
THE END ENVIRONMENTAL EXTERNALITIES MANIFESTO: A RIGHTS- BASED FOUNDATION FOR ENVIRONMENTAL LAW

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INTRODUCTION

Both of us had the privilege of serving in government with Dick Stewart when he was the Assistant Attorney General for the Environment and Natural Resources Division of the U.S. Department of Justice, and we served at his client, the Environmental Protection Agency. Before that, we both knew and respected Dick's work as an academic and environmental policy thought leader. We regard him as a mentor, an inspiration, and a model for our own careers. He is also a good friend.

In this Article, we attempt to extend Dick's path-breaking work with Bruce Ackerman, who is also a mentor to both of us, on market-based solutions to environmental problems.¹ And like all of those who look at law through the prism of the incentives that it creates, we are further indebted to our teacher, Dean (now Judge) Guido Calabresi.² We had the challenge—and opportunity—to try to implement some of their ideas about the role of economic incentives in regulation when we served at EPA in the late 1980s and early 1990s, most notably when we participated in the drafting and early implementation of the Acid Rain Trading Program under the 1990 amendments to the Clean Air Act. This Article reflects some of what we learned from that experience and what we regard as its implications for the future of environmental law.

Developing cost-effective ways to reduce obvious pollution, as Dick Stewart and other intellectual leaders of his generation did, made great sense for the first fifty years of America's modern efforts to protect the environment. Their approach delivered the low-

¹ See, e.g., Bruce A. Ackerman & Richard B. Stewart, Comment, *Reforming Environmental Law*, 37 STAN. L. REV. 1333, 1334 (1985); Richard B. Stewart, *Economics, Environment, and the Limits of Legal Control*, 9 HARV. ENV'T L. REV. 1, 1–2 (1985).

² In particular, we acknowledge the influence of his seminal article: Guido Calabresi & A. Douglas Melamed, *Property Rules, Liability Rules, and Inalienability: One View of the Cathedral*, 85 HARV. L. REV. 1089 (1972). Our approach to internalizing environmental externalities, which some have called a “pliability rule,” extends the Calabresi and Melamed framework. See Abraham Bell & Gideon Parchomovsky, *Pliability Rules*, 101 MICH. L. REV. 1, 5 (2002) (blending property and liability principles). As is described in more detail in the text that follows, we argue that people should have an entitlement—protected by a property rule—not to be adversely affected by pollution or other environmental externalities. In our framework, however, this property right is not absolute because compensation to internalize externalities would be paid where it is deemed not feasible to eliminate pollution harms.

hanging fruit, and environmental conditions across America are much better today as a result. We believe, however, that the challenge for the next generation is to extend their work by addressing the remaining environmental externalities that are neither obvious nor easy to address. To do so, we need to reframe environmental law and policy on an intellectual foundation of environmental rights rather than economic efficiency.

In Part I, we introduce our call for an *end to externalities* centered on a societal goal of eliminating pollution with an added requirement that emitters pay compensation for any residual emissions that remain after technologically feasible³ pollution controls have been implemented. We also critique the existing American framework of environmental protection that builds on benefit-cost analysis grounded in the Kaldor-Hicks principle of economic efficiency, and we explain the logic for our alternative rights-based approach. In Part II, we develop the philosophical underpinnings for the *end to externalities* principle—highlighting the need to ground environmental law and policy on the economic theories of A.C. Pigou rather than Ronald Coase. In Part III, we spell out the three core elements of the *end to externalities* approach and address several fundamental implementation issues. In Part IV, we illustrate the way our revised approach to environmental law might work in practice, making clear that we don't expect an end to *all* emissions. Rather, we seek to drive emissions toward zero and impose *harm charges* on pollution that continues to be emitted because it is not feasible to eliminate it with current technology, thus internalizing the externalities imposed on others. In Part V, we offer concluding thoughts and an agenda for further work to restructure environmental law in line with our proposed *end to externalities* strategy.

I. MOVING FROM THE KALDOR-HICKS FALLACY TO AN END TO EXTERNALITIES

Our central idea is that for the next phase of the environmental law revolution, the goal of environmental protection efforts should

³ As we discuss in more detail in below, we propose that *technological feasibility* be defined not simply as what is currently cost-effective, but rather with reference to technological possibilities that could be achieved with a commitment to zero emissions.

be to internalize *all* negative environmental externalities⁴—which for simplicity’s sake we dub the *end to externalities* approach. Negative environmental externalities include, most prominently but not exclusively, pollution involving releases to the environment that expose other people or ecological resources used by people⁵ to harm or the risk of harm.⁶ There are also other types of environmental externalities that are outside the scope of this Article. One example would be the consumption of shared non-renewable resources, such as depleting groundwater so that it is no longer available for use by future generations.

Another example would be clear-cutting a rainforest that acts as a carbon sink and biodiversity reserve.⁷ However, the climate change and biodiversity impacts from such timbering technically involve terminating positive externalities that benefitted others as well as the owners of the resource. As a general matter, we are inclined

⁴ We are currently aware of two minor exceptions to this principle: (1) if harms are *de minimis*, and (2) if the harm is accompanied by a benefit to the persons suffering the harm, and they give their *informed consent* to accept the harm without compensation in order to obtain the benefit. Both exceptions are discussed in more detail below, *see infra* text accompanying note 65 (on *de minimis* harms) and text accompanying note 47 (informed consent). We further note that not every minor inconvenience that someone would prefer to avoid rises to the level of a “harm” that constitutes an externality that must be internalized. *See infra* text accompanying notes 78 and 82 (mere dislikes do not constitute harm). By the term “pollution” we mean emissions that cause harm.

⁵ We recognize that our vision is anthropocentric. Others might go farther and claim nature itself has the right to be protected against harm from humans. *See, e.g.*, DOUGLAS A. KYSAR, REGULATING FROM NOWHERE: ENVIRONMENTAL LAW AND THE SEARCH FOR OBJECTIVITY 12, 19 (2010) (arguing in favor of ethical obligations to protect other species in environmental law); CHRISTOPHER D. STONE, SHOULD TREES HAVE STANDING? LAW, MORALITY, AND THE ENVIRONMENT (3rd ed. 2010); ALDO LEOPOLD, A SAND COUNTY ALMANAC: AND SKETCHES HERE AND THERE 21 (1949).

⁶ For details of what constitutes a harm or risk of harm, *see* discussion *infra* Part III.A.

⁷ To this list, we might also add the consumption or use of shared public resources such as water pumped for irrigation, timber cutting, livestock grazing, mining, or oil and gas extraction on government lands. While these impacts share with pollution the conceptual structure of private gain at public expense—and thus should be addressed with a similar pricing mechanism that requires the resource users to pay full market value for the timber, fossil fuels, or water they extract—we focus in this Article on pollution as the quintessential negative externality. *See, e.g.*, Tom Udall & Charles Grassley, Opinion, *Oil and Gas Companies Must Pay*, N.Y. TIMES, Dec. 5, 2020, at A23 (arguing for market pricing of all resource extraction on federal lands).

to believe that beneficiaries of such positive spillovers should fairly compensate land owners to the extent feasible, but such a principle raises a slew of practical problems that are outside the scope of this Article. Instead, we focus here on negative environmental externalities.

At least one U.S. environmental statute announces the ambitious goal of eliminating environmental externalities regarding water pollution. The Clean Water Act creates a “National Pollutant Discharge *Elimination* System”⁸ and boldly envisions the day when none of the navigable surface waters of the United States will be used for waste disposal.⁹ With some justification, that goal has been criticized as unrealistic.¹⁰

We agree with the Clean Water Act’s aspirational goal, but we also recognize that practical constraints on the application of the principle of eliminating all pollution must be accepted due to the limits of technology and to political realities. In our view, therefore, environmental law should now seek to end all harmful emissions subject only to the two minor exceptions noted above¹¹—and where that goal is not yet technologically feasible, to ensure as a second-best solution that the resulting harms are fully paid for by the polluter. We propose these goals as a matter of corrective justice, not economic efficiency, but we recognize that our zero-emissions goal must be tempered by practicality.

Our *end to externalities* framework therefore seeks to make zero harmful emissions the presumptive goal of environmental law and policy. But we recognize that, due to the current limits of technology, some polluting activities that provide significant benefits to society would be hard to continue without some residual pollution. For example, making cement or flying planes cannot currently be done in anything close to a cost-effective way with no emissions. In these cases, we propose that emissions be reduced to the greatest extent *technologically feasible*, which we define with reference not simply to existing *best available technology* but rather to what might

⁸ 33 U.S.C. § 1342 (emphasis added).

⁹ See *id.* § 1251(a)(1) (“[I]t is the national goal that the discharge of pollutants into the navigable waters be eliminated by 1985.”).

¹⁰ See BRUCE A. ACKERMAN ET AL., *THE UNCERTAIN SEARCH FOR ENVIRONMENTAL QUALITY* 319 (1974).

¹¹ That is, harms that are *de minimis* or to which informed consent has been given. See *supra* note 4.

be possible with an assiduous commitment to innovation.¹² On the one hand, this framing seeks to avoid society losing access to goods with significant benefits, such as cement or steel, from industries where achieving zero emissions might be extraordinarily costly or even impossible. On the other hand, we wish to avoid the inertia of the status quo or any assumption that things have to remain the way they are. In proposing that all residual pollution that remains after the application of technologically feasible pollution controls must bear a harm charge that compensates—as fully as is possible—those subject to the ongoing emissions, we aim to spur attention to the possibilities of breakthroughs that move us ever closer to the zero emissions goal. This obligation to pay *full compensation*¹³ is intended to avoid companies simply paying for the harms they cause as a cost of doing business without trying seriously to reach the zero emissions goal.¹⁴

¹² See Daniel C. Esty, *Red Lights to Green Lights: Toward an Incentive-Oriented Sustainability Strategy*, in *A BETTER PLANET: 40 BIG IDEAS FOR A SUSTAINABLE FUTURE* 87, 88–89 (Daniel C. Esty ed., 2019) (arguing for making innovation a central focus of environmental law and policy). Reducing emissions to the extent feasible has been a stated national policy since the enactment of the 1990 Pollution Prevention Act. See 42 U.S.C. § 13101(b) (“The Congress hereby declares it to be the national policy of the United States that pollution should be prevented or reduced at the source whenever feasible; pollution that cannot be prevented should be recycled in an environmentally safe manner, whenever feasible; pollution that cannot be prevented or recycled should be treated in an environmentally safe manner whenever feasible; and disposal or other release into the environment should be employed only as a last resort and should be conducted in an environmentally safe manner.”). However, that commitment is often not honored in practice. See *infra* text accompanying notes 30–39 (discussing the Kaldor-Hicks fallacy).

¹³ We acknowledge that no monetary payment can fully compensate someone for injuries to his or her health, or the health of those they love. We use the term *full compensation* as a shorthand for a generous payment that is intended to be sufficient to eliminate the temptation for polluters to pay harm charges rather than reduce or eliminate pollution. We leave the details of exactly how such harm charges would be set and assessed for another day.

¹⁴ We believe that this potential loophole, highlighted for us by Yale Law School Dean, Heather Gerken, can be closed and the incentive for innovation leading over time to zero harmful emissions maintained by a rigorous commitment to pricing the remaining externalities generously and ensuring that harm charges are paid and the victims of ongoing pollution compensated as fully as is possible. This proposal raises questions about what constitutes *full compensation*, issues we take up in a preliminary fashion in Part III, *infra*.

