

## Book Review

### What's the Risk in Risk?

*Risk vs. Risk: Tradeoffs in Protecting Health and the Environment*, John D. Graham and Jonathan Baert Wiener eds., Cambridge: Harvard University Press, 1995. 337 pages.

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Risk has become a four-letter word in much of the environmental community. Carol Browner, the Clinton Administration's Environmental Protection Agency (EPA) Administrator recently deleted risk from the list of the EPA's Guiding Principles,<sup>1</sup> reportedly at the behest of environmental group leaders.<sup>2</sup> This action, reversing the focus of prior administrations on risk-based priority setting,<sup>3</sup> reflected the perception among environmentalists that making risk analysis a centerpiece of EPA's work inhibits regulatory activity and hampers environmental protection.

The retreat from risk as a central analytic focus of environmental decision-making represents a poor policy choice. Reducing risk is, almost by definition, the central purpose of environmental regulation. As John D. Graham and Jonathan B. Wiener point out in their new book *Risk vs. Risk: Tradeoffs in Protecting Health and the Environment*, "risk tradeoffs are a pervasive feature" of both individual and governmental decision-making regarding human health and the environment.<sup>4</sup> Identifying, weighing, and comparing the risks (and benefits) of competing policy options are essential components of good environmental regulation. Fundamentally, there is no escaping risk analysis. If it is not done explicitly, with careful consideration

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1. See ENVIRONMENTAL PROTECTION AGENCY [hereinafter EPA], *THE NEW GENERATION OF ENVIRONMENTAL PROTECTION: EPA'S FIVE-YEAR STRATEGIC PLAN 7-8* (1994).

2. Interview with EPA Staff Member, in Washington, D.C. (Nov. 1994).

3. In 1987, the EPA released a pathbreaking relative risk analysis of 31 environmental problems of interest to the Agency. See OFFICE OF POLICY ANALYSIS, EPA, *UNFINISHED BUSINESS: A COMPARATIVE ASSESSMENT OF ENVIRONMENTAL PROBLEMS* (1987). Desiring to build on this foundation and to inculcate into the EPA a risk-reduction orientation, EPA Administrator William Reilly commissioned a follow-on analysis soon after taking office in 1989. See SCIENCE ADVISORY BOARD, EPA, *REDUCING RISK: SETTING PRIORITIES AND STRATEGIES FOR ENVIRONMENTAL PROTECTION* (1990).

4. John D. Graham & Jonathan B. Wiener, *Confronting Risk Tradeoffs*, in *RISK VS. RISK: TRADEOFFS IN PROTECTING HEALTH AND THE ENVIRONMENT* 1, 2 (John D. Graham & Jonathan B. Wiener eds., 1995) [hereinafter *RISK VS. RISK*].

of the alternatives available, risk tradeoffs will occur implicitly. Decision-making may be driven by public fear and special interest lobbying, and policies may not reflect the best interest of citizens.

The anti-risk attitude that has recently come to dominate the thinking of the environmental community has been engendered by a number of factors. First, environmentalists see some risk analysis proposals as a backdoor effort to promote deregulation. The Contract With America, for example, calls for labyrinthine regulatory impact analyses designed not to promote careful consideration of competing policy choices but to hamstring the EPA.<sup>5</sup> The proposed analyses cover 23 specific criteria and include intricate cost-benefit calculations for every rule affecting more than 100 people or costing more than \$1 million, imposing a time-consuming and potentially endless series of regulatory hurdles on EPA for even very minor regulations.<sup>6</sup> The House legislation implementing the Contract<sup>7</sup> mandates even more obfuscatory and burdensome risk assessment procedures, which the *Wall Street Journal* observed (approvingly!) would ensnare bureaucrats in red tape.<sup>8</sup>

Second, environmentalists worry that risk analysis will ignore values that cannot readily be monetized. Some supporters of risk assessment in the regulatory process advocate a "hard" approach to risk analysis<sup>9</sup> that goes beyond informing decision-making and replaces the policy process with a rigid algorithm for adding up costs and benefits.<sup>10</sup> Environmentalists fear that such a process will systematically ignore or undervalue the benefits of environmental regulation, which are almost always less certain and harder to quantify than its costs. How much, for example, is a pretty view worth? With such concerns in mind, Mark Sagoff and others argue that environmental policy-making is irreducibly about values and therefore quintessentially "political" and not

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5. Paul Portney, *Chain-Saw Surgery: The Killer Clauses Inside the 'Contract,'* WASH. POST, Jan. 15, 1995, at A23.

