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Albert C. Lin

FIG LEAVES, PIPE DREAMS, AND MYOPIA: TOO-EASY SOLUTIONS IN ENVIRONMENTAL LAW

ALBERT C. LIN*

Much of environmental law and policy rests on an unspoken premise that accomplishing environmental goals may not require addressing the root causes of environmental problems. For example, rather than regulating risks directly, society may adopt warnings that merely avoid risk, and rather than limiting plastic use and reducing plastic waste, society may adopt recycling programs. Such approaches may be well-intended and come at a relatively low economic or political cost. However, they often prove ineffective, or even harmful, and they may mislead society into believing that further responses are unnecessary.

This Article proposes the concept of "too-easy solutions" to describe these approaches. Too-easy solutions can be classified into three subcategories: (1) fig leaves, policy approaches that appear to do something about a problem without necessarily solving it; (2) pipe dreams, inherently flawed policy approaches adopted with the good faith expectation of solving the problem; and (3) myopic solutions, policy approaches that address part of the problem but may impede its overall resolution. Too-easy-solutions analysis can serve as a powerful mechanism for evaluating policies, facilitating the adoption of more effective approaches, and improving decision-making in the environmental arena and other areas as well.

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INTRODUCTION

Wide swaths of environmental law and policy rest on an unspoken premise that, as a society, we can have our cake and eat it too. Specifically, the premise is that addressing the root causes of environmental problems may not be necessary to accomplish environmental goals. For example, rather than regulating risks directly, society may adopt warnings, restrictions on use, and other measures that merely avoid risk. Instead of curbing pollution emissions at their source, society may allow for the purchase of pollution offsets, which sometimes fail to yield equivalent benefits. And rather than addressing the problem of plastic waste by limiting plastic use, society instead.may settle for recycling programs.

These comparatively easy solutions may be well intended. In some instances, they may address identified environmental concerns—at least in part. But because they often prove ineffective or even harmful, it is more accurate to label them as "too-easy solutions." Fish consumption advisories, for example, may not change human behavior and do not address harms to aquatic and marine life. Similarly, pollution offsets may undermine overall pollution control efforts. And plastic recycling is, at best, an imperfect solution to plastic waste and, at worst, a source of widespread toxic exposure and release.

Although poor implementation may contribute to their shortcomings, too-easy solutions also face inherent limits on their effectiveness because they do not address root causes. In treating symptoms, too-easy solutions can neglect important aspects of a problem. At the same time, political, economic, psychological, and social dynamics often favor adoption of too-easy solutions. Politicians may choose too-easy solutions because they are politically palatable, regardless of their efficacy. Moreover, vested interests often dominate the processes that generate environmental policies. Too-easy solutions often impose fewer costs on key stakeholders or appear less costly than alternative approaches. These alternatives may be more effective in the long term but appear inferior under conventional economic analyses. Additionally, decision-making heuristics and path dependence introduce further biases in favor of too-easy solutions. Finally, too-easy solutions tend to involve fewer or less burdensome restrictions on behavior and thus satisfy social preferences for maximizing individual freedom and minimizing regulation.

This Article proposes the too-easy-solutions concept as a mechanism for evaluating environmental policies and improving environmental decision-making. Part I develops a working definition of too-easy solutions and distinguishes the related concepts of greenwashing, stopgap measures, and ecological fixes. Part II explores political, economic, and cognitive factors that stack the deck in favor of too-easy solutions through a discussion of policymaking models, economic analysis, and mental heuristics. Part III illustrates the role of these factors in adopting and retaining too-easy solutions through a series of case studies. Part III also proposes three subcategories of too-easy solutions—fig leaves, pipe dreams, and myopic approaches—based on policies' origins and motivations. Part IV then applies too-easy-solutions analysis to a prospective policy dilemma—whether to engage in solar geoengineering—and explores how too-easy-solutions analysis might apply beyond the environmental arena. Too-easy-solutions analysis offers a new and valuable perspective for responding to many challenges society faces.

I. TOO-EASY SOLUTIONS: DEFINITION AND EXAMPLES

This Part defines too-easy solutions, explains how the concept can contribute to better policymaking, and sketches out examples of too-easy solutions.

A. Defining Too-Easy Solutions and Related Concepts

What exactly are too-easy solutions anyway? As the phrase suggests, certain policies appear to be easy solutions: they seem straightforward and attractive and involve minimal costs or limited restrictions on conduct. Yet framing these policies as solutions is misleading if they are, in fact, fundamentally inadequate—they are "too easy." This Article adopts a working definition of a "too-easy solution" as an approach that appears to solve an identified environmental problem without addressing its underlying root cause. Too-easy solutions usually come at a relatively low economic or political cost and may mislead society into believing that further responses are unnecessary.

Admittedly, the concept of root cause is somewhat subjective.[1] Consider, for example, the root cause of climate change. Is it the greenhouse gas (GHG) emissions that are accumulating in the atmosphere, the economic systems that fail to internalize the full costs of a fossil-fuel-driven economy, or the consumptive practices of developed nations? A reasonable case could be made that each of these is the root cause of climate change.[2] For purposes of this Article, however, the term "root cause" refers to the underlying physical phenomenon that gives rise to a problem—which, in the case of climate change, is the accumulation of GHG emissions.

Notably, some policies that do not directly address root causes may *actually* solve or alleviate the problem as identified. The Toxics Release Inventory (TRI), for example, requires facilities to report annually the amounts of toxic chemicals they release into the environment.[3] This mechanism places no limit on such releases and, therefore, does not directly address the root cause of the problem. Nonetheless, the TRI has pressured facilities to reduce toxic pollution by putting a spotlight on their releases.[4] The TRI's indirect effect of reducing but not eliminating toxic releases constitutes a *partial* solution, which addresses one aspect or fraction of an identified problem.[5] In contrast, some

1. *Cf.* CASS R. SUNSTEIN, AFTER THE RIGHTS REVOLUTION: RECONCEIVING THE REGULATORY STATE 75 (1990) (acknowledging that judging whether a regulation is successful depends on one's view regarding the goals and scope of the regulation).

2. *See, e.g.*, *Causes of Climate Change*, EPA, https://www.epa.gov/climatechange-science/causes-climate-change [https://perma.cc/T7SA-D2KJ] (describing "human activities [that] have released large amounts of carbon dioxide and other greenhouse gases into the atmosphere" as the "dominant cause" of climate change); James McCarthy, *A Socioecological Fix to Capitalist Crisis and Climate Change? The Possibilities and Limits of Renewable Energy*, 47 ENV'T & PLAN. A: ECON. & SPACE 2485, 2490 (2015) (discussing characterization of climate change brought about by the burning of fossil fuels as example of capitalism having "fouled its own nest in ways that will hinder production and create enormous, growing, and potentially catastrophic costs"); Rachel Shwom & Janet A. Lorenzen, *Changing Household Consumption to Address Climate Change: Social Scientific Insights and Challenges*, 3 WIRES CLIMATE CHANGE 379, 379-80 (2012) (discussing framing of climate change "as a problem of current consumption in developed nations").

3. 42 U.S.C. § 11023(a).

4. *See* MICHAEL E. KRAFT ET AL., COMING CLEAN: INFORMATION DISCLOSURE AND ENVIRONMENTAL PERFORMANCE 181–82 (2011) (observing that chemical releases decreased substantially after TRI requirements became effective but also noting variation in environmental performance across industrial sectors, states, communities, and individual facilities).

5. *See* Carol M. Rose, *Environmental Lessons*, 27 LOY. L.A. L. REV. 1023, 1032–33 (1994) (suggesting that partial solutions may be preferable to potentially costly all-or-nothing approaches).

policies make little or no contribution to solving an identified problem, let alone addressing its root cause. These are often too-easy solutions.

The failure to deal with root causes may leave unresolved not only the underlying problem, but also other aspects of the problem. The challenge of fisheries management provides an illustration. If the problem is defined narrowly in terms of overconsumption, a reasonable response might rein in open access to the fishery to prevent overfishing. A transferable quota system might assign property rights to the fish, for example.[6] However, a broader understanding of the fisheries management challenge would encompass additional related concerns: maintaining genetic diversity, avoiding bycatch of other species, and safeguarding a species' ecological role.[7] A too-easy solution focused on optimizing yield may exacerbate concerns regarding the health of the species and its ecosystem.[8]

Distinguishing too-easy solutions from similar terms in the policy and academic literature—greenwashing, stopgap measures, and ecological fixes—can help refine the too-easy solutions concept. First, "greenwashing" typically refers to a company's deceptive claims that its products, services, policies, or practices are environmentally beneficial.[9] A company might exaggerate environmental benefits, or it might claim such benefits when none exist. Although the term appears most commonly in the corporate marketing context, greenwashing also includes efforts by governments, nongovernmental organizations, and politicians to fashion a misleadingly positive image of environmental responsibility.[10] In short, deceptive intent is central to the

6. *See* Amy Sinden, *The Tragedy of the Commons and the Myth of a Private Property Solution*, 78 U. COLO. L. REV. 533, 559–60 (2007); Eriko Hoshino et al., *Individual Transferable Quotas in Achieving Multiple Objectives of Fisheries Management*, MARINE POL'Y, Mar. 2020, at 1, 1.

7. Sinden, *supra* note 6.

8. *See id.* at 560 (discussing open-access fishery concerns as a "sustainability problem" as well as a "pure consumption commons problem").

9. Eric L. Lane, *Greenwashing 2.0*, 38 COLUM. J. ENV'T L. 279, 280–81 (2013); Michelle Diffenderfer & Keri-Ann C. Baker, *Greenwashing: What Your Client Should Know to Avoid Costly Litigation and Consumer Backlash*, 25 NAT. RES. & ENV'T 21, 21 (2011).

10. *Greenwash*, OXFORD ENG. DICTIONARY, https://www.oed.com/view/Entry/251865 [https://perma.cc/ZT2V-VG9Q] (defining greenwashing as "[t]o mislead . . . by falsely representing a person, company, product, etc., as being environmentally responsible"); *see, e.g.*, Dino Grandoni, *The Energy 202: Trump's EPA Chief Drops into Battleground States Ahead of Election*, WASH. POST (June 16, 2020), https://www.washingtonpost.com/news/powerpost/paloma/the-energy-

notion of greenwashing. Too-easy solutions, by contrast, often are adopted with the good faith intent of addressing or alleviating environmental concerns.

Another related term, "stopgap measures," describes interim measures aimed at mitigating immediate harm while buying time for long-term solutions.[11] California's public-safety power shutoffs, in which electric utilities shut off power lines to avoid sparking wildfires during dry wind events, offer "a clear example of a stopgap."[12] These shutoffs buy time for grid maintenance, vegetation management, and other longer-term measures that would more permanently reduce power-system-related fire hazards.[13] By definition, stopgap measures are interim or incomplete, and policymakers and other key actors acknowledge them as such.[14] Too-easy solutions, in contrast, generally are not framed as interim in nature; rather, they purport to permanently resolve an identified problem.

