

Framing Rules: Breaking the Information Bottleneck

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The first generation of environmental law in the United States largely reflected a model of direct regulatory proscription of unwanted individual and corporate behaviors through a series of regulatory commands of the “*though shalt not*” variety,¹ which this Article will call the “Ten Thousand Commandments.”² So, for example:

*“Thou shalt not discharge specified pollutants into the nation’s waterways beyond specific volumetric tolerances established for your industry and incorporated in your permit.”*³

*“Thou shalt not cause harm to any fish or wildlife species listed as endangered or threatened.”*⁴

¹ There are important exceptions. For example, the National Environmental Policy Act (NEPA) simply requires federal agencies to produce assessments of the expected environmental impacts of major federal actions, a requirement that has been deemed “procedural only.” CERCLA, the so-called “Superfund” hazardous waste clean-up statute, works primarily through a strict liability mechanism and is not directly prohibitory in character.

² I do not know how many environmental regulations are extant, but the number is surely large. The number ten thousand is used here only in a poetic sense, redolent both of the Biblical Ten Commandments and of Minnesota’s “10,000 Lakes” which, depending on how one defines a “lake,” number somewhere in the range of 11,800 to 15,200.

³ More precisely, “the discharge of any pollutant by any person shall be unlawful” except by permit. Federal Water Pollution Control Act, §301(a), codified at 33 U.S.C. §1311(a). “Discharge of a pollutant” is defined to include “any addition of any pollutant to navigable waters from any point source,” 33 U.S.C. §502(12), and “the term ‘navigable waters’ means the waters of the United States,” 33 U.S.C. §502(7). Permits are to reflect, inter alia, “effluent limitations for categories and classes of point sources . . . which shall require application of the best available technology economically achievable for such category or class.” 33 U.S.C. §1311(b)(2)(A).

⁴ More precisely, “with respect to any endangered species of fish or wildlife listed pursuant to [4 of the Endangered Species Act] it is unlawful for any person subject to the jurisdiction of the United States to . . . take any such species within the United States or the territorial sea of the United States [or to] take any such species upon the high seas.” Endangered Species Act §9(a)(1), codified at 16 U.S.C. §1538(a)(1).

And so on.

These regulatory proscriptions, in turn, are backed by stiff administrative, civil, and criminal sanctions for non-compliance, enforceable by administrative agencies, federal and state prosecutors, and sometimes ordinary aggrieved citizens through the mechanism of the citizen suit.

By most accounts, these highly prescriptive rules have been reasonably effective at grabbing the “low-hanging fruit” in environmental policy, forcing dramatic reductions in outputs of the most ubiquitous, high-volume pollutants from large stationary sources like industrial facilities and municipal wastewater treatment plants.⁵ Critics argue, however, that this progress has come at the price of high compliance costs and disincentives to technological innovation.⁶

The prescriptive approach has generally been less effective at reaching more complex problems, such as the individually small but cumulatively damaging pollution outputs coming from numerous diffuse or mobile sources like automobiles⁷ or non-point source run-off from farms and urbanized areas.⁸ Nor has it been very effective at controlling small-volume but potentially high-impact toxic pollutants, except perhaps in those rare cases where the regulatory solution was an outright ban on the manufacture,

For purposes of this statute, “[t]he term ‘take’ means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct.” 16 U.S.C. §1532(19). By regulation, the prohibition on “take” also applies to species of fish or wildlife listed as threatened, except as otherwise provided by rule. See 50 C.F.R. §17.31 (extending prohibition on “take” to threatened wildlife species except as otherwise provided).

⁵ See

⁶ See, e.g., Ackerman & Stewart

⁷ While strict emissions controls on new cars have reduced the average pollution output per vehicle-mile traveled, especially in newer cars, this approach has done nothing to curb the growth in the number of automobiles and the average miles traveled, factors which have largely offset technology-induced gains in pollution efficiency.

⁸ EPA believes most of the remaining pollution in the nation’s rivers and streams comes from non-point sources, largely unregulated under the Clean Water Act.

use, or environmental release of a specified substance.⁹ Nor, finally, has this approach been very effective in the more complex and integrative tasks of protecting ecosystems.¹⁰

Almost from the outset of the era of prescriptive environmental regulation, the policy arena has been awash in proposals for regulatory reform, reinvention, and reorientation. These reform proposals vary in their specifics, but they tend to share some common features. Generally, the reformers call for more flexible, less *dirigiste* approaches to environmental regulation through such varied mechanisms as market-based cap-and-trade programs,¹¹ pigovian “green taxes,”¹² negotiated rulemaking and other forms of contractual or collaborative decision-making,¹³ quasi-voluntary “challenge regulation,”¹⁴ and programs that reward self-policing,¹⁵ environmental self-management,¹⁶ and voluntary commitments to superior environmental performance.¹⁷

⁹ See

¹⁰ See Edgewater Consensus

¹¹ See, e.g., Ackerman & Stewart, *supra* note

¹² See, e.g., Christina K. Harper, *Climate Change and Tax Policy*, 30 B.C. INT’L & COMP. L.REV. 411, 427-29 (2007) (summarizing arguments for taxes on environmental “bads”).

¹³ See generally David A. Dana, *The New “Contractarian” Paradigm in Environmental Regulation*, 2000 U. ILL. L.REV. 35 (2000) (describing the emergence of various forms of contractually based environmental regulation); Daniel A. Farber, *Triangulating the Future of Reinvention: Three Models of Environmental Protection*, 2000 U.ILL. L.REV. 61, 76-79 (2000) (describing the bilateral “bargaining model” of environmental regulation).