6. See CONTRACT WITH AMERICA 135 (Ed Gillespie & Robert Schellhas eds., 1994).

7. See "The Job Creation and Wage Enhancement Act of 1995," H.R. 9, 104th Cong., 1st Sess. (1995).

8. *Real Risk Reform*, WALL ST. J., Apr. 18, 1995, at A20.

9. See Donald T. Hornstein, *Reclaiming Environmental Law: A Normative Critique of Comparative Risk Analysis*, 92 COLUM. L. REV. 562, 584-586 (1992) (spelling out difference between "hard" approach to risk assessment that tries to put monetary values on all costs and benefits of a particular regulatory intervention and to reduce policy process to a net benefit calculation among competing policy options and a "soft" approach that views risk comparison as an indicative but not definitive policy guide, recognizing that some important values are hard to quantify).

10. The classic "hard" version of risk assessment is Office of Management and Budget, *Reforming Regulation and Managing Risk-Reduction Sensibly*, in BUDGET OF THE UNITED STATES GOVERNMENT FISCAL YEAR 1992 (arguing that regulatory agencies should set priorities and determine budget commitments according to quantitative measures of cost effectiveness, notably cost-per-life-saved calculations).

amenable to welfare-maximizing “economic” calculations.<sup>11</sup>

Third, environmentalists think that certain kinds of costs and benefits (such as harms borne by disadvantaged communities or individuals with special sensitivities to environmental threats) will be given short shrift because of biases inherent to the “expert” decision processes that underlie risk analysis.<sup>12</sup> More generally, they fear that the equity or distributional effects of risk-based policies will be overlooked.<sup>13</sup>

Other critics worry that risk-based decision-making will ignore public preferences or is otherwise susceptible to special interest manipulation.<sup>14</sup> Donald Hornstein argues, for example, that “the logic of collective action predicts that the technical process of making risk-based decisions is more accessible to those special interests that can consistently afford to deploy technically competent scientists, economists, attorneys, and public relations firms to represent their interests . . . .”<sup>15</sup> A similar critique by Wendy Wagner suggests that science is used by policy-makers to camouflage difficult regulatory decisions.<sup>16</sup>

Although special interests do manipulate the regulatory process, Hornstein and others misidentify the cause of this problem. An open analytical process supported by the clear decision rules that good risk assessment methodologies provide—even if open to special interest lobbying—is more transparent and thus less susceptible to distortion than uninformed policy-making in the non-analytic darkness.<sup>17</sup> By the same token, Wagner’s analysis, even if true, is

11. See Mark Sagoff, *We Have Met the Enemy and He Is Us or Conflict and Contradiction in Environmental Law*, 12 ENVTL. L. 283, 286-96 (1982) [hereinafter Sagoff, *We Have Met the Enemy*]. See generally MARK SAGOFF, *THE ECONOMY OF THE EARTH* (1988).

12. See Donald T. Hornstein, *Paradigms, Process, and Politics*, in WORST THINGS FIRST?: THE DEBATE OVER RISK-BASED NATIONAL ENVIRONMENTAL PRIORITIES 147, 150 (Adam M. Finkel & Dominic Golding eds., 1994) [hereinafter WORST THINGS FIRST] (arguing that “risk models used by experts are not value-neutral” and that they tend to emphasize “real” risks, thus downplaying worst-case assumptions.). Nevertheless, Hornstein fails to separate flaws in the current methodologies that could be corrected (e.g., by better benefit measurements or the use of “expected value” analysis to accurately reflect small risks) from the underlying theory of trying to make decisions by comparing risks.