A third concept, the ecological fix, overlaps to some degree with too-easy solutions. Drawing on Marxist economic theory, critical geographers developed the notion of the fix (and variants like the spatio-temporal fix and the ecological fix) to describe responses of capitalist systems to various "crises."[15] These crises include declining rates of profit, "overaccumulation" of capital,[16] and capitalism's "tendency to degrade and/or exhaust its own conditions of production."[17] Fixes enable capitalist systems to

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202/2020/06/16/the-energy-202-trump-s-epa-chief-drops-into-battleground-states-ahead-of-reelection/5ee7c47d602ff12947e8cd0a [https://perma.cc/K64K-HE7E] (quoting senior vice president of the League of Conservation Voters that "[g]iven the polling it makes sense [EPA Administrator] Wheeler would be heading to battlegrounds to greenwash Trump's abysmal record."); Josh Chetwynd, *How to Handle the Specter of Political Greenwashing*, MEDIUM: PUB. INT. NETWORK (Apr. 4, 2019), https://medium.com/the-public-interest-network/how-to-handle-the-specter-of-political-greenwashing-c53c7759a47a [https://perma.cc/B7P8-68L9] (discussing political greenwashing).

11. Holly Jean Buck et al., *Evaluating the Efficacy and Equity of Environmental Stopgap Measures*, 3 NAT. SUSTAINABILITY 499, 499 (2020).

12. *Id.* at 501.

13. *Id.*

14. *Id.* at 499.

15. McCarthy, *supra* note 2, at 2486 (explaining the Marxist view that crises are "inevitable features of capitalist economies," originating from the systematic underpayment of workers and their resultant inability to purchase the commodities they produced).

16. *Id.* at 2486–87.

17. Wim Carton, *"Fixing" Climate Change by Mortgaging the Future: Negative Emissions, Spatiotemporal Fixes, and the Political Economy of Delay*, 51 ANTIPODE 750, 753 (2019); *see also* Rachel Bok, *'By Our Metaphors You Shall Know Us': The*

withstand these crises. They may involve incorporating new markets into capitalist economies, investing capital in new locations, and privatizing common resources.[18] In these varied contexts, the term "fix" may evoke multiple meanings: a temporary addressing of a problem, a response to addiction, a lock-in of infrastructure, or a large-scale technological approach.[19]

More specifically, the concept of the ecological fix encompasses policies and initiatives that facilitate continued economic growth while alleviating environmental problems.[20] Carbon offsets and wetland mitigation banks[21] exemplify ecological fixes that commodify natural processes, restructure environmental governance, and thereby enable capitalist approaches to continue and expand.[22] What distinguishes an ecological fix from

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'Fix' of Geographical Political Economy, 43 PROGRESS HUM. GEOGRAPHY 1087, 1100 (2019) (defining "fix" as a "precarious, temporary solution mobilized in response to crises of capitalist reproduction that only exacerbates fundamental, underlying contradictions").

18. McCarthy, *supra* note 2, at 2487.

19. Michael Ekers & Scott Prudham, *The Metabolism of Socioecological Fixes: Capital Switching, Spatial Fixes, and the Production of Nature*, 107 ANNALS AM. ASS'N GEOGRAPHERS 1370, 1375 (2017).

20. *See* McCarthy, *supra* note 2, at 2487; Michael Ekers & Scott Prudham, *Towards the Socio-Ecological Fix*, 47 ENV'T & PLAN. A: ECON. & SPACE 2438, 2438 (2015) (extending the idea of fix to encompass "shifts in the social regulation of productions of space and nature in response to real and perceived crises of legitimacy"); Karen Bakker, *Neoliberal Nature, Ecological Fixes, and the Pitfalls of Comparative Research*, 41 ENV'T & PLAN. A 1781, 1782 (2009); *see also* Noel Castree, *Neoliberalising Nature: The Logics of Deregulation and Reregulation*, 40 ENV'T & PLAN. A: ECON. & SPACE 131, 146–49 (2008) (proposing four types of fixes, all aimed at "achieving strategically a core objective for capital and/or the state," but not all of which are intended to protect the environment).

21. To compensate for the loss of wetlands—and associated ecosystem services—from development, regulators may require developers to pay for restoring or creating wetlands at another location, often administered in a centralized parcel of land as a wetland mitigation bank. *See* James Salzman & J.B. Ruhl, *Currencies and the Commodification of Environmental Law*, 53 STAN. L. REV. 607, 611–12 (2000).

22. *See* Ekers & Prudham, *supra* note 20, at 2441; Morgan Robertson, *Flexible Nature: Governing with the Environment in the Development of U.S. Neoliberalism*, 108 ANNALS AM. ASS'N GEOGRAPHERS 1601 (2018). Ecological fixes often are rooted in neoliberalism, which features the market as an organizing principle for allocating goods and services and proposes market-oriented regulatory techniques as alternatives to conventional command-and-control regulation. Robertson, *supra* note 22, at 1606–07; McCarthy, *supra* note 2, at 2488, 2490 (describing neoliberalism "as a regime of accumulation and mode of regulation organized in large part around new ways of bringing nature within circuits of capital"); James McCarthy & Scott Prudham, *Neoliberal Nature and the Nature of Neoliberalism*, 35 GEOFORUM 275, 276 (2004).

other policy solutions is that the ecological fix creates opportunities for profit, even as it purports to address the immediate problem.[23] Thus, generators of carbon offsets can profit from selling those offsets to carbon emitters, and wetland mitigation banks can contract with developers to establish wetlands on their behalf.

Too-easy solutions and ecological fixes have much in common. Both are undertaken with the intent of resolving an environmental problem. And both may appear to address that problem while perpetuating the underlying dynamics that gave rise to it. Even though a specific policy measure may qualify as both a too-easy solution and an ecological fix, too-easy solutions and ecological fixes differ in fundamental ways. Unlike some ecological fixes, too-easy solutions do not attack an environmental problem's root cause. Moreover, too-easy solutions do not assume a particular economic system; they might be found in capitalist, socialist, or other economies. The ecological fix, in contrast, is embedded in the capitalist system that it helps to perpetuate.[24] Consistent with this understanding, some commentators have characterized various Green New Deal proposals as ecological fixes, in spite of their transformational potential, because they leave capitalist structures in place.[25] The fact that such proposals could serve as *actual* solutions to climate change and environmental injustices—instead of too-easy solutions—demonstrates the comparatively broad nature of the ecological fix concept.[26] Finally, while various scholars have written on fixes from a critical perspective, the fix is ultimately a descriptive account of capitalism's persistence.[27] In contrast, too-easy-solutions analysis is a normative approach that calls for developing and adopting effective solutions alongside or in place of too-easy solutions.

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23. *See* Bakker, *supra* note 20, at 1782.

24. *See* Buck et al., *supra* note 11, at 500.

25. *See* McCarthy, *supra* note 2, at 2491 ("[The] explicit goal of *most* of these 'Green New Deal' proposals is to save capitalism, not to promote a transition towards a genuinely different socioeconomic system."); *cf.* Kevin Surprise, *Preempting the Second Contradiction: Solar Geoengineering as Spatiotemporal Fix*, 108 ANNALS AM. ASS'N GEOGRAPHERS 1228, 1230 (2018) (suggesting that green capitalism would constitute a socioecological fix for the climate crisis).

26. *Cf.* Ekers & Prudham, *supra* note 20, at 2441 (noting the "highly generic" notion of the term "fix" in literature on neoliberal environmental regulation).

27. *See id.* at 2442.

B. The Value of the Too-Easy Solution Concept

How might the too-easy solution concept contribute to better policies? Understanding a particular policy choice as a too-easy solution focuses attention on the specific problem at hand: it asks (1) whether a measure is likely to achieve identified environmental objectives and (2) whether it addresses the activity or phenomenon responsible for the problem. Asking these questions in turn directs attention to alternative ways of defining the problem. Furthermore, although the too-easy-solutions approach does not directly critique the capitalist system, it inquires into the systemic factors—political, economic, and social—that promote the adoption of too-easy solutions. Asking how and why a particular measure was adopted can reveal barriers to reform and facilitate consideration of better approaches.

Too-easy-solutions analysis may be applied both prospectively and retrospectively. Prospective application can enable policymakers to identify too-easy solutions at the outset and consider more effective alternatives or additional measures. However, prospective application may not always be possible. Information to identify an approach as too easy may be lacking, or an initially promising approach may become a too-easy solution only after its adoption. In such circumstances, applying too-easy-solutions analysis after the fact can facilitate reconsideration of existing approaches.

To illustrate the distinct contributions of the too-easy-solutions and ecological-fix concepts, consider two examples: renewable energy technologies and fish consumption advisories. By substituting for fossil fuel combustion, renewable energy technologies directly reduce the GHG emissions associated with energy production and use. As such, they generally serve as an actual solution to climate change, not a too-easy solution. Yet renewable energy technologies also may constitute an ecological fix.[28] These technologies enable the commodification of energy from wind, waves, and sunlight. In doing so, renewable energy technologies may facilitate the growth of capitalist economies, and the substantial investment required may serve as a fix to absorb overaccumulated capital.[29] Moreover, by mitigating the climate crisis and expanding available energy resources, such

28. McCarthy, *supra* note 2, at 2495–97.
29. *Id.*

technologies relieve pressures to transition away from capitalism.[30] The ecological-fix framing highlights how such technologies may further capitalist expansion—and how such expansion can harm marginalized communities and the environment.[31] Nonetheless, the fact that renewable energy technologies may be an ecological fix does not require their abandonment. Far from being too-easy solutions, these technologies are essential to solving climate change.

Fish consumption advisories illustrate the value added by too-easy-solutions analysis. These advisories warn of the dangers of consuming contaminated fish but do not reduce contaminant levels in the environment.[32] Whether such advisories constitute a fix is debatable: they may serve as a temporary response to contamination and allow ongoing polluting activities to continue, but the advisories themselves do not create opportunities for profit. Advisories can be a too-easy solution, however, because they offer a cheap response to the identified problem without addressing its underlying root cause. Rather than reducing the environmental contamination that renders the fish inedible, the advisories merely discourage people from consuming contaminated fish.[33] Notably, the advisories do nothing to address environmental damage, the inability to carry out traditional cultural practices, or the loss of an important protein source.[34] Identifying the potential for consumption advisories to neglect these harms and to function as too-easy solutions underscores their limitations and surfaces the need to consider additional or alternative measures aimed at the broader problem of contamination. Too-easy-solutions analysis focuses attention on the fundamental question of whether fish advisories—or other measures—are likely to achieve key environmental objectives.

30. *Id.* at 2496–97. However, a transition to renewable energy could lead to more spatially extensive and dispersed energy production and, thus, bring about more socially progressive and equitable capitalist systems. *Id.* at 2499.

31. *Id.* at 2497 ("[T]he renewal of capital accumulation would turn centrally on . . . displacement and dispossession of economically and politically marginal populations, particularly in the global South.").

32. Catherine A. O'Neill, *No Mud Pies: Risk Avoidance as Risk Regulation*, 31 VT. L. REV. 273, 277–78 (2007).

33. *Id.* at 279.

34. *Id.* at 307, 318–20.

C. *Examples of Too-Easy Solutions Within Environmental Policies*

Too-easy solutions are commonplace; many environmental policies fail to solve the problems they purport to solve, come at a relatively low cost, and do not address underlying root causes. The following discussion briefly introduces further examples of too-easy solutions: plastics recycling, multiple-use management of the public lands, emissions trading under the Clean Development Mechanism (CDM), coastal armoring, and pollution control requirements. Part III will revisit these examples in the course of developing analytical subcategories of too-easy solutions.