¹⁴ In “challenge regulation,” the regulatory agency typically sets up a program with defined environmental protection objectives and publicly issues a “challenge” to industry to voluntarily meet program objectives, while holding out formal public recognition as a positive incentive to participate. See E. Donald Elliott, *Environmental TQM: Anatomy of a Pollution Control Program That Works!*, 92 MICH. L.REV. 1840, 1850-52 (1994) (describing the features of such programs and citing as examples EPA’s Green Lights, Energy Star, and 33/50 toxic emissions reduction programs)

¹⁵ See Sarah Stafford, *Does Self-Policing Help the Environment? EPA’s Audit Policy and Hazardous Waste Compliance*, 6 VT. J. ENVT’L L. 14 (2004-05) (describing and analyzing EPA’s “self-policing” policy which reduces or eliminates penalties for self-identified, self-reported, and self-corrected violations).

¹⁶ See generally LEVERAGING THE PRIVATE SECTOR: MANAGEMENT-BASED STRATEGIES FOR IMPROVING ENVIRONMENTAL PERFORMANCE (Cary Coglianese & Jennifer Nash, eds., 2006) (describing and evaluating environmental protection strategies based on environmental management systems (EMS) and similar approaches); David W. Case, *Changing Corporate Behavior through Environmental Management Systems*, 31 WM. & MARY ENVT’L L. & POL’Y REV. 75 (2004).

¹⁷ See Dennis D. Hirsch, *Project XL and the Special Case: The EPA’s Untold success Story*, 26 COLUM. ENVT’L L.REV. 219 (2001) (describing and offering a positive evaluation of EPA’s Project XL which offered

Despite these many calls for change, however, the statutory and regulatory landscape in the United States has remained remarkably static over the last several decades.

Many of the reform proposals are predicated upon the assumption that the central problem in environmental regulation is the economic and technological inefficiencies and resulting high compliance costs imposed by prescriptive regulation itself.¹⁸ But a public policy failure of at least equal magnitude is to be found in the long list of serious environmental problems that continue to go unaddressed by our current regulatory regime.¹⁹

These are, of course, not incompatible diagnoses. It could very well be the case *both* that the costs of existing environmental regulations are too high, *and* that our failure to address the remaining environmental problems stems at least in part from our recognition that simply extending familiar forms of regulation into new problem areas would impose unacceptably high costs. That fear appears to be central to the rationale offered by the present Administration for its reluctance to act decisively to curb greenhouse gas emissions, for example.²⁰

In my view, however, there is another, equally important barrier to progress in addressing complex environmental problems. Establishing and enforcing detailed, prescriptive regulatory standards is an extremely information-intensive enterprise. Regulators must isolate the problem they are trying to address and come to understand

regulatory relief to firms and facilities making specific commitments to achieve “superior environmental performance”)/

¹⁸ See Ackerman & Stewart, *supra* note , at

¹⁹ See EPA, *Edgewater Consensus* (1994); EPA, *Reducing Risk: Setting Priorities and Strategies for Environmental Protection* (1990).

²⁰ See Cass R. Sunstein, *Of Montreal and Kyoto: A Tale of Two Protocols*, 31 HARV. ENVTL L.REV. 1, 35 (2007) (stating that the Bush Administration declined to seek ratification of the Kyoto Protocol because it perceived compliance costs would be unacceptably high and the benefits relatively small because developing countries would not be subject to mandatory curbs on greenhouse gas emissions).

the causal factors contributing to it in sufficiently fine-grained detail to support the development of specific regulatory commands directed toward all or most of the parties who may be in a position to do something about it. This is typically a painfully slow, step-wise, highly technical process, and it places extreme information demands on regulatory agencies.

To set technology-based effluent standards for water pollution, for example, the EPA must proceed pollutant-by-pollutant and industry-by-industry, setting industry-specific effluent limitations for each pollutant based on the agency's best engineering judgments as to the level of control that might be achieved through the use of the most effective technology presently available in that industry. These highly technical judgments require detailed knowledge of the industry's production methods and processes, material inputs, the process chemistry that results in production of the unwanted pollutant as by-product, and the range of technologies available to reduce, recapture, control, or eliminate the unwanted by-product.²¹ This process must be repeated for each industry producing that particular pollutant, and for each pollutant of concern. Small wonder, then, that for more than thirty years EPA has concentrated its efforts on the highest-volume ubiquitous pollutants, while only slowly coming around to establishing standards for hundreds of lower-volume but potentially quite harmful toxic pollutants.²²

Nor have the regulatory agencies done more than scratch the surface of the gargantuan task of identifying possible toxic pollutants in the first place. Of the 82,000 synthetic chemicals in the EPA's inventory of chemicals in commerce, only a small

²¹ See Ackerman & Stewart, *supra* note .

²²

fraction have ever been subjected to even the most rudimentary toxicity screening, much less to the full battery of tests that would be necessary to establish health-based regulatory standards.²³

I call this problem the “information bottleneck” in environmental regulation. In my judgment, it is pervasive and severe, but it is not intractable. We may characterize the general problem through the following propositions:

1) *In our free market economy, the general presumption---the default rule---is that an activity is allowed unless it is specifically prohibited or restricted.*

2) *Activities may be prohibited or restricted only for good cause.*

3) *The burden generally falls on the proponent of a prohibition or restriction---generally, a regulatory agency---to justify it.*

4) *In the context of environmental (and many other forms of) regulation, the regulatory agency must produce a reasoned explanation, backed by scientific and technical data and information, not only as to why a prohibition or restriction is necessary in general, but as to why the particular restriction chosen is better than the alternatives.*

5) *Judicial review of agency action through the Administrative Procedure Act (APA) or comparable statutory judicial review provisions further compounds the difficulty for agencies. Because their justifications and the underlying data and information may be challenged in court, risk-averse agencies seeking to avoid reversal have an incentive to produce ever more detailed analyses incorporating or rebutting all*

²³ See Christine H. Kim, *Piercing the Veil of Toxic Ignorance: Judicial Creation of Scientific Research*, 15 NYU ENV'T'L L.J. 540, 541 (2007)

the data and information provided by interested parties during the notice-and-comment period.