A. *The Natural Law Right to a Healthy Environment*

We believe that everyone living in a community has a legal right, recognized both as a matter of natural right and positive law, to be free from avoidable interferences with their bodily integrity and that this in turn implies that they have a right to a healthy environment. And we believe that the concept of a “community” is elastic enough to include future generations. In advancing a rights-based foundation for the next stage of environmental law, we build on the common law doctrine that natural resources are held as a public trust for the benefit of the nation as a whole.¹⁵ We further note that the first modern environmental statute in the United States, the National Environmental Policy Act (NEPA),¹⁶ enacted as national policy that: “The Congress recognizes that each person should enjoy a healthful environment and that each person has a responsibility to contribute to the preservation and enhancement of the environment.”¹⁷ We believe that the use of the word *recognizes* was significant. By recognizing rather than declaring this right, Congress acknowledged a pre-existing natural law right for all Americans to be free from unhealthy environmental conditions created by others without their consent. We describe the philosophical underpinnings of this natural law right below in Part II.B.

Elsewhere, we have noted that these statements of national policy in NEPA “[t]oday ... have little or no effect ... probably because a strong enforcement mechanism did not back them up.”¹⁸ Perhaps this outcome reflects the political reality that limited the reach of the first generation and even the second generation of modern American environmental law through the early twenty-first century.¹⁹ The fact

¹⁵ See generally Gerald Torres, *Who Owns the Sky?*, 19 PACE ENV'T L. REV. 515 (2001); Joseph L. Sax, *The Public Trust Doctrine in Natural Resources Law: Effective Judicial Intervention*, 68 MICH. L. REV. 471 (1970).

¹⁶ See National Environmental Policy Act, 42 U.S.C. §§ 4321–4370 (2012). Although its official title is the National Environmental Policy Act of 1969, it was not actually signed into law by President Nixon until January 1, 1970.

¹⁷ 42 U.S.C. § 4331(c).

¹⁸ E. DONALD ELLIOTT & DANIEL C. ESTY, *ADVANCED INTRODUCTION TO U.S. ENVIRONMENTAL LAW* (forthcoming 2021).

¹⁹ The principal drafter of the Clean Water Act's aspirational goal of eliminating water pollution, the late Leon Billings, confided in one of the authors that setting this as a long term goal was as much as he thought he could get politically. See EBAN S. GOODSTEIN & STEPHEN POLASKY, *ECONOMICS AND THE ENVIRONMENT* 223–35 (8th ed. 2017) (spelling out the political clout of industry).

that environmental rights were *recognized* but not fully secured has resulted in measurable but incomplete progress²⁰ toward the national goal declared in NEPA of ensuring every American a healthful environment. We believe that it is now time to extend the work of environmental law pioneers such as Dick Stewart by taking on the remaining job of eliminating or internalizing *all* environmental externalities that cause harm to others. We acknowledge that this reframing of the foundations of environmental law will not be easy and that concessions to practicality and feasibility will need to be made.²¹ But we think such tradeoffs will be required today to a much lesser extent than in decades past due to technological and scientific advances.²² We recognize, furthermore, that the rights we seek to vindicate are not absolute. If, for example, our duly-constituted law-making institutions decide to set aside some portion of the waters of the United States for use as sewers, that policy decision should be accepted as within their purview. But we would insist that policymakers charge all polluters or natural resource users—including governments—fees to compensate the public for the fair value of their use of resources in common ownership.²³

We see the ambitious goal of ending or internalizing externalities as consistent with evolving societal mores and continuing public

²⁰ See E. Donald Elliott, *A Critical Assessment of the EPA's Air Program at Fifty and a Suggestion for How It Might Do Even Better*, 70 CASE W. RES. L. REV. 895, 926–27 (2020) (describing measurable but incomplete progress in eliminating air pollution).

²¹ Our call for an end to externalities with an eye toward the practical realities of environmental regulation reflects one of Dick Stewart's signal contributions to environmental law: his unrelenting focus on the tradeoffs and hard choices required and the need for regulatory interventions to be judged by their actual results. See David Schoenbrod, *Richard Stewart's Perennial Question: 'How's This Going to Work'*, 29 N.Y.U. ENV'T L.J. 403 (2021); Richard B. Stewart, *Regulation, Innovation, and Administrative Law: A Conceptual Framework*, 69 CALIF. L. REV. 1256, 1260 (1981).

²² See Daniel C. Esty, *Red Lights to Green Lights: From 20th Century Environmental Regulation to 21st Century Sustainability*, 47 ENV'T L. 1, 43–58 (resetting the environmental possibility frontier).

²³ See Bruce A. Ackerman & E. Donald Elliott, *Air Pollution "Rights,"* N.Y. Times, Sept. 11, 1982, at 23 ("The E.P.A. should, instead, sell polluters the right to dirty the air for a fixed period—just as the Government now auctions off oil and gas leases to the highest bidders. If polluters were forced to pay, they would clean up to avoid the cost—and breathers, not industry, would profit. The public would not stand for a multi-billion dollar give-away of public lands or water to industry. Why should the air be different?").

concern about environmental degradation.²⁴ Evidence of the emerging public belief in the importance of environmental rights and a principle of no negative externalities can be found in many places, both in the United States and around the world. Opinion surveys show Americans across party lines and other divides want stronger environmental protection.²⁵ And more than one hundred nations have elaborated environmental rights in their constitutions.²⁶ Perhaps even more notably, business leaders have increasingly come to accept the need for companies to address their negative effects on society and not simply to seek to optimize profits. For example, the Business Roundtable, representing several hundred CEOs of America's leading companies, recently updated its vision of corporate purpose, declaring that the era of *shareholder primacy* had ended and that corporations must take up a broader mission of *shareholder responsibility* that extends a duty of care to the enterprises' workers, customers, suppliers, communities, and society in general.²⁷ Some companies, such as Interface Carpet, have gone even further and expressly adopted a "zero negative impact" on society goal—which parallels our proposed *end to externalities* principle.²⁸ And more

²⁴ See e.g., Cary Funk & Brian Kennedy, *How Americans See Climate Change and the Environment in 7 Charts*, PEW RSCH. CTR. (Apr. 21, 2020), <https://www.pewresearch.org/fact-tank/2020/04/21/how-americans-see-climate-change-and-the-environment-in-7-charts/> ("Compared with a decade ago, more Americans say protecting the environment and dealing with global climate change should be top priorities for the president and Congress.").

²⁵ See, e.g., Alec Tyson & Brian Kennedy, *Two-Thirds of Americans Think Government Should Do More on Climate*, PEW RSCH. CTR. (June 23, 2020), <https://www.pewresearch.org/science/2020/06/23/two-thirds-of-americans-think-government-should-do-more-on-climate/>; James F. Smith, *Poll finds strong bipartisan support for rights, and concern that rights are under threat*, HARV. KENNEDY SCH. (Sept. 14, 2020), <https://www.hks.harvard.edu/faculty-research/policy-topics/human-rights/poll-finds-strong-bipartisan-support-rights-and-concern>.

²⁶ See *What Are Environmental Rights?*, U.N. ENV'T PROGRAMME, <https://www.unenvironment.org/explore-topics/environmental-rights-and-governance/what-we-do/advancing-environmental-rights/what> (last visited Mar. 20, 2021).

²⁷ See *Business Roundtable Redefines the Purpose of a Corporation to Promote 'An Economy That Serves All Americans'*, BUS. ROUNDTABLE (Aug. 19, 2019), <https://www.businessroundtable.org/business-roundtable-redefines-the-purpose-of-a-corporation-to-promote-an-economy-that-serves-all-americans>.

²⁸ See INTERFACE, LESSONS FOR THE FUTURE: THE INTERFACE GUIDE TO CHANGING YOUR BUSINESS TO CHANGE THE WORLD (2020), https://interfaceinc.scene7.com/is/content/InterfaceInc/Interface/EMEA/WebsiteContentAssets/Documents/25th%20anniversary%20report/English/wc_eu-

than one thousand companies—including Amazon, Apple, Ford, McDonalds, Microsoft, and even major energy sector companies such as BP, Shell, and Total—have made commitments to net-zero greenhouse gas emissions by 2050.²⁹

B. *The Kaldor-Hicks Fallacy*

Policy decisions to tolerate certain levels of pollution are not the main reasons why we as a country have, to date, been unable to eliminate all harmful environmental externalities and have come instead to accept significant levels of ongoing emissions.³⁰ We believe the primary culprit has been the emergence of a dominant vision of environmental policy based on benefit-cost analysis rather than the right to a healthy environment.³¹ This alternative vision limits our

lessonsforthe future-en.pdf?utm_source=interface&utm_medium=pdf&utm_campaign=sustainability-en_gb-organic&utm_content=sustainability-report. See also Sarah Peyok, *How Interface is Transforming Manufacturing with its Net Zero Emissions Strategy*, TRIPLE PUNDIT (Nov. 18, 2019), <https://www.triplepundit.com/story/2019/how-interface-transforming-manufacturing-its-net-zero-emissions-strategy/85641>.

²⁹ See *Commitments to Net Zero Double in Less Than a Year*, U.N. CLIMATE FRAMEWORK CONVENTION ON CLIMATE CHANGE (Sept. 21, 2020), <https://unfccc.int/news/commitments-to-net-zero-double-in-less-than-a-year>; Tom Murray, *Apple, Ford, McDonald's and Microsoft Among this Summer's Climate Leaders*, ENV'T DEF. FUND (Aug. 10, 2020), <https://www.edf.org/blog/2020/08/10/apple-ford-mcdonalds-and-microsoft-among-summers-climate-leaders>.

³⁰ For example, about one-fourth of the U.S. population—roughly 82 million people—live in areas that violate one or more of EPA's national ambient air quality standards (NAAQS). See *Air Quality – National Summary*, EPA, <https://www.epa.gov/air-trends/air-quality-national-summary> (last visited Mar. 21, 2021). However, scientific evidence is increasingly showing significant harm to health for some sensitive populations such as the elderly even in areas that meet the NAAQS. See Qian Di et al., *Air Pollution and Mortality in the Medicare Population*, 376 NEW ENG. J. MED. 2513, 2513–22 (2017).