First, plastics recycling is a too-easy solution to the problem of plastic waste. Recycling promises to eliminate unwanted plastic, avoid its breakdown and release into the environment, and regenerate material for productive use. Unfortunately, its promise has proven to be an empty one. After over three decades of recycling efforts, plastic recycling rates remain below 10 percent, even as plastic use—and the volume of plastic waste—has skyrocketed.[35] The problem lies not just in inadequate implementation, however. Recycling fails to address the root causes of the problem: the production and use of environmentally problematic materials that are neither biodegradable nor readily recycled.[36]

Multiple-use management is a too-easy solution to the dilemma of reconciling potentially conflicting uses of the public lands. The multiple-use philosophy governs how the primary federal land management agencies, the Bureau of Land Management and the U.S. Forest Service, administer the lands under their jurisdiction.[37] At first glance, multiple use offers some-

35. *Plastics: Material-Specific Data*, EPA, https://www.epa.gov/facts-and-figures-about-materials-waste-and-recycling/plastics-material-specific-data [https://perma.cc/UR24-5QND] (Sept. 30, 2021). Estimated global recycling rates are similar. Roland Geyer et al., *Production, Use, and Fate of All Plastics Ever Made*, 3 SCI. ADVANCES, July 2017, at 1, 2–3 (estimating that 60 percent of all plastics ever produced worldwide are accumulating in landfills or the environment and that only 9 percent of plastics have been recycled).

36. *See* EPA, *supra* note 35. The amount of plastics generated in the U.S. doubled between 1990 and 2018 to over 35 million tons, with just 8.7% recycled in 2018. Over 26 million tons of plastics—three-fourths of plastics generated—were landfilled. *Id.*

37. George Cameron Coggins, *Of Succotash Syndromes and Vacuous Platitudes: The Meaning of "Multiple Use, Sustained Yield" for Public Land Management*, 53 U. COLO. L. REV. 229, 229–30 (1982).

thing for everyone—ranchers, the mining industry, timber interests, recreationists, and those interested in wildlife conservation—all while maximizing social utility. In practice, however, powerful economic interests tend to dominate multiple-use management, and land use conflicts remain unresolved. These uses are often irreconcilable, making multiple use impossible in practice.

A prominent example of a too-easy solution to climate change is emissions trading under the Clean Development Mechanism (CDM). The Kyoto Protocol capped GHG emissions of developed countries and established the CDM, a market-based emissions trading scheme in which emission reduction projects in developing countries generate tradeable emissions credits.[38] Notwithstanding features designed to ensure the integrity of emissions trading, the CDM has been roundly criticized for its ineffectiveness.[39] The CDM's shortcomings are the result of not only poor design and implementation difficulties but also the failure to address the root cause of climate change: rising GHG emissions.[40]

Additionally, coastal armoring—the construction of seawalls, breakwaters, and other structures to protect the shoreline—is a too-easy solution to erosion, including erosion caused by rising seas and climate change.[41] Armoring can shield specific properties in the short-term. However, it exacerbates erosion on adjacent coastal tracts and, in the long term, erodes even the originally shielded properties.[42] Moreover, armoring does nothing to address the root cause of rising sea levels: rising GHG concentrations.

Finally, even pollution control requirements—a mainstay of environmental regulation—may become a too-easy solution. Also known as end-of-pipe controls, pollution controls can take diverse forms like a wastewater treatment plant, a scrubber on a smokestack, or a catalytic converter at an engine exhaust man-

38. Michael Wara, *Measuring the Clean Development Mechanism's Performance and Potential*, 55 UCLA L. REV. 1759, 1761–62 (2008).

39. *See infra* Section III.A.2.

40. *See* EPA, *supra* note 2.

41. MOLLY LOUGHNEY MELIUS & MARGARET R. CALDWELL, 2015 CALIFORNIA COASTAL ARMORING REPORT: MANAGING COASTAL ARMORING AND CLIMATE CHANGE ADAPTATION IN THE 21ST CENTURY 7 (2015).

42. *See infra* Section III.B.2.

ifold. Pollution control requirements have generated tremendous health and environmental benefits,[43] and they often do address root causes by eliminating pollutant releases into the environment. However, because environmental laws tend to regulate air, water, and land pollution separately, pollution controls sometimes "encourage the transfer of pollution" to unregulated media rather than its elimination.[44] In such circumstances, pollution controls may constitute a too-easy solution.

Too-easy solutions appear attractive but, in disregarding root causes, often fail to solve environmental problems. Understanding why policymakers nonetheless adopt too-easy solutions—the subject of the next Part—is a first step in improving environmental policymaking.

II. POLICYMAKING DYNAMICS

Too-easy solutions often hide in plain sight. This Part turns to the question of how too-easy solutions arise. For starters, too-easy solutions tend to be consistent with political norms in favor of minimizing government intervention. In U.S. policymaking, "an unregulated marketplace is the norm and . . . those who advocate government intervention must justify it by showing that it is needed to achieve an important public objective that an unregulated marketplace cannot provide."[45] These norms reflect

43. *See, e.g.*, Daniel H. Cole & Peter Z. Grossman, *When Is Command-and-Control Efficient? Institutions, Technology, and the Comparative Efficiency of Alternative Regulatory Regimes for Environmental Protection*, 1999 WIS. L. REV. 887, 914 (explaining that the Clean Air Act "has managed to produce sizeable net benefits to society throughout its history" while relying heavily on pollution control); OFF. OF AIR & RADIATION, EPA, THE BENEFITS AND COSTS OF THE CLEAN AIR ACT FROM 1990 TO 2020: SUMMARY REPORT 2 (2011), https://www.epa.gov/sites/default/files/2015-07/documents/summaryreport.pdf [https://perma.cc/8GPY-CKV2] (concluding that benefits generated by the 1990 Clean Air Act Amendments, which rely primarily on a pollution control approach, "vastly exceed[ ]" the costs of compliance).

44. Stephen M. Johnson, *From Reaction to Proaction: The 1990 Pollution Prevention Act*, 17 COLUM. J. ENV'T L. 153, 154 (1992).

45. Stephen Breyer, *Analyzing Regulatory Failure: Mismatches, Less Restrictive Alternatives, and Reform*, 92 HARV. L. REV. 547, 552 (1979). Government regulation might be justified by abuse of power, inequity, externalities, or imperfect information, for example. *Id.* at 553–60; *see also* Thomas O. McGarity, *The Expanded Debate over the Future of the Regulatory State*, 63 U. CHI. L. REV. 1463, 1466–67 (1996) (observing that, in enacting protective statutes, Congress has typically sought to stop harms and abuses of power rather than address externalities or other market failures); Joseph P. Tomain & Sidney A. Shapiro, *Analyzing Government Regulation*, 49 ADMIN. L. REV. 377, 400 (1997) (noting economic and noneconomic

the value society places on individual freedom as well as a basic skepticism of government authority.[46] The general presumption against regulation has a corollary: if regulation is needed, the less intervention and coercion, the better.[47] Too-easy solutions that involve lesser degrees of government intervention have a presumptive advantage over more coercive policy alternatives, which may not only limit autonomy but also cause additional harms.[48]

Beyond these general prescriptions, how do policymakers choose between different policy options? And why might they choose too-easy solutions that fail to address root causes—especially when that failure may be apparent from the outset? In constructing narratives to explain the frequency of too-easy solutions, understanding the political, economic, and psychological factors at work is essential. Models of policymaking can serve as the foundation for these narratives.

A. Models of Policymaking that Help Explain the Use of Too-Easy Solutions

This Section explores basic models of how policies are made as well as dynamic models of how policies change. Taken together, these models suggest that policies are influenced by history, context, and other factors and generally do not reflect perfectly rational choices.

1. Basic Models of Policymaking

Basic models of policymaking, such as institutionalism, interest-group theory, and the net-benefits model, capture key elements of how policy is made. Building on interest-group theory,

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justifications for government intervention); SUNSTEIN, *supra* note 1, at 47–73 (discussing justifications for government regulation).

46. Breyer, *supra* note 45, at 552; *see also* SUNSTEIN, *supra* note 1, at 46 (contending that considerations of autonomy and welfare can support government intervention, notwithstanding the general "presumption in favor of a system of voluntary arrangements, operated within the basic institutions of private property, tort, and contract").

47. *See* STEPHEN BREYER, REGULATION AND ITS REFORM 185 (1982) (recommending a "'least restrictive alternative' approach to regulation" and suggesting that "classical regulation ought to be looked upon as a weapon of last resort"); *see also* McGarity, *supra* note 45, at 1497 (discussing free marketeers' antipathy toward centralized regulatory decision-making).

48. *See* BREYER, *supra* note 47, at 261.

public-choice theory offers further insight by applying an economic lens to the political process. By themselves, however, none of these theories provides a complete explanation of policymaking.

Institutionalism explains policies as the product of institutions, laws, and procedures.[49] Norms, standard practices, and other institutional features tend to promote policy stability and inertia.[50] Although policy change can be difficult for institutionalism to explain,[51] institutions are neither apolitical nor immutable. Rather, they channel and respond to political pressures.[52]

Interest-group theory, in contrast, focuses on the political aspects of policymaking and views policy as the result of competition between interest groups.[53] In this environment, policymakers serve "as referees who reconcile the diverse interests in society to achieve results that are acceptable politically to the groups that represent those interests."[54] Interest-group theory places a spotlight on the power of regulated industries to capture agencies and questions the government's ability to act in the public interest.[55]

Finally, the net-benefits model, an economics-driven approach, casts policymakers as maximizers of social utility.[56] This normative model calls for policymakers to identify policy options, analyze their costs and benefits, and select the option that offers the greatest net benefits.[57] While the net-benefits model is quite influential, it does not readily account for equity or goals other than maximizing net benefits.[58]

Both interest-group theory and the net-benefits model assume rational decision-making. Under interest-group theory, policymakers aim to optimize policy choices in terms of political acceptability; under the net-benefits model, policymakers seek

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49. DANIEL J. FIORINO, MAKING ENVIRONMENTAL POLICY 10 (1995).

50. *See* B. Guy Peters, *Institutionalism and Public Policy*, *in* CONTEMPORARY APPROACHES TO PUBLIC POLICY 57, 63 (B. Guy Peters & Philippe Zittoun eds., 2016).

51. *Id.* at 68.

52. *Id.* at 64–65.

53. FIORINO, *supra* note 49, at 11.

54. *Id.*; *see also* WALTER A. ROSENBAUM, ENVIRONMENTAL POLITICS AND POLICY 44–47 (9th ed. 2014).

55. *See* George J. Stigler, *The Theory of Economic Regulation*, 2 BELL J. ECON. & MGMT. SCI. 3, 3 (1971).

56. FIORINO, *supra* note 49, at 11.

57. *Id.*

58. *See id.* at 12.

to maximize net benefits.[59] In practice, however, policymakers—like ordinary individuals—often depart from projections of comprehensively rational behavior. In some instances, policymakers may support a proposal when it is not politically or economically rational to do so.[60] Moreover, policymakers face constraints of bounded rationality and limited time and resources. Thus, they may simply make the best decisions they can under those constraints.[61]

Building on interest-group theory, public-choice theory offers a potentially powerful account of how too-easy solutions are adopted. Public-choice theory applies economic principles to analyze the political process and rejects the traditional view of legislating as informed, deliberative, and rational.[62] While the theory assumes that all political participants act in rationally self-interested ways, it focuses attention on the role of regulated industries and other concentrated groups.[63] Members of these groups face lower organizational costs and have a greater stake in the outcome of policy processes than individual members of the public.[64] Because concentrated groups have a greater ability and motivation to engage in collective action,[65] they wield disproportionate influence on legislation.[66]

The complex and technical nature of environmental problems can hinder public understanding and engagement and

59. *See* JOHN W. KINGDON, AGENDAS, ALTERNATIVES, AND PUBLIC POLICIES 82 (1st ed. 1984).

