Long-Range Planning in Environmental and Health Regulatory Agencies

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INTRODUCTION

Environmental and health regulatory agencies in the United States are widely perceived as agencies in crisis. One important assessment charges the U.S. Environmental Protection Agency (EPA) with "asking the wrong questions." 1 Others characterize the Agency as a regulatory failure. Over twenty-three years, EPA has met only about fourteen percent of its 800 or more congressional deadlines. 2 As of 1991, the Agency had regulated only seven hazardous substances emitted into the air. 3 As of 1984, it had registered less than half of the 600 active pesticide ingredients and fewer than 100 of the approximately 50,000 potentially toxic chemicals in commerce. 4 Furthermore, EPA had completed cleanup at less than fifty of the thousands of abandoned hazardous waste sites. 5

EPA is not alone in its shortcomings. One recent article described the Food and Drug Administration (the FDA) as "ailing, overburdened, and demoralized . . . by any measure . . . a sick agency in recent years." 6 A blue-ribbon commission reported that the FDA is "overextended, under-funded, and shackled by bureaucratic constraints." 7 The Occupational Safety and Health Administration (OSHA) was recently described by two widely respected commentators as "a disappointment." 8 In seventeen years it has completed only twenty-four substance-specific regulations, has either no standards or inadequate standards for over half of the 110 chemicals used in the workplace that the National Cancer Institute identifies as confirmed or suspected carcinogens, and has either no exposure limits or weaker limits for some 300 chemicals recommended for control by the widely respected American Conference of Governmental Industrial Hygienists (the ACGIH). 9 From 1970 to 1986, the ACGIH tightened its standards for over 100 hazards and added exposure limits for over 200, while OSHA changed exposure limits for only ten. 10

These assessments reflect two primary problems. The first is that over the last two decades, agency regulatory processes have become laby-
rinthine and cumbersome. The complexity of these processes is a product of inadequate resources, increasingly heavy burdens of proof to justify agency proposals,\textsuperscript{11} constant and detailed oversight,\textsuperscript{12} and the transfer and extension of political conflicts over regulatory mandates from the legislative into the administrative arena.\textsuperscript{13} This problem has been widely discussed in recent literature.\textsuperscript{14}

The second problem, less thoroughly discussed, is the agencies' limited capacity for long-range planning (i.e., for anticipating new responsibilities and priorities, and adjusting their priorities and interventions accordingly). "Planning" includes two equally important components: anticipatory planning (i.e., recognizing important problems at the first possible opportunity, perhaps even before their emergence); and regulatory planning (i.e., allocating agency resources to active regulatory programs). Anticipating and preparing for future challenges are vital to efficient and appropriate governance, yet the major U.S. health and environmental regulatory agencies lack effective planning and priority-setting capabilities.

This failure to sustain planning functions has resulted in part from uncertainties in scientific and technical knowledge and in part from resource and statutory constraints. More substantially, however, intense political pressures, both within and beyond the agencies, have worked against any systematic, purposeful, and long-range approach to protecting public health and the environment. The central argument of this article is that the environmental and health regulatory agencies need such capabilities to carry out their mission of protecting the environment and public health, but that they cannot do so without significant changes in recent patterns of micromanagement by both Congress and the Executive Office of the President (EOP). A corollary of this argument is that, as demonstrated by the experiences of EPA and other regulatory agencies, anticipatory and regulatory planning functions must themselves be

\begin{enumerate}
\item Shapiro & McGarity, supra note 8, at 6, 9.
\item Oversight is carried out by multiple and conflicting constituencies, congressional committees, and the White House and Executive Office agencies. For a description of the effects of constituency and congressional oversight, see infra notes 73-75, 172-75 and accompanying text. For a discussion of the history of executive oversight and its effects on agency efforts to plan, see infra notes 76-77 and accompanying text, and part VIII.B.
\item In addition to works cited above, see generally Symposium, Assessing the Environmental Protection Agency After Twenty Years: Law, Politics and Economics, LAW & CONTEMPO. PROBS., Autumn 1991; Shapiro & McGarity, supra note 8, at 15; GARY BRYNER, BUREAUCRATIC DISCRETION: LAW AND POLICY IN FEDERAL REGULATORY AGENCIES (1987); TED GREENWOOD, KNOWLEDGE AND DISCRETION IN GOVERNMENT REGULATION (1984); RICHARD A. HARRIS AND SIDNEY M. MILKIS, THE POLITICS OF REGULATORY CHANGE: A TALE OF TWO AGENCIES (1989).
\end{enumerate}
treated as priorities. Otherwise, these functions will atrophy and disintegrate.

This article advocates improved planning by the regulatory agencies. Strong planning capacities are necessary in the agencies themselves; they may also be necessary in Congress and the Executive Office. The question of where planning power should be lodged overlaps broader questions of agency discretion, judicial deference, and legislative power that have been widely discussed in administrative law literature. 15 While these general issues are important, they lie beyond the scope of this argument for better planning in the regulatory agencies. 16

Part I of this article argues that agencies are a necessary and proper repository of planning power, notwithstanding their ultimate subservience and accountability to Congress and the Executive. Part II reviews recent proposals for reforming regulatory agencies’ planning functions. Part III explains why agencies need anticipatory planning in addition to regulatory planning. Part IV discusses the relationship between anticipatory research and anticipatory planning. Part V briefly outlines the relationship between planning functions and an agency’s choice of goals and regulatory tools.

Part VI introduces the primary subject of this article, the history of anticipatory and regulatory planning at EPA. To reinforce the lessons of EPA’s experience, part VII examines the planning experiences of three other regulatory agencies. Part VIII explores the related experiences of the agencies with interagency planning and coordination. The article ends with a series of recommendations for institutionalizing planning capabilities both within and among the major agencies.

I
MODELS OF REGULATORY PLANNING

Regulatory agencies must and do plan, notwithstanding outdated images of them as mere “transmission belts” for the directives of the Congress or the President 17 and more recent congressional efforts to prescribe their agendas in increasing detail. 18 The key question is whether

15. See, e.g., sources cited supra notes 13-14.
16. The question of whether regulatory agencies such as EPA should be fundamentally altered also has implications for planning, but raises issues beyond the scope of this paper. A Department of the Environment, proposed by some before EPA’s creation and recently by others, would likely exercise much broader regulatory authority, which might change the dynamic of planning initiatives in the agency. For a discussion of the potential effects of Cabinet status on EPA planning, see infra notes 321-22, 446-47 and accompanying text. For a discussion of the general issues associated with giving EPA Cabinet level status, see Alfred A. Marcus, EPA’S Organizational Structure, LAW & CONTEMP. PROBS., Autumn 1991, at 5 (discussing the debate over comprehensive management versus regulatory integration at EPA’s creation); and Lazarus, supra note 2, at 368-72 (discussing recent proposals).
17. Stewart, supra note 13, at 1669, 1676; BRYNER, supra note 14, at 31.
18. Lazarus, supra note 2, at 340-42.
their planning is driven by a long-range vision of their broad mission, a medium-to-long-range strategy for implementing regulatory responsibilities, the short-term routine of year-to-year budget and staff allocations, or merely the daily necessity of reacting to political demands and media crises.

Amendments to environmental statutes throughout the 1970’s and 1980’s have imposed increasingly detailed duties on the agencies. Even within a narrow view of regulatory discretion, however, these statutory directives can rarely be implemented mechanistically. Given many mandates but scarce resources, regulatory agencies must make discretionary choices as to what will be implemented and enforced, and must allocate time, budgets, and manpower among competing mandates. They must plan the development and implementation of specific regulatory initiatives, as well as monitoring and enforcement programs. They must plan their future regulatory agendas, and set priorities for both resource allocation and temporal sequence among regulatory mandates. Agencies also must plan their research programs, at least to provide the information necessary for regulatory decisions, and perhaps to try to anticipate future regulatory needs as well. Finally, they must plan their legislative agendas, their budget requests, and their requests for changes in their statutory authorities to allow them to address new problems. If they do not make such decisions purposefully over time—if they do not explicitly plan—then they do so implicitly, in ways likely to be driven merely by inertia and short-term political pressures.

In a broader view of regulation, regulatory agencies must also plan because we wish to hold them accountable for achieving a fundamental public goal or mission, such as protecting public health and the environment. To do this they must plan, within that overall mission, not only the implementation of existing mandates but also changes in priorities among those mandates, changes in the means of achieving them, and the identification and assessment of new problems that were not specifically envisioned in previous statutes and priorities.


21. One might be tempted to frame this proposition in terms of the debate over synoptic/rational versus incremental approaches to decisionmaking. See generally DAVID BRAYBROOKE & CHARLES E. LINDBLOM, A STRATEGY OF DECISION (1963). The approach proposed here, however, is closer to Etzioni’s “mixed-scanning” approach to planning, in which decisionmakers explicitly link incremental decision processes to higher order poli-
In principle, there are at least three answers to the question of how regulatory agencies should plan. One answer is that Congress should do the planning, through its legislative process, and record the results in statutes and budget allocations, which the agency then implements as faithfully (even mechanistically) as possible. Some of Congress' choices may later prove inconsistent, burdensome, or incorrect in their assumptions. Right or wrong, however, they are backed by the constitutional legitimacy of the legislative process. In this view, the lawmaking process is itself the optimal form of long-range planning. An agency's statutory mission is simply to implement those plans. Of course, even the implementation of a statute requires both short-term development of specific regulations and long-range planning for developing and implementing the statute's full requirements. Regulatory planning of this nature, however, is limited to planning the short- and long-term implementation of specific statutes addressing predetermined problems.

The second possible answer is that the President should plan the regulatory agenda as an element of the overall program mandated by his election and justified by his constitutional role. Agencies should implement the President's priorities as faithfully as possible within the limits of their statutory authority. To allow room for the exercise of Presidential priorities, statutes must be presumed to grant broader discretion in this second vision of regulatory planning than they do in the first. The President could exercise this discretion by setting agency priorities within the narrow mission of each regulatory agency. Alternatively, the Executive could define agency priorities more broadly, coordinating them with the missions and tools of other agencies across the government as a whole. Under this second vision, the agency still implements specific responsibilities, rather than planning or setting priorities itself.


Landy and his co-authors also take issue with the current resort to interest-group pluralism as the dominant model of political analysis. This model assumes that all political behavior is driven by fixed and dominant individual desires, rejects the role of civic education as irrelevant or tyrannical, treats government agencies merely as one set of players in political games, and provides no way of judging better or worse outcomes. By contrast, Landy argues that government in a democratic society has a deeper role to play—to expand the capacity of a free people, both individually and jointly, to govern themselves successfully. They argue that this role rests on three essential functions: deliberation, integration, and accountability. See LANDY ET AL., supra note 1, at 12-13, 233, 240-41.


24. Executive definition and coordination would involve strengthening institutions for anticipatory planning and policy integration at the Executive Office level.
Finally, the third answer is that the agencies themselves should be responsible for regulating not just mechanistically, but wisely, to achieve fundamental public purposes such as public health and environmental protection rather than merely to carry out narrowly predetermined tasks. EPA should in principle be planning the most effective possible program of activities to protect the environment: focusing on the most important threats; targeting their most serious manifestations; and attacking them with the most effective policy tools, regulatory or otherwise. OSHA should be planning the most effective possible program to protect human health and safety in the workplace; the FDA and the Consumer Product Safety Commission (the CPSC) should be planning the most effective possible programs to protect human health from consumer product hazards.

This third answer comports with the general strategy of governance represented by Congress' establishment of regulatory agencies. Pervasive national regulation of environmental quality, health, and safety is still a recent phenomenon in U.S. governance. Federal regulation of economic activities dates back over a century. With the exception of food and drug regulation and a small number of workplace hazards, however, most federal regulation of environmental, health, and safety hazards is a prod-

25. Both EPA and OSHA, for instance, are frequently criticized for devoting regulatory emphasis (or mandating high-cost preventive or corrective actions) to problems whose risks appear to be far lower than those of less regulated problems. For example, the agencies have been criticized for emphasizing hazardous wastes and toxic chemicals rather than indoor air quality, radon, smoking, environmental health hazards to high-risk groups, habitat destruction, global warming, and other problems. EPA's senior managers and Science Advisory Board have confirmed in two important reports that they share this concern about misplaced regulatory emphasis. Office of Policy Analysis, U.S. Envtl. Protection Agency, EPA/230/2-87/025A-E, Unfinished Business: A Comparative Assessment of Environmental Problems (1987) [hereinafter Unfinished Business]; Science Advisory Bd., U.S. Envtl. Protection Agency, SAB-EC-90-021, Reducing Risk: Setting Priorities and Strategies For Environmental Protection (1990) [hereinafter Reducing Risk].

26. This argument builds in part on principles of Progressive and New Deal governance that acknowledge the inevitability of administrative discretion and, therefore, ascribe to government agencies a responsibility to act in the overall public interest rather than mechanistically. See, e.g., Richard E. Klosterman, A Public Interest Criterion, 46 J. AM. PLAN. Ass'n, July 1980, at 323, 323-32; Bruce A. Ackerman & William T. Hassler, Clean Coal/Dirty Air 4-7 (1981) (discussing the "New Deal" model of governance); Samuel P. Hays, Conservation and the Gospel Of Efficiency 261-76 (1959) (discussing the older roots of this pattern in the Progressive tradition); and Stewart, supra note 13, at 1676-78 (discussing its implications for the question of administrative discretion). Previous versions of this argument have been attacked on numerous grounds. See, e.g., THEODORE J. LOWI, THE END OF LIBERALISM 287-97 (1969); Charles Wolf, Jr., A Theory of Non-Market Failures, 55 PUB. INTEREST 114 (1979); and Michael D. Reagan, Regulation: The Politics of Policy (1987).

uct only of the past two decades. EPA, OSHA and the CPSC have all been created since 1970.28

The existence of these agencies is difficult to explain if one rejects the view that agencies should actively and thoughtfully pursue the public good through their missions. As one commentator notes:

Unlike the older bureaucratic legacies of the Progressive and New Deal eras, Congress directed the modern health and environmental agencies to be proactive promulgators and enforcers of rules, rather than neutral adjudicators. Delegating extraordinary powers to EPA, Congress demanded that the agency regulate important aspects of industrial life in fundamental ways.29

In other words, this third vision is a legitimate and important alternative to the visions of congressional and executive dominance over the agencies. To date, however, none of these three answers has been clearly institutionalized and implemented as a purposeful form of planning. Congress has legislated but not planned; the environmental regulatory statutes represent a patchwork sewn together over two decades. Over this time, the statutes have imposed increasingly detailed mandates and growing numbers of deadlines. They have provided no mechanism, however, either for setting or revising priorities, except for the annual budget process and the more infrequent and arduous statutory re-authorization processes.30 The Executive Office has intervened to block or alter particular regulatory proposals,31 but has not taken responsibility for affirmatively planning the regulatory agenda. Further, it has frequently intervened for ad hoc political purposes at the expense of planned or consistent implementation.

The agencies themselves have only recently, and on limited authority, sought to introduce procedures for planning and setting systematic priorities among their diverse mandates. Their regulatory processes have


29. McGarity, supra note 19, at 58. The grants of authority were tied to administrative procedures designed to hold agencies accountable for their exercise of discretion. The Agency's vast discretionary powers did not go unconstrained for very long, however. External influences, including judicial review as well as executive and congressional oversight, had a tremendous chilling effect on the Agency's exercise of discretion. Id.


been characterized instead by a narrowly particularized approach. The fundamental public purposes have been left largely implicit, leaving each agency with fragmented authority over pieces of its ostensible mission rather than an over-arching authority to implement its mission coherently over time.\textsuperscript{32}

II
PROPOSALS FOR REFORM

The problems of environmental, health, and safety regulation have attracted extensive debate and many proposals for reform. Most of this literature has focused on accountability for particular regulatory decisions rather than on the discretion to plan and set regulatory priorities. Much of the commentary has centered on comparative risk assessment.

EPA itself began the process with a seminal 1987 report entitled \textit{Unfinished Business} comparing the importance, in the consensus view of seventy-five senior EPA managers, of the environmental hazards it was already regulating with the importance of others that were not yet regulated—including some, such as indoor air pollution, which it did not yet even have clear statutory authority to regulate.\textsuperscript{33} By so doing, it asserted a version of the third answer above: the Agency took responsibility both to anticipate new hazards in its substantive sphere of regulatory responsibility, broadly defined, and to plan and set priorities, insofar as it had discretion to do so, among these environmental risks. A 1990 report by EPA's Science Advisory Board (SAB) endorsed this "comparative risk" approach, recommending its fuller development as a basis for recommending both budget and research priorities.\textsuperscript{34}

The extensive commentary stimulated by these initiatives has chiefly been directed at the following questions: First, whether comparative risk is an appropriate basis for setting regulatory priorities; second, what should be the public's role in evaluating risk; and, third, what should be the proper roles of the Agency, Congress, and the President in setting regulatory priorities. Donald Hornstein, for example, argues that risk evaluation has both instrumental and moral aspects; because social priority setting is inescapably collective and political, comparative risk analysis should not be taken to imply scientific legitimacy.\textsuperscript{35} Robin Shifrin attacks the idea of risk-based environmental research budgeting, assert-


\textsuperscript{33} \textit{Unfinished Business}, \textit{supra} note 25, at xiii-xvi.

\textsuperscript{34} \textit{Reducing Risk}, \textit{supra} note 25, at 16-25.

that by delegating such decisions to specialists within the executive branch, current proposals would unduly increase executive influence (and the influence of agency scientists in particular) and displace other important considerations of environmental research policy.\textsuperscript{36} She argues instead for a vaguely specified "bilateral delegation" process by which environmental research priorities would be set by the congressional environmental science committees, with input from congressional and executive science agencies and deference to the advice of congressional scientific staff.\textsuperscript{37}

A more systematic discussion by John Applegate addresses the question of setting regulatory priorities among toxic substances.\textsuperscript{38} Applegate proposes that the current regulatory regime for toxic substances be restructured to emphasize priority setting\textsuperscript{39} rather than ad hoc standards and deadlines. Unlike Shifrin, Applegate advocates more systematic and integrated priority setting within the executive branch and particularly within EPA itself.\textsuperscript{40} Two more steps that Applegate suggests might further these goals are transforming EPA into a Cabinet level Department of the Environment and adopting a single, comprehensive environmental protection statute within which priorities could be set with greater discretion.\textsuperscript{41} At the same time, he asserts the need for a more clearly defined framework of congressional goals, to which such priorities should be accountable, and formalized planning procedures to ensure this result through public comment, judicial review, and congressional revision through legislation if needed—similar in principle to current planning requirements for national forest management.\textsuperscript{42} Aspects of Applegate's proposals may be applicable to broader questions of regulatory planning as well.

In early 1993, the National Commission on the Environment, a private-sector initiative convened by the World Wildlife Fund and com-


\textsuperscript{37} \textit{Id.} at 566-69. Specific mention is made of staff of the congressional Office of Technology Assessment, the environmental subcommittees of the House Committee on Science, Space and Technology and the Senate Committee on Environment and Public Works, and of EPA's Office of Research and Development and Science Advisory Board (but not the President's Science Advisor or Council on Environmental Quality) in the executive branch. Omitted, however, is any discussion of what such a "bilateral delegation" would involve as a specific legal procedure, or of why one would expect deference to congressional staff to yield results any more scientifically defensible or democratic than EPA's own attempts to set priorities. The underlying theme of the article seems limited to fear of any increase in executive influence. \textit{Id.} at 566-68.


\textsuperscript{39} \textit{Id.} at 281, 319 n.213.