13. See Sagoff, *We Have Met the Enemy*, *supra* note 11, at 288; Hornstein, *supra* note 9, at 592-603.

14. See, e.g., Hornstein, *supra* note 12, at 151 (arguing that sophisticated analytic processes give advantage to highly organized interest groups which can bring resources to bear to affect the decision process). See generally Gillette P. Clayton & James E. Krier, *Risk, Courts, and Agencies*, 138 PENN. L. REV. 1027 (1990).

15. Hornstein, *supra* note 12, at 151.

16. Wendy E. Wagner, *The Science Charade in Toxic Risk Regulation*, 95 COLUM. L. REV. 1613, 1617 (1995).

17. Hornstein posits that the best environmental law is made during “republican moments” when emotional reactions to environmental crises spur Congress to go beyond their customary “legislative shirking,” to disregard the usual loud voices of (presumably anti-environmental) special interests, and to adopt the more environmental values of the public-at-large. Hornstein, *supra* note 12, 155-57. See also Hornstein, *supra* note 9, at 577. But even his own examples tell another

an argument not for less science and risk assessment but for *better* science and risk assessment. If fact, all of the concerns just cited go to the kind of risk procedures used and how risk assessment fits into the broader regulatory decision structure—not to the core value of using risk analysis to inform policy-making.

Neither the attempt by certain Congressional leaders and their allies to advance a radical anti-environmental agenda under the “risk” banner nor the recognized limitations of current risk assessment methodologies provide any excuse for environmentalists to adopt anti-risk rhetoric. Risk assessment provides a mechanism for informing environmental decision-making and for reducing the technical uncertainty in environmental policy-making.<sup>18</sup> Of course, risk analysis cannot eliminate politics entirely from the policy process. There will always remain decisions that must be made politically because the answers depend on value judgments, a realm where science and the weighing of relative risks provide few answers. But absent risk analysis, environmental policy-making lacks a rational basis for sorting out priorities and determining optimal funding levels for investments in public health and ecological protection.

The value of rationality as a political ally must not be gainsaid. To recapture lost political support, environmentalists need to demonstrate to the public and Congress the values of the programs they support as well as their recognition that the current budget constraints require that funds be targeted on bigger rather than smaller risks. Effective risk-benefit and cost-benefit analysis would demonstrate the value of many environmental programs—and provide a powerful political weapon to wield against eco-skeptics in Congress and elsewhere.<sup>19</sup> Having demonized risk analysis, the environmental community may find it difficult to shift gears, but environmental advocates should nevertheless stake a claim to risk as their own policy approach. Rather than opposing risk-based legislation, they should fight to shape what sort of risk assessment tools are put into law. To do otherwise is to surrender the analytic high ground.

Given the significant degree of confusion over risk as an environmental policy tool, Graham and Wiener’s new book adds an important dimension to

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story. Love Canal, for instance, spawned the Superfund Program, which is widely regarded as one of the most poorly structured and wasteful environmental programs ever conceived. See generally Richard Revesz & Richard B. Stewart, *ANALYZING SUPERFUND: ECONOMICS, SCIENCE AND LAW* (1995); Jan Paul Acton, *UNDERSTANDING SUPERFUND: A PROGRESS REPORT* (1989).

18. See Adam Finkel, *Should We—and Can We—Reduce the Worst Risks First*, in *WORST THINGS FIRST* 3, 6-8 (clarifying the difference between “risk assessment”—a method for estimating the probability and severity of hazards to human health, safety, and the natural environment—and “risk management”—the process of weighing policy alternatives and setting priorities).

