. This has long been a stated goal of EPA's Performance Track, with its emphasis on EMSs. However, the major question remains whether management-based strategies can truly offer significantly improved environmental outcomes—or whether they will just lull the public into thinking something is being done to address new environmental problems.

Unfortunately, measuring the effectiveness of management-based strategies on unregulated environmental problems may prove to be a most difficult undertaking, for the same reasons that it is difficult to evaluate any voluntary program. Unregulated environmental problems are usually problems for which firm-specific data are not required to be reported, so even in programs that require volunteers to report on their unregulated aspects, there will be a lack of comparable data before the volunteers joined the program or comparable data on firms that do not participate.

In the absence of good evaluation research, it will be difficult to learn whether some types of management-based strategies might work better if designed or implemented differently. In terms of their design, present-day management-based strategies promote a form of management that is highly systematic and rigorous, a form

[50] Richard N. L. Andrews, Andrew M. Hutson & Daniel Edwards, Jr., *Environmental Management Under Pressure: How Do Mandates Affect Performance?*, *in* LEVERAGING THE PRIVATE SECTOR, *supra* note 1, at 111.

of internal engineering.[51] But clear, analytic planning and precise forms of bureaucratic ordering are surely not the only—and maybe not the most important—features of good management. Dramatic changes in environmental performance may call for more creative, less rigid, more holistic management that fosters outside-the-box thinking. It is entirely possible that the best management practices—whether for environmental protection or economic success—require a much greater degree of decentralization and internal competition within organizations than is reflected in the current EMS ethos. More likely still, a firm's leadership may be what really makes the difference—and yet it is hard to imagine how public policy could define, let alone foster, the characteristics of the real leadership needed for firms to make and sustain environmental change.

Implementing management-based strategies effectively also calls for adequate oversight. Yet the very challenges that make management-based strategies attractive—namely, complexity in environmental problems and heterogeneity in their sources—also present challenges in overseeing the management government encourages or requires. Can government even know what truly constitutes "good" management? The most knowledgeable and sophisticated government officials still will undoubtedly have less information than private sector managers about how to manage their individual operations to return a profit and reduce environmental impacts. A critical question, then, is how regulators can overcome their informational disadvantage to ensure that firms subjected to management-based incentives or regulation are planning effectively and implementing those plans. Instead of conducting performance tests or observing whether firms have installed proper equipment, inspectors under management-based regulation need to assess the adequacy of a firm's planning and the documentation of its implementation. This can amount to a considerable new burden on certain regulatory agencies, which may need additional resources to meet the challenges.

[51] *See* THEO DE BRUIJN & VICKI NORBERG-BOHM, VOLUNTARY, COLLABORATIVE, AND INFORMATION-BASED POLICIES: LESSONS AND NEXT STEPS FOR ENVIRONMENTAL AND ENERGY POLICY IN THE UNITED STATES AND EUROPE (2001) (noting that "[t]he current approaches to EMS are overly bureaucratic" and calling for efforts "to reduce transaction costs by focusing on information generation that is useful to the firm and streamlining reporting requirements") (on file with journal).

Given the challenges associated with a heavy reliance on management-based strategies, the most appropriate role for them in the near term would appear to be to augment conventional forms of environmental regulation. One way of doing so is to promote management systems that assist firms in maintaining regulatory compliance. Anecdotal evidence suggests that management systems do enhance firms' compliance, and more systematic empirical research indicates that ISO-certified EMSs are associated with at least modest compliance improvements.[52] Yet, so far the research does not indicate whether the compliance improvements associated with EMSs come in the form of *procedural* compliance (such as in filing timely reports) or in *substantive* compliance (such as in reducing harmful emissions). Although all compliance might well be socially desirable, if all EMSs do is help facilities handle their paperwork burdens better, this certainly weakens the case for management-based strategies.

Environmental groups are already not enthusiastic supporters of management-based programs like Performance Track. Even the business community, which presumably should favor initiatives that leave it discretion to find less costly means of addressing environmental problems, actually exhibits ambivalence toward management-based strategies. Many businesses have on their own adopted ISO-certified EMSs; several major trade associations have implemented their own management-based solutions (such as Responsible Care); and about five hundred facilities have now secured membership in EPA's Performance Track program.[53] But far more firms and industries have yet to take any interest in developing ISO-certified EMSs or joining programs like Performance Track. Industry has also outright resisted a number of efforts to impose management-based regulation and related information-based requirements. The Massachusetts Toxics Use Reduction Act came into existence only after industry capitulated in the face of a credible threat of a citizen's initiative that would have banned the use of toxic chemicals altogether. Subsequent

[52] *See* PRAKASH & POTOSKI, *supra* note 6. It should be noted, however, that Prakash and Potoski's measure included compliance with the *procedural* requirements as well as with *substantive* environmental performance limits, without an ability to untangle whether ISO-certification was associated with improvements in one or the other.