³¹ See *Michigan v. EPA*, 576 U.S. 743, 749–50 (2015); Paul R. Noe & John D. Graham, *The Ascendancy of the Cost-Benefit State?* 5 ADMIN. L. REV. ACCORD 85, 87 (2020); CASS R. SUNSTEIN, *THE COST-BENEFIT STATE: THE FUTURE OF REGULATORY PROTECTION* at ix (2002) (noting that “government regulation is increasingly assessed by asking whether the benefits of regulation justify the costs of regulation.”); see also James Goodwin & Amy Sinden, *Progressive Regulatory Reform Recommendations for the Biden-Harris Administration*, REGUL. REV. (Dec. 21, 2020), <https://www.theregreview.org/2020/12/21/goodwin-sinden-progressive-regulatory-reform-recommendations-biden-harris-administration/> (outlining recommendations for administrative reform that include “realigning cost-benefit analysis to make it more consistent with social justice, equity, and other progressive principles”).

environmental aspirations by holding that government should only regulate if it is prepared to prove that a regulatory measure is scientifically justified and would produce *net benefits to society*.³²

This prevailing benefit-cost framework settles for the Kaldor-Hicks criterion of economic efficiency as opposed to the more demanding goal of Pareto superiority. The Kaldor-Hicks principle holds that a change of policy is desirable if the winners benefit enough that they *could* compensate the losers, even if they do not actually pay compensation. In contrast, Pareto superiority describes a situation where one is made better off without making any others worse off.³³ And for our purposes, the “others” who should not be made worse off include members of future generations. The Kaldor-Hicks approach, which allows some to be made worse off if others benefit more, became national policy through the *net social benefit* standard for new rules under the Reagan administration’s Executive Order 12,291.³⁴ That executive order created review of proposed major rules by the Office of Information and Regulatory Affairs (OIRA) and embedded benefit-cost analysis and risk assessment in the regulatory process, and subsequent interpretations have embedded risk assessment in order to quantify the benefit side of the benefit-cost comparison. These concepts still dominate most of the thinking in environmental policy today despite changes in language in subsequent executive orders.³⁵ However, we maintain that the

³² See, e.g., Exec. Order No. 12,291, 3 C.F.R. § 127 (1981).

³³ For a short explanation, see *Kaldor-Hicks Efficiency*, OXFORD REFERENCE, <https://www.oxfordreference.com/view/10.1093/oi/authority.20110803100028833> (last visited March 10, 2021); see also Stephanie H. Jones, Note, *Greater than the Sum of its Parts: The Integration of Environmental Justice Advocacy and Economic Policy Analysis*, 26 N.Y.U. ENV’T L.J. 402, 419 (2018) (defining the Kaldor-Hicks criterion) (citing NICHOLAS A. ASHFORD & CHARLES C. CALDART, ENVIRONMENTAL LAW, POLICY, AND ECONOMICS 162 (2008) (“If the net effects of a government policy are positive, then those who gain as a result of the policy could, in theory, pay off those who lose and still have some benefits left over for themselves. Potentially, no one loses and at least some gain.”)). Problematically, this framework accepts that the winners gain enough such that they *could* pay off the losers—not that they actually do so.

³⁴ See Exec. Order No. 12,291, 3 C.F.R. § 127 (1981).

³⁵ Compare Exec. Order No. 12,291, 3 C.F.R. § 127 (1981), with Exec. Order No. 12,866, 58 Fed. Reg. 51,735 (1993), and Exec. Order No. 13,563, 76 Fed. Reg. 3,821 (2011). Both President Clinton’s and President Obama’s subsequent executive orders reiterate and build on Exec. Order 12,291 to require the use of cost-benefit analysis to justify administrative regulatory action. See Noe & Graham, *supra* note 31, at 91–92. See generally SUNSTEIN, *supra* note 31.

benefit-cost state is merely a transitional stage in the development of environmental law, not its final culmination.³⁶

Under today's prevailing framework, a polluter sending emissions up a smokestack may make others worse off as long as the polluting enterprise gains more than the breathers are hurt. For example, the revenue an enterprise receives in addition to employment and other community-wide benefits may be seen as sufficient to justify modest harms to the health of the workers and neighbors. This outcome passes the Kaldor-Hicks and net-benefits tests but would not be Pareto superior because some are made worse off. Under our *end to externalities* principle, the polluting facility would be required to either stop the emissions or compensate fully the affected workers and neighbors.

While benefit-cost analysis may be useful in setting priorities and for choosing among alternative remedies,³⁷ in our view, it is a mistake to use benefit-cost analysis to limit our national commitment to internalizing environmental externalities. The problem is not merely measurement, which is a critique of benefit-cost analysis that some academics make and which we later discuss.³⁸ Rather, our *primary* concern is the more fundamental one—that using benefit-cost comparisons to allow harm to health to continue or increase presumes that harming the health of others is permissible as long as the benefits from doing so are greater than the harms. We do not agree, for example, that a polluting chemical plant should be allowed to adversely affect the health of its neighbors merely because the cost to the company of eliminating its discharges might outweigh the measurable benefits from eliminating the discharges to those who live near the facility. The reigning social net-benefit regulatory criterion with which we disagree—because it allows

³⁶ *Contra* FRANCIS FUKUYAMA, *THE END OF HISTORY AND THE LAST MAN* (1992) (arguing that liberal democracy and free markets are not merely a particular stage in history, but the end of history in the sense of being the final end-point of mankind's ideological evolution).

³⁷ See E. Donald Elliott, *Only a Poor Workman Blames His Tools: On Uses and Abuses of Benefit-Cost Analysis in Regulatory Decision Making About the Environment*, 157 U. PA. L. REV. 178, 182 (2009), <http://ssrn.com/abstract=1712326>.

³⁸ See, e.g., FRANK ACKERMAN & LISA HEINZERLING, *PRICELESS: ON KNOWING THE PRICE OF EVERYTHING AND THE VALUE OF NOTHING* (2004).

significant emissions that harm others to go uninternalized—we call the *Kaldor-Hicks Fallacy*.³⁹

C. Compensation Alternative to Internalize Externalities

While our *end to externalities* principle is indeed a proposal to shift the basic paradigm underlying environmental law away from the Kaldor-Hicks Fallacy, our approach should not be seen as a total break with the past. Indeed, Congress has sometimes articulated principles similar to ours but only in limited areas and not on a consistent or coherent basis. For example, the 1990 amendments to the air toxics provisions of the Clean Air Act specifically prohibited benefit-cost analysis and required sources of hazardous air pollutants to install maximum-achievable control technology to protect health regardless of whether it was cost-justified.⁴⁰

We do, however, go farther than Congress did in that we believe that the law should require *actual compensation* to those injured by the residual risks that remain after the application of whatever level of pollution control technologies are deemed economically feasible.⁴¹ While environmental lawyers often talk about the *polluter-pays principle*,⁴² the actual regulatory practice, at least in the United States, has gradually devolved into a polluter does *not* pay principle—with significant residual emissions literally “permitted” under government regulation.⁴³

As we indicated above, our main objection to the prevailing Kaldor-Hicks standard is that it merely requires that the beneficiaries of a government decision *could* pay compensation, not that they actually do so. We also worry that many of the benefits of pollution reductions in improving health and welfare of citizens and ecosystems may not be fully counted in benefit-cost analysis because they

³⁹ To be clear, we do not argue with Kaldor-Hicks as a way to assess economic efficiency. We maintain, however, that maximizing economic efficiency is not the right way to frame environmental law nor is it sufficient to vindicate environmental rights as we discuss below.

⁴⁰ See 42 U.S.C. § 7412.

⁴¹ Cf. *Boomer v. Atl. Cement Co.*, 257 N.E.2d 870 (N.Y. 1970) (allowing polluting plant to continue to operate upon condition of paying compensation in private nuisance case).

⁴² See generally *What is the Polluter Pays Principle?*, GRANTHAM RSCH. INST. ON CLIMATE CHANGE AND THE ENV'T (2018), <https://www.lse.ac.uk/granthaminstitute/explainers/what-is-the-polluter-pays-principle/>.

⁴³ See *supra* text accompanying notes 32–36.

are diffuse and difficult to measure.⁴⁴ On the other hand, pollution control costs are often concentrated on industries that are very well positioned to calculate the economic burden they face from abatement rules and to ensure that regulators and elected officials appreciate these costs and related economic consequences such as diminished competitiveness, lower economic growth, and job losses. Thus, we think the obligation to measure harms and pay compensation may, in fact, reveal more circumstances in which the polluting enterprise does not meet even the net social benefit test, much less our more demanding standard.

Under our proposed new legal framework, a factory that is harming its neighbors, even if it is producing net social benefits, would be obligated to reduce or eliminate its emissions to the fullest extent possible and pay compensation to the victims for any harm that remains. We see the additional compensation obligation as essential to internalize the externality, create proper incentives for pollution control innovation, and compensate victims for the violation of their right to a healthy environment.

We note that our proposed approach parallels the compromise that society has reached in allowing workers to engage in hazardous activities if their companies produce net social benefits, but requiring their employers to reduce the risks as much as is feasible and to pay compensation to workers for the harms that do occur⁴⁵ as well as to disclose the nature and extent of the health hazards.⁴⁶ Unlike the general population, however, workers consent to their exposures, although their consent may be tainted by their need for a job. We think that the general population should be entitled to at least the same combination of feasible controls, disclosure, informed consent,⁴⁷ and no-fault compensation that we offer to workers through

⁴⁴ See generally Al McGartland et al., *Estimating the Health Benefits of Environmental Regulations*, 357 SCI. 457 (2017) (addressing the scientific uncertainties involved with quantifying the benefit of pollutant regulation).

⁴⁵ See generally *Indus. Union Dep't, AFL-CIO v. Am. Petrol. Inst.*, 448 U.S. 607, 639–59 (1980) (construing OSHA to apply only “significant” risks to health because the Court will not presume Congress intended to protect workers by putting their employers out of business).

⁴⁶ See OSHA Standard 1910.1200 - Hazard Communication, 77 Fed. Reg. 17,574, 17,574–17,896 (Mar. 26, 2012), <https://www.osha.gov/laws-regs/regulations/standardnumber/1910/1910.1200>.

⁴⁷ In some circumstances, those harmed by activity also benefit from it and thus give their informed consent to accept the harm in order to obtain the benefit.

the workers' compensation and Occupational Safety and Health Act (OSHA) systems.

D. *Advancing Environmental Justice*

Because the hidden costs of pollution tend to fall more heavily on minority and low-income communities,⁴⁸ an important side benefit of our *end to externalities* principle would be a major boost to the environmental justice agenda.⁴⁹ Indeed, we believe that our proposed requirement for *actual payments to victims* would do more to advance environmental justice than all of the existing declarations, executive orders, and other policy mechanisms that merely require consideration of disproportionate impacts on people of color or other disadvantaged communities.⁵⁰

If it is not practical to identify specific people who are exposed to environmental risks, then compensation should be paid to their communities or through appropriate “supplemental environmental projects.”⁵¹ For broad-based harms that cannot be traced to specific communities, the compensation should be paid to the government

Examples include: (1) employment in an industry such as construction in which risks of harm are inevitable with current and foreseeable technology or (2) electricity generation in which consumers obtain the benefit of lower utility rates but at the cost of exposure to low levels of pollution. We acknowledge that whether government should override personal choices to accept harms to health in order to obtain benefits is a complicated problem that raises issues beyond the scope of this Article. See generally Cass R. Sunstein, *The Storrs Lectures: Behavioral Economics and Paternalism*, 122 YALE L.J. 1826 (2013).

⁴⁸ See *Environment and Health Risks: A Review of the Influence and Effects of Social Inequalities*, WHO REG'L OFF. FOR EUR. (2010), https://www.euro.who.int/__data/assets/pdf_file/0003/78069/E93670.pdf?ua=1; Marco Martuzzi et al., *Inequalities, Inequities, Environmental Justice in Waste Management and Health*, 20 EUR. J. OF PUB. HEALTH 21, 21–26 (2010), <https://doi.org/10.1093/eurpub/ckp216>.