19. And where good analysis does not support a program, environmentalists should be willing to redirect their energies.

the debate. Starting with the observation that risk tradeoffs are ubiquitous, Graham and Wiener introduce a method of risk tradeoff analysis (RTA) designed to illuminate environmental and health choices. They observe that regulatory actions aimed at a “target risk” may entail secondary effects or “countervailing risks” that can reduce, or even negate, the risk reduction of the policy actions aimed at the target risk, thus rendering the intervention less effective or even counter-productive.

To flesh out this approach to risk analysis, Graham and Wiener provide a useful typology of risk tradeoffs.<sup>20</sup> Where a countervailing risk arises that reduces the impact of the regulatory action vis-a-vis the original risk target, Graham and Wiener call the result a “risk offset.” Where the effort to reduce one risk creates another one, we face “risk substitution.” Where a countervailing risk of the same type as the target risk arises but is imposed on a different population, we have a “risk transfer.” And where the countervailing risk is both of a different type and affects a different population, Graham and Wiener describe the outcome as “risk transformation.” In every case, decision errors ensue if the decision-maker fails to consider the countervailing risk.

Much of the volume is devoted to case studies highlighting the risk-versus-risk phenomenon and demonstrating how a comprehensive risk tradeoff analysis can yield “risk superior” results which allow for more overall risk reduction than if the analysis focuses only on the original target harm. Graham demonstrates, for example, in a chapter on “Saving Gasoline and Lives” that the secondary effects of the fuel efficiency rules diminish the effectiveness of the government’s Corporate Average Fuel Economy (CAFE).<sup>21</sup> Cars with better gas mileage are cheaper to operate, inducing people to drive more. Moreover, because the requirements affect only new cars (and act, in effect, as a tax raising their cost relative to older cars), people have an incentive to hold on to their old, less-fuel-efficient cars longer than they might otherwise have. Most dramatically, Graham demonstrates that the downsizing of vehicles induced by the CAFE standards, far from saving lives by reducing air pollution from cars, actually exposes the driving public to higher risks of injury and death in crashes.

In another demonstration of RTA in operation, Paul D. Anderson and Jonathan Wiener show that although eating fish exposes a person to the countervailing risks of cancer from toxics in the fish, in most circumstances, the new risk should not be of concern.<sup>22</sup> In comparison to the potential reduction in heart-disease from moving to a lower fat diet through increased fish consumption, the cancer risk is minute. In another chapter, Susan Putnam

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20. *Graham & Wiener, supra* note 4, at 19-25.

21. See John D. Graham, *Saving Gasoline and Lives*, in *RISK vs. RISK* 87, 89.

22. Paul D. Anderson & Jonathan B. Wiener, *Eating Fish*, in *RISK vs. RISK* 104, 107.

and Jonathan Wiener walk the reader through the risk tradeoffs presented by reducing the chlorination of public water supplies.<sup>23</sup> They conclude that although reduced chlorination can lower cancer risks, the countervailing risk of increased water-borne disease would likely overwhelm any benefits. Other chapters explore the risk tradeoffs entailed in estrogen therapy for menopause, clozapine therapy for schizophrenia, allowing elderly drivers to keep their licenses, recycling lead, regulating pesticides, and protecting the global environment from climate change. Although each of these case studies illuminates the use of RTA, the individual analyses are likely to be of real value only to those with a substantive interest in the topic in question.

Of more general interest is Graham and Wiener's analysis of why regulatory mistakes—misguided risk comparisons—are so prevalent. They identify various telling explanations. First, and most powerfully, they note that regulators often ignore countervailing risks.<sup>24</sup> Where the secondary effects are spread broadly across a diffuse group, it becomes relatively easy for the regulator to disregard the consequences, particularly if the countervailing risk falls outside the regulator's mandate. Where risks are transferred or substituted onto groups outside the regulator's jurisdiction, the potential for an "omitted voice" to exist and thus for the risk comparison to be misguided is exacerbated. In such cases, risks shifted onto a "forgotten group" become an "externality" and like any other uninternalized harm create a market failure and inefficiency. Similarly, Graham and Wiener note that where countervailing risks fall on disadvantaged groups, environmental justice concerns may be raised.<sup>25</sup> For example, if a well-organized community mounts a not-in-my-backyard (NIMBY) campaign against an incinerator, the locally undesirable land use (LULU) may end up in a politically less influential community.