[53] *See* U.S. ENVTL. PROT. AGENCY, NATIONAL ENVIRONMENTAL PERFORMANCE TRACK, *supra* note 13.

attempts to expand TURA's requirements have met with resistance from industry, as have efforts in Congress to adopt a national pollution prevention planning law.[54] The federal Toxic Release Inventory, which simply requires the collection and reporting of information, has itself generated pitched battles, as have recent federal legislative efforts to impose security-related planning requirements on chemical facilities.

Management-based strategies offer little escape from the contentious politics and policy gridlock that most would agree characterized environmental policymaking at the end of the twentieth century. On the contrary, dramatic expansion of management-based strategies could well exacerbate ideological line drawing. Attempts to influence or control management processes begin to intrude into the core of private sector decision making. What could be more central to a free enterprise system than the ability of private managers to decide how to run their own operations?

Some business leaders and politicians might also worry about the extent to which management-based strategies give government officials worrisome discretion. If effective management cannot be easily observed and inter-subjectively validated, the risk of arbitrary government decision making presumably increases. Some private sector firms may be rewarded simply because they look like they have adopted sound management practices, while other firms that are really making a difference in reducing pollution could go unrewarded or even punished if they lack the kind of practices that the government deems necessary or desirable.

CONCLUSION

Despite the potential political perils inherent in the current managerial turn in environmental policymaking, management-based strategies are likely to remain attractive and plausible options to consider in charting a course for environmental policy in the next administration and beyond. Of course, in deciding whether and when to rely on management-based strategies, policy

[54] Coglianese & Nash, supra note 42, at 88–95; STEPHEN M. JOHNSON, ECONOMICS, EQUITY, AND THE ENVIRONMENT 355 (2001); Robert Style, *Are State Laws Motivating Business to Pursue Pollution Prevention?*, POLLUTION PREVENTION, Winter 1993/94, at 61.

makers should undertake the same kind of regulatory analysis that they should use in evaluating any other option. Businesses may well resist the costs or intrusiveness of the planning associated with management-based regulations, but these planning and paperwork requirements are justified anyway if the private sector undersupplies effective risk management practices from the standpoint of overall social welfare. When management-based strategies can be shown to work better than their alternatives, they should certainly be used.

Additional empirical evaluation is needed to understand better precisely when and how to use management-based strategies. There remains a need for further empirical research on the impacts of management-based strategies, especially to learn whether they can achieve meaningful benefits for society over the long term. Even though existing research shows that management-based regulation can prove successful under certain circumstances, the question remains whether such positive effects can be sustained over time—or whether any positive effects of management-based regulation diminish after the low-hanging fruit has been picked.

Given what we know now, it would be folly to think that, by themselves, management-based strategies could lead the way to a fundamentally transformed system of environmental protection.[55] Yet even if they cannot catalyze a revolution in environmental protection, management-based strategies have shown themselves to be a promising instrument in the policy toolkit.

The challenge for Congress and the regulatory agencies in the future will remain one of searching for the best tools for specific environmental problems and challenges. In some cases, the best available alternative will take the form of the conventional environmental regulation that has been used for the last forty years. In other cases, it will be best to use market-based instruments that have now been tried for specific environmental problems like phasing out lead from gasoline or addressing sulfur dioxide air pollution. However, in still other cases management-

[55] On occasion, some EPA officials appear to claim that they could. *See, e.g.*, Daniel Fiorino, *supra* note 11, at 9 ("A sea change in environmental management is underway that may well be the wave of the future."); U.S. ENVTL. PROT. AGENCY, PERFORMANCE TRACK FIFTH ANNUAL PROGRESS REPORT, *supra* note 35, at 31 ("Performance Track and its state counterparts aim to transform the way that government and industry address environmental issues and solve problems.").

based strategies will be appropriate and useful. Some environmental problems, for example, stem from the operations of a highly diverse set of industrial actors, where there is no clear one-size-fits-all technological solution and where it is difficult for regulators to monitor performance as necessary to enforce emissions limits, taxes, or trading.[56] In cases like these, and perhaps others as well, legislators and regulators will likely find the best option is to continue to make the managerial turn.

[56] *See* Coglianese & Lazer, *supra* note 17.