6) Under this approach, potentially regulated entities have little or no positive incentive—and possibly a disincentive---to cooperate with regulators in identifying potentially harmful pollutants or other environmental risks, or to provide information that might advance the regulator’s analytical process and lead to regulation. These parties often do have incentives later in the regulatory process to produce information that would tend to rebut or undermine the agency’s own information, data, or analyses, because this may force the agency to modify the proposed rule, to withdraw it, to delay its onset while further analysis is undertaken, or to risk judicial reversal of the regulation.

7) Thus, instead of promoting cooperation in information production and disclosure, the regulatory process devolves into an adversarial game in which strategic non-production, non-disclosure, or selective disclosure of asymmetrically held information can be used to thwart, retard, or complicate agency action.

Understood in this way, the regulatory process certainly appears to be suboptimal. It is important to bear in mind, however, that this is mainly an unintended result. The first generation of environmental law is simply an artifact of an age that firmly (and, we now think, naively) believed in “comprehensive bureaucratic rationality.”²⁴ That is, it assumed that complex societal problems could be solved by assigning the task to smart,

²⁴Cf. Colin S. Diver, *Policy Paradigms in Administrative Law*, 95 Harv. L.Rev. 393, 409-13 (1981) (describing the “comprehensive rationality” model of administrative decision-making in vogue in the 1960s and early 1970s) This view began to emerge in the New Deal of the 1930s and greatly accelerated in the Great Society era of the 1960s which saw an unprecedented expansion of the federal bureaucracy. Our present architecture of federal environmental law is largely the product of a bipartisan consensus in the 1970s that a similar top-down bureaucratic approach was needed to address the problem of environmental protection which had burst onto the national scene with publication of Rachel Carson’s inflammatory best-seller *Silent Spring*, some widely publicized fights over natural resource and public lands protection in the American West, and the Santa Barbara oil spill.

dedicated government experts who would objectively, efficiently, and more-or-less costlessly assemble all the relevant scientific and technical data and information, derive from it a scientifically and technically informed, efficient, and effective solution, and reduce the solution to a series of concise regulatory commands directing the relevant non-governmental parties to take the necessary steps to ensure that the solution was implemented.

But that project often becomes bogged down at the very first stage. Agency information-gathering, it turns out, is neither efficient nor costless. Because agencies can work on only so many problems at once, the opportunity cost of working on any particular rule is high, virtually guaranteeing that other important problems will go unaddressed. Once the decision is made to work on a rule, the costs of producing that rule, measured in the expenditure of agency personnel time and the costs of the information-gathering and analytical work that must precede it, can be staggering. Even then, the agency is typically working with incomplete information. There may be important gaps in the underlying science. Baseline environmental and public health data may be non-existent, spotty, ambiguous, inconsistent, or simply measured and recorded in incompatible formats. Potentially regulated parties often asymmetrically hold better or additional information or are better situated to produce the necessary information, but they may decline to produce or disclose information that might advance the regulatory process. Alternatively, they may selectively produce and disclose only the data and information they think likely to influence the rulemaking in a direction they perceive to be favorable to their interests. Or yet again, they may seek to bury regulators in a blizzard of data and information, with the aim to retard the regulatory process. Once a

rule is in place, neither the agency nor the regulated industry has much in the way of positive, dynamic incentives to improve the information base on that particular problem. Industry tends to treat compliance costs as sunk costs; producing new information might cause the matter to be reopened, possibly leading to new compliance costs. For the agency, the problem is considered solved once the rule is in place; it is time then to move on to the next in a bottomless series of other problems.

What, then, is to be done?

Here I will outline, in very broad terms, some basic principles that in my judgment should inform a reorientation of environmental regulation for the next century, before proceeding to discuss some concrete applications. These principles are:

- 1) Environmental programs should be structured to create incentives, both positive and negative, for private parties to continuously produce and disclose data and information that is relevant to the identification, understanding, and resolution of environmental problems.
- 2) Environmental programs should promote decentralized experimentation that can lead to the development of new, more efficient, and more environmentally benign technologies and production processes.
- 3) We should provide centralized mechanisms for the collection, distillation, analysis, and evaluation of this locally produced data and information, and create mechanisms for its efficient dissemination and diffusion.
- 4) In addition to centralized data and information *collection*, we should identify categories of information that are best *produced* centrally due to economies of

- scale associated with concentrated expertise, and assign responsibility to centralized agencies to conduct or oversee that research.
- 5) We should structure incentives to maximize the participation of the not-for-profit sector, especially universities and other not-for-profit research organizations, in environmental problem-solving.
 - 6) We should structure all of this in a way that provides maximum incentives, both positive and negative, for the parties best situated to produce the relevant information to do so.

I call rules aimed at achieving these six desirable outcomes *framing rules*. Unlike the first-generation environmental law of the “Ten Thousand Commandments,” framing rules are not designed to operate as prohibitions or mandates to control individual or corporate behaviors directly. Instead, they aim to change the frame for environmental problem-identification and problem-solving, by inducing the production and disclosure of knowledge and information that otherwise would be unavailable or difficult to obtain, or by altering the parties’ incentives to act cooperatively in environmental problem-solving, rather than strategically attempting to thwart it.