\textsuperscript{40} \textit{Id.}

\textsuperscript{41} \textit{Id.} at 350-52.

\textsuperscript{42} \textit{Id.} at 310, 334-36.
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prised of nineteen distinguished individuals from government, business, academia, and environmental advocacy organizations, issued a report endorsing the proposal for a Department of the Environment with an organic statute. Unlike the previous articles discussed, it also added recommendations that the Department be more than a regulatory agency, and that it develop a far-reaching National Environmental Strategy addressing not only environmental regulation, but also the role of environmental considerations in agriculture, energy, transportation, and other major sectors. The report also recommended that to integrate environmental policies and set priorities across the government as a whole, the Council on Environmental Quality (the CEQ) should be strengthened and revitalized in the Executive Office of the President (EOP). Recommended actions included changing the Council to an executive agency with a single head, increasing its financial and staff re-


44. Id. at 47-51. Regulation represents only one range of policy instruments available to government to achieve particular missions such as the protection of public health and environmental quality; other means to the same ends may include economic incentives, public investments, educational programs, and information disclosure requirements. For instance, both the Dutch and the Canadians have considered overarching environmental strategies. The government of the Netherlands in 1990 adopted a pioneering National Environmental Policy Plan whose strategic goal is to solve that nation's considerable environmental problems within one generation. The reported highlights of this Plan, "undoubtedly mark a novel and ambitious approach to environmental policy"; they include the following:

[T]he decision to develop a broad, integrated framework for national environmental policy based on clear principles and objectives; the concept of an explicit, long-term vision elaborated in annual rolling implementation programs and four-year revisions to a strategic plan; the goal of achieving sustainable development for the country within 20 years; the policy's focus on the sources and impacts of specific environmental problems; and the agreements with target groups on specific measures to be taken to reach the plan's goals. These characteristics contrast sharply with the traditional incrementalist approach to environmental policy.


Similarly, Canada in 1990 published its "Green Plan," a comprehensive environmental action plan based on the principle of sustainable development and including a Can$3 billion commitment to over 100 new policies on specific targets and schedules, to be updated annually. Environment Canada, Canada's Green Plan 22-27 (1990). While these plans too may have important gaps between their announced intentions and their actual implementation, they illustrate at least commitments in principle by national governments to pursue an important public policy mission through coordinated implementation of regulatory initiatives, resource allocation decisions, and other instruments of government. The United States, in contrast, has never developed such a plan to guide its regulatory and other agencies toward common overall goals. These agencies and their programs continue simply to implement a growing number of fragmented and uncoordinated statutory mandates. See generally National Comm'n on the Env't, supra note 43, at 46-48.

sources, and expanding the use of the National Environmental Policy Act as a statutory basis for executive environmental policy integration.  

Since 1990 a series of reports by the Carnegie Commission on Science, Technology, and Government, another high-profile private-sector initiative, has also addressed issues of organization, research, and regulation for environmental protection and related issues of health and safety. The first of these reports recommended creation of a stronger top-level mechanism for environmental (and related) policy integration, through an Executive Office Council on Environment, Energy, and Economics that would evolve from and replace the CEQ. This proposal was essentially a new version of the second answer, augmented by more extensive coordination among both administrative agencies and congressional committees. Another report, addressing environmental research and development (R&D) needs, noted that, to date, federal environmental R&D has focused almost exclusively on the natural sciences. It recommended increasing environmental R&D support for policy research and assessment, including studies of the economic, social, legal, and political aspects of environmental problems, and reaffirmed earlier recommendations on top-level policy integration. The Commission’s final report, on science and regulation, explicitly attacked the 1980’s policy of using Executive Office oversight to micromanage specific regulatory proposals. It recommended instead a more active EOP role in setting initial policy directions, leaving implementation details to the agencies, and relying on stronger coordination among the agencies themselves without top-down second-guessing.

III

THE NEED FOR ANTICIPATORY PLANNING

Anticipatory planning by regulatory agencies is necessary because environmental and health hazards change more rapidly than the broad institutions of general purpose governance can attend to them. Neither congressional nor Presidential institutions provide adequate alternatives.

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47. CARNEGIE COMM’N ON NV’T, at Science, Technology, and Gov’t, E3: Organizing for Environment, Energy, and the Economy in the Executive Branch of the U.S. Government 11-12 (1990). With respect to Congress, for instance, the report recommended consideration of a Select Committee on Environment, Energy and Economy to operate for several years and help to resolve contradictory legislative developments in these areas. Id. at 56.
to the agencies' capability—and indeed, responsibility—to anticipate and adjust regulatory agendas over time. For similar reasons, anticipatory strategic planning and related forms of organizational learning have long been recognized as essential features of adaptive and effective organizations in the business world, as well as in public agencies.\textsuperscript{50} The Shell Oil Corporation is particularly noted for its strategic planning staff under Pierre Wack, a small but highly diverse and creative group that played a key role in successfully preparing the corporation's senior and mid-level managers for emerging threats such as the Arab oil embargo.\textsuperscript{51} Military officers, similarly, have long been taught the danger of adhering to rigid systems, priorities, and doctrines—a trap popularly known as “fighting the last war.”\textsuperscript{52} Anticipatory planning is no less necessary in the environmental and health regulatory agencies, which also are charged with missions whose success or failure has fundamental importance to the body politic. Nonetheless, it has been much less evident or accepted in such agencies to date.

A primary justification for anticipatory planning by regulatory agencies is that both hazards and relevant knowledge about them evolve more rapidly than can regulatory statutes. Rapid changes in the set of known hazards manifest themselves in seven ways. First, new knowledge about the hazards of technologies and exposures regularly provides evidence that particular hazards are either more serious\textsuperscript{53} or less serious\textsuperscript{54} than previously believed. Such changes in knowledge sometimes add important new hazards to the agenda, and also raise the question of why relatively remote hazards should be stringently regulated if far more significant ones are not.\textsuperscript{55}

\textsuperscript{50} See, e.g., DONALD A. SCHON, BEYOND THE STABLE STATE passim (1971); DONALD N. MICHAEL, ON LEARNING TO PLAN—AND PLANNING TO LEARN passim (1973).


\textsuperscript{52} See, e.g., JAMES Q. WILSON, BUREAUCRACY 14-18 (1989).

\textsuperscript{53} Examples of hazards that have been recognized as more dangerous include lead, indoor air pollution, radon, and the effects of chlorofluorocarbons on the ozone layer and of combustion on global warming. See, e.g., Carl M. Shy, Progress and Public Health: Lessons From Environmental Lead, 10 ENVT. IMPACT ASSESSMENT REV. 417, 426-29 (1990) (lead); Laurence S. Kirsch, Behind Closed Doors: The Problem of Indoor Pollutants, ENVIRONMENT, Mar. 1983, at 16 (indoor air pollution and radon); JAMES SHACKELFORD ET AL., TOTAL HUMAN EXPOSURE AND INDOOR AIR QUALITY (1988).

\textsuperscript{54} Examples of hazards that have, over time, come to appear less dangerous include asbestos and some suspected carcinogens. See, e.g., Bruce N. Ames et al., Ranking Possible Carcinogenic Hazards, 236 SCIENCE 271 (1987); B.T. Mossman et al., Asbestos: Scientific Developments and Implications for Public Policy, 247 SCIENCE 294 (1990); MICHAEL FUMENTO, SCIENCE UNDER SIEGE 45-143 (1993) (carcinogens and dioxins).

\textsuperscript{55} See generally John E. Ahearne, Integrating Risk Analysis Information Into Public Policymaking, ENVIRONMENT, Mar. 1993, at 17, 37. Critics of EPA's proposals for risk-based decisionmaking and comparative risk analysis have expressed concern over the hidden value judgments that may underlie them. See, e.g., Hornstein, supra note 35 at 630-33; Shiffrin, supra
Second, new uses of existing technologies produce changes in exposure patterns and ecological effects. Examples include new applications of drugs and pesticides, accelerated development of coastal lands, increased use of light trucks and vans as substitutes for cars,66 energy efficiency measures that intensify exposures to indoor pollutants,57 and increased total combustion of fossil fuels.

Third, new behavior patterns also change exposure patterns to existing hazards. Examples include suntanning, urban jogging, entry of large numbers of women into new segments of the workforce, and new demographic patterns.58 Environmental health effects arising out of changes in behavior are often far less amenable than industrial pollution sources to solution by traditional regulatory controls.59 New susceptibilities or risk factors may also emerge in the population.60

Fourth, the introduction of new technologies, such as new drugs or other chemicals, as well as environmental applications of biotechnology, may also introduce new hazards. Such hazards probably arise less frequently than is sometimes feared,61 and indeed many new technologies are introduced in part to replace older and more severe hazards.62 However, both the risks and the opportunity to prevent new hazards, before they become embedded in capital investments and popular behavior, justify careful advance scrutiny. Well-known examples of hazards resulting from new technologies include the birth defects associated with the drug thalidomide in the 1960's,63 the ozone-depleting properties of

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59. See, e.g., Reducing Risk, supra note 25, at 21 ("To control the risks posed by widely dispersed sources like naturally-occurring radon and some consumer products, and to control the risks that remain after the imposition of end-of-pipe technologies, command-and-control approaches may not be as effective.").
60. Cf. Silbergeld, supra note 58, at 435-37 (regarding miscarriage and infertility).
61. See, e.g., Paul Slovic et al., Rating the Risks, ENVIRONMENT, April 1979, at 14, 15 ("In general, rare causes of death were overestimated and common causes of death were underestimated.").
62. CFC's, for instance, were unusually stable, nonflammable, nontoxic, and noncorrosive, which made them an attractive substitute for ammonia in refrigeration and for other chemicals used as aerosol propellants. See Richard Elliot Benedick, Ozone Diplomacy 10 (1991).
chlorofluorocarbons (CFC's), and the extreme toxicity of tributyl tin (TBT) antifouling boat paints to estuarine ecosystems.

Fifth, the effects of policy interventions include both successful interventions that reduce risks and side effects that may unexpectedly increase them. Banning DDT, for instance, reduced damage to wildlife but also led to the substitution of organophosphate pesticides, which are more acutely toxic to agricultural workers. The use of tall smokestacks to reduce urban air pollution diluted pollutants in the atmosphere as intended, but also exacerbated the long-range transport and atmospheric transformation of these pollutants into acid rain. More stringent regulation of any one medium (e.g., air, water, or land disposal) by itself may promote increased pollution in others. Source reduction of course reduces pollution, but its focus on a single medium has often created incentives simply to pollute different media. Even pollution prevention at any single point in a material's life cycle may in some cases mean disposal at some other point or substituting an alternative material that has its own negative, as well as positive, impacts.

Sixth, changes in the perceived cost of solutions affect the perceived acceptability of health and safety hazards and, therefore, the judgment that they should be regulated. As inexpensive solutions become available and general affluence rises, hazards previously tolerated become less acceptable, while demands for their regulation increase. Conversely, as inexpensive controls are implemented and additional control looks increasingly expensive or intrusive, hazards previously condemned may be tolerated, especially in times of economic stringency or anti-government conservatism.
Finally, changes in political concerns and public values alter the long-range regulatory agenda. These changes are driven in part by changes in scientific knowledge and perceived costs, as noted above, but also by more general value shifts such as concern for the biosphere, fear of cancer, distrust of businesses and governments, and compassion or disdain for the plight of the poor.\(^{72}\)

For all these reasons, narrowly targeted statutes and regulations lose their power to hold the greatest health and environmental threats at bay. Effective regulation requires a capability for both anticipatory planning and adjustment of priorities. To an important extent, moreover, this capability must be created both in basic constitutional institutions, such as Congress and the Presidency, and within the environmental and health regulatory agencies themselves. Congress and the Presidency, however, both have important institutional limitations on their ability to anticipate and plan the environmental and health regulatory agenda.

Congress can commission expert analysis and recommendations, for instance, by its Office of Technology Assessment (OTA), General Accounting Office, or Congressional Research Service. Such reports provide valuable supplements and alternative sources of ideas to those of the executive branch. However, these congressional policy-support offices have neither the resources nor the expertise to serve as substitutes for the executive agencies. Even if they did, they too would likely develop their own institutional agendas that would be subject to the same criticisms as are now attributed to the regulatory agencies.\(^{73}\)

The legislative process itself, moreover, has serious limitations as a planning process. It often produces compromise agreements to “split the difference” or adds floor amendments to obtain passage of a bill. These compromises often introduce gaps and inconsistencies into statutes, creating unexpected implementation problems.\(^{74}\) Further, Congress cannot afford the transaction costs of constant attention to the changing details

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\(^{72}\) See U.S. Council on Environmental Quality, supra note 71, at 6-9, 24-29.

\(^{73}\) Even at its current scale, for instance, some OTA reports and recommendations have reflected strongly held personal agendas of individual analysts. See, e.g., Office of Technology Assessment, Serious Reduction of Hazardous Wastes (1986) (authored primarily by Joel Hirschhorn, OTA Senior Associate and Project Director). This is not necessarily bad, but it is no more accountable, and in some ways less so, than such alternatives as EPA’s comparative risk process that have been criticized as insufficiently accountable by scholars who advocate priority-setting by congressional staff instead. See Shifrin, supra note 36, at 555-64. Landy et al. also note the increase in unaccountable entrepreneurial activity by congressional personal and committee staff. Landy et al., supra note 1, at 302.

\(^{74}\) See, e.g., Ackerman & Hassler, supra note 26, at 42-54.
of each policy sector.\textsuperscript{75} Because of its limitations, Congress must depend on the regulatory agencies to resolve issues that lie beyond its power to anticipate.

The President and Executive Office also have essential roles in broad priority setting and policy integration across the executive branch—arguably more positive ones than they have played in recent administrations—but they too must rely significantly on the anticipatory capabilities of the regulatory agencies themselves. Environment and health expertise in the Executive Office is generally modest and transitory, limited both by the small size of the staff and by the process of turnover with changes of administration.\textsuperscript{76} The Office of the President's Science Advisor, the CEQ, and the Office of Management and Budget each include only a few staff members versed in environmental issues.\textsuperscript{77} Given these constraints, EOP institutions must devote their efforts primarily to implementing the President's preconceived priorities, rather than anticipating new ones, to orchestrating agendas across rather than within sectors, and to reacting to immediate issues and events.


\textsuperscript{76} A unique feature of environmental policy under the Clinton administration is the President's apparently broad delegation of authority to Vice President Al Gore to oversee and coordinate environmental policy. \textit{Gore Appears to be "E" Policymaker in Early Days of Clinton Presidency}, \textit{Air Water Pollution Report}, Feb. 6 1993, available in LEXIS, Nexis Library, ZEV1 File. Both the EPA Administrator, Carol Browner, and the Director of the White House Office of Environmental Policy (intended successor to the Council on Environmental Quality), Katie McGinty, are former Gore aides. McGinty has also been put in charge of an interdepartmental team of deputy Cabinet Secretaries to coordinate environmental and natural resource issues government-wide. \textit{Id.} President Clinton's Earth Day speech in April 1993, committing the United States to phase down its emissions of greenhouse gases to 1990 levels by the year 2000, also reportedly reflected a victory by Gore over opposition from the Treasury and Energy Secretaries. \textit{Slants & Trends}, \textit{Air Water Pollution Report}, Apr. 26, 1993, available in LEXIS, Nexis library, ZEV1 File.

Vice President Gore clearly brings a virtually unique perspective and set of intellectual commitments to this task, including not only his personal authorship of a widely-read book about environmental problems and priorities, \textit{Al Gore, Earth in the Balance} (1992), but also, though less widely known, a longstanding commitment to improving long-range foresight in government, including authorship of a bill to require ongoing assessment of critical trends. S. 1345, 101st Cong., 1st Sess. (1989). Given Gore's close association with the emerging Executive Office environmental policy apparatus, it is not clear how it will be institutionalized so as to outlive his leadership.

\textsuperscript{77} The CEQ at its peak in the late 1970's had close to 50 staff members, U.S. Council on Environmental Quality, \textit{Environmental Quality} 1980, at 485 (1980), and like OMB, greater continuity from one administration to another than most other EOP agencies. Its staff level was severely cut by the Reagan administration, however, and most of its substantive expertise since has been provided either by consultants or by staff members borrowed from EPA. President Clinton has proposed to de-authorize the CEQ by statute and to divide its functions between a White House Office of Environmental Policy and EPA. See discussion \textit{infra} note 421 and accompanying text.
Given the current structure of administrative law, agencies have important limitations as anticipatory planning institutions as well. They cannot adjust either priorities or remedies beyond their statutory authority. This constraint has become increasingly severe. Agencies remain vulnerable to a variety of forms of organizational failure, including capture by regulated constituencies, loss of agency resources to "bureaucratic imperialism," and turf struggles with other agencies. Agencies may also suffer from inertia, adhering to established priorities because they fit the interests and expertise of agency staff. Finally, agencies are subject to unwarranted influence by Presidential politics and Executive Office priorities.

The environmental regulatory statutes of the past two decades appear overwhelmingly preoccupied with preventing or correcting these perceived dangers, reacting first to growing public and intellectual distrust of bureaucratic capture and self-interest in general, and more recently to well-documented abuses by the Reagan administration. Congress' prophylactic of choice has been micromanagement of agencies through highly specific statutes. Unfortunately, in the process Congress has destroyed the agencies' ability to anticipate hazards and to adjust priorities and interventions—in short, to maintain effective regulatory programs. It is time, therefore, to ask whether these agencies and the statutes that guide them should be redesigned to achieve better results rather than simply to avoid the worst.

IV
ANTICIPATORY PLANNING AND RESEARCH

To regulate wisely rather than mechanistically requires a generic rather than a particularized definition of an agency's mission. That is, the agency's task must be to protect human health and the environment from whatever hazards are most severe, not merely to regulate particular problems specified by statutes. An agency must do more than merely implement duties imposed by existing statutes, budgets, and programs. It must also possess and exercise the capacity to anticipate new priorities.

78. See generally Bryner, supra note 14, at 21.
79. See supra notes 53-72 and accompanying text.
80. See supra sources cited in note 26.
81. See Wolf, supra note 26, at 121-22.
82. See id. at 120 (arguing that agencies are influenced by short-term concerns of politicians rather than long-term concerns of society); Percival, supra note 31, at 160-66, 196 (describing the OMB's usurpation of EPA decisionmaking authority).
83. See Lazarus, supra note 2, at 332-33. EPA was expressly structured as a single-mission agency, rather than a broader and more management-oriented Department of the Environment, to avoid potential capture by the regulated community. See Percival, supra note 31, at 191; Marcus, supra note 16, at 15-17.
84. Lazarus, supra note 2, at 340-42.
This capacity consists of both an anticipatory research function and an effective linkage of this function to a procedure for anticipatory planning of policy interventions.\textsuperscript{85} It may also require authority to use a broad range of policy interventions.