60. *See id.* at 82–83.

61. FIORINO, *supra* note 49, at 14. *See* 3 HERBERT A. SIMON, MODELS OF BOUNDED RATIONALITY 291–94 (1997); Daniel Kahneman, *Maps of Bounded Rationality: Psychology for Behavioral Economics*, 93 AM. ECON. REV. 1449 (2003).

62. *See* William N. Eskridge, Jr., *Politics Without Romance: Implications of Public Choice Theory for Statutory Interpretation*, 74 VA. L. REV. 275, 282–83 (1988).

63. David A. Skeel, Jr., *Public Choice and the Future of Public-Choice-Influenced Legal Scholarship*, 50 VAND. L. REV. 647, 651 (1997) (reviewing MAXWELL L. STEARNS, PUBLIC CHOICE AND PUBLIC LAW (1997)).

64. *See id.* at 652.

65. Daniel A. Farber, *Politics and Procedure in Environmental Law*, 8 J.L. ECON. & ORG. 59, 78 (1992); *see* Eskridge, *supra* note 62, at 286; Edward L. Rubin, *Beyond Public Choice: Comprehensive Rationality in the Writing and Reading of Statutes*, 66 N.Y.U. L. REV. 1, 5–6 (1991). *See generally* MANCUR OLSON, THE LOGIC OF COLLECTIVE ACTION: PUBLIC GOODS AND THE THEORY OF GROUPS (photo. reprt. 1971) (1965).

66. *See* Farber, *supra* note 65, at 61, 65.

thereby magnify the influence of concentrated groups in environmental policymaking.[67] Moreover, institutional features tend to favor short-term policy options. Politicians' time horizons, driven by relatively short election cycles, often do not match up with the long-term nature of environmental problems.[68] When addressing such problems, politicians may prefer options that involve low short-term costs over those that involve higher short-term costs but lower long-term costs.[69]

In the wake of short election cycles and concentrated groups' advantages, the existence of environmental laws that reflect—at least in part—the interests of the general public calls for an explanation.[70] As an initial matter, existing firms might support regulations that raise barriers to entry by competitors while generating rents for themselves.[71] For example, generally applicable pollution control requirements can disadvantage smaller firms by imposing disproportionate costs on them.[72] At the same time, those requirements may reduce overall output and thereby raise market prices of goods produced by the industry.[73]

Environmental regulation that does not benefit existing firms, however, requires further explanation. Such regulation may flow from a "combination of republican moments and legislative credit-seeking" when legislators perceive political advantage from responding to heightened public support for environmental legislation.[74] Public-choice theory does not readily account for these public-spirited laws. Under a more comprehensive account of policymaking, various factors—including policy

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67. *See* Daniel C. Esty, *Toward Optimal Environmental Governance*, 74 N.Y.U. L. REV. 1495, 1548 (1999) ("[T]he complexity and opacity of many environmental issues and the public's difficulty in perceiving its own interest make the risk of special interest manipulation much more severe in the environmental realm than in other fields . . . .").

68. *See* Paul Pierson, *Increasing Returns, Path Dependence and the Study of Politics*, 94 AM. POL. SCI. REV. 251, 261 (2000).

69. *See* ZACHARY A. SMITH, THE ENVIRONMENTAL POLICY PARADOX 66 (6th ed. 2013). As discussed in Section II.B, this focus on the short term is compounded by discounting future costs and benefits.

70. *See* Farber, *supra* note 65, at 61; Tomain & Shapiro, *supra* note 45, at 392–93.

71. Richard L. Revesz, *Federalism and Environmental Regulation: A Public Choice Analysis*, 115 HARV. L. REV. 553, 572 (2001); Todd J. Zywicki, *Environmental Externalities and Political Externalities: The Political Economy of Environmental Regulation and Reform*, 73 TUL. L. REV. 845, 856–57 (1999).

72. Zywicki, *supra* note 71, at 862–63.

73. *Id.*

74. Farber, *supra* note 65, at 68.

rationales, ideology, constituents' preferences, morality, and interest-group pressure—may play a role in motivating legislators' votes.[75]

2. Dynamic Models of Policymaking

Additional theories of policymaking—incrementalism, the multiple-streams model, and punctuated-equilibrium theory—focus on how policy changes. Policymakers often take incremental steps rather than making abrupt policy changes.[76] An incremental approach allows for adjustments and corrections while implicitly acknowledging that information may be incomplete and uncertainties irresolvable.[77] An incremental approach also reflects the compromises inherent to politics and the difficulty of generating support for radical change.[78] Relatedly, policy choices are often influenced by previous policies. Such path dependence can reflect political inertia: a newly elected government inherits the institutions, programs, and laws of its predecessors, who may have taken steps to thwart subsequent policy change.[79] Path dependence also reflects the advantages that accrue to an existing approach as a result of learning-by-doing and the ability to spread out setup costs.[80]

Recognizing the limits of incrementalism in accounting for drastic policy change, the multiple-streams model views policymaking agencies as loosely organized sets of ideas, actors, and

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75. *See* Tomain & Shapiro, *supra* note 45, at 393–94; Rubin, *supra* note 65, at 28–35; Daniel A. Farber & Philip P. Frickey, *The Jurisprudence of Public Choice*, 65 TEX. L. REV. 873, 900–01, 908 (1987) (contending that relative importance of ideology, economic interest, and legislative structure in the legislative process is "unclear and variable"); Richard B. Stewart, *Pyramids of Sacrifice? Problems of Federalism in Mandating State Implementation of National Environmental Policy*, 86 YALE L.J. 1196, 1217 (1977) (discussing moral and religious bases of public concerns that prompted enactment of major environmental legislation).

76. *See* SMITH, *supra* note 69, at 331; Daniel J. Fiorino, *Rethinking Environmental Regulation: Perspectives on Law and Governance*, 23 HARV. ENV'T L. REV. 441, 442 (1999).

77. *See* FIORINO, *supra* note 49, at 15.

78. *See* SMITH, *supra* note 69, at 65; Fiorino, *supra* note 76.

79. *See* Richard Rose, *Inheritance Before Choice in Public Policy*, 2 J. THEORETICAL POL. 263, 266–67 (1990); Pierson, *supra* note 68, at 262. Other features of politics that favor path dependence include the allocation of authority, the necessity of collective action, the lack of clear measures of policy success, and the absence of market competition. Pierson, *supra* note 68, at 254–61.

80. *See* Pierson, *supra* note 68, at 254.

processes, rather than as monolithic actors.[81] This model explains policy change in terms of three conjoined streams: (1) the problem stream, (2) the policy stream, and (3) the political stream.[82] Shaped by problem indicators, focusing events, and feedback, the problem stream describes the matters that society believes the government should address.[83] The policy stream—which consists of possible policy responses—is affected by resource availability, the feasibility of possible responses, and consistency with policymakers' and society's values.[84] The political stream determines the problems and potential solutions that receive attention and reflects party ideology, interest-group pressure, the national mood, and the distribution of political power.[85]

Although policies are generally stable, they sometimes undergo sudden shifts—a pattern that punctuated-equilibrium theory explains in terms of negative and positive feedbacks.[86] Negative feedback mechanisms, such as separation of powers and constraints on agency policymaking, promote policy stability.[87] Yet positive feedback mechanisms—including bandwagon effects among politicians and in media coverage—can spark sudden policy change.[88] Such change is more likely when new information, technological developments, or other exogenous events disturb the policy environment.[89]

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81. *See* KINGDON, *supra* note 59, at 92; FIORINO, *supra* note 49, at 16.

82. *See* KINGDON, *supra* note 59, at 92–93.

83. *See id.* at 95–108.

84. *See* Nikolaos Zahariadis, *Bounded Rationality and Garbage Can Models of Policy-Making*, *in* CONTEMPORARY APPROACHES TO PUBLIC POLICY, *supra* note 50, at 155, 160; KINGDON, *supra* note 59, at 138–46.

85. *See* KINGDON, *supra* note 59, at 152; Zahariadis, *supra* note 84, at 160. The model has been criticized for giving insufficient weight to structural and historical factors in agenda setting. *See* Gary Mucciaroni, *The Garbage Can Model & the Study of Policy Making: A Critique*, 24 POLITY 459, 471–82 (1992); David M. Waguespack, *Reconciling Garbage Cans and Rational Actors: Explaining Organizational Decisions About Environmental Hazard Management*, 35 SOC. SCI. RSCH. 40, 41 (2006).

86. *See* Frank R. Baumgartner, *Punctuated Equilibrium Theory and Environmental Policy*, *in* PUNCTUATED EQUILIBRIUM AND THE DYNAMICS OF U.S. ENVIRONMENTAL POLICY 24, 26–27 (Robert Repetto ed., 2006); Robert Repetto, *Introduction* to PUNCTUATED EQUILIBRIUM AND THE DYNAMICS OF U.S. ENVIRONMENTAL POLICY, *supra*, at 1, 9–10.

87. Repetto, *supra* note 86, at 9–10.

88. *Id.* at 10–11.

89. *Id.* at 11.

The enactment of the major federal environmental statutes in the 1970s represented significant policy changes that exemplify punctuated equilibrium.[90] However, subsequent reform efforts have reflected incrementalism,[91] as partisan polarization, declining trust in government, and other factors have contributed to legislative gridlock.[92] Environmental policymaking has shifted to the executive branch and the courts, as illustrated by the Obama Administration's climate change regulatory initiatives, the Trump Administration's subsequent rollbacks of those initiatives, heated litigation over both the initiatives and rollbacks, and common law lawsuits aimed at forcing reductions in GHG emissions.[93] However, there are limits to what might be accomplished without Congress: effective solutions sometimes require new legislation.

3. Synthesis of Policymaking Models

Taken together, the various models of environmental policymaking suggest several fundamental principles for too-easy-solutions analysis. First, policies seldom reflect comprehensively rational choices. Policies are often the product of political compromise or of interest-group influence rather than precisely calibrated design. Even when such influence is minimal, policymaking institutions are not monolithic, and decision-makers within them are constrained by bounded rationality and other limitations. Second, policymaking usually occurs in small increments. Legislated policies are especially resistant to change. However, sudden shifts in policy can occur when problem, policy, and political streams coincide, or when new information or events disturb the policy environment. In any case, policies do not flow from continuous rational evaluation and re-evaluation

90. Daniel J. Fiorino, *Streams of Environmental Innovation: Four Decades of EPA Policy Reform*, 44 ENV'T L. 723, 729 (2014).

91. *Id.*; Fiorino, *supra* note 76, at 442 (characterizing efforts to reduce administrative burdens and increase compliance flexibility as "little more than a tinkering with specific elements of a highly complex system").

92. *See* CHRISTOPHER MCGRORY KLYZA & DAVID J. SOUSA, AMERICAN ENVIRONMENTAL POLICY, 1990–2006, at 21–32 (2008).