Some examples and applications

A. NEPA

The most obvious way to get parties to produce and disclose policy-relevant information is simply to require it, subject to penalties for non-compliance. Although this approach takes the form of a command-style rule, it can be distinguished from the “Ten Thousand Commandments” model insofar as it has a more limited and narrowly

tailored objective, seeking not to control behavior directly but rather to influence behavior indirectly by changing the information environment in which decisions are made.

This approach dates back to the first major federal environmental statute of the modern era, the National Environmental Policy Act of 1969 (NEPA).²⁵ NEPA famously requires federal agencies to provide a comprehensive environmental impact statement (EIS) detailing the expected environmental impacts of, and alternatives to, any proposed action that would “significantly affect the quality of the human environment.”²⁶ Proponents of NEPA argue that it has forced federal agencies to be more attentive to the environmental consequences of their actions and opened up agency decision-making to an unprecedented degree of public scrutiny. NEPA’s critics are skeptical of both of these claims, pointing out that production of the required impact assessment is usually farmed out to specialized agency personnel or to outside consultants far from the agency’s actual chain of command, and that the required public input and environmental analyses typically come late in the day, after the agency is already *de facto*, although not legally, committed to the proposed course of action.

I have argued elsewhere that both NEPA’s advocates and its critics miss the mark.²⁷ The open-ended information production and disclosure requirements of a formal EIS have turned out to be extremely costly and burdensome, creating a strong disincentive for agencies to pursue a formal EIS whenever it is possible to avoid one. If an agency is deeply committed to a proposed action that carries high and unavoidable

²⁵ National Environmental Policy Act of 1969 (NEPA), Pub. L. 91-190, Jan. 1, 1970, 83 Stat. 852, .as amended, codified at 42 U.S.C. §§ 4321 et seq.

²⁶ NEPA §102(2)(C), 42 U.S.C. 4332(2)(C).

²⁷ See Bradley C. Karkkainen, *Toward a Smarter NEPA: Monitoring and Managing Government’s Environmental Performance*, COLUM. L.REV. (2002) [hereinafter Karkkainen, *Smarter NEPA*]

environmental costs, however, production of a formal EIS is simply unavoidable. At present, federal agencies produce approximate 500 full EISs per year,²⁸ but since that figures includes both draft and final EISs (as well as a few supplementals), it effectively means only about 250 or so federal actions per year are subjected to an EIS. This is a significant reduction from the early 1970s, when federal agencies drew up some 2000 EISs per year---even though the scale and scope of federal activities has expanded quite dramatically over that period. This, I submit, is good prima facie evidence that agencies have learned to avoid EISs.

In the vast majority of cases, agencies have other options. They usually can, and in 50,000 cases a year do, escape the formal EIS requirement by preparing a slimmed-down document called an Environmental Assessment (EA), coupled with a “Finding of No Significant Impact” (FONSI) stating that the environmental impacts of the proposed action will not rise to the EIS-triggering threshold of “significant.”²⁹ Of course, to go this route and have it stand up against legal challenge might require the agency to design the project from the outset in such a way that minimizes adverse environmental impacts, but from the agency’s perspective, that may be a small price to pay to avoid the costs and delays of an EIS, which typically takes several million dollars and from 18 months to three years to prepare, and much more in some cases.

Many agencies take this court-sanctioned escape hatch a step further by pursuing so-called “mitigated FONSI,” predicating the EA and FONSI upon the inclusion in the project of mitigation measures specifically designed to keep the overall environmental

²⁸ See Council on Environmental Quality, *The National Environmental Policy Act: A Study of Its Effectiveness after Twenty-five Years* 19 (1997).

²⁹ See *id.*

impacts below the critical EIS-triggering “significant” threshold. Although detailed data on mitigated FONSI’s are unavailable, their use appears to be widespread.³⁰

The widespread use of EAs, FONSI’s, and especially mitigated FONSI’s suggests that NEPA has indeed changed the terms of debate in agency decision-making, albeit through a somewhat circuitous and unexpected backdoor route. By imposing heavy administrative and procedural costs (those associated with EIS production) on agency projects or programs that will cause severe adverse environmental impacts, NEPA inadvertently creates an incentive for agencies either to redesign projects *ab initio* to reduce their expected environmental impacts below the EIS-triggering threshold, or to add mitigation measures expected to keep the environmental costs down and thus obviate the need to produce a costly EIS. In most cases it is unlikely that agencies would have investigated, much less implemented, these environmentally benign design alternatives or mitigation measures absent the incentives backhandedly created by NEPA. Thus, when all is said and done, it appears that NEPA does in fact change the information environment in which agency decisions are made, leading to environmentally salutary results.³¹

Thus understood, NEPA is a clear example of what I call a *framing rule*. It does not directly mandate that agencies choose environmentally benign alternatives. But by forcing them to consider the matter, and creating a strong albeit indirect incentive to reduce adverse environmental impacts, it changes the terms of agency decision-making and produces substantively better outcomes from an environmental protection standpoint.

³⁰ Elisabeth A. Blaug, *Use of the Environmental Assessment by Federal Agencies in NEPA Implementation*, 15 ENVTL PROF. 57, 57 (1993) (concluding based upon a survey of 52 federal agencies that “agencies appear to rely heavily on mitigation measures to justify EAs and . . . findings of no significant impact (FONSI’s)”).

³¹ See Karkkainen, *Smarter NEPA*, *supra* note , at

And it does so while preserving a large sphere for agency discretion to choose the most cost-effective design alternatives or mitigation measures, and to experiment over time.