Second, Graham and Wiener explain that heuristics or mental shortcuts mean that some risks loom larger than others.<sup>26</sup> Policy is often driven by recent, big, visible problems despite the fact that slowly developing, less visible harms may present objectively more serious risks. For example, the Exxon Valdez oil spill ignited great passions, while burning coal generates much less excitement despite its well-documented harm to air quality. The absence of systematic risk assessment and priority setting exacerbates this tendency to pursue the "risk of the month."

A third source of policy distortion, according to Graham and Wiener, is "bounded oversight" by which the policy process narrows the vision of the

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23. See Susan W. Putnam & Jonathan B. Wiener, *Seeking Safe Drinking Water*, in RISK vs. RISK 124.

24. Jonathan B. Wiener & John D. Graham, *Resolving Risk Tradeoffs*, in RISK vs. RISK 226, 230-33.

25. *Id.* at 233.

26. *Id.* at 233-35.

regulator and leads her (or even requires her) to disregard countervailing risks.<sup>27</sup> As Graham and Wiener make clear, while it is often the regulatory agencies that are accused of “tunnel vision,” the real fault lies with the Congress that writes the laws and persists with a fragmented system of legislative drafting and oversight that does little to reward comprehensive risk analysis.<sup>28</sup>

While Graham and Wiener’s review of the problems that create risk tradeoff errors is quite thorough and convincing, the policy recommendations they offer are less penetrating. Their central piece of advice—encouraging policy-makers to adopt a comprehensive perspective and “treat the ‘whole patient’”<sup>29</sup>—is too abstract to be really useful. It is, moreover, unlikely to convert the very environmentalists most in need in persuasion. Although their key observation is that “bounded specialization tends to blind the decision-maker to information about risks outside his or her jurisdiction, to hamper synoptic decision-making, and to encourage risk tradeoffs,”<sup>30</sup> Graham and Wiener shy away from the logical implications of their own analysis. Indeed, while they acknowledge the problems created by the “disaggregation of authority,”<sup>31</sup> they hesitate in their support for more centralized expert analysis, preferring instead “to devise and inculcate a broader method of decision-making by actors at all levels.”<sup>32</sup>

Furthermore, they reject “more centralization of power in the hands of some unitary national or international agency—a ‘physician king’ entrusted, like Plato’s philosopher kings, with the power to resolve risk tradeoffs by sagely choosing a single best strategy”<sup>33</sup> and “pell-mell centralization,” as if these were the only alternatives.<sup>34</sup> Graham and Wiener proceed gingerly to endorse a “modest form of centralization of oversight in the federal government”<sup>35</sup> and urge “serious consideration” of Justice Stephen Breyer’s call<sup>36</sup> for risk analysis and environmental priority setting by a group of expert risk managers based in the White House.<sup>37</sup>

In fact, Breyer’s approach, relying on a small, centralized administrative group with inter-agency authority to rationalize decision-making,<sup>38</sup> would

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27. *Id.* at 235-240.

28. *Id.* at 238-39.

29. *Id.* at 242.

30. *Id.* at 238.

31. *Id.* at 240.

32. *Id.* at 242.

33. *Id.* at 246.

34. *Id.* at 247.

35. *Id.* at 247.