⁴⁹ See generally Ian Preston et al., *Climate Change and Social Justice: An Evidence Review*, JOSEPH ROWNTREE FOUND. (2014), <https://www.jrf.org.uk/sites/default/files/jrf/migrated/files/climate-change-social-justice-full.pdf>; Paul Mohai et al., *Environmental Justice*, 34 ANN. REV. ENV'T & RES. 405 (2009).

⁵⁰ See generally Exec. Order No. 12,898, 59 Fed. Reg. 7629 (1994); COUNCIL ON ENV'T QUALITY (CEQ), ENVIRONMENTAL JUSTICE: GUIDANCE UNDER THE NATIONAL ENVIRONMENTAL POLICY ACT 10 (1997) (instructing agencies to consider environmental justice at various stages of NEPA analysis).

⁵¹ For an explanation of “supplemental environmental projects,” which are a common feature of environmental enforcement settlements, see *Supplemental Environmental Projects (SEPs)*, EPA, (Sept. 8, 2020), <https://www.epa.gov/enforcement/supplemental-environmental-projects-seps>.

entity that most closely tracks the geographic scope of the emissions,⁵² which might be a state, tribe, or the federal government—with compensation for harms that are global in scope retained by the national government unless it has agreed to some other payment structure.⁵³ For current activities that may harm future generations, user fees can be paid into a trust that is set aside to respond to the problem in the future.⁵⁴ Something similar is currently done under a few environmental laws, primarily those that require the operator of a mine or other extractive activity to accumulate funds or post financial assurance during its operating life to pay for end-of-life expenses such as land restoration.⁵⁵

Charging polluters user fees makes sense not only as a matter of compensatory justice, but also to create incentives to develop better production processes as well as better pollution controls in the future.⁵⁶ We believe that EPA has existing authority to charge user fees for pollution under the 1952 Independent Offices Appropriations Act,⁵⁷ as many other government agencies already do to the

⁵² This proposal builds on Butler and Macey's famous "matching principle" for addressing externalities. See Henry N. Butler & Jonathan R. Macey, *Externalities and the Matching Principle: The Case for Reallocating Environmental Regulatory Authority*, 14 YALE L. & POL'Y REV. 23 (1996).

⁵³ One could imagine a future moment where nations might agree that compensation for residual greenhouse gas emissions should be paid into the Green Climate Fund or the Global Environment Facility (GEF). Such an outcome would follow Butler and Macey's matching principle and would be consistent with calls for "climate justice." *Id.* However, in view of current realities of national sovereignty, such a payment structure would only make sense as part of the give-and-take of ongoing climate negotiations.

⁵⁴ For a further discussion of charging "user fees" for the use of resources such as air or water that are held in trust for the public as a whole for waste disposal, see generally E. Donald Elliott, Comment, *EPA's Existing Authority to Impose a Carbon "Tax"*, 49 ENV'T L. REP. 10,919 (2019); Hugh D. Spitzer, *Taxes vs. Fees: A Curious Confusion*, 38 GONZAGA L. REV. 335, 345–47 (2002–03).

⁵⁵ For example, the Surface Mining Control and Reclamation Act (SMCRA) of 1977 created the Abandoned Mine Land (AML) Reclamation Program. Coal companies currently operating strip mines pay into a fund to support future abandoned mine reclamation. See 30 U.S.C. §1231 (2006).

⁵⁶ See generally Elliott, *supra* note 20; Esty, *supra* note 22, at 24–26 (2017).

⁵⁷ See 31 U.S.C. § 9701; see also OFF. OF MGMT. & BUDGET, OMB Circular No. A-25 Revised (July 8, 1993), https://obamawhitehouse.archives.gov/omb/circulars_a025/ (stating policy of the United States "to... promote efficient allocation of the Nation's resources ..." by charging the "market price" when a "service (or privilege) provides special benefits to an identifiable recipient beyond those that accrue to the general public." (emphasis added)).

tune of over \$64 billion a year for access to resources they control.⁵⁸ However, at present, the funds raised under that federal law are paid either to the agency to defer its costs or to the U.S. Treasury and do not directly compensate those harmed.

The harms from pollution are not only physical; they are also psychological due to the fear engendered when people and their children are exposed to substances involuntarily and worry about how this exposure may harm their health. To internalize this portion of the externality, when significant releases to the environment occur but it is not yet clear whether they are harmful, polluters should be required to disclose not only the extent of the releases, but also their basis for concluding that the releases will not harm others. In some cases, a review of the existing scientific literature may be sufficient to come to a *no harm* conclusion.⁵⁹ But if such a review cannot provide the necessary foundation for a *no harm* judgment, then we believe that the polluter should have a legal obligation to hire competent independent experts to conduct original research into whether their pollution will harm others before releasing it into the environment.⁶⁰ This is similar to the existing system of *hazard communication* which requires employers to provide objective information about the extent of risks to which their employees are exposed on the job.⁶¹

Compensating victims for the harms of residual pollution that remains after the application of technologically feasible controls

⁵⁸ See Elliott, *supra* note 54. The U.S. Government Accountability Office (GAO) found that 23 federal agencies collected nearly \$64 billion in fiscal year 2010 from over 3,600 user fees. See GAO, 2012 ANNUAL REPORT: OPPORTUNITIES TO REDUCE DUPLICATION, OVERLAP AND FRAGMENTATION, ACHIEVE SAVINGS, AND ENHANCE REVENUE 278 (2012).

⁵⁹ See E. Donald Elliott & Gail Charnley Elliott, *Private Product-Risk Assessment and the Role of Government*, 23 JOHN LINER REV. 73 (2009) (describing reliance on existing scientific literature by companies doing due diligence before introducing a new product).

⁶⁰ Such an obligation would reverse the burden of proof to demonstrate emissions safety, putting that burden on the enterprise involved rather than the government. In doing so, it follows the models of California's Proposition 65 regarding toxic risks and the European Union's REACH Directive. See Carl Cranor, *Information Generation and Use Under Proposition 65: Model Provisions for Other Postmarket Laws?*, 83 IND. L.J. 609, 613 (2008); Ellen K. Silbergeld et al., *Regulating Chemicals: Law, Science, and the Unbearable Burdens of Regulation*, 36 ANN. REV. PUB. HEALTH 175, 185 (2015).

⁶¹ See OSHA, *supra* note 46.

could be accomplished through the existing tort system. However, to reduce transaction costs, disclosure and compensation could be also required through an expansion of the existing permitting process to include no-fault compensation payments for psychological and physical harms from the level of pollution that a permit allows to continue.

We note, moreover, that one reason that proposals to track emissions, charge for harms, and pay compensation to victims were not considered as parts of America's modern framework of environmental law in the 1970s and 1980s can be traced to the perceived need to pursue strategies that were easier to manage administratively.⁶² But today's information technologies, big data analytics, and communications links make the challenge of charging for harms more manageable and likely to be lower in cost than in the 1970s.⁶³ In brief, these new tools make it easier to vindicate environmental rights and to meet the rising demand for more rigorous approaches to environmental justice.

II. PHILOSOPHICAL BASIS FOR THE GOAL OF ELIMINATING HARM

A. *Why Internalize Externalities?*

Our central thesis that environmental law should strive to eliminate all negative environmental externalities harkens back to British economist Arthur Cecil Pigou. In his 1920 book *The Economics of Welfare*, Pigou argued that the mere existence of negative externalities offers a valid reason for regulation and should be so recognized in law.⁶⁴ We agree with Pigou that the goal of environmental law should be to internalize negative externalities—at least if they are beyond *de minimis* discharges⁶⁵ or are not authorized by

⁶² See Daniel C. Esty, *Environmental Protection in the Information Age*, 79 N.Y.U. L. REV. 115, 140–48 (2004); see also Esty, *supra* note 22, at 43–51; Gregg P. Macey, *The Architecture of Ignorance*, 2013 UTAH L. REV. 1627, 1627–31 (2013).

⁶³ See Esty (*Information Age*), *supra* note 62, at 156–61.

⁶⁴ See, e.g., A. C. PIGOU, *THE ECONOMICS OF WELFARE* 172–85 (4th ed. 1920).

⁶⁵ An example of a *de minimis* discharge is one that does not exceed the assimilative capacity of the environment and thus may result in no harm. See Stephen J. Randtke, *Assimilative Capacity*, ENCYCLOPEDIA.COM (2019) <https://www.encyclopedia.com/environment/encyclopedias-almanacs-transcripts-and-maps/assimilative-capacity>. However, how to allocate the limited assimilative capacity of environmental resources among competing users raises difficult issues of equity that

informed consent. Thus, we argue here for an end to externalities through the imposition of *harm charges* and information disclosure of any externality that is allowed to continue due to practical considerations.⁶⁶

In our view, environmental law—at least in the academy—took a wrong turn by carrying the lessons of Ronald Coase too far and turning its back on Pigou. Coase’s work has been over-simplified in the so-called “Coase Theorem” that suggests, in the absence of transaction costs, regardless of whether or not ranchers were liable when their cattle destroyed farmers’ crops, the same level of fencing to keep cows out of the cornfield next door would be built.⁶⁷ Importantly, in Coase’s example, both parties have equally valid interests and the *harm* that results is merely the fact that their interests conflict. In addition, Coase was discussing an imaginary world without transaction costs and devoted to economic efficiency, not justice. In the real world,⁶⁸ some harms are not caused equally by both sides in any sense that the law should care about. Is your broken jaw really jointly *caused* by the presence of your jaw at a particular

are beyond the scope of the current paper. See Robert U. Ayres & Allen V. Kneese, *Production, Consumption, and Externalities*, 59 AM. ECON. REV. 282, 295 (1969) (“[U]nder conditions of intensive economic and population development the environmental media which can receive and assimilate residual wastes are not free goods but natural resources of great value with respect to which voluntary exchange cannot operate because of their common property characteristics.”).

⁶⁶ See Esty, *supra* note 22, at 24–25 (arguing for an end to externalities as a foundational principle for environmental regulation); see also Elliott, *supra* note 20 (suggesting EPA charge user fees for air pollution that it allows to continue to create incentives for further reductions); Erin Adele Scharff, *Green Fees: The Challenge of Pricing Externalities Under State Law*, 97 NEB. L. REV. 168 (2018) (discussing similar issues under state law).

⁶⁷ See Ronald Coase, *The Problem of Social Cost*, 3 J. L. & ECON. 1, 3–6, 10 (1960); see also Robert C. Ellickson, *The Case for Coase and Against “Coaseanism”*, 99 YALE L.J. 611, 611 (1989) (“Coase’s name is consistently attached to propositions he has explicitly repudiated.”). We do not denigrate Coase’s important work in pointing out the importance of transaction costs; however, we note that at the end of his famous essay, he ultimately endorses a position similar to ours that rights should be allocated based on “aesthetics and morals.” Coase, *supra* note 67, at 43 (“As Frank H. Knight has so often emphasized, problems of welfare economics must ultimately dissolve into a study of aesthetics and morals.”).

⁶⁸ The best empirical evidence is that people do not actually behave as predicted by the Coase Theorem, but rather resort to shared notions of the duties of neighbors not to injure one another. See ROBERT C. ELLICKSON, *ORDER WITHOUT LAW: HOW NEIGHBORS SETTLE DISPUTES* 4 (1994).

place and time at the moment that my fist comes smashing into it? Perhaps in some metaphysical sense, but that does not stop the law from prosecuting assaults. Similarly, the innate human need to breathe healthy air is not a joint “cause” of air pollution in the same way that a factory using our common air resource for waste disposal is.⁶⁹ For all of these reasons, Coase’s insight, valid as it is within limits, does not mean that environmental law should give up on trying to internalize environmental externalities to the maximum extent feasible.