Of course, the NEPA described here is something of an accidental policy success: no one quite intended it to work this way. Indeed, NEPA was conceived and enacted at the height of the age of comprehensive bureaucratic rationality, its authors apparently believing that comprehensive information production and analysis would lead to environmentally beneficial outcomes.³² They certainly did not intend to make the EIS information and analytical requirement so burdensome that agencies' chief incentive would be to avoid it. To that extent, the NEPA described here---revolving as it does around an onerous procedural penalty---is an awkward and somewhat ham-handed device.

Nonetheless, if we abstract the core incentive structure on which this scheme rests, we see an interesting and potentially quite powerful approach to environmental problem-solving. NEPA does create incentives for agencies to produce and disclose data and information relevant to environmental problem-identification and problem-solving that otherwise would likely be unavailable. It does preserve a sphere for decentralized experimentation that could lead to efficiency gains in environmental problem-solving. And it does place the burden of producing information on the parties best able to do so, namely the proponents of proposed federal projects and programs.

B. TRI

³² See Diver, *supra* note , at 409-11; Jonathan Poisner, *A Civic Republican Perspective on the National Environmental Policy Act's Process for Citizen Participation*, 26 ENV'T'L L. 53, 76-79 (1996)

An alternative to NEPA's heavy-handed procedural penalty/backdoor avoidance structure is to set more modest and targeted information production requirements from the outset. Perhaps the most familiar example of this approach is the EPA's Toxics Release Inventory (TRI), part of the Emergency Planning and Community Right-to-Know Act (EPCRA).³³ TRI requires any business with ten or more employees in specified SIC codes to report annually, on standardized forms, all releases into any medium of some 650 toxic pollutants. The data are collected in a central, publicly accessible, searchable EPA database. Because the data are reported on standard forms using standard definitions, standard nomenclature, standard units of measurement, unique facility identifiers, and precise GIS-mappable geographical coordinates, the data can be aggregated or disaggregated geographically, by firm, by industry, and longitudinally over time to produce a rich, multidimensional picture of the status of, and trends in, industrially sourced toxic pollution.³⁴

Although not directly linked to any further regulatory requirements, TRI data have multiple uses. The first TRI reports reportedly came as a shock to environmental regulators and corporate officers alike, with many stating that before TRI they simply had no idea just how much toxic pollution was being released into the environment---because until then, no one had ever bothered to ask.³⁵ Information generated through TRI has been used by regulatory agencies to help set regulatory and enforcement priorities;³⁶ by

³³ Emergency Planning and Community Right-to-Know Act § 313, codified at 42 U.S.C. § 11023.

³⁴ Bradley C. Karkkainen, *Information as Environmental Regulation: TRI and Performance Benchmarking, Precursor to a New Paradigm?*, 89 GEO. L.J. 257, 261(2001) [hereinafter Karkkainen, TRI]

³⁵ See R. Darryl Banks & George R. Heaton, Jr., *An Information-Driven Environmental Policy*, 12 ISSUES IN SCI. & TECH. 43 (1995) (stating that because firms often have vague or erroneous information about their environmental externalities, many were surprised at the size of their TRI-reported releases and took action to curb them).

³⁶ Karkkainen, TRI, supra note , at 309-12.

industry groups and individual firms to guide and monitor voluntary facility-specific, firm-wide, and industry-wide pollution reduction programs;³⁷ and by local governments and non-governmental organizations to inform themselves about the extent and severity of toxic pollution in their local communities, and to take appropriate response measures.³⁸ Because TRI data provide a transparent yardstick of one important dimension of facility- and firm-level environmental performance, TRI releases have also been used by corporate management, shareholder groups, and academic researchers as a proxy for firm-, facility-, and industry-level environmental performance generally.³⁹

Unleashing a host of regulatory, social, and market pressures, TRI prompted many firms to undertake ambitious programs of voluntary pollution reduction. As a result, the overall volume of reported TRI emissions has fallen by roughly half since the program was inaugurated, despite substantial economic growth over that period.⁴⁰

Like NEPA, TRI is not without its faults. Perhaps most critically, TRI data are so crude as to be potentially misleading. TRI-reported releases are not indexed to the toxicity of the substance released; all releases are reported straightforwardly in pounds, even though one TRI substance may be pound-for-pound a thousand-fold more toxic than another.⁴¹ In addition, environmental and public health risks are a function not only of a substance's toxicity but also of the number of persons or other organisms exposed, the degree of exposure, whether there are safe exposure thresholds, and the substance's rates

³⁷ Id. at

³⁸ Id. at

³⁹ Id. at

⁴⁰ See EPA, 2006 Toxics Release Inventory (TRI) Public Data Release Brochure 8 (2008), available at: www.epa.gov/tri/tridata/tri06/brochure.htm (stating that since 1988, manufacturing facilities have reduced their reported TRI releases by 59% for chemicals for which reporting has been required for that entire period).

⁴¹ Karkkainen, *TRI*, supra note , at

of dispersal and persistence in the environment---but none of this information is reflected in the TRI data.⁴² Third, because TRI reporting is limited to industrial sources, it may present a misleading picture of overall patterns of toxic pollution; in some areas, for example, automobile-generated hazardous air pollutants may equal or exceed those from industrial emissions, but only the pollutants from the industrial sources appear on TRI.⁴³ Finally, TRI provides a comprehensive national data set, but only on a single dimension of environmental performance. Yet because the TRI data are so easy to acquire and use, they are often used as a proxy for overall environmental performance, again possibly creating a misleading picture as to who are the better environmental performers.⁴⁴

Notwithstanding these criticisms, TRI has been an invaluable aid to governmental policymakers, corporate officers and directors, academic researchers, environmental NGOs, community organizations, and ordinary citizens, improving our understanding of the nature and extent of toxic pollution and contributing, however indirectly, to pressures and incentives generally tending in the direction of improved environmental performance. Most of the criticisms directed at TRI go to the question of what additional information would be needed to provide a clearer and more complete picture. The problem, then, is not so much with the information TRI provides as with what it does *not* provide, much of which could be added at a relatively modest cost.