93. *See* Albert C. Lin, *Uncooperative Environmental Federalism: State Suits Against the Federal Government in an Age of Political Polarization*, 88 GEO. WASH. L. REV. 890, 892, 914 (2020); *see also* KLYZA & SOUSA, *supra* note 92, at 33 (discussing the institutional disruption in environmental policymaking as policymaking has shifted to venues other than Congress).

but from discontinuous periods of focused attention. Third, regulated industries and other concentrated groups possess advantages in the policymaking process that favor too-easy solutions but do not guarantee their adoption. Policy choices reflect elements of path dependence, as well as stochasticity, and history and context matter in attempting to understand those choices.

B. The Tendency of Economic Analysis to Favor Too-Easy Solutions

The central analytical tool of welfare economics, cost-benefit analysis (CBA), often favors too-easy solutions in environmental policymaking.[94] Welfare economics "define[s] optimal social welfare as the state of the world that a perfectly functioning market would achieve," and it promotes efficiency in terms of maximizing social welfare.[95] CBA, the identification and analysis of the costs and benefits of alternative courses of action, is the primary mechanism for fostering efficiency in government regulation. However, only a few environmental laws mandate that regulatory standards be efficient.[96] Policymakers often prioritize health, feasibility, or cost-effectiveness instead of efficiency in enacting environmental statutes or promulgating rules to implement those statutes.[97] All significant regulations nevertheless must undergo an assessment of costs and benefits before they are finalized.[98] As a result, CBA has assumed a role "at the heart

94. *See* Wallace E. Oates & Paul R. Portney, *The Political Economy of Environmental Policy*, *in* 1 HANDBOOK OF ENVIRONMENTAL ECONOMICS 325, 348 (Karl-Göran Mäler & Jeffrey R. Vincent eds., 2003); Robert W. Hahn, *The Impact of Economics on Environmental Policy*, 39 J. ENV'T ECON. & MGMT. 375 (2000).

95. Sinden, *supra* note 6, at 537, 543.

96. *E.g.*, 15 U.S.C. § 2605(c)(2)(A)(iv).

97. Both feasibility analysis and cost-effectiveness analysis involve some consideration of costs but, unlike CBA, neither seeks to quantify the value of benefits. Feasibility analysis attempts to identify the most stringent level of regulation that is technologically and economically feasible, whereas cost-effectiveness analysis focuses on determining the cheapest way to achieve a specified regulatory goal. *See* Amy Sinden, *A "Cost-Benefit State"? Reports of Its Birth Have Been Greatly Exaggerated*, 46 ENV'T L. REP. 10933, 10934, 10937–39 (2016).

98. Exec. Order No. 12,866, 3 C.F.R. § 638 (1994), *reprinted as amended in* 5 U.S.C. § 601 app. at 802–06 (2012); 2 U.S.C. § 1532 (2018).

of [federal] regulatory decision-making,"[99] even when underlying statutes do not require—or authorize—its consideration.[100]

Rather than revisiting the vigorous debate surrounding the appropriateness of using CBA to set regulatory standards, this Article focuses on CBA's potential to introduce a bias in favor of too-easy solutions. Although CBA is often framed as a neutral technique, its inherent features and manner of application can be contrary to environmental goals.

As an initial matter, adoption of CBA as a decision-making criterion promotes efficiency over other possible objectives, such as long-term economic growth, innovation, or equity.[101] Even if policymakers use CBA only as an analytic tool and not as a basis for standard setting, it can lead to systematic biases against environmental protection. Generally, quantifying the costs of protection is easier than quantifying environmental benefits. For example, determining the cost of installing a pollution control device is relatively straightforward; calculating the value of health and environmental benefits from reduced pollution is more complicated.[102] Because CBA tends to focus attention on items that are more readily quantified, policymakers who rely on CBA may undervalue benefits because they tend to be more difficult to quantify.[103]

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99. Michael A. Livermore & Richard L. Revesz, *Retaking Rationality Two Years Later*, 48 HOUS. L. REV. 1, 4 (2011); *see also* Frank Ackerman & Lisa Heinzerling, *Pricing the Priceless: Cost-Benefit Analysis of Environmental Protection*, 150 U. PA. L. REV. 1553, 1560 (2002); Sidney A. Shapiro & Christopher H. Schroeder, *Beyond Cost-Benefit Analysis: A Pragmatic Reorientation*, 32 HARV. ENV'T L. REV. 433, 435 (2008) (describing CBA as "a one-size-fits-all technique" that is applied to a wide range of policy problems).

100. *See* David M. Driesen, *The Societal Cost of Environmental Regulation: Beyond Administrative Cost-Benefit Analysis*, 24 ECOLOGY L.Q. 545, 555–56 (1997); Shapiro & Schroeder, *supra* note 99, at 436 (noting that use of CBA is entrenched in federal government although "almost all" federal environmental, health, and safety statutes "reject the use of a cost-benefit test to establish the level of regulation").

101. *See* Driesen, *supra* note 100, at 581.

102. *See* Ackerman & Heinzerling, *supra* note 99, at 1557–58. Even when risk information regarding an environmental hazard is available, the uncertainty ranges associated with the data often are so broad as to render useless any quantification of regulatory benefits. *See* Shapiro & Schroeder, *supra* note 99, at 454–55.

103. *See* David M. Driesen, *Is Cost-Benefit Analysis Neutral?*, 77 U. COLO. L. REV. 335, 397 (2006); Lisa Heinzerling, *Regulatory Costs of Mythic Proportions*, 107 YALE L.J. 1981, 2061 (1998); Ackerman & Heinzerling, *supra* note 99, at 1578. In issuing regulations to phase out lead from gasoline, for example, EPA's initial CBA did not monetize recently discovered benefits of reducing adult blood pressure. ROBERT V. PERCIVAL ET AL., ENVIRONMENTAL REGULATION: LAW, SCIENCE, AND

Additionally, economists apply a discount rate to future costs and benefits to account for the fact that they may occur in different timeframes.[104] The systematic effect of discounting is to undervalue regulations projected to generate future benefits, as compared to those that promise immediate or near-term benefits.[105] Conversely, regulations with large upfront costs appear less favorable than those with primarily long-term costs.[106] Effective solutions to environmental problems often require sizable upfront investments in the form of redesigned production processes or new pollution control devices.[107] In addition, their benefits—in terms of lives saved or harms prevented—usually occur well into the future.[108] As a result, discounting tends to disfavor such solutions.

For example, fish consumption advisories demonstrate how discounting might favor too-easy solutions: the costs of such advisories are relatively low, and the benefits begin to accrue immediately. In contrast, remedying the underlying contamination itself would likely impose significant upfront pollution control costs, which would not be discounted. The bulk of the benefits, in terms of avoided morbidity or mortality, would be subject to significant discounting because they would occur in the future as contaminant levels gradually decline.[109]

POLICY 36 (8th ed. 2018). These benefits were later shown to dwarf all other benefits—as well as the costs—of the regulation. *Id.* at 36 fig.1.3.

104. Heinzerling, *supra* note 103, at 2043.

105. Michael A. Livermore, *Cause or Cure? Cost-Benefit Analysis and Regulatory Gridlock*, 17 N.Y.U. ENV'T L.J. 107, 115–16 (2008); Daniel A. Farber, *From Here to Eternity: Environmental Law and Future Generations*, 2003 U. ILL. L. REV. 289, 295.

106. Farber, *supra* note 105, at 295.

107. *See* Richard L. Revesz, *Environmental Regulation, Cost-Benefit Analysis, and the Discounting of Human Lives*, 99 COLUM. L. REV. 941, 989 (1999) ("Environmentalists have traditionally favored low discount rates because the costs of environmental protection generally must be borne well before the benefits begin to accrue.").

108. *Id.* at 945.

109. *Cf.* Ackerman & Heinzerling, *supra* note 99, at 1572–73 (noting that discounting can drastically affect assessments of programs to clean up hazardous waste or control persistent toxins because "the benefits are assumed to occur in the future when deaths are avoided, rather than in the near term when risks are reduced").

Furthermore, the manner in which the federal government has implemented CBA creates an institutional bias against regulation.[110] CBA first assumed a prominent role in federal regulation with the issuance of Executive Order 12,291, which formalized White House review of proposed agency regulations.[111] This executive order required a CBA of each proposed rule and subsequent review of the rule and CBA by the Office of Information and Regulatory Affairs (OIRA). These requirements, with minor modifications, have become entrenched within the federal government over the last four decades.[112] OIRA's regulatory review focuses on whether a rule's benefits exceed its costs.[113] If OIRA finds an agency's rule is too burdensome for industry, it can require the agency to reconsider or reanalyze the rule.[114] Notably, OIRA's mission is not to determine whether a rule is stringent enough; deregulatory rules and agency inaction escape OIRA review.[115] Thus, OIRA's skewed review process has not only weakened regulation but "largely stymied it altogether."[116] Even the possibility that OIRA might oppose a rule has sometimes prompted EPA to weaken or abandon proposed rules.[117]

CBA's entrenchment within the federal government reflects the interconnectedness of economic and political factors. Simply put, CBA "serves the interests of a number of powerful constituencies."[118] For agencies, CBA is a useful means of defending decisions; for presidents, an effective means of exercising control over executive branch agencies; and for regulated entities, a powerful tool for undermining regulation.[119] To be sure, CBA can foster policy stability by requiring agencies to explain depar-

110. Livermore, *supra* note 105, at 116–18; Shapiro & Schroeder, *supra* note 99, at 450–51 (discussing evidence that "White House review tilts in the direction of reducing the stringency of proposed regulations").

111. Exec. Order No. 12,291, 3 C.F.R. § 127 (1981), revoked by Exec. Order No. 12,866 § 11, 3 C.F.R. 638, 649 (1994).

112. 3 C.F.R. § 638, *reprinted as amended in* 5 U.S.C. § 601 app. at 802–06 (2012); Livermore & Revesz, *supra* note 99, at 4–8, 13–18.

113. Livermore, *supra* note 105, at 116–17.

114. 3 C.F.R. §§ 638, 645 (outlining OIRA responsibilities); *see* Livermore, *supra* note 105, at 116–17.

115. Livermore, *supra* note 105, at 117–18.

116. Driesen, *supra* note 103, at 384.

117. *Id.* at 352–53.

118. Shapiro & Schroeder, *supra* note 99, at 446.

119. *Id.* at 462.

tures from a prior CBA and by disregarding costs already expended in reaching the status quo.[120] Nonetheless, the pervasive use of CBA systematically favors short-term fixes that promise immediate rewards at modest upfront costs over approaches that address underlying root causes and are more likely to be effective in the long term.

C. Psychological Phenomena Favoring Too-Easy Solutions

Mental biases in how people process information and make decisions further stack the deck in favor of too-easy solutions. Contrary to the assumptions of some economic models, people do not act in perfectly rational ways. Various cognitive heuristics, or mental shortcuts, lead individuals—and policymakers—to depart from the predictions of rational choice theory.[121] Heuristics that may favor the adoption of too-easy solutions include status quo bias, single action bias, the availability heuristic, discounting, and other phenomena relating to intertemporal decision-making.