Future health, safety, and environmental problems that can be anticipated will arise, by definition, from conditions observable today, either through extrapolation of current trends or through "surprise" scenarios that significantly alter those trends in ways subject to reasoned speculation. Many of the seeds of tomorrow's most serious environmental problems, for example, are clearly visible today, as is the technical knowledge to address them. Publicly reported information may provide warnings of coming problems; useful places to look for these warnings include popular scientific publications about new technologies and growth trend data for products and production technologies (e.g., energy extraction and use, organic metals, maricultural biotechnology, agricultural chemicals), and growing groups of unusually exposed or susceptible individuals within populations (e.g., workers, children, the elderly, the impoverished). Finally, government policies and cultural trends should regularly be reviewed for new harms that may arise as side effects of other changes. These can include changes in behavior patterns and public policy incentives that alter environmental exploitation and exposure rates.\textsuperscript{86}

The environmental and health regulatory agencies, however, have frequently failed to anticipate new problems. This failure occurs for several reasons. Uncertainty and lack of knowledge may deny an agency any hope of anticipating certain problems. Even with the best anticipatory research, an agency still may not fully understand the basic

\textsuperscript{85} It is possible to have an anticipatory research function that is not well linked to policy planning. For instance an agency may believe in its importance enough to create and support it, but lack the statutory authority or political autonomy to set its priorities accordingly. EPA, for example, has conducted research for a decade on indoor air pollution, enough to demonstrate that such pollution may be a higher risk to human health than many other hazards it regulates, but EPA still has only very limited authority to regulate exposure in the indoor environment. See Kirsch, supra note 53, at 17-18; see generally Dr. Irvin L. White, Research Needs in Anticipation of Future Environmental Problems: The EPA Experience 17 (June 14, 1989) (unpublished manuscript, for National Research Council, Board on Environmental Studies and Toxicology, on file with author).

\textsuperscript{86} As in economic and business indices, some of these might be characterized as "leading" and others as "lagging" indicators. Our real concerns may be measurable damage to ecosystems and to human health (e.g., statistically valid changes in mortality), but these indicators lag behind the factors causing the problems and may not be evident until the damage is already done. "Leading" indicators, in contrast, measure changes that may reasonably be expected (though not clearly proven) to lead to harmful results. See, e.g., KAN CHEN, ET AL., U.S. ENVIRONMENTAL PROTECTION AGENCY, EPA'S ENVIRONMENTAL PROBLEMS ANTICIPATORY SYSTEM (1982); FUTURE STUDIES GROUP, U.S. ENVT. PROTECTION AGENCY, LOOKING AHEAD: DRIVING VARIABLES THAT AFFECT ENVIRONMENTAL QUALITY 7-9 (1993).
processes involved in a potential threat. The agency may not even be able to design research that would reduce the uncertainty.

The press of agency business presents the primary obstacle to effective anticipatory research. Statutes that impose short-term deadlines consume an agency's scarce resources, leaving little time for anticipatory research. Much of the regulatory agencies' current research is directed simply toward the justification and defense of current regulations. New problems compete for program resources against existing problems that have established constituencies, and for research resources against established patterns of research funding that are invested in particular laboratories, disciplines, beliefs, and people.

In still other cases, important changes are anticipated, but for various reasons—such as disbelief, scientific uncertainty, or political opposition—they are not incorporated into regulatory programs. Excellent research may be done, but may not be usable in timely, high-quality assessments that would improve actual regulatory decisions.

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87. A recent example is the role of CFC's in stratospheric ozone depletion. Discovery of the effect was made possible only by recent advances in scientific understanding and monitoring of atmospheric chemistry. See BENEDICK, supra note 62, at 9-22; Michael E. Kowalok, Research Lessons From Acid Rain, Ozone Depletion, and Global Warming, ENVIRONMENT, July-Aug. 1993, at 12, 36-37.

88. The newly emerging "chaos" theory also argues that traditional predictive methods may substantially underestimate the likelihood that small errors in estimates or assumptions may be magnified into large differences in outcomes, especially in complex environmental phenomena such as the global climate. See JAMES GLEICK, CHAOS 14-18 (1987). Because such surprises can be important, but by definition cannot be predicted before the development of new information and hypotheses, it is essential that agencies be designed to recognize the earliest possible signs of such surprises—for instance, by creating at least modest staff capabilities devoted to speculating in a disciplined way about such possibilities—and to adapt rapidly and flexibly to investigating and responding to such surprises as they occur. See, e.g., SCHON, supra note 50, at 116-80; MICHAEL, supra note 50, at 202-09, 227-36.

89. See infra notes 231-32 and accompanying text.

90. See infra note 205 and accompanying text.

91. See, e.g., CARNEGIE COMM’N ON SCIENCE, TECHNOLOGY, AND GOV’T, supra note 48, at 39.

92. See, e.g., H. Keith Florig, Containing the Costs of the EMF Problem, 257 SCIENCE 468, 488 (1992).


94. Recent cases include airborne lead, acid deposition, radon, indoor air pollution, and electromagnetic fields. A useful topic for anticipatory research would be to compare the histories of these cases, asking in each case (a) how long was it anticipated by someone before it was officially anticipated by EPA; (b) what factors prevented earlier anticipation by EPA, and what factors then led EPA to recognize it; and (c) what actions therefore might encourage earlier EPA legitimation of other important problems.

95. See, e.g., NATIONAL ACID PRECIPITATION ASSESSMENT PROGRAM OVERSIGHT REVIEW BD., THE EXPERIENCE AND LEGACY OF NAPAP (1991) (regarding extensive and high-quality NAPAP research that provided little benefit in making better policy decisions); Leslie Roberts, Learning from an Acid Rain Program, 251 SCIENCE 1302, 1304 (1991) (summarizing NAPAP experience).
The type of research valued by agencies also accounts for their failure to fund anticipatory planning. "Exploratory" research at EPA is largely oriented not toward problem anticipation, but simply toward support for "basic" science. At other times, disciplinary biases, or preferences for "hard" rather than "soft" scientific research, may undercut anticipatory programs studying behavioral trends. Neither socioeconomic causative factors nor policy effectiveness now receive significant research support from the environmental and health regulatory agencies. To develop anticipatory planning will therefore require significant adjustments even in research support, as well as an organizational capability that is clearly committed to this purpose.

V

PLANNING, GOALS, AND TOOLS

Anticipatory planning requires not only that agencies apply their resources to foresee the emergence of important new problems, but also that they have the power to act against them. This does not mean that an agency should immediately apply command-and-control regulation to every identified hazard. An agency may study a hazard sufficiently to rule out policy intervention. Alternatively, an agency may alter priorities

96. "Basic" research seeks to develop better understanding of fundamental processes and mechanisms in natural and socioeconomic systems (e.g., how clouds affect atmospheric temperature balance, what factors most strongly influence the behavior of economic organizations, or how human perceptual and cognitive processes affect their judgments). Anticipatory research, in contrast, seeks to predict the likelihood and magnitude of future problems and issues, based not only on the best available knowledge from basic research but also on the study of trends in natural, technological, and socioeconomic conditions that may cause or exacerbate hazards to human health and ecosystems. See NATIONAL RESEARCH COUNCIL, OPPORTUNITIES IN APPLIED ENVIRONMENTAL RESEARCH AND DEVELOPMENT 3-5 (1991).

97. Of EPA's total $347 million R&D budget for fiscal year 1992, for instance, $190 million was spent on natural science research in the environmental sciences, $149 million on engineering and related fields, $8 million on information sciences, and $1 million on social science research (up from zero in fiscal year 1990). Out of total federal funding of $4.5 billion for environmental research and development in fiscal year 1992, $3.1 billion went to the environmental sciences, $1.2 billion to engineering and related fields, $200 million to information sciences, and less than $50 million to the social sciences. See AMERICAN ASS'N FOR THE ADVANCEMENT OF SCIENCE, FEDERAL FUNDING FOR ENVIRONMENTAL R&D: A SPECIAL REPORT 4, 12-13, 48, 64 (1992). These figures do not include applications of economic and social science methods in assessing environmental policies when such applications are not classified by the agencies as R&D, but correcting for these omissions would not greatly change these relative magnitudes of support.

98. It would be useful to consider how effective anticipatory research and planning are carried out in other organizations (for instance, in corporate research and strategic planning offices), how their success is evaluated, and which of their characteristics could be transferred to federal regulatory agencies. See, e.g., Frances M. Lynn et al., Coping with Scientific and Technological Uncertainty: Federal Policy Analysis for Non-Routine Decisions, in NEW RISKS: ISSUES IN MANAGEMENT 515, 515-28 (L.A. Cox, Jr., & P.F. Ricci eds., 1990) (reduction of information about risks at higher levels of agency decisionmaking); see generally RICHARD O. MASON & IAN I. MITROFF, CHALLENGING STRATEGIC PLANNING ASSUMPTIONS (1991).
in the allocation of regulatory resources to deal with the new problem. In other cases, an agency may need to implement a broader range of policy tools than is currently provided by statute to solve an approaching problem.\textsuperscript{99} One example of such a planning approach is the comparative risk analysis now being advocated and pursued by EPA. Expert and administrative judgments of the relative risks of environmental hazards are used as a basis for proposing changes in priorities—and sometimes changes in policy tools—for EPA intervention.\textsuperscript{100}

The case for anticipatory planning does not rest, however, on the goal of reducing risk per se. EPA’s advocacy notwithstanding,\textsuperscript{101} reducing the greatest overall environmental risks (however measured) is only one of several possible goals for environmental and public health protection. Others include achieving the following: environmentally sustainable development;\textsuperscript{102} environmental justice by reducing the most extreme risks to the most vulnerable subgroups (e.g., children, minorities, workers in high-risk jobs, or the poor);\textsuperscript{103} elimination of those environmental problems that are cheapest, most cost-effective, or most economically efficient to solve;\textsuperscript{104} or preservation of ecosystems and natural beauty for their own sakes.\textsuperscript{105} The need for reasonable amounts of discretion to plan and adjust priorities over time is distinct from, although obviously related to, the question of what goal should guide the use of this discretion.

Protecting public health and the environment requires not only anticipatory research and flexibility to adjust priorities, but also appropriate choices of policy actions to achieve those purposes. Many of the public


\textsuperscript{100} \textit{UNFINISHED BUSINESS}, \textit{supra} note 25, at xvii-xx; \textit{REDUCING RISK}, \textit{supra} note 25, at 19, 24.

\textsuperscript{101} In 1987 a major EPA report stated flatly that “[t]he fundamental mission of the Environmental Protection Agency [...] is to reduce risks.” \textit{UNFINISHED BUSINESS}, \textit{supra} note 25, at 1. The authority for this statement is not clear, however, inasmuch as EPA has no single organic statute and not all of its mandates are based on risk criteria. One former assistant administrator appears to defend it as a matter of necessity and common sense, as the only alternative to a proliferation of ad hoc, subjective, and thus less justifiable decisions. Milton Russell & Michael Gruber, \textit{Risk Assessment in Environmental Policy-Making}, 236 \textit{Science} 286, 287 (1987).

\textsuperscript{102} See, e.g., \textit{WORLD COMM’N ON ENV’T & DEVELOPMENT, OUR COMMON FUTURE} 8-9, 22-23 (1987).


purposes to be achieved are intrinsically regulatory, such as defining minimum standards for ambient air and water quality and protection of public health against unreasonable risks. The most effective policy instruments for these purposes, however, may be far more diverse than regulations per se. Such instruments include regulatory commands and prohibitions, economic incentives, information and disclosure requirements, and others. EPA itself has advocated a shift from command and control to more market oriented means of policy intervention, many of which it does not currently have statutory authority to pursue.

Anticipatory research and planning must therefore include flexibility to explore and evaluate such alternative approaches, at least to the extent of proving or disproving their effectiveness in comparison with established regulatory remedies. In more than a few cases, the most effective policy tool may not be a new regulation at all, but simply the correction of perverse policy incentives in other agencies or sectors.

If we wish to protect public health and environmental quality and to hold government agencies accountable for doing so, the agencies responsible for these missions must be authorized to propose the most effective means for achieving their overall missions, rather than being restricted to specific regulatory tools. The form this authority should take is the subject of an important discussion, but one that lies beyond the scope of this paper.

The following discussion examines anticipatory planning and research in the major environmental, health, and safety regulatory agencies. It is useful to focus first and in most detail on EPA, since it has made perhaps the most extensive recent, albeit still modest, efforts to introduce these functions into its programs.


108. See, e.g., REDUCING RISK, supra note 25, at 21 (recommending increasing use of market incentives and other instruments in preference to “conventional command and control regulation” as a means for achieving EPA’s mission, which it defined as reducing risks to human health, ecosystems, and public welfare). A recent example is the proposed “cash for clunkers” proposal, which would allow polluting industries to meet their emissions reduction responsibilities either at their own sites or by buying up and retiring old cars generating equivalent pollution (thus benefitting sales of newer autos as well). Sharon Begley & Mary Hager, Cold Cash for Old Clunkers, NEWSWEEK, Apr. 6, 1992, at 61, 61.

109. Examples of these perverse policy incentives include hidden subsidies for wasteful energy and water consumption and for minerals extraction, procurement specifications mandating virgin materials rather than performance requirements, and even environmental regulations that mandate particular technological investments rather than allowing the most cost-effective means for achieving the ultimate performance standard desired. See, e.g., Stavins & Whitehead, supra note 99, at 32.

110. See generally Marcus, supra note 16.
VI
PLANNING IN THE ENVIRONMENTAL PROTECTION AGENCY

The Environmental Protection Agency has no single overall statute (organic act) authorizing it to protect the environment. It was created in 1970, not by a statute, but by a Presidential Executive order that simply reorganized into one agency a number of existing units and their associated statutory authorities.\(^{111}\) To these have been added a steadily increasing but still not integrated range of mandates: the Clean Air Act (the CAA),\(^{112}\) the Clean Water Act (the CWA),\(^{113}\) the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA),\(^{114}\) the Toxic Substances Control Act (TSCA),\(^{115}\) the Safe Drinking Water Act (the SDWA),\(^{116}\) the Resource Conservation and Recovery Act (RCRA),\(^{117}\) the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA or Superfund),\(^{118}\) major amendments and reauthorizations of these laws, and numerous others. These statutes were enacted at different times, established different criteria and often different procedures for setting standards, and added in an ad hoc manner. The resultant patchwork of several dozen separate statutes lacks any single framework for planning, changing priorities, reallocating resources and effort over time, or even for coordinating the multiple mandates affecting the same regulated facilities.\(^{119}\)

These laws are implemented by nine Assistant Administrators in Washington and ten regional offices. Four of the nine headquarters units are defined by statutory program domains: air and radiation; water; solid waste and emergency response; and pesticides and toxic substances. Administrative functions define the other five: research and development; enforcement and compliance monitoring; administration and resources management; international activities; and policy, planning, and evaluation.\(^{120}\) Within each Assistant Administrator's jurisdiction are several

\(^{119}\) J. Clarence Davies and others have proposed a model for integrating these statutes into a unified environmental code. Such proposals have received little discussion, reportedly because of the large number of congressional subcommittees and associated interests that have stakes in the status quo. Telephone Interview with J. Clarence Davies, former EPA Assistant Administrator for Policy, Planning, and Evaluation (May 1991); Telephone Interview with Douglas Costle, former EPA Administrator (September 1991); see also RABE, supra note 32, at 9-18.
\(^{120}\) OFFICE OF THE FEDERAL REGISTER, GENERAL SERVICE ADMINISTRATION, UNITED STATES GOVERNMENT MANUAL 1990/91, at 543.
offices responsible for particular programs, whose directors both represent the highest level of civil servants and bear primary responsibility for the substance of regulations. Each office is subdivided into divisions and branches responsible for more specific sub-programs and functions.

The EPA Administrator has only limited discretionary authority to reallocate resources or integrate regulatory procedures across these statutory and programmatic lines (i.e., to undertake anticipatory planning). In practice, his subsidiary administrators direct separate programs under the differing standard-setting procedures and criteria of separate statutes.

Ironically, two principal motivations for creating EPA were to develop a capability for integrating environmental regulatory functions across the fragmented and disparate program elements that existed at the time, and to permit anticipation and adaptation to deal with new pollution problems. In practice, however, the reality of diverse conceptual and statutory bases for existing programs, reluctance to disrupt established procedures within programs, and the urgency of demonstrating success in addressing immediate problems led to rapid entrenchment of the existing programs. The envisioned integration has never occurred. Nor have anticipatory functions developed. Instead, EPA has evolved as a hybrid organization in which media-specific programs and functionally defined units coexist and no unit wields overarching authority to plan.

A. Regulatory Planning

Most regulatory planning that occurs at EPA is related to implementing mandates and choosing priorities under each statute. For example, of the dozens of hazardous air pollutants that EPA has identified as highly toxic, which does the Agency intend to consider for regulation at all, which of these will it address first, and how much money and effort will it devote to each? On which Superfund sites will cleanup be

121. See generally McGarity, supra note 19, at 65-70 (discussing EPA's organizational structure); Office of the Federal Register, supra note 120, at 540-46.
122. See generally McGarity, supra note 19, at 65-70.
123. See BRYNER, supra note 14, at 111; RABE, supra note 32, at 9-18.
125. See Marcus, supra note 16, at 5, 30-31.
126. Id. at 32-33.
127. Id. at 31-33.
128. Id. at 31, 38-40.
129. Id. at 38.
130. See, e.g., John D. Graham, The Failure of Agency-Forcing: The Regulation of Airborne Carcinogens Under Section 112 of the Clean Air Act, 1985 DUKE L.J. 100, 116. In the Clean Air Act Amendments of 1990, however, Congress directed that EPA instead establish technology-based standards for 189 of these, and reconsider after six years whether the remaining "residual risk" warranted further control requirements. 42 U.S.C. § 7412(f)(1) (Supp. III
started this year and next, and how much money will be devoted to each?\textsuperscript{131} Which drinking water contaminants will be rejected?\textsuperscript{132} Most of these specific decisions are properly characterized as at best short-term planning, associated with year-to-year programming of staff and budget resources.

EPA regulatory planning begins with a start-action request initiated by one of its four program offices whose assistant administrators have rulemaking responsibility.\textsuperscript{133} Requests are then approved by an agency-wide steering committee, the Agency’s primary collective decisionmaking body, composed of high-level representatives of each assistant administrator and the general counsel.\textsuperscript{134} Following approval, a proposal is assigned to a workgroup headed by an analyst from a lead program office.\textsuperscript{135} The workgroup shepherds the proposal through the appropriate notice and comment procedures and into law.\textsuperscript{136}

This bottom-up “team model” has advantages in its capability to bring multiple professional and programmatic perspectives to bear on regulatory initiatives. From a planning perspective, however, it leaves the program offices—driven by the short-term pressures of statutory mandates, deadlines, constituencies, and their own programmatic and professional worldviews—as the dominant sources of specific regulatory proposals and thus of the agency’s regulatory agenda.\textsuperscript{137} This shifts the locus of policymaking significantly downward to the program offices and even to lower-level workgroups concerned only with particular regulatory proposals, a pattern which is not by itself conducive to longer-range anticipatory planning and priority setting.\textsuperscript{138}

A longer-range version of regulatory planning does in fact exist, namely program planning for the implementation of each statute’s requirements. Few if any of EPA’s statutes are simple and straightforward. Most delegate multiple regulatory responsibilities, often requiring multi-year research planning as well as regulatory planning per se, which must be carried out over several to ten years. The 1990 Clean Air Act

\textsuperscript{1991)\textsuperscript{131}. EPA has developed a “national priority list” of sites based on a weighted scoring system evaluating potential hazards. This system generally has been accepted as reasonable and allows consistent comparisons among sites, despite the possibility that some important hazards may slip through the cracks of its weighing system. It does not provide clear answers, however, to the much-litigated question of how much money and effort should be devoted to each site, and how clean each site must be before reallocating resources to others. See John A. Hird, *Superfund Expenditures and Cleanup Priorities: Distributive Politics or the Public Interest?*, 9 J. POL‘Y ANALYSIS & MGMT. 455, 457-61 (1990).


\textsuperscript{133}. See McGarity, *supra* note 19, at 71.

\textsuperscript{134}. See generally id. at 69-72.

\textsuperscript{135}. *Id.* at 72.

\textsuperscript{136}. For a more detailed discussion of EPA’s internal regulatory process, see *id.* at 73-90.