Like NEPA, TRI generally fits the profile of a *framing rule*. It has clearly induced private parties to produce, on a regular and recurring basis, an important class of information relevant to environmental problem-solving that otherwise would have been unavailable or difficult to obtain. It has placed the burden of producing that information

⁴² Id. at

⁴³ Id. at

⁴⁴ Id. at

on the parties best positioned to produce it, the industrial sources themselves, and unlike NEPA it has done so at a relatively modest cost. By enabling closer scrutiny of corporate environmental performance by regulators, environmental groups, community organizations, shareholders, and corporate managers themselves, it appears to have played a salutary (albeit so far unquantified) role in creating or strengthening incentives for private parties to act in more environmentally benign ways, while allowing them the flexibility to experiment in finding the most cost-effective means to do so, and avoiding the straight-jacketing effects of more coercive forms of regulation. Finally, unlike NEPA, TRI has provided for the centralized collection and efficient dissemination of data on facility- and firm-level environmental performance. Indeed, centralized data collection and ease of distribution is TRI's signature feature.

C. Proposition 65

A third approach to creating incentives for information production and disclosure is embodied in California's Proposition 65, the Safe Drinking Water and Toxic Enforcement Act of 1986.⁴⁵ Enacted by voter initiative in 1986, Proposition 65 requires California businesses to give a "clear and reasonable warning" to any person---whether it be a worker, customer, or neighbor---whom the business causes to be exposed to any substance identified by the state of California as carcinogenic or a reproductive toxin.⁴⁶ Most discussion of Proposition 65 has focused on the ubiquitous warning labels it has generated, whether these have any effect in altering behavior, and whether the information they provide is useful, misleading, or simply ignored.⁴⁷

⁴⁵ Safe Drinking Water and Toxic Enforcement Act of 1986, codified at Calif. Health & Safety Code § 25249.5-.13.

⁴⁶ Calif. Health & Safety Code § 25249.6.

⁴⁷ See, e.g.,

In the case of environmental releases, however, Proposition 65's effect is more indirect. Although implementing regulations authorize mass mailings, newspaper advertisements, and the posting of signs as acceptable methods of warning,⁴⁸ there is always some uncertainty in the case of environmental exposures as to who may be exposed, and whether the specific warnings given would be deemed by a jury to be "reasonable and adequate" under the circumstances. Failure to warn, or failure to warn adequately, exposes the violator to civil penalties of up to \$2500 per violation for each day of violation, enforceable by a civil action by the attorney general or by citizen suit.⁴⁹ Thus environmental polluters face an open-ended risk of liability, even if they make good faith efforts to warn of exposures.

At this point, however, the statute creates the possibility of a safe harbor. If "the person responsible can show that the exposure poses no significant risk assuming lifetime exposures at the level in question," that exposure is exempt from the warning requirement.⁵⁰ Making such a showing on a case-by-case basis would be difficult for most industrial polluters, but the California Environmental Protection Agency (CalEPA) is authorized to promulgate regulatory "safe harbor" thresholds, known as "no significant risk levels" (NSRLs), below which toxic exposures will be deemed not to pose a significant risk and therefore not require warnings.⁵¹

This approach reverses the usual incentives for industrial polluters. Instead of opposing or seeking to delay regulation, California businesses welcome the issuance of

⁴⁸ See

⁴⁹ See Calif. Health & Safety Code §25249.7.

⁵⁰ Calif. Health & Safety code §25249.10.

⁵¹ See California EPA, *Proposition 65 Safe Harbor Levels: No Significant Risk Levels for Carcinogens and Maximum Allowable Dose Levels for Chemicals Causing Reproductive Toxicity* (2006), at 1. See also 22 Cal. Code Reg. §§12705, 12805 (listing NSRL and MADL levels for specific pollutants).

regulatory “safe harbor” thresholds which promise shelter against the open-ended threat of liability for failure to warn, provided they can get their toxic releases below the NSLR levels. But first, the regulatory agency must establish the safe harbor thresholds. That is where the inverted incentive structure has its greatest effect. Instead of strategically declining to produce or disclose information, California businesses now have an affirmative incentive to cooperate with the regulatory agency in producing and disclosing any credible information that might assist the agency in establishing NSLR regulatory thresholds.

That is precisely what happened in California. Within a few months after Proposition 65 was enacted, California regulators were able to establish “safe harbor” regulatory thresholds for nearly 300 carcinogens and reproductive toxins—a far faster rate of regulatory output than that of the federal EPA or OSHA, which must struggle against the usual industry incentives to withhold or strategically manipulate information to impair the regulatory process.⁵² Trade associations and individual firms came forth with voluminous information on chemical toxicity, epidemiological studies, exposure pathways, and other relevant information in support of the regulatory effort.⁵³ Nor did industry have an incentive to delay the onset of regulation through judicial review; the promulgated rules went unchallenged.⁵⁴

The “safe harbor” NSLR regulatory thresholds that emerge from the Proposition 65 process bear a striking similarity to conventional “Ten Thousand Commandments” regulations: they are fixed regulatory standards, established by a centralized regulatory

⁵² See David Roe, *Toxic Chemical Control Policy: Three Unabsorbed Facts*, 32 ENV'T'L L. REP. 10,232, 10,235 (2002).