1. Status Quo Bias

Status quo bias, which describes individuals' preference for the current state of affairs, favors approaches that do not require changes to the status quo over approaches that do.[122] This heuristic is often manifested as loss aversion—a hesitancy to give up something one already has, as compared to one's willingness to risk potential future gains.[123] Status quo bias can be rational: by standing pat, one can avoid difficult decisions, transition costs, and new and uncertain risks.[124] Fear of loss, as well as a

120. Caroline Cecot, *Deregulatory Cost-Benefit Analysis and Regulatory Stability*, 68 DUKE L.J. 1593, 1627 (2019).

121. Jeffrey J. Rachlinski, *The Psychology of Global Climate Change*, 2000 U. ILL. L. REV. 299, 303–04; Rebecca Eissler et al., *The Transformation of Ideas: The Origin and Evolution of Punctuated Equilibrium Theory*, *in* CONTEMPORARY APPROACHES TO PUBLIC POLICY, *supra* note 50, at 95, 99.

122. Rachlinski, *supra* note 121, at 307–08.

123. *Id.*; Daniel Kahneman et al., *Anomalies: The Endowment Effect, Loss Aversion, and Status Quo Bias*, 5 J. ECON. PERSPECTIVES 193, 194, 197–98 (1991).

124. William Samuelson & Richard Zeckhauser, *Status Quo Bias in Decision Making*, 1 J. RISK & UNCERTAINTY 7, 33–34 (1988); ROBERT MEYER & HOWARD KUNREUTHER, THE OSTRICH PARADOX: WHY WE UNDERPREPARE FOR DISASTERS 45 (2017).

desire to maintain consistency or avoid regret for past choices, also contributes to status quo bias.[125]

Status quo bias can hamper critical reassessments of existing programs and negotiation of new policies.[126] The bias is especially pronounced when decision-makers face difficult choices[127] or when substantial uncertainty surrounds the distribution of gains and losses from policy change.[128] Status quo bias also commonly arises when proposed changes threaten significant economic losses or reductions in environmental quality.[129] Obstacles to lawmaking, such as bicameralism requirements, supermajority rules, and the executive veto, can compound the tendency of status quo bias to hinder new approaches.[130] As a result of status quo bias, new pollution control technologies or novel environmental policies may face resistance, even if they are more efficient or effective than the too-easy solutions already in place.[131]

2. Single Action Bias

Single action bias describes the tendency to assume that a single measure will be sufficient to address a risk.[132] Taking action can reduce feelings of worry or vulnerability and alleviate the pressure to take further action.[133] Accordingly, people may disregard additional measures or alternatives that could be more effective. Single action bias affects not only individuals but also decision-makers, who may direct their attention elsewhere

125. Samuelson & Zeckhauser, *supra* note 124, at 37–40.

126. *See id.* at 45–46.

127. Stephen M. Fleming et al., *Overcoming Status Quo Bias in the Human Brain*, 107 PROC. NAT'L ACAD. SCI. 6005, 6007 (2010).

128. Raquel Fernandez & Dani Rodrik, *Resistance to Reform: Status Quo Bias in the Presence of Individual-Specific Uncertainty*, 81 AM. ECON. REV. 1146, 1146–47 (1991).

129. Rachlinski, *supra* note 121, at 308.

130. Rebecca M. Kysar, *Dynamic Legislation*, 167 U. PA. L. REV. 809, 816–17 (2019).

131. L. Venkatachalam, *Behavioral Economics for Environmental Policy*, 67 ECOLOGICAL ECON. 640, 643 (2008).

132. Elke U. Weber, *Understanding Public Risk Perception and Responses to Changes in Perceived Risk*, *in* POLICY SHOCK: RECALIBRATING RISK AND REGULATION AFTER OIL SPILLS, NUCLEAR ACCIDENTS AND FINANCIAL CRISES 82, 96 (Edward J. Balleisen et al. eds., 2017).

133. *Id.*

after acting on an issue or address problems in single steps rather than through a combination of interventions.[134] A too-easy solution may be the first action policymakers undertake, and its existence may discourage further, more difficult action that is necessary or appropriate. An example of single action bias is the embrace of recycling, in response to the problem of plastic waste, to the exclusion of reducing plastic use or substituting more environmentally friendly materials.

3. The Availability Heuristic and Discounting

People tend to judge an event's likelihood based on its mental availability—a phenomenon known as the availability heuristic.[135] The more readily one can imagine or recall a particular event, the more likely one believes that event will occur.[136] The availability heuristic can lead to misjudgments because the ease of recalling an event does not necessarily correspond to its likelihood of occurrence.[137] People may overestimate the probability of especially salient or vivid environmental harms, such as oil spills.[138] However, other environmental harms—including toxic risks, climate change, and biodiversity loss—are less salient.[139] The low visibility, uncertainty, and delayed manifestation of many environmental harms may lead policymakers to disregard them.[140] When policymakers do pay heed to such harms, they may underestimate their seriousness or likelihood and, accordingly, adopt inadequate responses.

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134. *Id.* at 98.

135. *See* Amos Tversky & Daniel Kahneman, *Judgment Under Uncertainty: Heuristics and Biases*, *reprinted in* PREFERENCE, BELIEF, AND SIMILARITY: SELECTED WRITINGS 203, 210 (Eldar Shafir ed., 2004).

136. *See id.* at 211–13; Timur Kuran & Cass R. Sunstein, *Availability Cascades and Risk Regulation*, 51 STAN. L. REV. 683, 706 (1999).

137. Kuran & Sunstein, *supra* note 136, at 706.

138. *See* Rachlinski, *supra* note 121, at 311 (discussing an example of toxic contamination at Love Canal).

139. Jeff Rachlinski suggested that "[t]he threat of climate change provides more than adequate opportunity to create an availability cascade" because of the high-profile weather events that might follow. *Id.* at 312. However, "climate itself is difficult for laypersons to track," as Rachlinski acknowledged. *Id.* And associations between weather events and climate change, until recently, have "seem[ed] speculative" to many people. Cass R. Sunstein, *The Availability Heuristic, Intuitive Cost-Benefit Analysis, and Climate Change*, 77 CLIMATIC CHANGE 195, 201 (2006).

140. Rachel R. Jones, Note, *Risky Business: Barriers to Rationality in Congress*, 36 ECOLOGY L.Q. 467, 486 (2009).

Heuristics that influence people's willingness to make intertemporal tradeoffs also may favor too-easy solutions. First, just as economists engage in discounting as part of CBA, individuals engage in discounting in everyday decision-making.[141] In general, people think myopically: they focus on the short-term and give less weight to costs and benefits that occur in the future.[142] Psychologists also have found that people engage in hyperbolic discounting—that is, they apply an especially high discount rate in the near future and a lower discount rate further into the future.[143] In other words, people often make choices that reflect a preference for instant gratification. Measures that promise immediate payoffs—including too-easy solutions—may appear particularly attractive in comparison to measures whose payoffs occur in the future.

Relatedly, the certainty effect describes people's overvaluation of outcomes that are certain and their undervaluation of outcomes that are merely probable.[144] This phenomenon suggests that people may be unwilling to make sacrifices today to avoid uncertain losses in the future.[145] In addition, people may prefer an option that totally eliminates a risk over an alternative that reduces risk, even if the latter has a greater expected value.[146] The certainty effect may explain seemingly irrational decisions, such as the failure to adopt economically worthwhile energy efficiency measures.[147] The costs of taking such measures are certain—and likely to be weighed more heavily—than the benefits, which are less certain.

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141. *See* Elke U. Weber, *What Shapes Perceptions of Climate Change?* 1 WIRES CLIMATE CHANGE 332, 337 (2010). Not only are people strongly biased toward the present, but they tend to discount future benefits more than future costs. *Id.*

142. *See* MEYER & KUNREUTHER, *supra* note 124, at 14 (explaining how myopia "hinder[s] decisions to invest in protection against low-probability, high-consequence events").

143. Joseph P. Redden, *Hyperbolic Discounting*, *in* ENCYCLOPEDIA OF SOCIAL PSYCHOLOGY 450, 450 (Roy F. Baumeister & Kathleen D. Vohs eds., 2007); Venkatachalam, *supra* note 131, at 642.

144. Daniel Kahneman & Amos Tversky, *Prospect Theory: An Analysis of Decision Under Risk*, 47 ECONOMETRICA 263, 265 (1979).

145. *See* Barton H. Thompson, Jr., *Tragically Difficult: The Obstacles to Governing the Commons*, 30 ENV'T L. 241, 262–63 (2000).

146. *See* Antonio Pratelli, *Risk Perception in Emergency Planning Environments*, 134 WIT TRANSACTIONS ON BUILT ENV'T 233, 240 (2013).

147. *See id.* at 240; Brandon Hofmeister, *Bridging the Gap: Using Social Psychology to Design Market Interventions to Overcome the Energy Efficiency Gap in Residential Energy Markets*, 19 SE. ENV'T L.J. 1, 23 (2010).

People prefer certain outcomes over probable outcomes and probable outcomes over ambiguous outcomes—a phenomenon known as ambiguity aversion.[148] Defined as a lack of relevant information or as uncertainty about a probability judgment, ambiguity can make people unwilling to act.[149] Waiting can be a reasonable strategy: one might obtain more information and avoid the regret potentially associated with acting on inadequate information.[150] Unfortunately, the ambiguity effect can hinder effective responses to environmental problems, which tend to involve significant uncertainty.[151] Moreover, the cautious language scientists use in describing their conclusions can magnify any apparent uncertainty.[152] Amid uncertainty, "people faced with a tough solution to a commons dilemma engage in tremendous wishful thinking . . . us[ing] uncertainty to willingly fool themselves that the resource is in better shape and under less threat than it is in fact."[153]

* * *

The heuristics just discussed do not guarantee that policymakers will adopt too-easy solutions, but they do make it more likely. Overall, a too-easy-solutions approach to analyzing policy choices involves a consideration of political, economic, and psychological factors. It is a case-by-case approach that incorporates context, history, and a bit of storytelling. Considering the various factors surrounding the making of a policy can draw attention to the inadequacy of existing approaches to environmental problems. Moreover, exploring why too-easy solutions persist can facilitate the adoption of more effective approaches. Though not scientifically testable, too-easy-solutions analysis offers a new and valuable perspective for tackling environmental challenges.

148. Yusuke Tanaka et al., *Are Ambiguity Aversion and Ambiguity Intolerance Identical? A Neuroeconomics Investigation*, 5 FRONTIERS PSYCH. 1550, 1550 (2015).

149. *See* Deborah Frisch & Jonathan Baron, *Ambiguity and Rationality*, 1 J. BEHAV. DECISION MAKING 149, 149, 152 (1988).

150. *Id.* at 153.

151. *See* Thompson, *supra* note 145, at 258 (discussing fisheries management, groundwater management, and climate change as "examples of commons dilemmas [that] involve significant scientific uncertainty").

152. *Id.*

153. *Id.* at 258–59.

III. CATEGORIES AND CASE STUDIES OF TOO-EASY SOLUTIONS

This Part reexamines, categorizes, and analyzes the specific examples of too-easy solutions introduced earlier. Some too-easy solutions work their way into policy because of their political viability. Other measures begin as actual solutions but become too-easy solutions as their perceived role changes. The history behind the adoption of each policy may reflect path dependence and various political, economic, and psychological factors.[154] Based on these factors and a measure's functional role, too-easy solutions can be organized into three subcategories: (1) fig leaves, (2) pipe dreams, and (3) myopic solutions. Although a particular policy may not fall neatly within a single subcategory, its categorization can highlight the main forces at work.