\textsuperscript{137}. *Id.* at 74.

\textsuperscript{138}. *Id.* at 92-94.
Amendments, for example, are in effect a strategic plan, mandated by Congress for EPA's air quality regulation program over the next decade. Under most statutes, EPA must set priorities as to what it plans to do first, and how it plans to allocate staff and budget resources among its responsibilities. The Agency incorporates these plans into its annual budget proposals. After negotiations with the OMB and the conclusion of the congressional appropriations process, these plans become the agency's actual year-to-year operating plan. Implementation of many of EPA's regulations occurs through state plans and programs, which EPA must approve.

These regulatory planning processes are driven by the following seven major and conflicting forces: the budget cycle and congressional oversight; statutory and court-imposed deadlines; burden of proof; executive oversight; political and media pressures; organizational inertia; and the Administrator's agenda.

The budget cycle is the primary arena for short-term regulatory planning. For the last two decades, long-term planning has been the cumulative result of short-term decisions. As a result, the budget process is a central arena for long-range and anticipatory planning as well. At any

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140. See RABE, supra note 32, at 14-15.

141. The relationship between the OMB and the agencies is inherently adversarial. The OMB's relationship with EPA was particularly adversarial under the Reagan administration, which set out to severely reduce EPA's budget as a means of defunding the government's capacity for environmental and health regulatory initiatives. See Bartlett, supra note 20, at 121-22; U.S. ENVTL. PROTECTION AGENCY, FISCAL YEAR 1994 PROBLEM AREA ANALYSIS OF THE BUDGET 1-2 (Draft June 5, 1993). Under the Clinton administration, preliminary indications suggest that the relationship will be less hostile. By February, for instance, Clinton had dissolved Vice President Quayle's Council on Competitiveness. Along with the OMB, this Council has been the most directly intrusive source of micromanagement of the regulatory agencies' proposals. However, hard budget choices must inevitably be made, particularly if the President wishes to hold to his commitment to reduce the deficit, and some of those choices may well involve cuts in EPA's budget.


143. See, e.g., LANDY ET AL., supra note 1, at 245-72 (examining EPA policy formation during the Reagan administration).
given time, the Agency is working under one year's budget, negotiating incremental changes proposed for the next year's, and proposing new initiatives or significant changes for the following year. This process is far from ideal as a planning mechanism. EPA's budget is an accumulated patchwork of over 1200 budget categories, which relate neither to a set of goals (such as relative risks or even problems to be solved) nor even to the structure of the agency's programs. This disrupts EPA's ability to plan and manage even over short time periods. Moreover, virtually all budgeting is done on a single rather than multi-year basis.

Despite these serious impediments, the budget process is in reality a central arena for planning at EPA, in which changes are made to reflect changing priorities. The budget process serves as a unifying process, in which choices at least of short-term priority are made across program and statutory lines. A series of incremental changes can evolve into a longer term commitment. The process itself both allows and demands such choices. Since 1990 the Administrator's office has also mandated a process of strategic planning by each office and region, based on the relative risks associated with different problems. The results reportedly are used to drive incremental changes in budget allocations. In principle, for example, the EPA Administrator or the President could recommend funding as low as zero or as high as any statutory limit for virtually any item in EPA's budget. In practice, such changes are limited by political commitments and potential opposition; but a series of well-justified changes even as small as five percent per year over several years can add up to significant reallocations of resources. This process does not alter in any formal way the balance of power between the Agency and

144. See generally David Clarke, Chasing Rainbows: Is an Integrated Statute the Pot of Gold for Environmental Policy?, 22 ENVTL. L. 281, 293 (1992)
145. The regulatory calendar, mandated by the OMB in the early 1980's as an executive oversight mechanism, also compels each regulatory agency to list all proposed regulatory initiatives in advance on an annual calendar. Exec. Order No. 12,498, 3 C.F.R. 323 (1985), reprinted in 5 U.S.C. § 601 (1988). This obviously necessitates planning, but not over any longer time period than the short-term perspective of the budget cycle. It also does not necessitate, or even authorize, the explicit choices across the statutory boundaries among EPA's programs that would be necessary for truly anticipatory planning.
150. Telephone Interview with J. Clarence Davies, supra note 119.
Congress, but it does permit EPA to present a more coherently reasoned and systematic justification for its budget proposals. At best this will invite easier congressional endorsement. At the least, it renders the Agency's priorities transparent to debate and disagreement.

Statutory and judicial deadlines, however, are perhaps the most powerful and pervasive influence on regulatory planning at EPA. Their importance derives both from the sheer volume of regulatory responsibilities assigned to the Agency, and equally from the increasing use of statutory deadlines and "hammer" clauses as instruments of political accountability.151 From EPA's earliest years, it has been charged with implementing a large and constantly increasing number of complex, science-based regulatory mandates.152 Statutes direct the Agency, for example, to develop and justify industry-by-industry standards for air153 and water154 pollution control technologies and for solid and hazardous waste management facilities;155 to develop and justify substance-by-substance standards for pesticides,156 hazardous air pollutants157 and toxic water pollutants,158 drinking water contaminants,159 and other toxic substances; and to ratchet some of these standards tighter by increments over time.160 In addition, statutes uniformly instruct EPA periodically to review standards in the light of any new scientific and technical information that becomes available.161 Lazarus notes that these statutes set some 800 deadlines, eighty-six percent of which applied to EPA itself in the first instance rather than to the regulated parties; one-third were for six months or less, and sixty percent were for one year or less.162

The result has been constant pressure simply to feed the Federal Register. This pressure was exacerbated both by the constant stream of new mandates added throughout the 1970's and 1980's and by the severe budget cuts enacted by the Reagan administration, with congressional acquiescence, in the early 1980's.163 This sense of pressure was charac-

152. See, e.g., Bryner, supra note 14, at 92-94.
162. Lazarus, supra note 19, at 222.
163. Between fiscal years 1981 and 1984, EPA's operating budget excluding Superfund was reduced by 22%, and its research budget by more than 50%. Bartlett, supra note 20, at 121, 131, 133.
terized by a former EPA Administrator as "trying to perform an appendectomy while running a 100 yard dash"—clearly not a setting conducive to anticipatory planning. In the opinion of one former Assistant Administrator, the press of immediate problems throughout the 1970's and most of the 1980's has always driven out any serious attention or commitment to anticipatory planning.

A large volume of responsibilities can of course be managed, and even guided by anticipatory planning, if the Administrator wields discretionary authority to set priorities and to allocate resources accordingly. For EPA, however, the problem of proliferating mandates has been compounded by increasingly routine congressional use of specific statutory deadlines, hammer clauses, and appropriations riders to direct the Agency's priorities.

Beginning in the 1960's, a dramatic transformation has occurred in U.S. public administration, from limited statutory mandates coupled with considerable administrative discretion to sweeping statutory mandates but increasingly restricted discretion. The origin of this shift is a fundamental change in prevailing American ideas about governance, from the Progressive and New Deal belief in a general public interest implemented by politically neutral professionals, to pluralist theories that there exists no general public interest. In the various versions of this new perspective, the regulatory agencies can be expected to do one of the following: first, be "captured" over time by the groups with the most to gain from their decisions; second, develop their own self-interested agendas, which may or may not serve any overall public interest; or third, be unduly influenced by Presidential politics and executive agendas.

In the name of accountability, therefore, Congress increasingly has mandated specific deadlines for EPA regulatory actions, and it has imposed hammer clauses specifying automatic (and often severe) statutory consequences if the deadlines are not met. Stakeholder groups in turn

164. Telephone Interview with Douglas Costle, supra note 119.
165. Telephone Interview with Dr. Stephen Gage, former EPA Assistant Administrator (Apr. 1991).
166. See, e.g., 42 U.S.C. §§ 7408(a), 7409(a) (CAA); 33 U.S.C. § 1311(b) (CWA); 42 U.S.C. §§ 6921(a)-(b), 6922, 6923, 6924 (RCRA).
167. Lazarus notes that the appropriations committees have sometimes placed riders on appropriations bills that have effectively prevented EPA from taking actions otherwise required by the Agency's statutory mandate. Lazarus, supra note 19, at 230-31.
168. ACKERMAN & HASSLER, supra note 26, at 26.
169. Id. at 4-7; LOWI, supra note 26, at 287-97.
171. Wolf, supra note 26, at 126.
172. Lazarus, supra note 2; see also Shifrin, supra note 36, at 556-58; Percival, supra note 31, at 162-66.
173. See supra note 151 and accompanying text.
use the courts to enforce the deadlines. As a result, EPA's discretionary authority even for short-term regulatory planning, let alone long-range or anticipatory priority setting, is severely limited by statutory and judicial mandates that specify as much (or more) regulatory activity as the Agency has resources to conduct.174

Congressional oversight by itself, moreover, consumes a significant amount of the Agency's time and attention.175 EPA has become, in one commentator's view, "every elected official's favorite whipping boy."176 Lazarus asserts that these practices have damaged morale and chilled innovation, and have thwarted efforts to achieve cross-media regulatory integration, pollution prevention, and more market-oriented initiatives.177 In addition, as EPA tries to respond to the demands of politicians, policies have become dominated by special interests rather than by any coherent or comprehensive approach.178

A closely related force shaping EPA's regulatory agenda is a significant and relentless increase in the burden of proof that the agency must satisfy in justifying each regulatory proposal.179 The growing burden of proof means that EPA must expend resources on costly and time-consuming documentation and continuous review in each area that it regulates.180 Judicial review of agencies' decisions shifted in the 1970's from traditional deference towards regulatory decisions to a "hard look" at a "reviewable record," requiring far more extensive documentation of the merits of the decision rather than merely a reasonable judgment on the part of the Administrator.181 At the same time, statutes and Executive orders have imposed an increasing number of additional documentation requirements, including environmental impact statements, regulatory impact statements, paperwork impact statements, risk assessments, and competitiveness impact reviews.182 Each of these, whatever its individual

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174. See, e.g., Andrews, supra note 20, at 490-94; Lazarus, supra note 2, at 323-38.
175. Lazarus, supra note 19, at 211-12.
176. Melnick, supra note 13, at 322.
177. Lazarus, supra note 2, at 350-63.
178. Id. at 359-63. For an especially egregious example, see Fumento, supra note 54, at 301-34 (gasohol-fueled vehicles); see also Marc C. Landy & Mary Hague, The Coalition for Waste: Private Interests and Superfund, in ENVIRONMENTAL POLITICS 67, 77 (Michael S. Greve & Fred L. Smith, Jr., eds., 1992) (Superfund protected by environmental lobby for political purposes with support from lawyers and hazardous waste treatment industry).
179. McGarity, supra note 19, at 58.
181. McGarity, supra note 19, at 58; Bryner, supra note 14, at 26. More recent decisions appear to reverse this trend to some extent, according greater flexibility and deference to administrative decisions. See Robert Glicksman and Christopher H. Schroeder, EPA and the Courts: Twenty Years of Law and Politics, LAW & CONTEMP. PROBS., Autumn 1991, at 249, 286.
merits, adds to the time, cost, and red tape involved in planning and carrying out a regulatory agenda. By increasing the resources necessary to justify each individual regulatory decision, moreover, such orders and statutes decrease the resources available for longer term anticipatory planning and intensify the agency's internal pressures to focus simply on the short-term task of justifying actions to meet statutory deadlines.

Since 1981, planning by the regulatory agencies has also been influenced by the introduction of far more intrusive Executive Office oversight procedures, in the form of two Executive orders promulgated by President Reagan. Executive Order 12,291 required each agency to prepare a detailed "regulatory impact assessment" for each major proposed rulemaking. The assessment had to conform to standards developed by the OMB and was subject to review both by the OMB and by a Presidential Task Force on Regulatory Relief. The agencies were also directed that to the extent permitted by law, regulations should not be promulgated unless their benefits exceeded their costs. Further, only the most cost-effective regulatory alternative should be selected. The result was both an increase in the burden of proof that the agencies must meet and an increase in White House political influence over particular regulatory proposals.

Executive Order 12,498 further increased the OMB's control over the agencies' regulatory planning processes. This order required all federal agencies to prepare annual "regulatory calendars" of all proposed regulatory initiatives. The OMB would then approve or disapprove the calendars, with input from the Presidential Task Force.

In principle, the requirement of regulatory calendars could be viewed as a step toward more explicit and transparent planning. The calendars did publicly set temporal priorities among existing standard-setting mandates. In the context of the Reagan and Bush administrations, however, they served primarily to derail regulatory initiatives at an


183. The anti-regulatory policy stance of the Reagan administration also had catastrophic effects on all anticipatory planning initiatives. See infra note 232 and accompanying text.
185. Id.; see Percival, supra note 31, at 154-55; see generally, Andrews, supra note 182, at 76-81; EADS & FIX, supra note 182, at 107-38.
189. Id.
190. Id.; see also CARNEGIE COMM'N ON SCIENCE, TECHNOLOGY, AND GOV'T, supra note 49, at 49.
191. CARNEGIE COMM'N ON SCIENCE, TECHNOLOGY, AND GOV'T, supra note 49, at 49.
early stage for political and economic reasons. The OMB and the Competitiveness Council argued that, since they were Executive Office agencies, their advice and influence were not subject to the public disclosure protections of the formal rulemaking process. Secrecy in the OMB and the Competitiveness Council thus made the process of setting priorities less transparent rather than more so. The result was a significant shift in authority and regulatory philosophy, from the agencies to the Executive Office, and from publicly accountable regulation to increased ad hoc political intervention by the White House.

Political and media crises are a fifth key influence on EPA’s regulatory agenda. Some of these arise from unexpected events (such as the Exxon Valdez oil spill in the Gulf of Alaska) and from new scientific findings (such as the Antarctic ozone hole). Others arise from the strategies of various interest groups, through the media and often the courts, to get their priorities onto EPA’s agenda. Love Canal raised the priority of hazardous wastes. Public concern regarding ethylene dibromide (EDB) and Alar (daminozide), together with the Natural Resource Defense Council’s 1975 lawsuit over toxic water pollutants raised the priority of particular toxic substances. Such strategies may be perceived by policy advocacy groups, both business and environmental, as the only way to get their concerns onto the agency’s over-committed

192. Id. at 51; see also Percival, supra note 31, at 161-68.
193. CARNEGIE COMM’N ON SCIENCE, TECHNOLOGY, AND GOV’T, supra note 49, at 51; see also Percival, supra note 31, at 161-68.
194. See generally Oil Pollution Act of 1990, 33 U.S.C § 2761 (Supp. IV 1992). One might argue that such events, though not their exact timing, can be anticipated, given knowable imperfections in oil transport practices.
195. See BENEDICK, supra note 62, at 112. The ozone hole/chlorofluorocarbon case provides a rare but good example of adaptation of policy issues to meet a newly recognized, high priority problem.
197. EDB is a fumigant which became the subject of intense media coverage when residues of it were found in groundwater and baking products in 1983. EPA ordered an immediate emergency suspension of its use as a soil fumigant and initiated cancellation proceedings against all other pesticide uses. EPA did not feel it had sufficient information to stop all uses on an emergency basis, but did give immediate priority to collecting and evaluating such information. As With EDB, Tolerances Change: Ethylene dibromide, FDA CONSUMER, July 1984, at 10.
199. NRDC v. Train, 519 F.2d 287 (D.C. Cir. 1975). NRDC sued to compel EPA to comply with congressional deadlines for regulating toxic water pollutants. The outcome was a consent decree by which EPA agreed to specific timetables for setting standards for some 65 toxic water pollutants. Additional substances were subsequently added as well. See NRDC v. Train, 8 Env’t. Rep. Cas. (BNA) 2120, 2122 (D.D.C. June 8, 1976) (including text of opinion and settlement agreement).
While sometimes a necessary counter to bureaucratic inaction, however, they can also deflect the agencies’ priorities from more serious hazards.

The importance of sheer organizational inertia itself should not be underestimated. The Agency’s structure itself reflects a particular set of established regulatory priorities. Its existing staff expertise embodies an agency commitment to particular programs and fields of scientific and technical knowledge. Its congressional committees and political constituencies reflect similar commitments to past priorities. These constituencies can easily occupy the agency’s full attention just with the constant reconsideration of past decisions in light of new scientific and technical information, without any attention to new problems at all. New resources may offer opportunities for enlargement of the agency’s mission because they do not require reordering of priorities. The current federal budget debate, however, offers few such opportunities except through skillful creation of public perceptions of crisis.

Finally, the EPA Administrator exercises a limited influence on regulatory and anticipatory planning though her personal agenda. If a public crisis erupts, such as a Love Canal or EDB scare, the Administrator can raise its priority, in effect “jumping the queue” of scheduled regulatory actions. Over several years, if she is effective, she also can incrementally shift some budget priorities and add a few new initiatives to the agenda. Moreover, the Administrator can serve as an advocate for better anticipatory planning per se. Without question, an Administrator who places a high priority on anticipatory planning is a necessary, though not sufficient, prerequisite for its occurrence.

B. Anticipatory Research

EPA has a separate Office of Research and Development (ORD), originally labelled the Office of Research and Monitoring (ORM), headed by an Assistant Administrator. Like the regulatory offices themselves, however, ORD has been dominated since its inception by the

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200. Cf. FUMENTO, supra note 54, at 19-44 (regarding use of media by Alar opponents).
201. One study, conducted by a scholar who also had extensive EPA experience, concluded that this inertia was so strong that only external political pressures such as lawsuits would cause the Agency to pay attention to new concerns. This view implies that organizational inertia may impede serious anticipatory planning even more than do external political crises. See Berry, supra note 180, at 219.
202. See generally, As With EDB, Tolerances Change, supra note 197.
203. Administrator William Ruckelshaus, for instance, can be credited for promoting the use of quantitative risk assessment to justify EPA regulatory decisions (as an alternative to cost-benefit analysis). Andrews, supra note 32, at 209. Administrator William Reilly can be credited for implementing risk-based planning in budget and enforcement decisions and for promoting experiments with voluntary pollution prevention programs and market-oriented economic incentives.
204. OFFICE OF THE FEDERAL REGISTER, supra note 120, at 542.
demand to produce information to justify and defend immediate regulatory actions.\textsuperscript{205} As its congressional oversight committee chairman wrote in 1981,

One of our fundamental premises is that EPA should conduct or fund only such research activities as will support its mission. That mission is defined in large part by several federal statutes. \ldots [T]he need is to translate legislated regulatory objectives into criteria for managing research. \ldots [T]he problems facing the agency exist now; so the question for EPA research managers becomes one of how to plan and operate a program that will be supportive of the immediate agency mission.\textsuperscript{206}

While the authors may have recognized the need for more anticipatory research, their statement shows a clear intent to focus EPA's research program to support the Agency's current regulatory agenda. This philosophy appears to rule out research to anticipate new or emergent environmental problems that are not yet the subject of regulatory mandates. It also precludes other research, such as studies of policy instruments other than those specified in existing regulatory statutes, or even basic scientific research.

During the first decade of its history EPA made several forays in the direction of an anticipatory research capability. In 1971, ORM created a separate unit, the Washington Environmental Research Center (WERC), to devote more intensive effort to forecasting and anticipatory research, as well as socioeconomic studies of environmental problems.\textsuperscript{207} WERC pursued several lines of effort, including development of new environmental indicators,\textsuperscript{208} projections of alternative scenarios of future environmental conditions and hazards,\textsuperscript{209} and integrated assessments of several complexes of environmental problems.\textsuperscript{210} WERC's centerpiece, however, was the development of a large and complex computer model, the Strategic Environmental Assessment System (SEAS).\textsuperscript{211} WERC intended SEAS to integrate diverse environmental forces and effects into a single model that could then be used to anticipate and predict future

\textsuperscript{205} \textbf{National Research Council}, supra note 151, at 59 ("[T]he principal role of EPA's in-house laboratories should be to perform research and provide technical expertise responsive to immediate agency needs."); see also George E. Brown & Radford Byerly, Jr., \textit{Research in EPA: A Congressional Point of View}, 211 \textit{Science} 1385, 1387-88 (1981).