36. See STEPHEN BREYER, *BREAKING THE VICIOUS CIRCLE: TOWARD EFFECTIVE RISK REGULATION* (1993).

37. Wiener & Graham, *supra* note 24, at 247.

38. BREYER, *supra* note 36, at 60.

better capture the benefits of RTA than the mechanisms proposed by Graham and Wiener. As Breyer argues, such a group offers the potential for careful risk analysis and decision-making in a context that draws on real expertise, permits insulation from political and special interest contortion, and stimulates public confidence through its authoritativeness.<sup>39</sup> Breyer deftly turns aside criticisms that his answer is undemocratic and elitist.<sup>40</sup> Noting that “chaos is not democracy,” Breyer observes that his risk rationalization mechanism need not deprive the People of their right to choose but rather will streamline and clarify the policy choices the public faces.<sup>41</sup>

Although they fail to provide as comprehensive a solution as Breyer, Graham and Wiener’s endorsement of risk-benefit analysis of all proposed legislation in advance of Congressional action makes good sense, as does their recommendation that Congress acquire greater technical competence to support its risk judgments.<sup>42</sup> Their suggestion that Congressional risk judgments be consolidated within a single Joint House-Senate Committee on Risk would help to control the issue fragmentation endemic to Congress and the competition for attention among oversight committees that discourages comprehensive risk reduction.<sup>43</sup> But Graham and Wiener do not go far enough in attacking the Congressional roots of the risk problems that plague environmental policy-making.<sup>44</sup> Mandatory turnover of both Committee members and staff, for example, would inhibit empire building and the unthinking defense of narrowly conceived policy interests.

More boldly, Graham and Wiener urge the rewriting of the existing patchwork of environmental laws, many of which mandate non-risk-based

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39. *Id.* at 62-63.

40. *Id.* at 73-74.

41. *Id.* As Breyer succinctly notes: “Representative democracy is not undemocratic.” *Id.* at 74.

42. Wiener & Graham, *supra* note 24, at 250. Ironically, the Congress recently abolished the Office of Technology Assessment (OTA) which Graham and Wiener argue might provide the needed technical assistance. See John Heilemann, *Proof That Gingrich & Co. Don't Know What They're Doing; Newt Gingrich and Republicans in Congress*, WASH. MONTHLY, Jan., 1995, at 14.

43. Wiener & Graham, *supra* note 24, at 251; see also Cass Sunstein, *Valuing Life*, NEW REPUBLIC Feb. 15, 1993, at 36.

44. Specifically, EPA and other regulatory agencies are torn in competing directions by dozens of House and Senate Committees and Subcommittees, each with their own narrow legislative jurisdictions and resulting priorities. Any attempt to transfer resources from one area of environmental activity to another higher priority (higher risk) problem brings a torrent of criticism from those (both members and staff) whose oversight jurisdiction is limited to the problem deemed to be of lesser importance. From their constricted viewpoint, the only issue that matters is the one they control. As an EPA Assistant Administrator once remarked, “testifying before a committee chairman whose pet issue has been put on the back burner can ruin your whole day.” Telephone Interview with Linda Fisher, Assistant Administrator for Prevention, Pesticides and Toxic Substances, EPA (May 1991).



regulatory action.<sup>45</sup> Of course, reconstructing the nation's environmental rules and adopting an integrated environmental statute would require thoughtful drafting. Recent Congressional environmental debates offer little promise of this sort of systematic and careful legislation, and Graham and Wiener's hope that "cultural maturation" will bring a commitment to RTA seems accordingly misplaced. Yet their call for a new paradigm for risk policy, based on comprehensive and analytically rigorous consideration of risk tradeoffs, should be heeded.

In a world full of politicians seeking "silver bullets," Graham and Wiener offer a more sober truth: "Faced with complex, multidimensional realities . . . [we must ignore] the temptation to despair or to be satisfied with piecemeal responses" and instead have confidence in "the capacity of human reason to confront and resolve risk tradeoffs."<sup>46</sup> After all, those who eschew risk analysis offer even weaker foundations for environmental action. Hornstein, for example, suggests that a "cause-oriented" paradigm might be a more useful approach to setting environmental policy. Yet his desire for a regulatory model that targets the "reasonably proximate causes of environmental problems," rather than the "effects" upon which a risk-orientation concentrates, provides no traction for policy.<sup>47</sup> Specifically, it offers no help in setting priorities, addressing the problem of unintended consequences, or determining the appropriate level of response to an identified cause of environmental harm.