A fig leaf's primary function is to appear to do something about an identified problem; actually solving the problem is of secondary importance. Fig leaves may involve some degree of deception, especially by the parties advocating them, and thus may overlap with the concept of greenwashing. While policymakers may adopt fig leaves to appear to be responding to a problem, they may nevertheless be acting in good faith. A fig leaf may be part of a wider tradeoff, or it may be an untested approach that could actually solve the problem at hand. Plastic recycling is one example of a fig leaf: as explained below, industry successfully fended off more drastic alternatives, such as bans on plastic products, by advocating for recycling.[155] A further example of a fig leaf is the CDM.[156] The CDM served as a key component of a political compromise that generated widespread support for the Kyoto Protocol.[157] Although the CDM was commonly viewed as a tool for mitigating climate change, the mechanism itself did not reduce—and may have in fact increased—GHG emissions.[158]

Pipe dreams are adopted with the good faith expectation that they will solve identified problems. Upon closer examination, however, these too-easy solutions have inherent flaws that make them too good to be true. Prospective application of too-

154. Pierson, *supra* note 68, at 263 ("A focus on increasing returns processes justifies a turn to history.").

155. *See infra* Section III.A.1.

156. *See infra* Section III.A.2.

157. *See infra* Section III.A.2.

158. *See infra* Section III.A.2.

easy-solutions analysis might reveal these flaws and enable better policymaking. One example of a pipe dream is multiple-use management of the public lands, which promised both to resolve the problem of conflicting land uses and to satisfy the interests of major stakeholders.[159] However, the irreconcilable nature of many land uses makes fulfilling this promise impossible. Coastal armoring offers another example of a pipe dream. Constructing shoreline structures temporarily protects specific parcels of land, but often exacerbates erosive processes and ultimately damages the shielded parcels.[160]

Finally, a myopic solution addresses part of the identified problem while impeding its overall resolution. Partial solutions are not inherently problematic.[161] They can offer some benefit and may serve as the initial step in a series of constructive actions or part of a broader set of solutions. However, when partial solutions become an obstacle to further action or an excuse for not acting, they become myopic solutions. For example, fish consumption advisories were framed initially as a partial and temporary response to toxic contamination.[162] Over time, however, they have become a permanent feature of environmental risk management, potentially undermining strategies to address the contamination directly.[163] Even pollution control strategies, though effective and appropriate in many instances, may constitute a myopic solution if they hinder the development of more effective pollution prevention approaches.[164]

A. Fig Leaves

Fig leaves appear to do something about an identified problem without necessarily solving it. Fig leaves may generate environmental benefits or reduce environmental harms, but these effects are incidental to the fact that some action was taken. The discussion to follow considers plastics recycling and the CDM as examples of fig leaves.

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159. *See infra* Section III.B.1.

160. *See infra* Section III.B.2.

161. *Cf.* Massachusetts v. EPA, 549 U.S. 497, 524 (2007) ("Agencies, like legislatures, do not generally resolve massive problems in one fell regulatory swoop, but instead whittle away at them over time." (citation omitted)).

162. *See infra* Section III.C.1.

163. *See infra* Section III.C.1.

164. *See infra* Section III.C.2.

1. Plastics Recycling

Plastics recycling nicely exemplifies a fig leaf too-easy solution: it appears to address—but is unlikely to solve—the problem of plastic waste. This is not to cast aspersions on all recycling efforts. Recycling in the United States has a long history and has been motivated by different purposes. In the preindustrial era, scarcity and thrift drove efforts to fashion paper and other items from recycled materials.[165] During World War II, altruism motivated recycling campaigns to bolster the supply of metals and other raw materials.[166] More recently, environmental concerns have prompted state and local governments to adopt curbside recycling, container deposit laws, and other recycling programs.[167]

Plastics recycling efforts began with a series of pilot projects launched by the plastics industry in the 1970s to counter the threat of government regulation.[168] Whether such efforts would ultimately address the plastic waste problem was doubtful from the start.[169] Manufacturers shied away from using potentially contaminated or mixed materials that had been recycled, and the modest recycling that did occur was largely limited to scrap from manufacturing processes rather than post-consumer waste.[170] In the 1980s, as concerns about increasing solid waste and limited landfill space intensified, key industry players touted recycling, as well as incineration, to head off calls to ban plastic.[171] In theory, recycling plastic diverts material from

165. *See* FRANK ACKERMAN, WHY DO WE RECYCLE?: MARKETS, VALUES, AND PUBLIC POLICY 14 (1997).

166. *See id.* at 15–16; Ann E. Carlson, *Recycling Norms*, 89 CALIF. L. REV. 1231, 1257–58 (2001).

167. Carlson, *supra* note 166, at 1262–70.

168. Hugh H. Connolly, Deputy Dir., Bureau of Solid Waste Mgmt., Env't Health Serv., Dep't of Health, Educ. & Welfare, What's Ahead for Plastic Wastes in the 1970's, Address Before the Society of Plastics Engineers Palisade Section, at 16 (Oct. 27, 1970) ("If industry doesn't take more positive steps to help solve the waste problems it creates, and take them now, Federal regulation will likely result."); *see also* Roger B. May, *Heaping It On: Plastic Refuse Begins to Mount in U.S.; The Efforts to Recycle It Prove Difficult*, WALL ST. J., Jan. 8, 1973, at 26 (describing the efforts of plastics companies to "push ahead with recycling projects, in spite of all the difficulties").

169. May, *supra* note 168, at 26.

170. *See id.*

171. *See Frontline: Plastic Wars* (PBS television broadcast Mar. 31, 2020); Myra Klockenbrink, *Plastics Industry, Under Pressure, Begins to Invest in Recycling*, N.Y. TIMES, Aug. 30, 1988, at C4; *SPI Testifies on Plastics and Municipal Solid Waste Issues; Plastics Bill Moves in House*, WASH. MEMO (The Soc'y of the

landfills and, compared to virgin plastic production, requires less energy and generates less GHGs.[172] Yet plastics recycling—occurring then at very low rates (less than 1 percent)—faced many of the same obstacles as it faces today: the low cost of virgin plastics, difficulties in collecting widely dispersed materials, and complexities of separating different types of plastics before recycling.[173]

The plastics industry nonetheless vowed to invest in further research to improve recycling technology, develop degradable plastics, and find new uses for plastic waste.[174] A central element of the industry's promotion of recycling was the development of the now-ubiquitous numbering system and logo designating different types of plastics within a triangle of chasing arrows.[175] The industry convinced states to enact laws requiring use of the recycling symbol, which gave the impression that plastics were recyclable.[176] Critics worried that plastics recycling would be ineffective, however, and instead advocated limitations on use.[177] Indeed, internal industry documents from that time

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Plastics Indus., Inc., Washington, D.C.) Oct. 2, 1987, at 1, https://cdn.toxicdocs.org/x1/x1DyQYpw3Kax7v68KmqK9B1Qb/x1DyQYpw3Kax7v68KmqK9B1Qb.pdf [https://perma.cc/953D-6UPY]. Anticipating that "[s]tate environmental agencies [would] seek outright bans against [plastic] packaging materials which are not recycled," the industry set up the Plastic Recycling Foundation in 1984 to establish a pilot demonstration plastics recycling facility and to conduct research on plastics recycling. *Fact Sheet on the Plastics Recycling Foundation*, TOXIC DOCS, https://www.toxicdocs.org/d/e59M463r3eOzY6jBmwmJZJKME?lightbox=1 [https://perma.cc/AX22-SLFZ].

172. *See Environmental Factoids*, EPA, https://archive.epa.gov/epawaste/conserve/smm/wastewise/web/html/factoid.html [https://perma.cc/TE9L-T49S] ("Producing new plastic from recycled material uses only two-thirds of the energy required to manufacture it from raw materials."); David Lazarevic et al., *Plastic Waste Management in the Context of a European Recycling Society: Comparing Results and Uncertainties in a Life Cycle Perspective*, 55 RES., CONSERVATION & RECYCLING 246, 258 (2010) (reviewing literature on life cycle assessment studies and concluding that recycling is generally environmentally preferable to other waste treatment options); Saravanan Rajendran et al., *Environmental Impact Assessment of Composites Containing Recycled Plastics*, 60 RES., CONSERVATION & RECYCLING 131, 139 (2012) (concluding that use of recycled plastics is more environmentally advantageous in some contexts than use of virgin plastics, but not for automotive applications).

173. Klockenbrink, *supra* note 171. The high cost of petroleum during the late 1970s and early 1980s made plastics recycling more economically attractive, at least for a brief period. *See* Bruce Keppel, *Rising Costs Making Recycling Profitable: Cities Discover Treasure in Trash*, L.A. TIMES, Apr. 8. 1981, at A13.

174. *See* Klockenbrink, *supra* note 171.

175. *Frontline: Plastic Wars*, *supra* note 171.

176. *Id.*

177. Klockenbrink, *supra* note 171.

acknowledged the economic infeasibility of recycling[178] and expressed skepticism that recycling would ever become economically worthwhile.[179]

The industry also challenged plastics bans that had begun to take root. In 1988, Suffolk County, New York, enacted the country's first ban on plastic products, a prohibition on specified throwaway plastic items used by retail food establishments.[180] As other local jurisdictions passed similar laws,[181] the plastics industry sued to prevent Suffolk County's ban from taking effect.[182] In the meantime, the industry continued to push recycling through demonstration projects and offers to assist schools' and businesses' recycling efforts.[183] Eventually, Suffolk County's ban was repealed with the support of many environmentalists, who had been swayed to push states to promote recyclable packaging instead.[184]

The plastics recycling rate in the United States remains below 10 percent today.[185] Notwithstanding widespread adoption of curbside recycling programs, many obstacles continue to hinder plastics recycling. Recycled plastics remain more costly than

178. THE VINYL INSTITUTE, PLASTICS IN THE WASTE STREAM: OPTIONS FOR PRACTICAL SOLID WASTE MANAGEMENT (1987), https://cdn.toxicdocs.org/MG/MGMkk4OrpGoG1qyonYkxpzVaM/MGMkk4OrpGoG1qyonYkxpzVaM.pdf [https://perma.cc/PFR6-53XH] (noting the limited market for recycled plastic consisting of single material and the infeasibility of recycling most multi-material plastic); Tik Root, *Inside the Long War to Protect Plastic*, CTR. FOR PUB. INTEGRITY, https://publicintegrity.org/environment/pollution/pushing-plastic/inside-the-long-war-to-protect-plastic/ [https://perma.cc/9Y72-R4SQ] ("[T]here is no market for recycled plastics." (quoting a 1972 document published by the Society of Plastics Industry)).

179. Minutes from M. M. O'Mara on Quarterly Vinyl Institute Technical Committee Meeting 2 (Dec. 8, 1986) (on file with author) (reporting the conclusion of an analyst at Oak Ridge National Laboratories that plastics "recycling is not and will never be commercially viable unless it is significantly subsidized by a government entity").

180. John Rather, *Suffolk Weighs Plastics Delay*, N.Y. TIMES, May 7, 1989 (§ 12LI), at 1; Josh Barbanel, *Suffolk County's Ban on Plastics Loses Allies*, N.Y. TIMES, Dec. 31, 1991, at A1.