B. *Toward a Rights-Based Framework of Environmental Law*

For the reasons outlined above, we believe that members of a community owe one another a moral duty not to injure each other, regardless of whether abating a particular injury is economically efficient. The natural law duty for polluters not to injure others creates a correlative right for breathers to be free from harmful pollution.⁷⁰ As a second-best solution, if abating harmful pollution is infeasible and not merely inefficient, natural law calls for polluters to compensate breathers for their injuries and ameliorate their fears—and thereby internalize externalities as fully as is possible with money.⁷¹ However, U.S. environmental law in practice today subsidizes pollution by under-internalizing the harms of pollution that it deems economically inefficient to abate. This efficiency limitation shapes pollution control in a manner similar to the way that the nineteenth century law of industrial accidents, which was designed to be “employer-friendly” and created numerous defenses against liability,⁷²

⁶⁹ If it is more efficient for what environmental law sometimes calls “receptors” (people) rather than polluters to abate a harm, polluters can pay them to do so. For example, at Superfund sites where it is too expensive to clean up the groundwater to drinking water quality, it is common for polluters to pay for alternative water supplies. But this does not mean that the result is “the same” regardless of to whom the law assigns legal rights. The “wealth position” (who pays for the efficient solution) is different depending upon whom the positive law recognizes as the rights holder. In addition, monetary compensation rarely if ever makes someone whole for harm to their health, but it is the best that we can do.

⁷⁰ See generally Wesley Hohfeld, *Some Fundamental Legal Conceptions As Applied In Judicial Reasoning*, 23 YALE L.J. 16, 28–59 (1913) (describing reciprocal relationship of rights and duties).

⁷¹ See discussion *supra* note 13.

⁷² One example is the now-abrogated “fellow servant rule,” which exonerated the employer from paying compensation if another employee caused the injury.

subsidized industrial development by giving factory owners broad defenses to avoid paying the costs of workplace injuries.⁷³ Over time, workers gained greater protection, and compensation for industrial accidents became the norm. We think it is now time for pollution victims to be accorded similar protection, disclosure, and compensation.

III. IMPLEMENTING THE END TO EXTERNALITIES PRINCIPLE

A. Identifying Negative Environmental Externalities

Before we can try to end—or more accurately, *internalize*—negative externalities, we must, of course, be able to recognize and define them. This task proves to be more difficult than it might appear. A surprising degree of confusion emerges from the scholarly literature about exactly what constitutes a negative externality. Most definitions merely consist of a handwave in the direction of imposing “costs” on a third party, and then give pollution as an example. The *Encyclopedia Britannica*, for example, states that:

A negative externality exists when the production or consumption of a product results in a cost to a third party. Air and noise pollution are commonly cited examples of negative externalities. When negative externalities are present, private markets will overproduce because the costs of production for the firm are understated and profits are overstated.⁷⁴

Similarly, *The Law Dictionary* tells us that a negative externality “[o]ccurs when a product or decision exceeds the society’s private cost” and goes on to note that such circumstances represent a

See, e.g., Fellow Servant Rule, USLEGAL, <https://definitions.uslegal.com/f/fellow-servant-rule/> (last visited Mar. 11, 2021).

⁷³ *See, e.g., Charles O. Gregory, Trespass to Negligence to Absolute Liability*, 37 VA. L. REV. 359, 368 (1951) (“Judicial subsidies . . . to youthful enterprise removed pressure from the pocket-books of investors and gave incipient industry a chance to experiment on low-cost operations without the risk of losing its reserve in actions by injured employees. Such a policy no doubt seems ruthless; but in a small way it probably helped to establish industry. . . .”); LAWRENCE M. FRIEDMAN, A HISTORY OF AMERICAN LAW 413–17 (1973) (discussing development of nineteenth-century American tort doctrine as guarding industry against damages claims). *See generally* MORTON J. HORWITZ, THE TRANSFORMATION OF AMERICAN LAW, 1780-1860, at 67–108 (1977) (discussing the “burden” on development imposed by damages judgments and development of legal doctrines to subsidize economic development).

⁷⁴ Rebecca Summary & Eleanor G. Henry, *Private Good*, ENCYC. BRITANNICA (Dec. 5, 2013), <https://www.britannica.com/topic/private-good#ref1189688>.

“market failure.”⁷⁵ In a recent article that seeks to give more depth to the issue of externalities, economist Bryan Caplan contends that they can be defined as anything that someone would pay to avoid:

Research and development is a standard example of a positive externality, air pollution of a negative externality. Ultimately, however, the distinction is semantic. It is equivalent to say “clean air has positive externalities and so clean air is underproduced” or “dirty air has negative externalities and so dirty air is overproduced.”

Economists measure externalities the same way they measure everything else: according to human beings’ willingness to pay. If one thousand people would pay ten dollars each for cleaner air, there is a ten-thousand-dollar externality of pollution. If no one *minds* dirty air, conversely, no externality exists. If someone likes dirty air, this unusual person’s willingness to pay for smog must be subtracted from the rest of the population’s willingness to pay to curtail it.⁷⁶

But as “clean air”—whatever that means—is not a commodity traded in markets, how are we to know how much people would be willing to pay for it? Is it really true, moreover, that people ought to have to *pay* to breathe clean air? Or rather, aren’t some claims to use the air for certain purposes, such as breathing, more deserving of protection by the law than others, such as using the air for waste disposal? Other areas of law, such as riparian rights for allocating water, traditionally give preference to uses for domestic consumption that are necessary for human self-preservation.⁷⁷ And is it really true that whatever people “mind” and would prefer to avoid is an externality? The late President George Herbert Walker Bush

⁷⁵ *What is NEGATIVE EXTERNALITY?*, LAW DICTIONARY, <https://thelawdictionary.org/negative-externality/> (last visited Mar. 11, 2021).

⁷⁶ Bryan Caplan, *Externalities*, LIBR. OF ECON. & LIBERTY, <https://www.econlib.org/library/Enc/Externalities.html> (last visited Mar. 11, 2021).

⁷⁷ See Jarret C. Oeltjen & Loyd K. Fischer, *Allocation of Rights to Water: Preferences, Priorities, and the Role of the Market*, 57 NEB. L. REV. 245, 249 (1978) (“The fundamental preferential use developed through the riparian doctrine is classified as ‘natural,’ ‘ordinary,’ or ‘domestic.’ This classification of uses reflects a right of self-preservation and creates in the riparian owner a preference to supply the needs of himself, his family, and his livestock for such purposes as drinking, cooking, and cleansing.”).

famously expressed dislike for broccoli.⁷⁸ Does that make broccoli farmers guilty of creating an “externality” that the law should address?

The concept of internalizing externalities is actually a very old principle in the common law, the antecedents of which can be traced back at least to the 1610 decision in *Aldred’s Case*, a matter rediscovered and popularized by Dick Stewart’s 1978 environmental casebook with Jim Krier.⁷⁹ In that case, a court held that the neighbor of an English pig farmer whose animals were causing a stench that spilled onto his neighbor’s property had a cause of action as a result of the negative externality.⁸⁰

The libertarian tradition goes back farther than Pigou, albeit in different language.

Another Stewart, one who misspelled his middle name—John Stuart Mill—called this the “harm principle” and made it the cornerstone of his philosophy that everyone has the liberty to do what they will if, but only if, their actions do not harm others.⁸¹ John Stuart Mill distinguished between what he called “harms” and “mere offenses.” Not everything that others do not like is a “harm” that the state may rightly prohibit in his philosophical system. “To constitute a harm, an action must be injurious or set back important interests of particular people, interests in which they have rights.”⁸² This seminal idea has also been elaborated more recently in the ethical theories of philosopher William David Ross: that everyone has a *prima facie* duty not to harm others.⁸³ We argue that this ethical duty

⁷⁸ See, e.g., Erica Chayes Wida, *President George H.W. Bush Never Liked Broccoli — and People Still Love Him for It*, TODAY (Dec. 3, 2018), <https://www.today.com/food/president-george-h-w-bush-celebrated-never-liking-broccoli-t144284>.

⁷⁹ See generally RICHARD B. STEWART & JAMES E. KRIER, ENVIRONMENTAL LAW AND POLICY: READINGS, MATERIALS AND NOTES 117–19 (1978).

⁸⁰ See *Aldred’s Case* (1610) 77 Eng. Rep. 816 (K.B.).

⁸¹ See, e.g., David Brink, *Mill’s Moral and Political Philosophy*, STAN. ENCYC. OF PHIL. at 3.5 (Aug. 21, 2018), <https://plato.stanford.edu/entries/mill-moral-political/>.

⁸² *Id.* at 3.6.

⁸³ See, e.g., Anthony Skelton, *William David Ross*, STAN. ENCYC. OF PHIL. at 4.1 (June 19, 2012), <https://plato.stanford.edu/entries/william-david-ross/>; Jan Garrett, *A Simple and Usable (Although Incomplete) Ethical Theory Based on the Ethics of W. D. Ross*, W. KY. U. (last revised Aug. 10, 2004), <http://people.wku.edu/jan.garrett/ethics/rossethc.htm>.

not to harm others has important implications for environmental law, as we will try to elaborate.

The primary harm of concern in the field of environmental pollution is that pollution impinges upon every person's fundamental human right to bodily integrity and to a healthy environment that does not harm his or her health.⁸⁴ But pollution also produces other cognizable harms, such as degrading visibility, adversely affecting ecosystems, threatening the viability of endangered species, and contributing to climate change. Many of these effects also affect non-human species, which may or may not be seen as also possessing natural law rights against harm. In addition, we face further difficulties in defining externalities by reference to environmental rights that have been infringed because many of these rights are held in common by large numbers of people.

Whether some kinds of pollution are or are not actually creating an identifiable harm is furthermore often unclear as a matter of science.⁸⁵ As a result, one of the key issues to be decided in any system of environmental law is who bears what we call the *uncertainty risk*.⁸⁶ Notably, should we allow one party—usually, but not always, industry—to continue activities that may be harming others merely because “full scientific certainty”⁸⁷ that the behavior is indeed

⁸⁴ Note that, since the 1970s, a growing number of national constitutions (although not the U.S. one) recognize a right to a healthy environment in one form or another. See, e.g., DAVID R. BOYD, DAVID SUZUKI FOUND., THE STATUS OF CONSTITUTIONAL PROTECTION FOR THE ENVIRONMENT IN OTHER NATIONS 6 (2013), <https://david Suzuki.org/wp-content/uploads/2013/11/status-constitutional-protection-environment-other-nations.pdf>.

⁸⁵ See Albert C. Lin, *Technology Assessment 2.0: Revamping Our Approach to Emerging Technologies*, 76 BROOK. L. REV. 1309, 1324 (2011) (detailing the level of uncertainty involved in hazard risk assessments, especially with regard to hazards whose risks involve “unknown unknowns” given technological shortcomings).