⁵³ *Id.* at 10,235-36.

⁵⁴ Michael Barsa

agency on a substance-by-substance basis. Notwithstanding this facial similarity, however, there are also some important differences. The decision to reduce emissions below the “safe harbor” thresholds is voluntary. Businesses are not legally obligated to achieve these targets, and if it is too costly to do so they may elect to continue with higher levels of pollution and assume the risk of liability for failure to warn. Second, unlike most “Ten Thousand Commandments” regulations, the Proposition 65 “safe harbor” thresholds are purely health-based performance standards. CalEPA neither specifies the means to achieve them, nor does it predicate the standard upon the use of any particular technology. Businesses consequently remain free to experiment with whatever combination of process changes and pollution control measures they deem most cost-effective and most suitable to their particular circumstances.

The Proposition 65 scheme bears many of the hallmarks of a *framing rule* approach. Clearly, Proposition 65 creates powerful incentives for private parties to produce and disclose information relevant to environmental decision-making that would otherwise be unavailable or difficult for regulators to obtain, and it creates unprecedented incentives for those same private parties to cooperate in the regulatory process. It shifts the burden to produce information from the regulatory agency to the potentially regulated private parties, presumably better situated to produce it, but it preserves a role for the regulatory agency as the centralized repository of that information. It preserves a zone of decentralized experimentation in pollution-reducing technologies and production processes, and creates strong incentives for such experimentation to occur as businesses seek to achieve the “safe harbor” thresholds.

Proposition 65 has its own limitations. Like NEPA, it relies upon a blunt, heavy-handed, and onerous penalty default feature---in this case, the open-ended threat of liability under a nebulous “clear and reasonable warning” standard. For this reason, Proposition 65 is widely reviled among California businesses, and efforts by environmental NGOs to enact similar measures in other states have been derailed by vigorous business opposition, raising serious questions about the replicability of the Proposition 65 model.⁵⁵

The underlying incentive structure created by Proposition 65, however, is remarkably similar to that of NEPA. Each features a kind of penalty default provision, the costly and time-consuming EIS procedure in the NEPA case and the uncertain and open-ended threat of civil liability in the Proposition 65 case. In each case, this penalty can be avoided through channeled cooperation on the part of the regulatory target. Federal agencies can avoid NEPA’s procedural EIS penalty by identifying and adopting design alternatives or mitigation measures that keep adverse environmental impacts below the EIS-triggering threshold of “significant.” Similarly, businesses can avoid the Proposition 65 civil liability penalty can be avoided by cooperating in providing the information necessary to allow the regulatory agency to set safe harbor thresholds, and subsequently by identifying and undertaking strategies to reduce their own emissions below regulatory thresholds. In each case, the regulatory target is induced to produce and reveal valuable information and to undertake affirmative environmental protection measures that otherwise would probably not occur. Yet the regulatory regime does not

⁵⁵ See Paulette L. Stenzel, *The Right-to-Know Provisions of California’s Proposition 65: The Naivete of the Delaney Clause*, 15 HARV. ENVTL L.REV. 493, 494 & fn. 8 (1991) (indicating early hopes of Proposition 65’s backers that the measure would be replicated elsewhere); Richard A. Lovett, *Prop 65’s Non-toxic Legacy*, SACRAMENTO BEE, Nov. 30, 1997, at A15 (reporting criticisms of Proposition 65 as too harsh and rigid, and noting failures to enact similar measures in other states).

prescribe in detail the behavior that must be undertaken, thus avoiding the pitfalls of the “Ten Thousand Commandments” approach. Instead, the regime creates incentives that induce and channel a self-designed and self-executed program of voluntary environmental performance improvements.

Proposition 65’s effectiveness is limited by its narrow reach: it addresses only those substances determined by the State of California to be carcinogens or reproductive toxins. Many toxic substances produce acute or chronic adverse health effects other than cancer, birth defects, or other reproductive harms. And even within these categories, the list of covered substances is limited by CalEPA’s current state of knowledge concerning carcinogenic or reproductive effects. As was noted earlier, thousands of chemicals in common use have never been subjected to even the most basic toxicity screening.

At first blush, it might appear that this arrangement reflects an appropriate assignment of responsibility to investigate possible toxic effects. I suggested earlier that for some classes of problems, economies of scale might make it more efficient to assign responsibility for information production---here, basic medical, epidemiological, and toxicological research---to a centralized government agency (here, CalEPA’s Office of Environmental Health). Indeed, this has been our standard approach to research in this area.

Yet critics have argued, with some reason, that this arrangement is inefficient. Business firms, especially those in the chemical industry, often begin with far greater expertise with respect to the chemicals they are producing than do distant regulators, and arguably are better positioned to study such substances “close up” and at an earlier stage than disinterested academic researchers or government scientists and other agency

personnel. It is precisely in this situation that the strategic non-production of information by the parties best able to produce it operates as an important barrier to effective regulation of toxic substances. For the private party producing the substance, it is an easy call to decide *not* to screen a chemical substance for toxicity, since such screening is not routinely required and, if undertaken voluntarily, might lead to results that must be disclosed⁵⁶ and could lead to more stringent regulatory scrutiny.⁵⁷

D. REACH

The European Union recently adopted an ambitious new program to reverse these perverse incentives. Dubbed REACH (for *Registration, Evaluation, Authorization, and Restriction of Chemical Substances*),⁵⁸ the new EU regulation requires chemical manufacturers and importers to collect information on the toxic and hazardous properties of chemical substances and on their safe handling. This information will be registered with a central, publicly accessible database managed by the European Chemicals Agency in Helsinki, which will monitor and evaluate industry submissions for quality control purposes, require further testing and evaluation of chemicals that appear potentially hazardous, and initiate regulatory proceedings leading to the authorization or restriction of substances “of very high concern,” including carcinogens, mutagens, reproductive toxins, and persistent, bioaccumulative, and toxic (PBT) substances.