\textsuperscript{206} Brown & Byerly, supra note 205, at 1385.

\textsuperscript{207} White, supra note 85, at 4-5.

\textsuperscript{208} \textit{Id.}

\textsuperscript{209} \textit{Id.}

\textsuperscript{210} \textit{Id.} at 5-6. The Western Energy Study, for example, provided an integrated assessment of potential combinations of energy technologies and resource development, their impacts on both natural and socioeconomic environmental conditions, and policy options for forestalling or mitigating these impacts. Telephone Interview with Dr. Irvin White, Director of EPA's Office of Strategic Assessments and Special Studies (June 1989).

environmental problems. Unfortunately, the Agency elected to close down WERC in the mid-1970's.

In 1975-76 a major study of EPA by the National Research Council produced a recommendation for longer term research to anticipate environmental problems before they became crises. The House Committee on Science and Technology adopted this recommendation and sought to earmark fifteen percent of EPA's research budget for 1977-78 for that purpose. Concurrently, within the Agency, Dr. Stephen Gage, Assistant Administrator for Research and Development negotiated an agreement, with the support of the Administrator, that in return for more active regulatory office control over eighty to eighty-five percent of the R&D budget, the other fifteen to twenty percent would be allocated to longer range needs. The Assistant Administrator then established a task force to develop a workable plan for allocating the earmarked funds. The main results of these negotiations were funding for a small number of university-based "centers of excellence" for extramural research, a program of "internal sabbaticals" for EPA scientists on a competitive basis, a modestly funded Anticipatory Research Program, and an Office of Exploratory Research (OER) with a small forecasting program, the Office of Strategic Assessments and Special Studies (OSASS).

OSASS' purposes were to identify and anticipate future environmental problems, research needs, and long-term concerns in decisionmaking and policymaking. In three years it produced a major forecasting and research agenda document, Environmental Outlook—1980; more specific outlook reports on particular regions and research areas; four mini-assessments of emerging technologies and problems; a variety of studies on refinement of concepts and analytical methods; and exploratory studies in at least five newly identified problem areas. OSASS also supported numerous outreach initiatives to broaden the Agency's field of anticipatory awareness (and to seek peer review of its own judgments),

212. White, supra note 85, at 4.
213. Id. at 5.
214. NATIONAL RESEARCH COUNCIL, supra note 151.
215. Telephone Interview with Dr. Stephen Gage, supra note 165.
216. Id.
217. Id.
220. Id. at 16-17.
221. White, supra note 85, at 10-11.
222. Id. at 9.
223. Specific projects included studies on acid rain, environmental cancer, environmental benefits, bio-monitoring, and an integrated technology assessment of Sunbelt development. Id. at 12. For a study using mini-assessments to explore methodological approaches to anticipatory research in general, see, CHEN ET AL., supra note 86.
including in particular a National Research Council workshop on the long-range environmental outlook.\textsuperscript{224}

The OSASS experience was probably the most substantial attempt in EPA's history to institutionalize anticipatory research and long-range research planning, and it deserves attention as one potential model for the future. Unfortunately, it also illustrates the vulnerability of such units to competing interests, short-term priorities, and budget cuts. Internal EPA constituencies opposed OSASS from the start, viewing it as a congressional initiative financed by reallocation of funds from other programs.\textsuperscript{225} The program's funding was too small and its existence too brief to build strong external constituencies.\textsuperscript{226} Several of its key congressional supporters were defeated or lost interest in it after the 1980 elections.\textsuperscript{227} Reagan budget cuts of the early 1980's essentially dismantled OSASS, leaving as its only surviving element a small Office of Exploratory Research.\textsuperscript{228} The OER administers funds for competitive research grants and centers—the two activities that the academic community lobbied to keep.\textsuperscript{229} Even the centers, which in principle can assemble teams for interdisciplinary efforts, have never been well funded, and have not achieved the expected payoffs.\textsuperscript{230}

With the exceptions of these modest and short-lived initiatives, EPA's research mission has remained closely linked to the operating mandates and priorities of its established regulatory programs. EPA's environmental research planning has also been heavily influenced by the exigencies of the annual budget process. Research is often the last funded and first reduced portion of the Agency's budget, and was in fact severely cut over the past decade.\textsuperscript{231} The Reagan budget reductions of the early 1980's reduced EPA's R&D budget from $360 million to $250 million in the course of two years and virtually eliminated long-range and anticipatory research.\textsuperscript{232} While the R&D budget in nominal dollars has now gradually risen once again, in real dollars it declined by about

\begin{itemize}
\item \textsuperscript{224} White, \textit{supra} note 85, at 9-10; see, e.g., \textsc{National Research Council, Long-Range Environmental Outlook: Proceedings of a Workshop} (1980).
\item \textsuperscript{225} Telephone Interview with Dr. Irvin White, \textit{supra} note 210.
\item \textsuperscript{226} \textit{Id.}
\item \textsuperscript{227} \textit{Id.}
\item \textsuperscript{228} White, \textit{supra} note 85, at 16.
\item \textsuperscript{229} \textsc{National Research Council, supra} note 96; \textsc{Carnegie Comm'n on Science, Technology, and Gov't, supra} note 48, 38-42. In connotation and in practice, "exploratory" research has tended to mean basic science research whose policy payoffs are uncertain, as opposed to "anticipatory" research intended more specifically to illuminate policy issues that are likely to result from technological and socioeconomic trends. Both differ from EPA's traditional emphasis on research in support of short-term regulatory priorities.
\item \textsuperscript{230} White, \textit{supra} note 85.
\end{itemize}
eleven percent between 1980 and 1992.\(^\text{233}\) It stands today at or below its level of ten years ago, which was inadequate even then.

The increases that did occur in EPA's research budget during this period, moreover, were frequently earmarked for crash programs on particular high-visibility issues, such as acid rain, health risks at hazardous waste sites, and global climate change.\(^\text{234}\) These came at the expense of developing a balanced and sustained research program.\(^\text{235}\) This pattern produced increased unpredictability and disruptions in the year-to-year continuity that is necessary to plan and produce good research of any kind, let alone anticipatory research.

In short, the agreement negotiated by Assistant Administrator Gage in 1977 no longer obtains. In his estimate, as of 1991, over ninety-eight percent of EPA's research budget was devoted to immediate regulatory priorities rather than longer-range anticipatory needs.\(^\text{236}\)

C. Recent Initiatives: Comparative Risk Assessment and Negotiated Rulemaking

Beginning in the early 1980's, EPA's Office of Policy, Planning, and Evaluation (OPPE) sponsored a series of exploratory studies of integrated environmental management and pollution control on a cross-media basis.\(^\text{237}\) The studies reviewed the most effective tools for reducing combinations of environmental hazards in particular geographic regions, such as the City of Philadelphia, the Santa Clara Valley (California), and several major estuaries.\(^\text{238}\) These studies might better be classified as attempts at regional regulatory integration, rather than anticipatory planning.\(^\text{239}\) On the other hand, they did represent initiatives to plan beyond

\(^{233}\) Carnegie Comm'n on Science, Technology, and Gov't, supra note 48, at 40.

\(^{234}\) See, e.g., Roberts, supra note 95, at 1302-05.

\(^{235}\) Despite their stated urgency to inform high-priority decisions, moreover, such crash programs have often failed to improve regulatory planning. A recent review of EPA's 10-year National Acid Precipitation Assessment Program (NAPAP) by its Oversight Review Board concluded that it had funded many excellent research projects of interest to basic scientists, and produced useful and high-quality research results, but had not adequately linked these research outputs to a timely and effective assessment process as had been intended. As a result, the program had not made as useful a contribution to improving the scientific basis for regulatory policy as had been hoped. See sources cited supra note 95; Milton Russell, NAPAP: A Lesson in Science Policy, 8 F. FOR APPLIED RES. & PUB. POL'Y 55, 55-57 (1993); Orie L. Loucks, Science or Policy? NAPAP and Reagan, 8 F. FOR APPLIED RES. & PUB. POL'Y 66, 66-72 (1993).

\(^{236}\) Telephone Interview with Dr. Stephen Gage, supra note 165.


\(^{239}\) Id. at 809-10.
mere implementation of individual regulatory mandates, and they acted as catalysts for EPA's later initiatives in comparative risk assessment.\textsuperscript{240} Similar initiatives include a "toxics integration project" to explore a cross-media approach to chemical regulation, and an Office of Pollution Prevention, created in 1987 and 1988 respectively.\textsuperscript{241}

Beginning in 1987, successive EPA Administrators have undertaken a series of initiatives whose cumulative influence has directed increased attention toward anticipatory planning, both of research and of regulatory priorities. These efforts are both tentative and severely constrained by the short-term and implementation-oriented forces discussed above.\textsuperscript{242} Moreover, they presume and assert a particular regulatory goal—risk reduction—which is not necessarily essential to the improvement of anticipatory planning per se.\textsuperscript{243} They are nonetheless important and hopeful initiatives.

Since the mid-1980's, EPA's Office of the Administrator has advocated the concept of relative risk as a primary criterion for setting priorities among its diverse responsibilities.\textsuperscript{244} An unusual study by EPA in 1987 attempted to compare the relative risks of some thirty-one environmental problems, spanning the full range of EPA's responsibilities and beyond.\textsuperscript{245} The study considered four different sorts of risks: cancer, non-cancer health risks, ecological effects, and other effects on human welfare.\textsuperscript{246} It rested on the consensus judgments of some seventy-five senior EPA managers.\textsuperscript{247} The study then compared these judgments to the agency resources EPA was devoting to each problem.\textsuperscript{248}

\textsuperscript{240} Telephone Interview with Robert Currie, Director of Strategic Planning and Management, U.S. Envtl. Protection Agency (June 10, 1993).
\textsuperscript{241} See McGarity, supra note 19, at 85 nn.91-92; see also text accompanying note 19. For arguments favoring expanded use of integrated approaches to pollution control, see Guruswamy, supra note 68, at 46-49; \textit{INTEGRATED POLLUTION CONTROL IN EUROPE AND NORTH AMERICA} (Nigel Haigh & Frances Irwin eds., 1990).
\textsuperscript{242} See supra notes 143-203 and accompanying text.
\textsuperscript{243} See supra note 235 and accompanying text.
\textsuperscript{244} Hornstein, supra note 35, at 565.
\textsuperscript{245} \textit{UNFINISHED BUSINESS}, supra note 25, at xvii.
\textsuperscript{246} Hornstein, supra note 35, at 578.
\textsuperscript{247} \textit{UNFINISHED BUSINESS}, supra note 25, at xviii.
\textsuperscript{248} Id. at xix. The study found that the information available to assess risks for virtually any of these problems was surprisingly poor. Id. at 98-99. It also found that the agency’s actual risk management priorities were more consistent with public opinion concerns than with those problems EPA managers thought most serious. Id. at 96. Third, it found that in all programs except surface water quality, EPA had been more concerned with pollution that affects public health than with the protection of natural habitats and ecosystems. Id. Finally, it found that even with respect to public health hazards, localized hazards may cause much higher risks to individuals than overall risk estimates reveal. Id. at 97. Note that while the concept of "relative risk" borrows from the language of quantitative risk assessment, a highly formalized and established procedure for justifying regulation of particular substances (especially potential carcinogens), the \textit{UNFINISHED BUSINESS} study was not a quantitative risk assessment, but a group consensus, since both data and methodology were lacking for most non-cancer risks. Id. at 14-15.
This study was an unusually candid and public step by EPA to take stock of the relative importance of its diverse responsibilities, and to compare them directly with other problems that might be anticipated. EPA's ten regions subsequently conducted similar assessments. The study was arguably limited (and perhaps biased) by its fundamental units of analysis—EPA's thirty-one existing program categories—and by the fact that its ultimate vision was limited to the perspectives of in-house administrators. Nonetheless, it reflected an unusual initiative to anticipate important problems beyond those currently regulated.

In the spring of 1987, EPA Administrator Lee Thomas also requested EPA's Science Advisory Board (the SAB) to provide him with advice on ways to improve strategic and anticipatory research planning at EPA. In response, the SAB appointed a Research Strategies Committee, chaired by former Deputy Administrator Alvin Alm. The committee included five subcommittees on major research subject areas and made broad recommendations aimed at redirecting both research and regulatory planning. It found that while EPA's past research priorities had been dominated by preconceived regulatory imperatives and end-of-the-pipe controls, its future priorities must be directed more broadly to prevent or reduce environmental risks: "EPA's R&D program has to be expanded and reoriented to include much more basic, long-term research not necessarily tied to the immediate regulatory needs of EPA's program offices." The committee's report made ten recommendations, including a call for increased emphasis on anticipating new environmental problems, rather than merely meeting immediate regulatory mandates. In 1989, Administrator William Reilly requested that EPA's SAB sponsor a thorough review of the 1987 Unfinished Business report by a committee of outside scientists and policy experts, and make recommendations to guide EPA's use of relative risk as a planning and budgeting criterion. The committee endorsed EPA's further development of this approach and recommended its use in setting budget priorities.

249. Initially only Regions I, III, and X conducted the assessments. See, e.g., REGION I, U.S. ENVTL. PROTECTION AGENCY, EPA/901/7-89/001, UNFINISHED BUSINESS IN NEW ENGLAND: A COMPARATIVE ASSESSMENT OF ENVIRONMENTAL PROBLEMS (1988); COMPARING RISKS, supra note 148.
250. See SCIENCE ADVISORY BD., supra note 231, at ii.
251. Id.
252. Id. at 4.
253. Id. at 8-19.
254. Id. at 12.
255. See REDUCING RISK, supra note 25, at ii.
256. Id. at 16, 18-20. In addition, the committee made substantive recommendations for anticipating several emerging high-priority risks (especially ecological hazards, such as global climate change and habitat destruction), and urged the use of a broader range of policy tools rather than regulation alone to forestall and mitigate these risks.
Reilly publicly praised and endorsed the *Reducing Risk* report and made its implementation a personal priority.\textsuperscript{257}

Over the ensuing two years Administrator Reilly and his staff initiated a risk-based strategic planning system throughout the Agency.\textsuperscript{258} Each office and region was directed to produce an annual assessment of the relative risks within its jurisdiction, and to identify quantitative program goals based on these priorities over a four-year time horizon.\textsuperscript{259} Thereafter, each office would need to justify its budget requests according to these priorities.\textsuperscript{260} By 1992 two annual rounds of these plans had been produced.\textsuperscript{261} The initial rounds often merely repeated existing program priorities as their strategies, rather than advancing longer range goals and plans for achieving them.\textsuperscript{262} Nonetheless, the assessments did have the side effect of prompting thought about anticipatory planning and about better coordination between ORD research priorities and long-range program office needs.\textsuperscript{263} The changing priorities uncovered in the assessment even led to some rethinking of the agency’s structure; for example, the Office of Water was reorganized.\textsuperscript{264} In addition, risk assessments have led to incremental changes in priorities and budget allocations.\textsuperscript{265} Funding has been increased for efforts on such emerging threats as global warming, CFCS, pesticides, indoor air quality, and, in fiscal year 1994 especially, drinking water quality and non-point sources of water pollution.\textsuperscript{266} At the same time, the budgets for hazardous waste programs and point sources of water pollution (especially water treatment construction grants), which *Unfinished Business* and its sequels suggested should be de-emphasized, have levelled off.\textsuperscript{267} Finally, the EPA budget for R&D has significantly increased.\textsuperscript{268}

Beginning in 1991, EPA’s OPPE began to develop the nucleus of a new capacity for strategic planning on an ongoing basis. One of OPPE’s three subdivisions is now an Office of Strategic Planning and Environmental Data (OSPED).

\textsuperscript{257} See generally Hornstein, *supra* note 35, at 565.
\textsuperscript{258} Telephone Interview with J. Clarence Davies, *supra* note 119. The demonstrated linkage of these plans to the budget process apparently increased attention to them by the second year.
\textsuperscript{259} Id.; see, e.g., REGION I, *supra* note 249; OFFICE OF SOLID WASTE AND EMERGENCY RESPONSE, U.S. ENVTL. PROTECTION AGENCY, OSWER COMPARATIVE RISK PROJECT (1989).
\textsuperscript{260} Telephone Interview with J. Clarence Davies, *supra* note 119.
\textsuperscript{261} Id.
\textsuperscript{262} Id.
\textsuperscript{263} Telephone Interview with Robert Currie, *supra* note 240.
\textsuperscript{264} Id.
\textsuperscript{265} See generally BASE REVIEW, *supra* note 148.
\textsuperscript{266} Id. at 43.
\textsuperscript{267} Id.
\textsuperscript{268} See AMERICAN ASS’N FOR THE ADVANCEMENT OF SCIENCE, *supra* note 97, at 64.
OSPED includes a three person group devoted to forecasting and futures analysis, which focuses on such issues as the impacts of emerging national trends on future environmental risks and policy effectiveness over a ten-to-forty year time horizon.269 The purposes of such forecasting are to identify emerging trends that may either cause or exacerbate environmental hazards, or thwart the effectiveness of EPA's intended remedies, and also to help the Agency avoid creating new problems while solving old ones.270

OSPED also is responsible for developing and encouraging the use of empirical indicators of environmental results as a basis for evaluating and correcting environmental protection policies. It seeks to replace past reliance merely on indicators of administrative activity (e.g., size of budget or staff, numbers of permits written, enforcement cases initiated, fines collected.)271

Finally, OSPED is responsible for promoting improved priority setting and implementation of environmental protection strategies at sub-national levels of government, and assisting the EPA regions, states, and local governments in instituting such activities.272

The creation of these capabilities is a positive and important step in the directions urged in this article. Initiated over two years ago, they appear to have the support of the Clinton administration as well. Indeed the base budget review cited above has served as a direct source of information to the new Administrator in her decisions about budget priorities.273 EPA's strategic planning initiatives remain limited, however, by four serious constraints: the balkanization of EPA's statutory authorities; the political power of short-term crises and inertia of existing programs; the resulting modesty and vulnerability of budgetary resources for anticipatory research and strategic planning; and their consequent high dependence on the continuity of top-down support and protection by the Administrator and the head of OPPE.

In short, EPA's top management has now adopted a strategic planning process based on relative risk criteria as a primary process for set-

270. See Telephone Interview with David Rejeski, supra note 269 (discussing several remedial programs that exacerbated or created other environmental problems).
272. Debora Martin, Presentation at U.S. Environmental Protection Agency/Air and Waste Management Association Conference on Comparative Risk Analysis and Priority Setting of Air Pollution Issues (June 7, 1993).
273. Telephone Interview with Robert Currie, Director of Strategic Planning and Management, U.S. Envtl. Protection Agency (June 6, 1993).
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This process is still in its infancy; its ultimate degree of success cannot yet be predicted. One can expect continued debate about the proper relative priorities among diverse "risks" (health, ecosystems, welfare, and all the many specific instances of each), and even about whether "risk" as a whole is an adequate criterion for EPA's total responsibilities. Nonetheless, the attempt to coordinate regulation to eliminate the greatest threats represents a step towards coherent anticipatory and regulatory planning.