⁸⁶ See Alyson C. Flournoy, *Legislating Inaction: Asking the Wrong Questions in Protective Environmental Decisionmaking*, 15 HARV. ENV'T L. REV. 327, 366 (1991) (highlighting how absent concrete demonstration of high risk of harm, classical environmental regulations do not regulate potentially harmful conduct).

⁸⁷ *Communication from the Commission on the Precautionary Principle*, at 10, COM (2000) 1 final (Feb. 2, 2000), <https://op.europa.eu/en/publication-detail/-/publication/21676661-a79f-4153-b984-aeb28f07c80a/language-en> (explaining that under the European Union's “precautionary principle,” the absence of full scientific certainty should not preclude regulation); see Robert V. Percival, *Who's Afraid of the Precautionary Principle?*, 23 PACE ENV'T L. REV. 21, 25 (2006).

harmful is not yet available? Such circumstances take us to the domain of the (in)famous and much-debated precautionary principle.⁸⁸

We take the strong view that imposition of a credible *risk of a risk* without someone's informed consent, not merely provable *actual* injury, should be cognizable as a harm that environmental law should address to the extent practical.⁸⁹ The difficulty comes in deciding what rebuts the presumption that environmental externalities should be eliminated or internalized and how much weight to give to practicality. How much evidence is necessary and who has a burden to compile it? How much expense may be imposed by the state to obviate what may or may not turn out to be an actual harm to others? We acknowledge those issues but are not yet prepared to answer those questions, and we leave them for another day.

B. Further Implementation Issues

Our *end to externalities* framework raises a number of difficult implementation issues. We try to approach these issues pragmatically by learning from what has and has not worked in the history of environmental law. We do not take the view that *precaution* should always be adopted by government policy.⁹⁰ Rather, there should be a rebuttable presumption that government will require the internalization of externalities—eliminating harm to others—to the maximum extent practical and paying full compensation for any

⁸⁸ See, e.g., Joined Cases T-74, T-76, T-83, T-84, T-85, T-132, T-137 & T-141/00, *Artegodan GmbH and Others v. Comm'n of the European Communities*, 2002 E.C.R. II-5016 (holding that in the European Union, the precautionary principle requires that “where there is uncertainty as to the existence or extent of risks . . . the institutions may take precautionary measures without having to wait until the reality and seriousness of those risks become fully apparent.”); see also U.N. Conference on Environment and Development, *Rio Declaration on Environment and Development*, ¶15, U.N. Doc. A/CONF.151/26 (Vol.I) (June 14, 1992) (“Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation.”).

⁸⁹ See Albert C. Lin, *The Unifying Role of Harm in Environmental Law*, 2006 WIS. L. REV. 897, 911 (2006) (“Yet even in risk-based regulation, the law has generally required an affirmative showing that harm is likely before intervening.”). Courts have begun to recognize risk of harm as a cognizable injury conferring constitutional standing to sue. See, e.g., *Massachusetts v. EPA*, 549 U.S. 497 (2007); *Nat. Res. Def. Council v. EPA*, 464 F.3d 1, 7 (D.C. Cir. 2006); *Strubel v. Comenity Bank*, 842 F.3d 181, 191 (2d Cir. 2016).

⁹⁰ But see sources cited *infra* note 91 for arguments in favor of erring on the side of precaution.

residual harms. As noted above, this principle should additionally permit *risk compensation charges* to be imposed on conduct that *may* credibly be harming others even though there is not yet full scientific certainty that it is actually doing so.⁹¹

1. What Degree of Pollution Control Should Be Required?

In view of our starting point that governments have a presumptive obligation to restrict conduct that imposes cognizable harm on others without their consent, we would generalize the application of the operative standard under one of our nation's most recent environmental statutes, the Food Quality Protection Act, which declares that members of a community are entitled to reasonable assurance of no harm from the actions of others in applying pesticides to their crops.⁹² We believe persons subject to exposure to substances released into the environment by others in whatever form are entitled to that same level of protection: reasonable assurance of no harm.

In determining what degree of pollution control should be mandated in this regard requires assessments of technological feasibility, innovation possibility, and economic practicality. We envision that the existing EPA would be well positioned to develop such *feasibility standards* building on its current engineering and industrial technology capabilities. We believe, furthermore, that the regulated community would be strongly incentivized to collaborate with this exercise in standard setting, knowing that any amount of pollution left unabated will bear an unavoidable harm charge.

2. How Are Harm Charges and Compensation Calculated?

The second element of our proposed structure would require polluters to pay fully for any residual emissions that cannot feasibly

⁹¹ On compensation for involuntary exposure to risk, *see generally* E. Donald Elliott, *The Future of Toxic Torts: Of Chemophobia, Risk as a Compensable Injury and Hybrid Compensation Systems*, 25 Hous. L. Rev. 781 (July, 1988); Clifford Fisher, *The Role of Causation in Science as Law and Proposed Changes in the Current Common Law Toxic Tort System*, 9 BUFF. ENV'T L.J. 35 (2001) (exploring potential compensation mechanisms and tradeoffs for victims involuntarily exposed to potentially harmful toxics); Albert C. Lin, *Beyond Tort: Compensating Victims of Environmental Toxic Injury*, 78 S. CALIF. L. REV. 1439 (2005) (examining the weaknesses of the existing toxic torts framework of compensating victims).

⁹² *See* 7 U.S.C. § 136 (2018) (implementing a safety standard for tolerance of pesticide chemical residue).

be abated. As noted earlier, this commitment to *full compensation* is essential to spur pollution control innovation, ensure that companies take seriously their obligation to eliminate harmful emissions to the greatest extent *feasible*,⁹³ and meet the demands of environmental justice.

We note that setting the level of harm—or risk—charges and identifying those who should be compensated would require a new emphasis at EPA on both understanding the fate and transport of emissions and on evaluating the epidemiological and ecological harms they create. We anticipate that this new regulatory focus would require a shift in the human resource capabilities of the Agency toward more refined exposure assessment, increased epidemiological and ecological analysis, as well as risk assessment and benefit-cost analytics.

3. Who Receives the Required Compensation?

The duty to pay compensation for environmental harms or risks raises another question: who should receive the charges levied? Current practice typically has fees paid going to the government whose legal framework imposes the charge. For example, the emissions allowance fees paid under the Regional Greenhouse Gas Initiative (RGGI) go to the compact of Northeastern states that make up the RGGI region and are then redistributed to the individual states. For broad-based harms, such as acid rain or climate change, it perhaps makes sense for the funds to go to the governments on behalf of the affected public.

But we argue that if specific *victims* can be identified—especially for localized harms such as the air pollution from an incinerator—the compensatory charges should be paid by the beneficiaries to those bearing the burden of the pollution.⁹⁴ This principle also

⁹³ We believe that informed consent by pollution victims and affirmative assent to compensation rather than further emissions reduction represents the best test of *full* internalization of the remaining pollution externality. But to avoid the well-documented risk of holdouts, we acknowledge that government calculation of the appropriate harm charge may be necessary. We remain open to the possibility that such a structure may not deliver the full compensation that we intend—and the system proposed will need to be further refined.

⁹⁴ Whether victims may collect both for the exposure to risk, and again if they actually suffer a disease resulting from the risk, is an issue to be decided under state law, but in some instances, states might decide to allow an offset against a damage verdict for the risk charges previously paid.

applies to future generations when we can reasonably anticipate that they may be adversely affected by today's pollution or other environmental externalities. While the details of how to pay out such compensation will require a methodological discussion beyond the scope of the present Article, as we noted earlier, a rule to "compensate victims if they can be identified"—either in person or by category—would go a considerable distance toward operationalizing *environmental justice* as a central principle of twenty-first century environmental law.

IV. OUR PRINCIPLES ILLUSTRATED

Experience under America's environmental laws illustrate how the general principles outlined above should work in practice. As we have suggested elsewhere,⁹⁵ the drafters of our environmental laws in the 1970s recognized that they did not know exactly what would be the best approach to regulate environmental pollution. They therefore created a toolbox of legal authorities and approaches and left it to implementation and experimentation to work out which approaches worked best. Now, fifty years into modern national environmental law in the United States, it is time to reflect on this experience and ask what has worked well and what has not,⁹⁶ an exercise that one of us has called "domestic comparative law."⁹⁷

One of the basic lessons to be learned is that drafters of environmental laws should pay greater attention to the *incentives* they create.⁹⁸ Many U.S. environmental statutes have been interpreted to put the burden of proof on the government to show that a practice is causing harm or, in other circumstances, that the benefits of regulation exceed the costs or at least that the proposed rules would be

⁹⁵ See ELLIOTT & ESTY, *supra* note 18.

⁹⁶ See Esty, *supra* note 22, at 1–31.

⁹⁷ E. Donald Elliott, *Rationing Analysis of Job Losses and Gains: An Exercise in Domestic Comparative Law*, in DOES REGULATION KILL JOBS? 256 (Cary Coglianese & Adam Finkel eds., 2013). For prior examples of trying to draw lessons from experience under various environmental laws, see also Elliott, *supra* note 20; E. Donald Elliott, *U.S. Environmental Law in Global Perspective: Five Do's and Five Don'ts from Our Experience*, 2010 NAT'L TAIWAN U. L. REV. 144 (2010); E. Donald Elliott, *Lessons From Implementing the 1990 CAA Amendments*, 40 ENV'T L. REP. 10592 (2010).

⁹⁸ See Esty, *supra* note 12, at 88. This is also a recurrent theme in our jointly-authored forthcoming summary of U.S. environmental law. ELLIOTT & ESTY, *supra* note 18.

cost-effective. This structure of regulation, however, encourages those who wish to avoid the costs of regulation to create *paralysis by analysis*, studying a problem to death as a way of avoiding or at least postponing regulation. This problem has been brilliantly addressed by David Roe, the principal drafter of California's Proposition 65, in an article that has not received sufficient attention.⁹⁹ We anticipate that our *end to externalities* approach with its insistence on fully compensatory harm charges for residual emissions would provide similar incentives to clarify the facts and innovate to reduce pollution.

We note further that in some countries litigation has emerged as a primary tool for pollution control and the internalization of environmental externalities. In the United States, however, while environmental advocacy groups have recently ramped up the use of lawsuits to hold polluters responsible for monetary damages for the harms their emissions cause or governments responsible for failure to regulate, such efforts have found only limited success—making our alternative strategy for harm charges all the more important.¹⁰⁰

⁹⁹ See David Roe, *Barking Up the Right Tree: Recent Progress in Focusing the Toxics Issue*, 13 COLUM. J. ENV'T L. 275 (1988) (an economic incentive analysis of Proposition 65 by its author which claims that it is successful because it removes incentives for industry to delay regulation).