For substances requiring authorization, the burden is on the manufacturer or importer to show that the risks of the substance are adequately controlled, and that the socio-economic benefits of its continued use outweigh the remaining risks. If the risks

⁵⁶ See TSCA

⁵⁷ See TSCA

⁵⁸ European Community Regulation on chemicals and their safe use, EC 1907/2006, entered into force June 1, 2007.

are deemed unacceptable, any or all uses may be subjected to regulatory restrictions, up to an outright ban. This regime will apply to both old and new chemicals, but it will be phased in, with pre-registration by 2008 for high-volume chemicals (produced or imported in quantities over 1,000 tonnes per year) as well as certain highly toxic substances, and eventually reaching all substances produced or imported in quantities over one ton per year by 2018.

The principal effect of REACH is to shift the burden of producing data and information on chemical toxicity and safe use from the regulatory agency to the manufacturers and importers of chemical substances, who are presumably better situated to conduct such evaluations. However, a public agency retains a central oversight, data management, supervisory, and regulatory role, essentially managing a triage system in which industry-supplied data are evaluated for quality control and for substantive content. When a “suspicious” substance is singled out for further inquiry, the burden shifts back to the manufacturer or importer to supply additional data and information on its risks and safe uses, and to justify its continued use in light of the risks, measures that may be taken to minimize or mitigate risk, and a risk-benefit analysis. If the regulatory agency is satisfied, it may authorize the continued use of the substance; if not, it may restrict any or all uses.

Under this quasi-licensing scheme, chemical manufacturers and importers operate under a very different set of incentives than under the conventional U.S.-style approach. Not only are they under a legal mandate to produce the required information, but they no longer have an incentive toward “willful blindness” or strategic non-production or non-disclosure of relevant information, because failure to produce or disclose such

information, or a regulatory determination that the submitted information is inadequate, could trigger a process leading to suspension or termination of the right to produce or sell the substance in question. Moreover, chemical manufacturers and importers have a positive incentive to identify and disclose the safest methods of handling and use of their products in order to avoid or limit the scope of any possible regulatory restrictions. And although such regulatory restrictions as finally emerge will look much like conventional “Ten Thousand Commandments”-type rules, the process of getting there appears to be structured more like a constructive, collaborative, back-and-forth dialog between the regulatory agency and the regulated entity, with the latter invited to make its best case for the continued use of its product by identifying and promoting the safest uses and methods of use. Given this set of incentives, and with the regulatory body acting as a central repository and dissemination point for information produced by the parties best positioned to produce it, REACH bears many of the hallmarks of a *framing rule* approach.

While it is too early to say how REACH will work out in practice, I foresee two areas of possible concern. The first of these is the sheer volume of information the European Chemicals Agency will be required to process, possibly leading either to regulatory backlogs, or to cursory review of the information submitted, or both. Second is the static, once-off nature of the review process. The assumption seems to be that once a substance is initially screened and all the extant information is considered (stage 1), regulators can conclusively determine whether that substance poses enough of a risk to merit further inquiry, and once that further review is completed (stage 2), whether it still poses “unacceptable risks” and should be restricted. But this approach does not create

dynamic incentives for ongoing investigation that keeps abreast of scientific advances, much less does it push the boundaries in our understanding of chemical properties and their interactions with human biochemistry and microbiology.

REACH almost certainly will add to the stock of knowledge concerning chemical toxicity and safe use, and just as importantly it will provide broad access to the assembled data and information, facilitating self-help actions to identify and implement safe uses, and to avoid risky uses, of chemical products. While the central focus is on chemical *product* safety, many of the substances in the REACH database are also sometimes environmental or workplace *pollutants*, and to that extent REACH will operate in aid of informed decision-making in the environmental and occupation health-and-safety arenas as well, both in Europe and elsewhere, including the United States.

Given the limitations outlined above, however, REACH must be considered only a partial step toward a *framing rule* approach.

Conclusion

Despite their many differences, NEPA, TRI, Proposition 65, and REACH are all, to varying degrees of consanguinity, part of a broad family of approaches to environmental regulation that this Article dubs *framing rules*. All these measures change the terms of environmental decision-making by inducing parties to investigate and to disclose relevant information relevant that otherwise likely would have remained undiscovered or undisclosed. All place the burden of producing such information on the parties best positioned to do so. All create incentives (of varying kinds and degrees of strength) for parties to engage in voluntary improvements in environmental self-management and environmental performance. All leave their regulatory targets with a

broad zone of discretion in which to experiment with efficient solutions to environmental problems.

Perhaps the most important shortcoming of these approaches, and the area in which they most strongly depart from the *framing rule* approach that I described earlier in this essay, is that they generally do not create fully dynamic incentives for continuous improvements in the information base upon which environmental decision-making is predicated. Thus, while there is much to be learned from studying and attempting to replicate the incentive structures created by these quasi-*framing rule* regimes to address other environmental problems currently left unaddressed because of the information bottleneck, there is also further conceptual work to be done to devise a second-generation of *framing rule* approaches that more fully capture the potential of the model sketched out here.