Over the past several years EPA also has sponsored a series of procedural experiments in negotiated rulemaking. In each, the agency has invited representatives of the potentially regulated and other interested parties to participate directly in negotiating the substance of proposed regulations. Under traditional procedures, the agency develops a regulatory proposal on its own, announces it after great investment of effort and organizational commitment, and then defends it against inevitable opposition and litigation. Regulatory negotiations thus represent a significant refinement to traditional, formal procedures.

Initially, these experiments involved only relatively minor regulatory proposals, such as for wood-stove emissions. However, in mid-1991 EPA announced two far more significant negotiated agreements, for reducing air pollution in the Grand Canyon and for supplying clean automotive fuels to high-pollution urban areas.

These initiatives may appear peripheral but, in fact, they have at least three important implications for regulatory planning. First, the central problem in environmental regulation is not so much scientific uncertainty as controversy. A well-designed negotiation offers an important mechanism for resolving or at least reducing these conflicts.

274. See generally Andrews, supra note 32, at 220-29; Hornstein, supra note 35; Shifrin, supra note 36.
275. Telephone Interview with Dr. Anthony Rosenbaum (Mar. 1991); Telephone Interview with J. Clarence Davies, supra note 119.
277. Id.
278. 53 Fed. Reg. 5860, 5862 (1988) ("This was the first NSPS to be developed by regulatory negotiation.").
281. Because law has now established "science" rather than administrative discretion as the primary authority for regulatory decisions (e.g., substantial evidence, the "hard look") the scientific record has itself become a surrogate battleground for regulatory controversies. Negotiation of consensus statements stipulating what scientific assertions are agreed, disputed, and uncertain is therefore an essential basis for improving regulatory planning and decisionmaking.
Second, anticipatory planning requires not only inferences of likelihood, but also judgments of importance and priority; developing political consensus about such issues is also important. Third, at a practical level one may expect those directly affected by potential hazards to be important sources of anticipatory information about them, not necessarily superior to agency experts but often aware of additional information.

D. Summary

In summary, under Administrator Reilly, anticipatory planning for regulatory priorities became a high-visibility Agency program, based on the concept of comparative risk. The Administrator's emphasis on this issue, underscored by his linking it to budget decisions, affected thinking and behavior throughout the Agency. It is not yet clear, however, whether the concept of comparative risk can sustain the full weight that Reilly sought to put on it as a basis for planning and setting priorities. Nor is the task of anticipatory planning perceived as sufficiently distinct from risk reduction to assure that it will continue to develop independently of that goal. Risk-based priority setting conveys the image of science, but it does not provide a clear scientific basis for comparing different types of risks. Nevertheless, such choices must be made. If

and for reaffirming the boundaries between scientific and political judgments as well. In a case involving a highly controversial proposal for a waste incinerator in a major urban area, a skilled mediator was able to elicit an unexpectedly detailed consensus among opposing scientists about what facts and assumptions were actually in dispute, and thus to provide a far clearer basis for decisionmaking under uncertainty by the public officials involved. Connie P. Ozawa & Lawrence Susskind, Mediating Science-Intensive Policy Disputes, 5 J. PUB. POL’Y ANALYSIS & MGMT. 23, 25 (1985).

282. See supra note 25 and accompanying text.

283. This is also one of the central concerns of several leading critics of comparative risk assessment: not that risks should not be compared, but that priorities among them should be set by open and legitimate political processes rather than by quantitative formulas or expert authority. See Hornstein, supra note 35, at 629-633; Shifrin, supra note 36, at 575. Consensus-based procedures for setting comparative risk priorities are now being used experimentally by several state governments (e.g. Colorado, Louisiana, Michigan, Vermont, Washington). See Richard Minard et al., The Northeast Center for Comparative Risk, State Comparative Risk Projects: A Force for Change (1993).

284. In the EPA wood-stove regulatory negotiation, for instance, the knowledge provided about potential problems by the participants—manufacturers, state officials, and environmental advocacy groups—enabled EPA both to design more effective regulations and to anticipate and avoid additional implementation problems than it would have produced on its own. See Richard D. Olin, Residential Wood Combustion Emissions: The Development of a Negotiated Regulation 145, 146 (1986) (unpublished Master's Technical Report, University of North Carolina (Chapel Hill)). Precedents for such involvement are also available in such mechanisms as the “scoping” meetings required for environmental impact assessments, in which concerned individuals are invited to identify anticipated impacts at an early stage of project planning. See 40 C.F.R. §§ 1500, 1501.7 (1992).

they are not grounded in anticipatory research and planning, they will merely enshrine past priorities at the expense of emergent ones.

EPA's current comparative risk process represents the strongest attempt to date to move a regulatory agency from a mechanistic to a purposeful philosophy of governance, from balkanized implementation of diverse statutes, to a unified process for setting priorities beyond as well as within its statutory regulatory agenda. The fate of OSASS and the recent success of comparative risk assessment at EPA, however, point to a single lesson. An administrator can initiate and enhance an anticipatory planning function, but they cannot by themselves make it permanent. Initiatives by previous administrators have not endured. If planning is desirable, it must be built into agency procedures, preferably by addition to EPA's statutory authority and budget.

VII

ANTICIPATORY PLANNING IN OTHER REGULATORY AGENCIES

The lessons of anticipatory planning initiatives at EPA are confirmed and amplified by the experiences of the other health regulatory agencies. It is not possible to discuss each in the same detail as the foregoing assessment of EPA, but it is useful to note some key similarities, differences, and lessons.

A. Food and Drug Administration

The Food and Drug Administration (the FDA) is responsible for consumer protection in a broad sense, with special emphasis on public health. The Agency's responsibilities, while narrower than EPA's, are still broad. Within the realm of drugs alone, for instance, the FDA regulates not merely health and safety, but also efficacy. The FDA also regulates a wide range of other products, which account for an estimated twenty-five percent of total consumer spending. These include blood products, vaccines, feed and drugs for animals as well as humans, cosmetics, heart pacemakers, X-ray machines, and microwave ovens. The Agency has a staff of 8400 and a budget of $682 million (fiscal year 1991), divided among five product-related centers, a field force, and a toxicological research center. Unlike EPA, the FDA does not have a

288. Id. at 2.
289. Id.
290. Id. at 42, A-12, A-23 (1990 figures); see also BRYNER, supra note 14, at 176 (discussing the organization of the FDA). The five field centers each deal with different subject areas: drugs and biologies, food safety and applied nutrition, toxicological research devices, and radiological, and veterinary medicine.
separate research directorate; its research programs are largely integrated with its five product evaluation centers. 291

Like EPA, the FDA must manage an overflowing and heavily science-driven regulatory agenda. The FDA receives limited resources but faces frequent challenges to its decisions. Intense political struggle has continually surrounded implementation of the 1958 Delaney Amendment to the Food, Drug and Cosmetics Act. 292 More generally, controversy arises because many products are simultaneously beneficial for some health purposes and hazardous for others. 293 When the FDA approves new products quickly, it is suspected of caving in to business pressures; 294 when it regulates strictly, it is attacked for overzealousness. 295 When it proceeds cautiously, the Agency is accused of delaying the availability of allegedly beneficial new substances that often are already available in other countries. 296

Also like EPA, the FDA must plan a regulatory agenda in accordance with a body of statutory mandates whose demands stretch far beyond its budgetary resources. Statutory deadlines require decisions on new drug applications within six months. 297 The FDA has long been attacked for multi-year backlogs in these processes. 298 New statutes continually add responsibilities without commensurate resources; twenty-one new laws and amendments were enacted between 1980 and 1990. 299

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294. For example, FDA has been accused of caving in to business in the cases of arthritis drugs and antidepressants. See, e.g., Teresa Moran Schwartz, Punitive Damages and Regulated Products, 42 AM. U. L. REV. 1335, 1348-52 (1993).
295. FDA roused a storm of protest over its regulation of saccharin. See, e.g., ARTHUR J. VANDER, NUTRITION, STRESS, AND TOXIC CHEMICALS 307-311 (1981) (claiming that FDA may have intentionally provoked protest).
296. Subjects of these controversies have included new AIDS therapies. Gibbons, supra note 6, at 200. One problematic regulatory issue for the FDA is the pressure to get new drugs approved quickly for at least some uses, but with the attendant risk that once they are on the market, they may in fact be prescribed for other unproven or even hazardous applications.
298. Julie Kosterlitz, Reagan is Leaving His Mark on the Federal Drug Administration, 17 NAT'L J. 1568, 1571 (1985); see generally BRYNER, supra note 14, at 196 (citing GAO study that approximately half of drug applications filed in 1975 had been acted on four years later).
In 1990 alone, two landmark statutes, the Nutrition Labelling and Education Act\textsuperscript{300} and the Safe Medical Devices Act,\textsuperscript{301} added thirty-nine new regulatory mandates.\textsuperscript{302} Meanwhile, new hazards and technologies, such as AIDS therapies and medical biotechnologies, as well as media crises, place additional burdens on the FDA.

Unlike EPA, however, the FDA is not an independent agency. Since 1953, it has been a unit of the Department of Health and Human Services (HHS), formerly, Health, Education, and Welfare.\textsuperscript{303} For the past twenty-three years it has reported through the Public Health Service. Until 1981 it enjoyed relative autonomy within the Department. Beginning in that year, some of this delegated authority began to be retracted.\textsuperscript{304} Regulations must pass through several layers of review within the FDA, and significant regulations require additional approval by both the Assistant Secretary and the Secretary of HHS.\textsuperscript{305} This review process slows the development of regulations and diminishes the Agency's autonomy to anticipate and plan responses to new problems.

Like EPA and other regulatory agencies, the FDA sustained severe damage to both resources and morale from the Reagan administration's de-regulatory initiatives.\textsuperscript{306} The FDA's problems were exacerbated both by a continuing expansion of statutory responsibilities and by the concurrent proliferation of scientific and technical information and innovation affecting those responsibilities. It has only recently begun to recover under the leadership of a new Commissioner, Dr. David Kessler, who is one of the few Bush appointees President Clinton left in office.

Given the scarcity of FDA resources, the Agency cannot help but favor certain programs over others. However, it has no statutory authority to plan comprehensively and set priorities. The laws it administers are a patchwork of ad hoc provisions for addressing specific hazards.\textsuperscript{307} Furthermore, the FDA's own regulatory procedures have become relatively informal, out of a perception that the formalized proceedings provided by statute are unworkable.\textsuperscript{308}

At various times in its history, the FDA has reordered its priorities and reallocated resources to address new, higher priority problems. In the 1980's, for instance, to address the proliferation of medical devices, 

\begin{itemize}
\item \textsuperscript{302} U.S. DEP'T OF HEALTH AND HUMAN SERVICES, supra note 7, at 16.
\item \textsuperscript{303} See BRYNER, supra note 14, at 174.
\item \textsuperscript{304} See id., at 91.
\item \textsuperscript{305} See generally, Kosterlitz, supra note 298, at 1570-71.
\item \textsuperscript{306} See, e.g., Julie Kosterlitz, Waking the Watchdog, 23 NAT'L J. 385, 388 (1991).
\item \textsuperscript{307} BRYNER, supra note 14, at 198-99.
\item \textsuperscript{308} Id. at 198.
the FDA merged its bureaus of radiological health and medical devices, reassigning the majority of the staff of the former to the latter.\textsuperscript{309} Anticipating a major increase in regulatory applications for biotechnology products, the FDA recently began concentrating resources on improving management and increasing staff and training in its Center for Biologics Evaluation and Research.\textsuperscript{310}

Finally, in a new initiative in 1992, the FDA announced a program through which drug companies will pay for additional FDA staff to review new products more rapidly.\textsuperscript{311} This agreement potentially could substantially increase the Agency's resources for the new drug approval program. This in effect raises the new drug approval program to a level of support significantly beyond the priority accorded it in the overall congressional appropriations process. At the same time, it may create the moral hazard that the FDA's resulting plans and priorities will be influenced primarily by the financial stakes of the companies involved, rather than by the severity of the hazards it is charged to prevent.\textsuperscript{312}

By and large, however, the FDA's priority adjustments appear to have been driven more by emerging crises and political pressures than by any systematic process for anticipatory planning. A recent review of the Agency by a distinguished blue-ribbon committee concluded that the FDA did not have any written statement of purpose, goals, strategic objectives, or priorities. The review stated that, "it is essential that the Agency more specifically define its goals and how it intends to achieve them . . . . The absence of a comprehensive, unified Statement of Purpose contributes to a sense that the Agency is adrift . . . ."\textsuperscript{313}

In 1990, the FDA's Office of Planning and Evaluation conducted a Comprehensive Needs Assessment (CNA) for the years 1994-97.\textsuperscript{314} The FDA intended the document to identify forces that would shape its changing environment, outline long-term directions and goals for the agency, and estimate the resources needed to fulfill its mission during the period covered by the document.\textsuperscript{315} This report appears to be the only

\textsuperscript{309}. See generally U.S. DEP'T OF HEALTH AND HUMAN SERVICES, supra note 7, at 11.
\textsuperscript{310}. Gibbons, supra note 6, at 202.
\textsuperscript{311}. L. Wayne, Biotech Companies Backing User Fee to Speed Drug Approval, DENVER BUS. J., Nov. 13, 1992, at 12.
\textsuperscript{312}. This is not to suggest that the firms would corrupt the FDA's judgments about products selected for regulatory approval, but only that its choices of which products to process more rapidly, and thus its overall regulatory agenda, might be dominated by the firms' expectations of financial gain. This would work to the detriment of products that benefit serious but less lucrative conditions—for instance, severe conditions occurring only in small populations, or conditions occurring mainly in relatively poor populations.
\textsuperscript{313}. U.S. DEP'T OF HEALTH AND HUMAN SERVICES, supra note 7, at 9-10.
\textsuperscript{314}. See Annual Inspection of Highest Risk Firms Envisioned by FDA, FOOD CHEMICAL NEWS, Jan. 7, 1991 available in LEXIS, Nexis Library, ZCPG1 File.
\textsuperscript{315}. Id.
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recent example of anticipatory planning within the FDA. Out of over 900 recommendations from these sources, the report distilled eighty-two proposals in five key functional areas as a recommended set of long-term initiatives.

The CNA provides a useful assessment of the major forces the FDA expects to confront over the coming four to seven years. These include the acceleration of industrial R&D, the emergence of a new generation of biotechnology products, and growing markets and numbers of products. Unfortunately, the report itself does not suggest a procedure for ranking the anticipated forces. It advocates that the FDA receive additional resources and categorizes objectives according to amount of resources needed, rather than documenting a priority-setting process. In short, the CNA is more a budget advocacy document than a long-term plan or priority statement.

The FDA’s experience suggests several overall points of comparison to EPA. Like EPA, the FDA has largely failed to develop and sustain any program for anticipatory research and planning. In fact, the FDA has shown less evidence of this than has EPA in some of its recent initiatives. As at EPA, major reasons for this deficiency include the proliferation of uncoordinated statutory mandates, shortages of agency resources, and intense political pressures at the level of individual decisions rather than at the Agency’s overall mission. The FDA has not performed well at setting priorities among risks. The inherently greater diversity of EPA’s responsibilities make risk comparison difficult for the Agency. In principle, FDA’s more specific focus on the public health effects of specific types of products should permit at least relatively easier application of a comparative-risk approach to planning and priority setting. In practice, however, this does not seem to have occurred, perhaps due to lack of administrative initiative, or more likely, to the diversity of statutory and political demands and the informality of priority setting that have characterized the Agency.

One lesson the FDA’s experience holds for EPA is that Cabinet status is not in itself a solution. Despite the FDA’s near-Cabinet status, the multi-layered approval processes within the Department of Health and

316. The FDA last completed a CNA in 1975. Id.
317. Id.
318. Id.
319. Id.
320. Finally, the advisory committee concluded that the Agency needed both greater institutional autonomy and significant improvements in management, staff and resources, and congressional decisionmaking, to plan and carry out its mission effectively. U.S. DEP’T OF HEALTH AND HUMAN SERVICES, supra note 7, at iii-vi. Specifically, it recommended that final authority for all FDA regulations be re-delegated to the FDA Commissioner, that the FDA itself be given separate status within HHS or even established as an independent executive agency similar to EPA, that the FDA define explicit goals and priorities for carrying out its mission, and that Congress provide resources commensurate with those priorities. Id.
Human Services have hampered its planning capability.\textsuperscript{321} External evaluations have recommended that the FDA be redelegated additional autonomy for regulatory planning and decisionmaking.\textsuperscript{322} Some of the FDA's problems may be a result of being buried within a far larger and multi-functional Cabinet department, rather than being an independent Cabinet unit. Nonetheless, these difficulties do suggest that if EPA is elevated to Cabinet status, careful thought must be given to articulate its statutory mission and autonomy so as to improve, rather than impede, planning.

\textbf{B. Occupational Safety and Health Administration}

The Occupational Safety and Health Administration (OSHA) was created by the Occupational Safety and Health Act of 1970,\textsuperscript{323} which charged it to "assure so far as possible every working man and woman in the Nation safe and healthful working conditions."\textsuperscript{324} Located within the Department of Labor (the DOL) and headed by an Assistant Secretary of Labor for Occupational Safety and Health, OSHA is authorized to develop and promulgate standards and regulations, to carry out investigations and inspections, and to issue citations and penalties.\textsuperscript{325} Like the FDA, OSHA operates as a sub-unit of a Cabinet Department, although it reports directly to an Assistant Secretary, not through an additional layer.\textsuperscript{326} OSHA is primarily responsible for implementing a single statute, the Occupational Safety and Health Act of 1970.\textsuperscript{327} It also oversees several miscellaneous pieces of more specific legislation promoting health and safety for building and construction workers,\textsuperscript{328} longshoremen,\textsuperscript{329} and workers employed by federal contractors.\textsuperscript{330}

Perhaps the most striking point of this history is how very few standards were promulgated at all, both in absolute numbers and in contrast to the far larger number recommended over the same period by the American Council of Government Industrial Hygienists (the ACGIH). Between 1968 and 1986, the ACGIH tightened its exposure limits for over 100 of the 400-odd substances on its 1968 list of recommended limits,\textsuperscript{331} and added new exposure limits for approximately 200 more chemi-

\textsuperscript{321} \textit{Cf.} \textsc{Bryner, supra} note 14, at 191-92 (arguing that politics hampered implementation of scientists' recommendations).

\textsuperscript{322} \textsc{U.S. Dep't of Health and Human Services, supra} note 7, at 20.


\textsuperscript{324} \textsc{Id.} § 651(b).

\textsuperscript{325} \textsc{Id.} §§ 655, 657, 658.

\textsuperscript{326} \textsc{Bryner, supra} note 14, at 123 (organizational chart).

\textsuperscript{327} \textsc{Id.} at 119.

\textsuperscript{328} \textsc{Id.; see also} Contract Work Hours and Safety Standards Act, 40 U.S.C. § 333 (1988).


\textsuperscript{331} \textit{See generally} Shapiro & McGarity, \textsc{supra} note 8, at 2.
During the same period, OSHA issued only twenty-six regulations (all of them revisions of the 1971 rules) and eighteen health standards. All in all, OSHA has had relatively marginal effect. Instead, ACGIH, a private organization rather than a government regulatory agency, serves as the primary regulatory planning body for occupational health. Given more resources and a mandate to regulate more hazards less restrictively, OSHA could probably do so, but this would require conscious policy choice and more effective planning of regulatory priorities.

As a DOL Agency, OSHA's regulatory proposals must be reviewed by the departmental Solicitor's Office and other DOL officials. Statutes have fragmented OSHA into three Directorates, whose directors are coequal and can be coordinated only by the intervention of the Assistant Secretary. Adding to its functional complexities is the fact that OSHA must use hybrid rather than informal rulemaking procedures. The Agency must meet a stringent "substantial evidence" standard of review rather than the more common and lenient "arbitrary and capricious" test.