¹⁰⁰ For example, the Earth Island Institute recently filed suit seeking compensatory damages as well as the costs of clean-up against ten major users of disposable plastics that litter beaches. See Complaint, *Earth Island Inst. v. Crystal Geyster Water Co.*, No. 20CIV01213 (Cal. Super. Ct. 2020), https://www.earthisland.org/images/uploads/suits/2020-02-26_Earth_Island_Complaint_FILED.PDF. But in a number of climate change cases, courts have denied plaintiffs the right to proceed. See, e.g., *Native Village of Kivalina v. ExxonMobil Corp.*, 696 F.3d 849, 858 (9th Cir. 2012); *Juliana v. United States*, 947 F.3d 1159 (9th Cir. 2020). In other nations, however, courts have moved more aggressively to hold polluters and governments accountable for harms including greenhouse gas emissions. Courts in France, Ecuador, Colombia, Pakistan, Britain, Nigeria, and the Philippines have issued decisions in recent years holding parties accountable for violating environmental rights. See Daniel C. Esty, *Toward a Sustainable Future: Environmental Jurisprudence from France's Constitutional Council Breaks New Ground*, in FRENCH CONSTITUTIONAL COUNCIL: ANNUAL REPORT 2020 106, 106–07 (2020); e.g., Conseil d'Etat (CE) [highest administrative court] Nov. 19, 2020, No. 427301 (Fr.), <https://www.conseil-etat.fr/actualites/actualites/emissions-de-gaz-a-effet-de-serre-le-gouvernement-doit-justifier-sous-3-mois-que-la-trajectoire-de-reduction-a-horizon-2030-pourra-etre-respectee>; Corte Suprema de Justicia [C.S.J.] [Supreme Court] febrero 12, 2018, Sentencia 4360-2018 (Colom.); Corte Constitucional [C.C.] noviembre 10, 2016, T-622/16, Expediente T-5.016.242 (Colom.); Leghari v. Fed'n of Pakistan, (2015) W.P. No.25501 (HC Lahore) (Pak.); Complaint, *Mbabazi and Others v. The Attorney General and*

This brief Article is not the place to outline comprehensively the changes to existing law and regulatory policies needed to implement our vision of an environmental law dedicated to internalizing externalities, but in the paragraphs that follow we illustrate briefly each of the three governing principles we highlighted at the outset of Part III.

(1) *Regulate to Eliminate or Reduce Harmful Pollution to the Extent Technically Feasible and Economically Practical.* We believe that the existing system of “command and control” regulation in which government imposes mandatory pollution reduction obligations should be supplemented with a new principle that *no harmful emissions* should be the goal and that all residual pollution harms, after what is technologically feasible has been abated, be subject to a compensation obligation as discussed in the next section.

(2) *Impose Emissions Charges to Compensate Victims of Residual Risks Remaining After the Application of Feasible Technology and to Create Incentives to Develop Better Pollution Controls.* For the reasons described above, we believe that harm charges should be imposed on a routine basis to compensate victims for the harms to others that regulators determine cannot feasibly be eliminated.

A good example of why this is necessary is provided by the wealthy municipalities in Connecticut and New York that periodically discharge untreated sewage from their antiquated sewer systems into Long Island Sound. These releases result in beach closings and other damages to natural resources, and possibly risks to human health.¹⁰¹ But the municipalities currently bear little cost for the harm they cause and thus have insufficient incentives to upgrade their underperforming sewer systems that are the root cause of the problem.

Congress legislated what could have been the beginning of harm charges for residual pollution in Section 185 of the Clean Air

National Environmental Management Authority, Civil Suit No. 283 of 2012 (Uganda).

¹⁰¹ See Ben Lambert, *Mill River Sewage Spill Spurs Closures of East Haven, Branford Beaches*, NEW HAVEN REG. (July 9, 2020), <https://www.nhregister.com/metro/article/East-Haven-prohibits-swimming-at-beaches-after-15393912.php>.

Act Amendments of 1990.¹⁰² That section, which is still on the books, provides for emission fees on major sources of air pollution located in severely polluted areas that are violating the national air quality standards. To the present day, however, EPA has declined to implement it.¹⁰³ In fairness, much of the pollution in the areas with the most severe air quality problems, such as the Northeast, comes in from out of state, so imposing charges on local industry would not put pressure on those responsible.¹⁰⁴ While providing a mechanism for harm charges, Section 185 was mistaken in focusing on major sources *located in* non-attainment areas rather than on the out-of-state sources that were actually causing most of the problem.¹⁰⁵ But the idea of charging polluters for their remaining emissions after pollution controls have been put in place would create incentives for continuous improvement and innovation.

(3) *Disclose Emissions Volumes and Risk for Significant Discharges to the Environment Not Currently Known to be Harmful.* A recurrent lesson in environmental law is that pollution thought not to be harmful at one point in time, sometimes later turns out to be

¹⁰² See 42 U.S.C. § 7511(d).

¹⁰³ Fourteen years after its enactment, EPA purported to “waive” the fee requirement for emissions charges in severely polluted non-attainment areas, see Final Rule to Implement the 8-Hour Ozone National Ambient Air Quality Standard, 69 Fed. Reg. 23,951, 23,974–76, 23,984–85 (Apr. 30, 2004) (to be codified at 40 C.F.R. pts. 50, 51 & 58), but it was sued and ordered to comply with the law in *S. Coast Air Quality Mgmt. Dist. v. EPA*, 472 F.3d 882, 903 (D.C. Cir. 2006). Since that time, EPA has begrudgingly applied the law, while still trying to give states as much flexibility as it can to disregard that part of the law through “an equivalent alternative program,” such as requiring more low emission vehicles (LEVs) rather than imposing emission charges. See OFF. OF AIR QUALITY PLANNING AND STANDARDS, EPA, MEMORANDUM: GUIDANCE ON DEVELOPING FEE PROGRAMS REQUIRED BY CAA § 185 FOR THE 1-HOUR OZONE NAAQS at 2–3 (Jan. 5, 2010), https://www.epa.gov/sites/production/files/2015-09/documents/1hour_ozone_nonattainment_guidance.pdf.

¹⁰⁴ See Sarah E. Light, *Precautionary Federalism and the Sharing Economy*, 66 EMORY L.J. 333, 353 (2017) (exploring that market failures that surface when “decentralized actors set environmental standards” resulting in out of state pollution); see also Butler & Macey, *supra* note 52, at 56.

¹⁰⁵ See David Schoenbrod, *The Clean Air Act Is in No Shape to Be Celebrated*, HUFFINGTON POST (May 25, 2011), https://www.huffingtonpost.com/david-schoenbrod/the-clean-air-act-is-in-n_b_704631.html (“Congress assumed . . . that each state’s pollution came almost entirely from smokestacks within that state and, on that basis, required each state to adopt a formal plan to cut pollution. Experience has shown, however, that much pollution comes from other states and even other nations.”).

more harmful than originally recognized.¹⁰⁶ A good example is lead, which was used in the past as a gasoline additive to increase octane and prevent engine knocking. At the time lead in gasoline became an issue in the 1970s, lead was generally thought to be harmful only in high concentrations.¹⁰⁷ But as larger epidemiological studies have been conducted, lead levels considered safe have decreased significantly.¹⁰⁸ In other circumstances, preliminary warning signs, such as “subclinical effects”—changes to bodily functions that are not in and of themselves harmful, or that fall short of disease—or data from animal tests at high doses may or may not turn out to be harbingers of more serious problems.¹⁰⁹

In these situations, the U.S. legal system generally finds it difficult to regulate pollution. The issue is not so much the terms of substantive environmental statutes, which are often precautionary in their stated goals, but rather the background norms of judicial review. Historically, Americans are suspicious of governmental action and as a result, we have generally placed a burden on the government to show that there is a reasonable basis for its actions in court.¹¹⁰ For example, the 1976 Toxic Substances Control Act

¹⁰⁶ See, e.g., Sanne H. Knudsen, *The Long-Term Tort: In Search of a New Causation Framework for Natural Resource Damages*, 108 NW. U. L. REV. 475 (2014) (exploring legal causation frameworks for long-term or latent ecological harms).

¹⁰⁷ See *Ethyl Corp. v. EPA*, 541 F.2d 1 (D.C. Cir. 1976) (en banc), cert. denied, 426 U.S. 941 (1976). For a history of EPA’s twenty-five year long effort to get the lead out of gasoline, see Elliot, *supra* note 20, at 911–19.

¹⁰⁸ See NAT’L TOXICOLOGY PROGRAM, DEP’T OF HEALTH AND HUM. SERVS., NTP MONOGRAPH: HEALTH EFFECTS OF LOW-LEVEL LEAD xiii (2012) https://ntp.niehs.nih.gov/ntp/ohat/lead/final/monographhealtheffects/lowlevel-lead_newissn_508.pdf (detailing the evidentiary support for adverse health effects in both children and adults at blood lead levels below 10 µg/dL [micrograms per deciliter], and, for some effects, below 5 µg/dL).

¹⁰⁹ See, e.g., George D. Thurston et al., *A Joint ERS/ATS Policy Statement: What Constitutes an Adverse Health Effect of Air Pollution? An Analytical Framework*, EUR. RESPIRATORY J., 13 (2017), <https://erj.ersjournals.com/content/erj/49/1/1600419.full.pdf> (“Alternatively, adverse CNS health effects from air pollution may be secondary to systemic impacts mediated by other body systems. Subclinical and clinical cardiovascular and metabolic disease are established risk factors for cognitive decline and dementia, and it is likely that at least part of the observed impact of air pollutants on cognitive disease risk occurs as a result of air pollution-induced ischaemic effects.”) (citations omitted).

¹¹⁰ See generally Gail Charnley & E. Donald Elliott, *Risk Versus Precaution: Environmental Law and Public Health Protection*, 32 ENV’T L. REP. 10363, 10363 (2002) (“The precautionary principle is based on the idea that it is better to be safe

aspired to place the burden of proof on manufacturers of new chemical substances to show that they were safe before they were distributed in commerce and released into the environment.¹¹¹ Nevertheless, the courts held that the burden lies with EPA to show a need for testing before approving a new chemical.¹¹² As a result, according to a 2003 study, 67 percent of applications for approval of new chemicals included no test data and 85 percent included no health data, but about 90 percent of such applications to distribute new chemicals in commerce were approved.¹¹³

Our solution to this problem is mandatory disclosure. If too little scientific evidence is available to justify regulation, at a minimum, those who are releasing significant amounts of substances beyond their property's boundaries should be required to disclose publicly: (1) the volume of the releases, and (2) what scientific research leads them to believe that the releases will not be harmful to others. The underpinnings of such a rule have been demonstrated in practice since the 1980s when California adopted Proposition 65,

than sorry; that is, precaution reflects the need to take action in the face of potentially serious risks without awaiting the results of scientific research that establishes cause-and-effect relationships with full scientific certainty. In contrast, U.S. law reflects a traditional suspicion of government regulation, requiring extensive actual records proving 'significant risks' to justify regulation aimed at protecting public health from environmental contaminants. This fundamental norm of the U.S. legal culture, sometimes called the 'principal of legality,' makes precautionary environmental health regulation difficult because government must assemble a factual record to support its actions." (citations omitted).

¹¹¹ See generally Ortwin Renn & E. Donald Elliott, *Chemicals in THE REALITY OF PRECAUTION: COMPARING RISK REGULATION IN THE UNITED STATES AND EUROPE*, 223, 223–56 (Jonathan B. Wiener et al. eds., 2011) (quoting "[i]t is the policy of the United States that . . . adequate data should be developed with respect to the effect of chemical substances and mixtures on health and the environment and that the development of such data should be the responsibility of those who manufacture and those who process such chemical substances and mixtures" (15 U.S.C. § 2601(b)(1))).

¹¹² See, e.g., *Chem. Mfrs. Ass'n v. EPA*, 859 F.2d 977, 986 (D.C. Cir. 1988) (finding that "Congress obviously intended section 4 [of TSCA] to empower EPA to issue a test rule [to require testing of a chemical substance] only after it had found a solid 'basis for concern' by accumulating enough information to demonstrate a more-than-theoretical basis for suspecting that an 'unreasonable risk' was involved in the use of the chemical.").