Howard Latin proffers an even less helpful conclusion. Citing "pervasive uncertainty,"<sup>48</sup> he suggests that we abandon altogether any pretense of relying on risk assessment or scientific "packaging" to make environmental policy and simply accept that virtually all regulatory judgments entail policy judgments.<sup>49</sup> However, as Jay Michaelson observes, "risk assessment science, though complex, is not sorcery."<sup>50</sup> Although its limitations are real, and science in general is not value neutral in any strong sense, a risk-based approach to environmental decision-making offers at least the hope of a rational environmental policy process.

To suggest, as Hornstein does, that risk analysis may "rationalize choices we should not make"<sup>51</sup> is nonsense. Policy choices must be made and will

45. WIENER & GRAHAM, *supra* note 24, at 251.

46. *Id.* at 271.

47. See Hornstein, *supra* note 12, at 159.

48. Howard A. Latin, *Ideal Versus Real Regulatory Efficiency: Implementation of Uniform Standards and "Fine-Tuning" Regulatory Reforms*, 37 STAN. L. REV. 1267, 1270 (1985).

49. Howard A. Latin, *Good Science, Bad Regulation, and Toxic Risk Assessment*, 5 YALE J. ON REG. 89, 90 (1988).

50. Jay Michaelson, Note, *Rethinking Regulatory Reform: Toxics, Politics, and Ethics*, 105 YALE L.J. 1891, 1903 (1996).

51. Hornstein, *supra* note 9, at 564. In fact, to dismiss the exercise saying that "incommensurables" are being compared, *id.* at 602, is to beg an unbeggable question. Whether to buy an ice cream cone or a newspaper presents incommensurable alternatives, but people still

be made implicitly if not explicitly. What is the alternative to trying to compare harms and maximize the reach of environmental spending? Should we avoid data and rely on guesswork? Without denying the weaknesses of current risk methodologies, the argument in favor of using risk analysis in decision-making is simple: there is no other metric available that allows policy choices to be made coherently. Moreover, we live in an era of rapid evolution in the capacity of systems that depend on information management.<sup>52</sup> Advances in computer technology are making synthesis and comparison of vast quantities of data ever easier which, in turn, make the prospect of improved risk analysis in the very near future a reasonable bet.<sup>53</sup>

Ultimately, to paraphrase Winston Churchill on democracy, risk-based environmental decision-making may be the worst system ever invented except for all the others. Building a more analytic approach to setting environmental priorities and using risk tradeoff analysis to craft specific policy mechanisms offer the promise of creating programs that will deliver *environmental value*—maximum bang for the public's inevitably limited environmental buck. Unless policy is crafted with this concept of value in mind, ensuring that the benefits of regulation exceed the costs and that the maximum degree of safety (risk reduction) is obtained for a given level of resources invested, public support for environmental programs will erode.

Ultimately, environmentalists cannot afford to cede "risk" analysis to their opponents. They must fight to make the concept their own. There is no other basis for sound environmental policy-making.

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find a way to choose. Similarly, government officials must find ways to weigh policy options. Welfare comparisons (bounded by some notion of fundamental rights) offer something as a decision mechanism in the place of nothing. Unhappiness with the relative weights given various values in the calculus is a separate issue and should be addressed separately. See Carol Rose, *Environmental Faust Succumbs to Temptations of Economic Mephistopheles, or, Value by Any Other Name Is Preference*, 87 MICH. L. REV. 1631 (1989).

52. See WILLIAM GATES with NATHAN MYHRVOLD & PETER RINEARSON, *THE ROAD AHEAD* (1995).

53. The EPA, for example, now makes judgments about pesticide safety on a non-comparative basis judging the chemical that is on the docket against an abstract standard of safety. With computer-enhanced data capacity the Agency soon should be able to analyze simultaneously all pesticides across all crop uses and, cognizant of total dietary exposure to chemicals generally and the risks created by not having pesticides available, set food safety standards for each pesticide and its substitutes.