Unlike EPA and the FDA, OSHA has two external sources of research and scientific advice. One is the National Institute for Occupational Safety and Health (NIOSH), one of the National Institutes of Health, which reports to the Department of Health and Human Services. The other is the ACGIH, a private and "quasi-governmental" organization with which it has no formal relationships, but which has for many years established voluntary guidelines for occupational exposures to hazardous substances. "OSHA has found NIOSH data inadequate for its purposes." In any event, OSHA cannot cede its priority-setting responsibility to another agency in a different department, and so OSHA has not drawn extensively on the NIOSH recommendations.

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332. BRYNER, supra note 14, at 140-41.
333. Id. at 140.
335. Mendeloff offers from this a more general hypothesis about government regulatory agencies. He suggests that they will tend simultaneously to regulate too stringently those few substances that they do regulate, and to fail to regulate many equally important hazards. He attributes this pattern to the fact that agencies' resources are overwhelmed by the demands for justification of a few very stringent standards. Mendeloff, supra note 10, at 442.
336. Shapiro & McGarity, supra note 8, at 8.
337. Id.
338. Id. at 9.
339. Id.
341. Shapiro & McGarity, supra note 8, at 2; see also BRYNER, supra note 14, at 140.
342. Shapiro & McGarity, supra note 8, at 17; see also id. at 58.
343. Id. at 17. But see BRYNER, supra note 14, at 122 (noting that health standards are usually based on a NIOSH criteria document).
OSHA's enabling statute directs it to set priorities based on the urgency of the need for regulation ("worst first"), and on the recommendations of the Secretary of Health and Human Services. Other than these listed priorities, the statute does not specify detailed standards or criteria to guide the agency's choice of priorities. In practice, OSHA bases its priorities on multiple factors, including the number of workers exposed, the severity of the hazards, and the existence of research on the hazards and on methods for controlling them. In addition, OSHA considers NIOSH recommendations, citizen petitions, court decisions, and other factors. A variety of interest groups regularly pressure OSHA to weigh factors differently. As a result, the Agency's regulatory planning decisions are often perceived as efforts to placate the parties that make the most noise.

OSHA's regulatory priorities have changed considerably over time. The primary impetus for change has been the shifting priorities of particular administrations, rather than the emergence of any long-range or anticipatory planning process. At its creation, OSHA was directed by statute to adopt all existing national consensus standards established by industry and private groups. Under that mandate, OSHA quickly issued over 4000 health and safety standards based upon federal regulations, industry codes, and the guidelines of the American National Standards Institute, the National Fire Protection Association, and other similar organizations. This mandate may have seemed practical to its congressional authors at the time, but it subjected OSHA to years of business ridicule and hostility for the unnecessary and arbitrary nitpicking involved. Details that were reasonable as guidelines could easily appear absurdly bureaucratic when enforced as government requirements.

345. Five basic principles guide OSHA standard-setting: (1) a standard must address a significant risk and be "reasonably necessary and appropriate to reduce" it; (2) alternate approaches (including nonregulatory approaches) must be considered; (3) the standard must be "technically and economically feasible"; (4) the public must have an opportunity to participate; and (5) the most "cost-effective" alternative must be selected. BRYNER, supra note 14, at 125-26. The Supreme Court has required a showing of "significant risk," Industrial Union Dep't v. American Petroleum Inst., 448 U.S. 607, 662 (1980) [hereinafter Benzene]. But OSHA has generally resisted the argument that it should base its planning and regulatory decisions on balancing economic costs and benefits of regulation, and the courts have generally upheld that resistance.
346. See generally Shapiro & McGarity, supra note 8, at 15-17.
347. On OSHA's regulatory decision process, see BRYNER, supra note 14, at 121, 124.
348. Shapiro & McGarity, supra note 8, at 15-17.
Under the Carter administration, Assistant Secretary Eula Bingham reordered OSHA’s priorities in two ways. First, she sought to eliminate or modify the least defensible of the safety standards. Second, Bingham focused the Agency’s attention on occupational health, particularly exposure to carcinogens, in addition to safety. Major regulatory initiatives of this period, for example, included regulation of occupational exposure to benzene, cotton dust, DBCP, arsenic, acrylonitrile, and lead. However, new standard-setting virtually halted in the last two years of the Carter administration, pending the results of court challenges to the benzene and cotton dust standards.

Perhaps the most significant innovation of the Bingham years, however, was the introduction of generic labelling standards for carcinogens in the workplace. Concluding that it could never effectively regulate the large and constantly changing range of such exposures in the workplace, OSHA instead proposed to require employers to label all such hazards and to provide related hazard and safety information to their workers. In order to accommodate the variety of labelling systems already in use, OSHA proposed to allow flexibility in some labelling methods. With the arrival of the Reagan administration, this standard was revised.

Beginning with the Reagan administration, OSHA’s priorities reemphasized safety. The primary new initiative of that period, safety in grain handling, was driven by incidents of explosions in grain eleva-

352. Over 1100 standards were designated for change by late 1978. Once designated, actual removal of the regulations required virtually the same laborious administrative procedure that would be required to pass a new regulation. BRYNER, supra note 14, at 120-21.

353. Id. at 140.
356. 29 C.F.R. § 1910.1044 (1992) (regulating 1,2-dibromo-3-chloropropane).
359. Viscusi, supra note 10, at 471. In Industrial Union Dep’t v. American Petroleum Inst., 448 U.S. 607 (1980), the Supreme Court struck down the benzene standard set by OSHA. The Court held that prior to promulgating a health standard, OSHA must make a threshold determination that the proposed standard is reasonably necessary to reduce a significant risk of harm, in accordance with the language of the OSH Act. The Court found that no such threshold determination was made. In American Textile Mfrs. Institute, Inc. v. Donovan, 452 U.S. 490 (1981), the Court found the OSHA regulation legal except for a provision regarding wage guarantees for workers who had to be transferred. The Court found that such guarantees were not absolutely tied to workers’ health and safety. Id. at 537-38.
362. Id.
363. Id.
364. Id.
A health standard was also promulgated for ethylene oxide. By the mid-1980's, OSHA had also resurrected the concept of generic standards, with a proposed generic standard for chemical labelling. However, like all the regulatory agencies, OSHA's effectiveness, resources, and morale were severely damaged by the policies of the Reagan administration. It is difficult to uncover much evidence even of short-term planning. Since the mid-1980's, most OSHA rulemaking initiatives have been triggered by petitions from unions and public interest groups backed by the threat of lawsuits. In contrast to EPA's current initiative for comparative risk analysis, OSHA presently has no discernable formal system for setting priorities.

OSHA's one past attempt to plan regulation fell victim to the same lack of permanence that afflicted specific regulatory programs. OSHA's 1980 carcinogen policy, in which it screened and attempted to rank some 200 substances—based on exposure, quality of data, and potency—was its only attempt to rank priorities systematically. This proposal was intensely controversial, since it would have subjected all potential occupational carcinogens to regulation under very inclusive criteria (i.e., based solely on extrapolation from animal models and assuming no threshold for carcinogenicity) and under a presumption-rebuttal procedure (rather than weight-of-the-evidence criterion) that placed a heavy burden of proof on industry to rebut the agency's proposal. OSHA ultimately abandoned the proposal after the Benzene decision cast doubt on its validity. In addition, the intensity of industry opposition to the proposal made the Agency reluctant to attempt any systematic public priority setting thereafter.

OSHA's experience illustrates the extent to which an agency's failure to anticipate, plan, and set priorities may stem not from scientific

367. 29 C.F.R. § 1910.1047 (1992). Ethylene oxide is sometimes used as a fumigant and poses an exposure risk to medical personnel.
368. See, e.g., Bryner, supra note 14, at 142 (regarding OSHA).
369. Shapiro & McGarity, supra note 8, at 15.
370. Id. at 15-18.
371. See generally Rushefsky, supra note 360, at 88-94. OSHA regulates many of the same toxins as EPA, and in a setting where human exposures are likely to be far more concentrated than in the ambient environment. EPA's Science Advisory Board actually listed worker exposure to chemicals and toxins in agriculture and industry as one of its highest priority health concerns. Reducing Risk, supra note 25, at 14.
372. See generally Rushefsky, supra note 360, at 88-94.
373. Industrial Union Dep't v. American Petroleum Inst., 448 U.S. 607, 659 (1980) (holding that OSHA had an affirmative burden to prove that a standard was necessary to reduce a "significant risk" in the workplace).
374. See Shapiro & McGarity, supra note 8, at 45-46. This does not on its face, however, prevent the agency from planning; indeed if anything it strengthens the case for the agency setting clear priorities for its regulatory initiatives rather than merely reacting to constituency pressures. See id. at 18.
375. Id.; Bryner, supra note 14, at 141-45.
uncertainty or bureaucratic failings, but from statutory constraints and political opposition. Unlike EPA, OSHA does not have sufficiently active public support for its overall mission of health and safety in the workplace to offset powerful interests with economic stakes in the outcomes. As a result, workplace health priorities are set only when highly motivated interests generate pressure on specific issues.\textsuperscript{376} Further, the OSHA experience confirms how unreliable executive support for anticipatory planning is, and how necessary it is that the capacity to plan be built legally into the structure of an agency.

\section*{C. Consumer Product Safety Commission}

The Consumer Product Safety Commission (the CPSC) is smaller and less visible than EPA, the FDA, or OSHA. Created in 1972 by the Consumer Product Safety Act,\textsuperscript{377} the CPSC is an independent commission of five members.\textsuperscript{378} The purpose of the Act is to protect the public against unreasonable risks of injury from consumer products, to assist consumers in evaluating the relative safety of products, to develop uniform safety standards for products, and to promote research and investigation into the causes and prevention of product-related deaths, illness, and injuries.\textsuperscript{379} Like OSHA (but unlike EPA and the FDA), the CPSC is responsible for administering one primary act, the Consumer Product Safety Act.\textsuperscript{380} A primary reason for its creation was to "end the piece-meal approach to consumer safety" by providing generic authority for this mission to a single agency.\textsuperscript{381} The CPSC’s enabling legislation is thus one of the broadest of any regulatory agency.\textsuperscript{382} The Commission is

\begin{itemize}
\item \textsuperscript{376} Mancur Olson has argued that this pattern is generally true of public policy issues; minority interests with strong economic stakes in the outcomes of public decisions, such as shoe manufacturers or labor unions, tend to be consistently overrepresented compared to majorities that have relatively less individually to gain or lose from the outcome. \textit{Olson, supra} note 170, at 33-36, 49, & 132-67. Environmental quality appears to be a partial exception to this principle in its ability to motivate mass public concern, but a major segment of this public appears more motivated by back-yard issues, such as waste disposal sites, than by global environmental hazards that may ultimately be more significant. \textit{See Anthony Downs, \textit{Up and Down With Ecology: The Issue-Attention Cycle}}, \textit{PUB. INTEREST}, Summer 1972, at 38; \textit{see generally} \textit{Samuel P. Hays, Beauty, Health and Permanence} 36-39 (1987).
\item \textsuperscript{378} \textit{Id.} § 2053.
\item \textsuperscript{379} \textit{Id.} § 2051.
\item \textsuperscript{382} \textit{Id.; Bryner, supra} note 14, at 146-73.
\end{itemize}
responsible for deciding which of some 10,000 consumer products present hazards serious enough to warrant government intervention.\textsuperscript{383} When consumers are at risk, the Commission must test appropriate remedies and establish procedures for regulatory planning and rulemaking.\textsuperscript{384} At its peak, the CPSC had 900 employees and a budget of approximately $44 million.\textsuperscript{385}

The CPSC has been nearly as ineffective at setting standards as OSHA. It has the option of issuing either mandatory or voluntary standards.\textsuperscript{386} As at OSHA, the Commission's initial leadership targeted the development of mandatory standards; the CPSC experienced similar delays and difficulty in producing them.\textsuperscript{387} One chairman envisioned issuing 100 standards by 1982 and then going out of business.\textsuperscript{388} However, the CPSC began work on only eight standards in its first four years and completed only two.\textsuperscript{389} By 1982, the Commission had issued only twenty rules, banned seven products, and imposed reporting requirements on three.\textsuperscript{390}

The CPSC's low productivity resulted partially from administrative inexperience,\textsuperscript{391} but even more from a lack of procedures for setting priorities.\textsuperscript{392} As early as 1973, the CPSC developed a Consumer Product Hazard Index, which could have been used to set systematic priorities for regulation.\textsuperscript{393} Instead, for at least its first five years, the CPSC's regulatory agenda was dominated by a statutory requirement that it respond to all petitions within 120 days.\textsuperscript{394} The result was a proliferation of regulatory projects without clear rationales or priorities.\textsuperscript{395}

The Commission nearly escaped from its paralysis in the late 1970's and early 1980's. Beginning in 1977, the CPSC instituted four significant changes. First, it established seven criteria for regulatory priority, including the severity of the risk, the population exposed, and the vulnera-

\textsuperscript{383} Paul Weaver, \textit{The Hazards of Trying to Make Consumer Products Safer}, \textit{FORTUNE}, July 1975, at 133, 134.
\textsuperscript{385} \textit{Bryner}, supra note 14, at 146.
\textsuperscript{386} \textit{Id.} at 147-48.
\textsuperscript{388} Johnson, \textit{supra} note 381, at 75.
\textsuperscript{390} \textit{Bryner}, \textit{supra} note 14, at 166-67.
\textsuperscript{391} Johnson, \textit{supra} note 381, at 76-77.
\textsuperscript{392} \textit{Id.}
\textsuperscript{393} \textit{Id.} at 77-78.
\textsuperscript{395} \textit{Bryner}, \textit{supra} note 14, at 168-69; Johnson, \textit{supra} note 381, at 77.
bility of the exposed population. These criteria, along with the development of a product injury data base, were used to select ten to fifteen regulatory projects per year for priority attention, in contrast to some 150 projects previously underway. Second, the CPSC instituted a matrix management system for allocating its staff among the relevant projects and requisite disciplines. Third, it introduced explicit use of cost-benefit analysis to balance the costs of each regulatory initiative against its benefits in reduced illness and injury. Fourth, it introduced an "emerging hazards system" to identify potential hazards at an early stage. For instance, it assigned staff to attend trade shows and read trade journals in order to identify new hazardous products before they were widely produced and marketed and to work with the manufacturers to redesign safety features early on.

These changes resulted in a marked improvement in the Agency's performance. It won seventeen of twenty-one court cases, suggesting that its regulatory actions were well grounded in strong administrative records. Further, the CPSC garnered the respect of business economists for its use of economic analysis to set its priorities and justify its regulations. Nonetheless, other than the voluntary standards, the CPSC's total output for its first decade included only twenty mandatory rules, seven product bans, and three information requirements standards. Despite this modest record, the Reagan administration, taking the position that the CPSC had ventured too far in its regulatory zeal, reduced its budget and sought unsuccessfully to transfer it into the Department of Commerce. The budget cuts and attempted transfer eroded the new management procedures. Through the 1980's, the Agency by and large retreated into its previous reactive mode, responding to external demands by victim constituencies rather than planning its regulatory activities according to systematic priorities of risk and cost.

The CPSC experience demonstrates how anticipatory and regulatory planning can improve efficiency in an agency that has a unified statutory framework within which to set priorities. The CPSC was able to dramatically alter its performance by instituting an explicit system for

396. Johnson, supra note 381, at 79.
397. Id. at 78-79.
398. Id. at 79.
399. Id.
400. Id.
401. Id.
402. BRYNER, supra note 14, at 157.
403. Id. at 166.
404. Id. at 166, 171-73.
405. Johnson, supra note 381, at 79.
406. Id. at 80.
407. Id. One typical object of regulation in the 1980's was the lawn dart.
planning and setting priorities. Its success suggests that EPA could protect public health and the environment far more effectively if it were similarly able to focus on regulating the most serious environmental hazards, rather than being continually whipsawed by additional deadlines.

The CPSC's history also shows how quickly systematic planning initiatives can be destroyed by a change of administration, and how much easier and safer it is for agencies to operate in reaction to demands from organized ad hoc constituencies rather than setting and sustaining their own agendas consistent with their broad mission. The CPSC's experience underscores the tenuousness of the reform initiatives by recent administrators at EPA. Initial reports suggest that the Clinton administration intends far more continuity than change from Reilly's initiatives. However, without continuity of active commitment to long-range planning from the top, and even to the further step of seeking increased statutory discretion to anticipate new problems and set priorities among them, EPA could easily lapse into comfortable constituency service.

VIII
INTERAGENCY PLANNING AND COORDINATION

The responsibilities of the regulatory agencies intersect in several ways. They regulate many of the same substances and therefore require similar scientific and technical information. They regulate many of the same firms and industrial processes, by requirements that may either harmonize or conflict. Finally, they must anticipate many of the same trends and events that may alter their priorities over time. Logically, therefore, better planning within each agency should be augmented by some process for coordinating research, regulatory development, and decision criteria among these various agencies. Such coordination can be achieved in principle in one of two ways: coordination and management by the Executive Office of the President, or more direct coordination among the regulatory agencies themselves.

A. Planning Among the Agencies

A general mechanism for direct interagency regulatory coordination has been created only once: the Interagency Regulatory Liaison Group

408. See text accompanying infra note 440.
409. See BRYNER, supra note 14, at 207; Some statutes require one agency's participation in regulatory programs administered by another agency. For example, EPA sets pesticide tolerance levels for residues in foods under the Federal Food, Drug and Cosmetics Act of 1938 administered by the FDA. See Walter A. Rosenbaum, The Clenched Fist and the Open Hand: Into The 1990's at EPA, in ENVIRONMENTAL POLICY IN THE 1990s, supra note 32, at 121, 126.
410. See BRYNER, supra note 14, at 207.
During the Carter Administration, EPA and the FDA at one point were both involved in developing testimony on the same subject (CFC's). FDA Administrator Donald Kennedy proposed to EPA Administrator Douglas Costle that they develop their testimony together. From this initiative resulted an ongoing informal organization, the IRLG, chaired by EPA Administrator Costle. Its members included the heads of all the major health, safety, and environmental regulatory agencies.

As regulatory proposals became increasingly subject to oversight and critical review by agencies of the Executive Office of the President, the IRLG provided a forum for agencies both to coordinate regulatory initiatives and improve shared analytical methods and assumptions.

Had it survived longer, the IRLG might have provided a nucleus for more sustained interagency cooperation in longer range and anticipatory regulatory planning as well. Under the Reagan administration, however, the dominant agenda for the regulatory agencies was not anticipatory planning but deregulation, using hand-picked Presidential appointees accountable to the White House and OMB controls on both resources and regulatory oversight. Interagency regulatory agenda-setting lay essentially at odds with the Reagan deregulatory agenda. The IRLG was therefore discontinued.

A liaison group resembling the IRLG would be worth creating again. As noted above, the environmental and health regulatory agencies deal with many of the same hazards, regulate many of the same industries, and must anticipate many of the same changes in trends and associated priorities. With better coordination, the agencies themselves might both increase their regulatory efficiency and reduce the burden placed on industry by multiple and competing regulatory schemes.

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411. Many ad hoc interagency working groups have of course been convened to coordinate specific regulations and agency responses to particular substances. See generally McGarity, supra note 19, at 72 (concerning the routine use of working groups to develop EPA regulations). For a detailed history of the IRLG, see LANDY ET AL., supra note 1, at 172-203.