¹¹³ See Renn & Elliott, *supra* note 111, at 231 (citing BATELLE, OVERVIEW: OFFICE OF POLLUTION PREVENTION AND TOXICS PROGRAMS 8 (Dec. 24, 2003), <http://chemicalspolicy.org/downloads/TSCA10112-24-03.pdf>). For a description of the techniques EPA uses to review the safety of new chemicals in lieu of testing, see *id.*

which required those putting into the marketplace products that contain chemicals causing a risk of carcinogenicity or reproductive harm to disclose these potential harms.¹¹⁴

More generally, since the 1960 *Restatement of Torts*, manufacturers have had an obligation to test their products to confirm that they are safe before releasing them to the public.¹¹⁵ In practice, this often consists primarily of conducting a review of the existing scientific literature.¹¹⁶ We believe that polluters should have a comparable legal obligation to conduct reasonable testing and literature review to verify that the materials that they release into the environment will not harm others. It is arguable that they already do have such an obligation under the *Restatement of Torts* cited above because the pollution that accompanies the manufacture of a useful product or service is a by-product of its production. In any event, for the same policy reasons that the producer of a product has an obligation to assure that it is safe before putting the product into the marketplace, the producer of pollution should be obligated to do the same.

Some of the quiet successes of environmental law—the Toxics Release Inventory¹¹⁷ and discharge monitoring reports under the Clean Water Act¹¹⁸—already rely on disclosure obligations, which

¹¹⁴ For an assessment of the successes achieved by this approach, see David Roe, *Little Labs Lost: An Invisible Success Story*, 15 GREEN BAG 2D 275, 275–90 (2012); see also Clifford Rechtschaffen, *How to Reduce Lead Exposures with One Simple Statute: The Experience of Proposition 65*, 29 ENV'T L. REP. 10581 (Oct. 1999) (contrasting reductions in lead exposure at the federal level with more substantial reductions in California).

¹¹⁵ See RESTATEMENT (THIRD) OF TORTS: PRODS. LIAB. § 2 cmt. m. (AM. LAW INST. 1998) (“[A] seller bears responsibility to perform reasonable testing prior to marketing a product . . . [and] is charged with knowledge of what reasonable testing would review. If testing is not undertaken, or is performed in an inadequate manner, and this failure results in a defect that causes harm, the seller is subject to liability.”); see Ryan Sila, *Incentivizing Pharmaceutical Testing in an Age of Off-Label Promotion*, 93 N.Y.U. L. REV. 941, 964 (2018) for a discussion of the manufacturer’s duty to test pharmaceuticals.

¹¹⁶ See generally Elliott & Elliott, *supra* note 59, at 75–80.

¹¹⁷ See *Toxics Release Inventory (TRI) Program*, EPA, <https://www.epa.gov/toxics-release-inventory-tri-program> (last visited Mar. 21, 2021).

¹¹⁸ See *DMR - Discharge Monitoring Reports*, VELOCITY EHS, [https://www.ehs.com/ehs-tasks/discharge-monitoring/#:~:text=Discharge%20Monitoring%20Reports%20are%20reports,Elimination%20System%20\(NPDES\)%20regulations](https://www.ehs.com/ehs-tasks/discharge-monitoring/#:~:text=Discharge%20Monitoring%20Reports%20are%20reports,Elimination%20System%20(NPDES)%20regulations) (last visited Mar. 21, 2021).

not only inform the government and the public but also put pressure on polluters to reduce their discharges to the extent feasible.¹¹⁹ The key weakness in these existing environmental disclosure programs is that they only apply to substances that are already known to be hazardous.¹²⁰ We believe that similar disclosure obligations should be extended to substances that are released in significant quantities to the environment even if they are not yet regulated or known to be hazardous. Admittedly, what is *significant* can vary and may be contentious. So as the EU's REACH program¹²¹ to test chemicals provided, we propose that disclosure be phased in starting with substances known to be toxic or produced in large volumes and gradually encompassing lower trigger thresholds.¹²² The weight of material produced is not an ideal proxy for potential risks of chemical exposure, but it is a good place to start as a matter of administrative practicality when we do not yet know whether a substance is or is not toxic and, as better techniques for prioritizing chemicals for

¹¹⁹ See Daniel C. Esty & Quentin Karpilow, *Harnessing Investor Interest in Sustainability: The Next Frontier in Environmental Information Regulation*, 36 YALE J. REGUL. 2 (2019) (arguing for expanded environmental disclosure); see also David W. Case, *The Law and Economics of Environmental Information as Regulation*, 31 ENV'T L. REV. 10,773, 10,773 (2001) (“[I]nformation disclosure has emerged as a key component of strategies to promote more effective, less costly alternatives to command-and-control regulation.”).

¹²⁰ See David J. Abell, *Emergency Planning and Community Right to Know: The Toxics Release Inventory*, 47 S.M.U. L. REV. 581, 595 (1994) (“The effectiveness of the [Emergency Planning and Community Right-to-Know Act’s Toxic Release Inventory] is limited by the short list of chemicals defined as toxic.”).

¹²¹ For a summary, see generally EUR. COMM’N, REACH IN BRIEF (October 2007), http://ec.europa.eu/environment/chemicals/reach/pdf/2007_02_reach_in_brief.pdf.

¹²² See generally *Do I reach the one tonne a year threshold?*, EUR. CHEMS. AGENCY, <https://echa.europa.eu/support/registration/your-registration-obligations/do-i-reach-the-one-tonne-a-year-threshold> (last visited Mar. 21, 2021). At a November 14, 2019 Conference—“Toward 21st Century Environmental Protection: Policies, Technologies, and Institutions”—co-hosted by the Yale Center for Environmental Law and Policy and the American University’s Center for Environmental Policy, former DuPont chief sustainability officer and acting EPA Administrator, Linda Fisher, objected to an earlier version of our proposal by noting that industry can detect releases as low as one part per trillion. We agree that disclosure should focus first on exposure at a scale where harm from the emissions seems more likely.

review are developed, they can gradually be integrated into the system.¹²³

Similarly, disclosure of release volumes and summaries of data showing that the material is or is not harmful to others might further be required by the Securities and Exchange Commission (SEC) as part of corporate annual financial reporting.¹²⁴ We recognize that the SEC conceives of its primary role as protecting investors, although we note that, in fact, the 1969 National Environmental Policy Act contains a *super-mandate* that makes protecting the environment part of the mission of every agency of the federal government.¹²⁵ In any event, in light of some companies paying hundreds of millions of dollars to settle cases for disposal of substances that they maintain they thought were not hazardous,¹²⁶ disclosure of large releases and the science relating to their propensity to harm others can arguably be justified under the SEC's usual tests for what information should be disclosed.¹²⁷ However, a specific interpretation issued by the SEC or the accounting profession regarding disclosure requirements for releases of potentially harmful substances into the environment would be helpful; it would speed compliance rather than leaving clarification of the issue to litigation. Such disclosures can be

¹²³ For an example of more advanced scientific methods of estimating and prioritizing chemical risks, see *Toxicity Estimation Software Tool (TEST)*, EPA, <https://www.epa.gov/chemical-research/toxicity-estimation-software-tool-test> (last updated Jan. 27, 2001). See also COMM. ON TOXICITY TESTING AND ASSESSMENT OF ENV'T AGENTS, NAT. RSCH. COUNCIL, *TOXICITY TESTING IN THE TWENTY-FIRST CENTURY: A VISION AND A STRATEGY* (2007). For a brief accessible summary, see NAT'L ACAD. OF SCIS., *TOXICITY TESTING IN THE 21ST CENTURY: A VISION AND A STRATEGY; REPORT IN BRIEF* (2007), https://www.nap.edu/resource/11970/Toxicity_Testing_final.pdf ("The report envisions a new toxicity-testing system that relies mainly on understanding "toxicity pathways"—the cellular response pathways that can result in adverse health effects when sufficiently perturbed. Such a system would evaluate biologically significant alterations without relying on studies of whole animals.").

¹²⁴ See Esty & Karpilow, *supra* note 119, at 678–79 (making the case for expanded SEC reporting obligations related to environmental issues); see also Exec. Order No. 14,030, 86 Fed. Reg. 27,967 (2021).

¹²⁵ See 42 USC § 4331 (2018).

¹²⁶ See, e.g., Marc S. Reisch, *3M to pay \$850 million to settle fluorosurfactants lawsuit*, 96 CHEM. & ENG'G NEWS 9 (Feb. 21, 2018), <https://cen.acs.org/articles/96/i9/3M-pay-850-million-settle.html>.

¹²⁷ For a good summary of the SEC's current disclosure rules in the context of climate change, see Roshan Wasim, *Corporate (Non)Disclosure of Climate Change Information*, 119 COLUM. L. REV. 1311, 1322–32 (2019).

helpful not only to potential investors but also to alert government agencies and independent scientific researchers that significant populations are being exposed to pollutants with only a weak scientific basis to conclude that they are not hazardous, thus spurring additional research.

CONCLUSION

We think it is time to undergird environmental law with a new foundation in environmental rights, and thus with a principle that all negative externalities should be eliminated or reduced to the extent feasible subject only to the two narrow exceptions we have noted above—with any remaining pollution being paid for through a structure of compensatory harm charges. We believe the philosophical logic for such a principle comports with modern public sentiment and the emerging consensus that a fundamental human right to a healthy environment exists and should be recognized and protected to the maximum extent possible. Our no-externalities principle is consistent with changing attitudes in the corporate world where *shareholder primacy*, the belief that the mission of a corporation is to deliver maximum returns to its owners,¹²⁸ has given way to a new spirit of *stakeholder responsibility*. Some observers have even called for a reimagined capitalism.¹²⁹ Our proposal builds on and extends these changing societal norms.¹³⁰

We leave the precise contours of how environmental regulation would need to be recast to advance an *end to externalities* principle to another day. We recognize that significant issues related to tracking emissions, identifying those affected by pollution, valuing impacts, calculating harm charges, assessing risks based on potential future harms, and determining who should receive compensation need to be worked out. But we think the time is right to extend the

¹²⁸ See, e.g., BUS. ROUNDTABLE, *supra* note 27.

¹²⁹ REBECCA HENDERSON, REIMAGINING CAPITALISM IN A WORLD ON FIRE (2020); GUS SPETH, THE BRIDGE AT THE END OF THE WORLD: CAPITALISM, THE ENVIRONMENT, AND CROSSING FROM CRISIS TO SUSTAINABILITY (2008).

¹³⁰ See *id.*; Daniel C. Esty, *Creating Investment-Grade Corporate Sustainability Metrics*, in VALUES AT WORK: SUSTAINABLE INVESTING AND ESG METRICS (Daniel C. Esty & Todd Cort eds., 2020) (arguing “that business models which depend on externalizing costs onto society—whether in the form of pollution or inadequate wages that leave workers dependent on social safety nets—will be ever more difficult to sustain in the years ahead”).

work of Dick Stewart and his generation and begin the shift beyond government-defined command and control mandates and technology-based standards based on benefit-cost analysis to a more just system of environmental law and policy dedicated to internalizing all environmental externalities.