412. LANDY ET AL., supra note 1, at 174; Costle, supra note 49.

413. RUSHEFSKY, supra note 360, at 87, 94-98; LANDY ET AL., supra note 1, at 172.

414. LANDY ET AL., supra note 1, at 176, 180.

415. See Norman J. Vig, The President and the Environment: Revolution or Retreat? in Environmental Policy in the 1980s, supra note 20, at 77, 87-90 (discussing the Reagan administration's policies in this regard).

416. LANDY ET AL., supra note 1, at 172-203.

417. A similarly informal consultative group of senior officials has in fact already begun meeting under the Clinton administration, although among a somewhat different cast of characters. This monthly "breakfast club" on energy, environment and natural resource issues includes EPA Administrator Browner, Agriculture Secretary Espy, Energy Secretary O'Leary, and Interior Secretary Babbitt. Slants & Trends, Toxic Material News, Mar. 10 1993, available in LEXIS, Nexis Library, OMNI File.

418. See supra note 409 and accompanying text.

419. CARNEGIE COMM'N ON SCIENCE, TECHNOLOGY, AND GOV'T, supra note 49, at 71-
Without coordination, the agencies waste resources addressing the same hazards independently, and risk being played off against one another by regulated interests.

B. Planning by the Executive Office of the President

In principle the Executive Office of the President (EOP) is a key place to locate both interagency coordination and a long-range anticipatory capability, particularly for overall determinations of national tradeoffs and priorities among competing public goods, such as health, the environment, and economic welfare. Some solutions require EOP leadership, particularly those involving policy conflicts among agencies. Several important environmental problems could be most effectively solved, for instance, not by new EPA regulations but by elimination of perverse policies administered by other agencies. Finally, an EOP office could review and coordinate the environmental impacts of legislative initiatives well before they became law.

The following EOP agencies share in and compete for its policy coordination role: the OMB, the CEQ and its proposed successor (the Office of Environmental Policy), the Office of Science and Technology Policy, and working committees of the Cabinet. President Clinton has created an Economic Security Council, which might supplant some of these and supersede others. He has also proposed to repeal the section of the National Environmental Policy Act establishing the CEQ, and to divide its functions between EPA and a White House Office of Environmental Policy. Other such mechanisms have existed in the past, of which Franklin Roosevelt's National Resources Planning Board was probably the most far-reaching example.

72.


421. White House Floating Draft Proposal to Shift Some CEQ Authority to EPA, AIR WATER POLLUTION REPORT, Mar. 1, 1993, available in, LEXIS, Nexis Library, ZEV1 File. The new OEP is directed by former Gore aide Katie McGinty. Id.

422. See Robert M. White, Mastering a New Role: U.S. Technology Policy, TECH. REV. Nov. 1993, at 67, available in LEXIS, Nexis Library, OMNI File. Other contenders include the Competitiveness Council, discussed above, chaired by the Vice President; and the Federal Coordinating Council for Science, Engineering and Technology (FCCSET, pronounced "fix-it"), which is authorized by 42 U.S.C. § 6614, and is chaired by the President's Science Advisor.


While some form of improved institutional capability for anticipatory planning and policy integration is needed at the White House level, any such mechanism must be a complement to, rather than a substitute for, effective anticipatory capability in the regulatory (and non-regulatory) agencies themselves.\textsuperscript{425} White House institutions and staff are inherently driven by the timeframe and agenda of each particular President. Most of them are better equipped both by history and expertise to address economic issues rather than health and environmental ones, and have limited staff capability in any event.\textsuperscript{426}

One institution that bucked this tendency, at least in its early years, is the CEQ. Throughout the 1970's, under both Republican and Democratic Presidents, the CEQ played an active role not only in advice and oversight but also in maintaining the high visibility of national environmental issues through its widely distributed annual reports and other media initiatives.

The CEQ also anticipated new problems, sponsored special studies of them, and added them to the national agenda. Examples include studies of ocean dumping,\textsuperscript{427} toxic chemicals,\textsuperscript{428} integrated pest management,\textsuperscript{429} ecological damage to the public lands from off-road vehicle use,\textsuperscript{430} environmental issues involving agricultural lands,\textsuperscript{431} and perhaps most widely publicized, the 1980 \textit{Global 2000} study of environmental trends and emerging problems worldwide.\textsuperscript{432} As a group, these studies exemplified the role that a well-led, high-level advisory body can play in anticipating emerging problems and raising their prominence on both executive and legislative agendas.

The weakness of the CEQ model is its fundamental dependence on the personal support of the President. Through the 1970's the CEQ's professional staff grew to about fifty and included substantial expertise in the ecological and environmental sciences as well as economics, policy,

\textsuperscript{425} See CARNEGIE COMM'N ON SCIENCE, TECHNOLOGY, AND GOV'T, \textit{supra} note 49, at 45-46.
\textsuperscript{426} Harold H. Bruff, \textit{Presidential Management of Agency Rulemaking}, 57 GEO. WASH. L. REV. 533, at 558 (1989) ("EPA, with a staff of 10,000, submits all its rules to four desk officers in OIRA. These officers have neither the time nor the expertise to evaluate conflicting interpretations of technical data in a rulemaking.")
\textsuperscript{427} U.S. COUNCIL ON ENVIRONMENTAL QUALITY, OCEAN DUMPING (1970).
\textsuperscript{428} U.S. COUNCIL ON ENVIRONMENTAL QUALITY, TOXIC SUBSTANCES (1971).
\textsuperscript{429} U.S. COUNCIL ON ENVIRONMENTAL QUALITY, INTEGRATED PEST MANAGEMENT (1972).
\textsuperscript{430} DAVID SHERIDAN, U.S. COUNCIL ON ENVIRONMENTAL QUALITY, OFF-ROAD VEHICLES ON PUBLIC LAND (1979).
and law. Its budget, while modest, allowed it to initiate the studies discussed above. The Reagan administration, however, led by OMB Director David Stockman, deliberately destroyed it in all but name. Reagan fired its entire professional staff and drastically reduced its budget. Under the Bush administration the CEQ once again was led by an experienced professional, but its critical mass of budget and staff expertise was not restored. Despite a few modest initiatives over the decade, the CEQ has not yet demonstrated its ability to play once again the strong anticipatory, agenda-setting, or interagency coordinating roles it played in the 1970's.

The Carnegie Commission's proposal to reconstitute the CEQ as a Council on Environment, Energy, and the Economy (the CE3) might serve this purpose, were it able to avoid merely brokering short-term policy and political conflicts. However, the history of the CEQ indicates that despite efforts to protect it by statute, it is vulnerable to White House politics.

In summary, anticipatory planning is needed in the Executive Office as well as within the regulatory agencies themselves. The regulatory agencies cannot substitute for the authority and responsibility of the President to integrate policies across agency missions. Conversely, however, the President and Executive Office agencies cannot accomplish effective policy integration across agencies when these agencies lack any ability to anticipate problems and set priorities themselves. Any EOP agency will be effective only to the extent that the President supports such an anticipatory or foresight capability and gives it the resources, independence of perspective, and coordination authority necessary to fulfill these functions. In contrast to Roosevelt recent Presidents and their staffs have been interested almost exclusively in short-term political gain.

The Clinton administration, however, seems more interested in supporting such a capability in some form. President Clinton has taken as his Vice President a committed advocate of environmental policy initiatives and foresight capabilities in government, and has given him considerable responsibility for policy coordination in those areas. The

433. U.S. COUNCIL ON ENVIRONMENTAL QUALITY, supra note 77, at 485.
435. Id.; Vig, supra note 415, at 88.
439. CARNEGIE COMM'N ON SCIENCE, TECHNOLOGY, AND GOV'T, supra, note 47, at 12.
President has created a White House Office of Environmental Policy, and authorized its Director to initiate increased cross-agency policy coordination towards environmental protection goals. As Director of his Office of Science and Technology Policy (the OSTP), he appointed Dr. Jack Gibbons, former Director of the Congressional Office of Technology Assessment. Dr. Gibbons is known for his support of technological forecasting, anticipatory analysis, and environmental protection initiatives. While he will continue to have direct access to Clinton himself, Director Gibbons has been assigned to work under the general direction of Vice President Gore to increase coordination between technology policy and environmental policy. The National Security Council has also been given an environmental policy staff, including Eileen Claussen (EPA's former head of atmospheric and indoor air programs) and David Doniger (formerly a senior attorney of the Natural Resource Defense Council).

CONCLUSION

The rapid expansion of U.S. environmental, health, and safety regulation represents a vastly enlarged commitment to the protection of environmental quality and public health through the expansive use of national regulatory authority. The implementation of this commitment has been marred, however, by two serious and unresolved flaws. The first is the poor productivity of the regulatory process itself. In each agency, implementation has lagged far behind statutory responsibilities. Secondly, the agencies have had only limited effectiveness in anticipating new responsibilities and setting priorities.

Effective government demands purposeful planning. Good regulatory planning requires good anticipatory planning as a frame of reference. Over the past two decades, however, U.S. regulatory planning has been dominated by the short-term forces of statutory and judicial deadlines, annual budget cycles, political influences and crises, organizational growing pains and inertia, and the politicization of debate over scientific evidence. To the extent that "long-range" planning has occurred at all, it has inhered almost exclusively in multi-year planning of the implementation of specific statutory mandates. Anticipatory planning has been advocated repeatedly, but has not yet been institutionalized in an enduring form.

440. See discussion supra note 76.
442. Id.
Beginning in 1987 at EPA and in 1991 at the FDA, new administrators have championed more explicit mechanisms for anticipating risks and longer range planning of regulatory priorities. These initiatives, while still young, are promising. Given past history, however, it seems unlikely that personal initiatives alone will achieve enduring reform. Anticipatory planning must be institutionalized in ongoing structures and resource allocation procedures, both within and beyond the agencies.

Institutionalizing anticipatory planning in the regulatory agencies must overcome significant obstacles. One is the overload of short-term statutory deadlines which agencies already face. A second is the opposition of interests that are likely to suffer new regulation when agency priorities are reordered. A third is the broader mix of congressional committees and subcommittees, Executive Office agencies, and interest groups that can be expected to guard their existing influence over the regulatory agencies against any increase in the agencies' discretionary authority. A final obstacle is the agencies' own inertia. Absent strong leadership and external pressures, the agencies tend to employ traditional techniques and pursue familiar problems rather than shifting resources to new problems and priorities. Anticipatory planning will be difficult to institutionalize and will perennially compete with short-term politics and problems. Nonetheless, anticipatory planning will remain a vital element of any serious initiative to improve the performance of the regulatory agencies.

RECOMMENDATIONS

The single most important change needed in U.S. environmental and health regulatory policy is to shift from the present policy pattern of merely implementing narrowly specific bureaucratic statutes, and holding agencies accountable for meeting deadlines for bureaucratic outputs such as publishing standards, to a pattern of setting measurable environmental and health goals. The agencies should be given increased flexibility in selecting the means and priorities to meet those goals, and then held accountable for real progress. This shift requires, in short, the legitimation of anticipatory planning and effective policy leadership by the agencies, within a more broadly defined form of accountability to the public through Congress and the President. The actions required to achieve this change include reforms both within and beyond the regulatory agencies. Reforms within each agency are needed to institutionalize


445. See Berry, supra note 180, at 219. This may be especially problematic in science-driven agencies such as those considered here, since staff expertise may not be readily transferable from one problem to others.
anticipatory planning capabilities and functions, to assure the agencies access to and support from top-level administrators, and to protect them against budgetary raids in moments of short-term crisis. Reforms among the regulatory agencies are necessary to re-institute the active coordination among the regulatory agencies that existed briefly in the IRLG, and to ensure common sense and consistency in regulatory priorities, methods, and impacts on regulated entities. Such reforms are also needed to achieve the greatest possible cost-effectiveness in developing the basis for regulating similar substances and processes by different agencies. Finally, reforms are needed across the agencies to achieve fundamental public purposes and priorities by the most effective and least costly combinations of regulatory and non-regulatory policy tools. Recent initiatives within the agencies are both necessary and encouraging, but by themselves will not suffice to make environmental, health, and safety regulation effective. The following recommendations might provide useful starting points toward more lasting improvements.

First, each agency needs clear statutory confirmation of its overall mission and of its authority and responsibility to set regulatory priorities among more specific statutory directives, consistent with implementing that mission. Model legislation for integration of EPA's statutes has been proposed in connection with recent proposals to transform EPA into a Cabinet level Department of Environmental Protection. This language may not go far enough; it will be tempting to settle for symbolic elevation to Cabinet status without the harder political work of approving an integrated organic act. Reports to Congress by the General Accounting Office in both 1991 and 1993 recommended serious consideration of such proposals.\textsuperscript{446} President Clinton has also endorsed draft legislation that would transform EPA into a Department of the Environment. As of September 1993, this legislation had passed the Senate but was expected to receive slow consideration in the House due to an amendment by Senator Johnston that would require that all regulations be justified on the basis of scientific risk assessment.\textsuperscript{447} Other authors have recommended similar steps for OSHA, including a more flexible mandate, more appropriate deadlines, and reorganization of NIOSH into the Department of Labor.\textsuperscript{448} Such changes would not necessarily resolve other important problems, such as inadequate budget resources, burden of proof, limited regulatory tools, multiplicity of oversight committees,

\textsuperscript{446} U.S. General Accounting Office, Environmental Protection: Meeting Public Expectations with Limited Resources 42 (1991); Senate Comm. on Governmental Affairs, Creation of a Department of the Environment GAO/T-RCED-93-6, (1993) (Statement for the record of Richard L. Hembra).

\textsuperscript{447} Richard Stowe, Congress Faces Busy Environmental Agenda, 261 Science 1263 (1993).

\textsuperscript{448} Shapiro & McGarity, supra note 8, at 44-45.
and red tape within the executive branch. They would, however, permit more effective planning than now occurs.

Second, each agency should establish an explicit process for anticipating and revising regulatory priorities, and for reallocating budget and staff resources to implement these priorities. EPA's comparative risk analysis represents one approach to meeting this need. Similar procedures could be introduced in the other agencies, based on EPA's model or past examples in other agencies (such as the CPSC's emerging hazard system), or on new initiatives. No single quantitative formula can substitute for qualitative judgments and tradeoffs. Criteria such as equity, cost of remedy, and the relative importance of qualitatively different types of hazards are all important. Nonetheless, a systematic process for developing and articulating such priorities will significantly improve regulatory planning.

Third, the planning process must have political legitimacy. That is to say, it must be explicit, public, and open to comment and input (though not to ad hoc veto) by all those affected by the agency's decisions. It is essential that each agency regularly compare the merits of alternative initiatives by some explicit and legitimate set of criteria, across its full range of responsibilities. The resulting judgments must be defended by persuasive reasoning in open discourse. Finally, the agency must have accountable but flexible authority to reallocate resources accordingly. A formal planning process for setting regulatory priorities among toxic chemicals, subject to congressional approval as in national forest management plans, provides one model for such accountability. As a general anticipatory program, this proposal would have to be broadened somewhat, both to incorporate a broader range of environmental hazards than toxic chemicals alone, and to include increased discretion to assess new hazards and new policy tools for remedying them.

To support such a process, each agency should establish a specific organizational unit for anticipatory research and assessment. This unit should identify emerging hazards, produce comparative assessments of the risks, costs, benefits, and other impacts of remedying them, and prepare annual reports on long-range regulatory needs and priorities. The anticipatory unit should also be directed to evaluate the effectiveness of the agency's actions so as to anticipate both unsolved and new problems resulting from them. Such units must be formally established, so that they are not identified merely as the pet projects or political allies of a

449. But comparative risk is only one approach. Relative risk provides one criterion of importance, but not necessarily one superior to such reasonable alternatives as cost-efficiency, feasibility, or environmental justice.
450. See, e.g., Shapiro & McGarity, supra note 8, at 43 (recommending a similar step for OSHA).
particular administrator; but they must also have direct access to and support from the top-level agency administrators. There is no substitute for top-level clients and champions for anticipatory research and strategic planning.

A new organizational unit for anticipatory research and assessment by itself, however, will not be effective or even endure for long without practical steps to encourage foresight and creative thought throughout each agency, and to build broad awareness of its importance and necessity. Good anticipatory research requires good researchers, and good anticipatory planning requires good managers, who are in touch with the frontiers of ideas and trends both in science and technology and in the larger society. Such researchers and managers must bring to that awareness the constant "What if?" question of their relationship to the agency's goals and responsibilities. This requires personnel policies that attract and retain outstanding staff, travel support policies that send them to conferences where they are in touch with other creative people and ideas, and professional development policies that move them around enough both within the agency and among academic, business, and other institutions to keep the staff growing in their understanding of changing interrelationships and priorities.

To coordinate these capabilities and approaches among the agencies, the Interagency Regulatory Liaison Group or some similar mechanism should also be reestablished. The IRLG served a useful function during its brief existence, and this function is best provided at the level of direct interaction among the regulatory agencies themselves, distinct from the broader needs and political constraints that are involved with Executive Office oversight.

Three further changes are necessary to move beyond a purely regulatory approach to environmental quality and public health. First, the regulatory agencies must be encouraged to consider and propose the most effective means for the achievement of their overall missions, rather than being restricted to specific regulatory tools. EPA now publicly advocates this approach, but its capacity to implement it is severely constrained by the specificity of its statutory mandates.

Second, anticipatory capability and policy leadership must also be developed in the Executive Office of the President, with a clear mandate to coordinate policies across agency lines toward a sustainable long-term combination of environmental, economic, and other public purposes. Unfortunately, few recent presidents have shown interest in asserting such leadership. President Clinton may be more inclined to do so, especially if the idea enjoys broad-based support among business, state and local governments, and environmental groups.

Finally, the President could announce his intention to implement the substantive rather than merely the procedural and institutional man-
dates of the National Environmental Policy Act of 1969. This statute has long been identified merely with its procedural requirement for the production of environmental impact statements and its institutional requirement of a Council on Environmental Quality. In fact, however, both these provisions arguably were intended merely as mechanisms for assuring implementation of its substantive policy mandate, which remains a foresighted and articulate statutory framework for a broadly anticipatory and strategic approach to national environmental policy:

[I]t is the continuing policy of the Federal Government . . . to use all practicable means and measures . . . to foster and promote the general welfare, to create and maintain conditions under which man and nature can exist in productive harmony, and fulfill the social, economic, and other requirements of present and future generations of Americans.

[I]t is the continuing responsibility of the Federal Government to . . . (1) fulfill the responsibilities of each generation as a trustee for succeeding generations; (2) assure for all Americans safe, healthful, productive, and aesthetically and culturally pleasing surroundings; (3) attain the widest range of beneficial uses of the environment without degradation, risk to health or safety, or other undesirable and unintended consequences; (4) preserve important historical, cultural, and natural aspects of our national heritage, and maintain, wherever possible, an environment which supports diversity, and variety of individual choice; (5) achieve a balance between population and resource use which will permit high standards of living and a wide sharing of life's amenities; and (6) enhance the quality of renewable resources and approach the maximum feasible recycling of depletable resources.452

It is time to acknowledge that regulatory agencies must plan as well as implement, and that they must have sufficiently flexible authority and discretion to enable them to do so. This does not mean unaccountable access to arbitrary powers: their priorities must be reasoned and defensible, and developed through processes that allow broad opportunities for input and debate. It does mean, however, that the agencies must have authority and resources for anticipatory research and planning; that they must be allowed to set overt rather than merely de facto priorities among their responsibilities; and that they must have scope to consider the most effective ways of achieving their missions. Most importantly, the regulatory agencies must no longer be so hemmed in by overly specific mandates and constituencies that they cannot be held accountable for their more fundamental responsibilities to protect public health and sustainable environmental conditions.