181. Barbanel, *supra* note 180.

182. Josh Barbanel, *Few Tears for a Blocked Plastics Ban*, N.Y. TIMES, Mar. 5, 1992, at B7.

183. Barbanel, *supra* note 180; Barbanel, *supra* note 182.

184. *See* Barbanel, *supra* note 182.

185. *See Plastics: Material-Specific Data*, *supra* note 35 (reporting 8.7 percent recycling rates in 2018).

new plastics made from crude oil.[186] Costs aside, manufacturers often prefer virgin plastics to recycled plastics, which generally are weaker and can only be "downcycled" into lower value products.[187] Furthermore, contamination, which occurs when non-recyclable items are mixed with recyclables or when recyclable materials are not separated or cleaned, can make an entire batch of material unusable.[188] Rising use of customized plastics and products made of multiple materials further hampers plastics recycling efforts.[189] Absent dramatic advances in collecting and sorting plastics, recycling diverse materials together, and redesigning products in an eco-friendly manner, plastics recycling will continue to languish.[190]

Recent developments at the time of this writing will further reduce already low recycling rates. First, the COVID-19 pandemic prompted cutbacks in recycling programs and drove down oil prices, shifting cost dynamics even further in favor of virgin plastics.[191] More importantly, plastics recycling has become more difficult and costly as foreign markets for plastic waste have shut down. Prior to 2018, China accepted the majority of

186. Sarah Kramer, *The One Thing that Makes Recycling Plastic Work Is Falling Apart*, BUS. INSIDER (Apr. 5, 2016, 10:00 AM), https://www.businessinsider.com/low-oil-prices-hurt-plastics-recycling-2016-4 [https://perma.cc/R838-AQ2M].

187. *See* Maija Pohjakallio, *Secondary Plastic Products—Examples and Market Trends*, *in* PLASTIC WASTE AND RECYCLING: ENVIRONMENTAL IMPACT, SOCIETAL ISSUES, PREVENTION, AND SOLUTIONS ch. 18, at 467, 468–69 (Trevor M. Letcher ed., 2020); Michael Kozderka et al., *High Impact Polypropylene (HIPP) Recycling—Mechanical Resistance and Lifecycle Assessment (LCA) Case Study with Improved Efficiency by Preliminary Sensitivity Analysis*, 137 J. CLEANER PROD. 1004, 1008 (2016) (finding that recycling process decreases the yield stress in High Impact Polypropylene).

188. Livia Albeck-Ripka, *Your Recycling Gets Recycled, Right?*, N.Y. TIMES, May 29, 2018, at B1.

189. *See* NAT'L ACADS. OF SCIS., ENG'G, & MED., CLOSING THE LOOP ON THE PLASTICS DILEMMA: PROCEEDINGS OF A WORKSHOP—IN BRIEF 2 (2020), https://www.nap.edu/catalog/25647/closing-the-loop-on-the-plastics-dilemma-proceedings-of-a [https://perma.cc/LSE8-7M7M].

190. *See id.* at 4.

191. Luke Denne, *Coronavirus Pandemic Threatens to Undo Progress on Plastic Pollution*, NBC NEWS (May 15, 2020, 3:00 AM), https://www.nbcnews.com/science/environment/coronavirus-pandemic-threatens-undo-progress-plastic-pollution-n1207231 [https://perma.cc/6NHW-XEDB] (noting environmentalists' worry that the petrochemical industry is exploiting the pandemic to undo initiatives to curb single-use plastics); Rachel A. Miedl, *Pandemic, Plastics and the Continuing Quest for Sustainability*, FORBES (Apr. 14, 2020, 10:12 AM), https://www.forbes.com/sites/thebakersinstitute/2020/04/14/pandemic-plastics-and-the-continuing-quest-for-sustainability [https://perma.cc/YC37-F95B].

globally traded plastic waste, thanks to trade flows, low labor costs, and relatively weak regulation.[192] While some of these plastics were recycled, much of it—contaminated, mislabeled, or unrecyclable—wound up in the environment.[193] In late 2017, however, China effectively banned the import of plastic waste by strictly limiting the impurities allowed in plastics destined for recycling.[194] The United States and other nations turned to smaller Asian countries to offload their plastic waste, but many of these countries soon put in place their own waste-import restrictions.[195] As a result, some communities have cut back or eliminated plastics recycling programs, and efforts to reestablish recycling plants in the United States have been slow to take.[196]

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192. *See* Colin Parts, Note, *Waste Not Want Not: Chinese Recyclable Waste Restrictions, Their Global Impact, and Potential U.S. Responses*, 20 CHI. J. INT'L L. 291, 303 (2019). Seventy percent of plastic waste exported by the U.S. for recycling in 2017 was sent to China. Karen McVeigh, *Huge Rise in US Plastic Waste Shipments to Poor Countries Following China Ban*, GUARDIAN (Oct. 5, 2018, 2:00 AM), https://www.theguardian.com/global-development/2018/oct/05/huge-rise-us-plastic-waste-shipments-to-poor-countries-china-ban-thailand-malaysia-vietnam [https://perma.cc/HJ4W-EXZ7].

193. Christopher Joyce, *Where Will Your Plastic Trash Go Now that China Doesn't Want It?*, NPR (Mar. 13, 2019, 4:28 PM), https://www.npr.org/sections/goatsandsoda/2019/03/13/702501726/where-will-your-plastic-trash-go-now-that-china-doesnt-want-it [https://perma.cc/4SGN-V8JE]; Parts, *supra* note 192, at 298.

194. Kimiko de Freytas-Tamura, *Plastics Pile Up as China Refuses to Take the West's Recycling*, N.Y. TIMES (Jan. 11, 2018), https://www.nytimes.com/2018/01/11/world/china-recyclables-ban.html [https://perma.cc/MQ7K-RBKJ]; Announcement No. 39 on Issuing the Catalogue for the Administration of the Import of Solid Waste (issued by the Ministry of Environmental Protection et al., Aug. 10, 2017, effective Dec. 31, 2017), CLI.4.300517(EN) (Pkulaw), http://en.pkulaw.cn/display.aspx?cgid=23a0b7f48d3efeb1bdfb&lib=law [https://perma.cc/L5KV-G96C]; *see also* Christopher Joyce, *U.S. Recycling Industry Is Struggling to Figure Out a Future Without China*, NPR (Aug. 20, 2019, 3:27 PM), https://www.npr.org/2019/08/20/750864036/u-s-recycling-industry-is-struggling-to-figure-out-a-future-without-china [https://perma.cc/2Y92-7TLA].

195. *See* Parts, *supra* note 192, at 303–04. Furthermore, parties to the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal recently adopted legally binding amendments, effective 2021, that subject most plastic wastes to the Convention's prior notice-and-consent regime for transboundary shipments of waste. Amendments to Annexes II, VIII and IX to the Basel Convention, May 10, 2019, BC-14/12, http://www.basel.int/Implementation/Plasticwaste/Decisions/tabid/6069/Default.aspx [https://perma.cc/W4ZB-YRGS].

196. Cheryl Katz, *Piling Up: How China's Ban on Importing Waste Has Stalled Global Recycling*, YALE ENV'T 360 (Mar. 7, 2019), https://e360.yale.edu/features/piling-up-how-chinas-ban-on-importing-waste-has-stalled-global-recycling

To counter resurgent concerns about plastic waste, the petrochemical industry and leading producers of consumer products are again pushing recycling with promises to make their plastics recyclable, reusable, or compostable.[197] As in the past, this approach places the burden on consumers and state and local governments to recycle properly.[198] Meanwhile, industry continues to expand the plastics market—and to dodge responsibility when recycling fails to solve the problem.[199]

Powerful interest-group advocacy, aided by economic and behavioral factors, has driven the adoption of plastics recycling as a fig leaf too-easy solution. Recycling techniques have never been capable of actually managing most plastic waste and may never be able to do so. Nonetheless, the plastics industry framed recycling, from the outset, as the centerpiece of its strategy for addressing the growing volume of waste. In response to low recycling rates, industry touted research efforts that offered the prospect of someday establishing a more effective system of recycling and reuse. More recently, the widespread practice of exporting plastic waste allowed recycling programs to grow at a

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[https://perma.cc/X8Z2-VAN6]; Heather van Blokland, *U.S. Recycling Begins Infrastructure Development to Solve China Crisis*, KJZZ (Sept. 19, 2019, 2:40 PM), https://kjzz.org/content/1017251/us-recycling-begins-infrastructure-development-solve-china-crisis [https://perma.cc/VM6X-F6BP] (describing the need for infrastructure to carry out plastic recycling in the U.S.).

197. Joyce, *supra* note 194; Timothy Cama & Ariana Figueroa, *Plastics Industry Spends Millions to Boost Recycling*, E&E DAILY (Feb. 7, 2020, 7:09 AM), https://subscriber.politicopro.com/article/eenews/1062282703 [https://perma.cc/5QXT-ZZ59].

198. *See* James Marshall, *Legislation Aims to Educate Public About Recycling*, E&E DAILY (Mar. 3, 2020, 7:12 AM), https://www.eenews.net/publication/eedaily/page/17 [https://perma.cc/FU8U-ZYRP] (reporting on an industry-backed bill that would authorize a five-year, $15 million EPA campaign to teach consumers how to recycle properly); James Marshall, *Greens Skeptical of Bipartisan Recycling Legislation*, E&E DAILY (Nov. 19, 2019, 7:01 AM), https://www.eenews.net/publication/eedaily [https://perma.cc/YG2E-AADG] (reporting on a bill, backed by two of world's five largest commercial contributors to global plastic pollution, that would allocate $500 million to state, tribes, and local governments for recycling infrastructure and programs).

199. Laura Sullivan, *How Big Oil Misled the Public into Believing Plastic Would Be Recycled*, NPR (Sept. 11, 2020, 5:00 AM), https://www.npr.org/2020/09/11/897692090/how-big-oil-misled-the-public-into-believing-plastic-would-be-recycled [https://perma.cc/ASW9-YKDW]; Laura Sullivan, *Plastic Wars: Industry Spent Millions Selling Recycling—To Sell More Plastic*, NPR (Mar. 31, 2020, 8:00 AM), https://www.npr.org/2020/03/31/822597631/plastic-wars-three-takeaways-from-the-fight-over-the-future-of-plastics [https://perma.cc/FY69-7D5F].

relatively affordable cost.[200] Plastic waste export fostered an "out of sight, out of mind" approach to the problem: it invited Americans to assume that tossing plastics in the recycling bin would solve the problem.[201] In continuing to advocate for recycling, the plastics industry has taken advantage of single action bias and the availability heuristic to divert attention away from measures to reduce plastics use or encourage substitution of other materials.[202] While politically more difficult and potentially more costly upfront, these alternatives would be more effective solutions that address the root cause of the problem.[203]

2. The Clean Development Mechanism

The CDM, touted as an important tool for reducing GHG emissions,[204] constitutes a fig leaf driven by political compromise rather than industry influence. Kyoto Protocol negotiators accepted the CDM to secure broad support for the Protocol, even though they were aware that CDM projects might undermine efforts to reduce GHG emissions.[205]

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200. *Cf.* Michael Corkery, *As Costs Skyrocket, More U.S. Cities Stop Recycling*, N.Y. TIMES (Mar. 16, 2019), https://www.nytimes.com/2019/03/16/business/local-recycling-costs.html [https://perma.cc/SCP4-USLP] (observing that U.S. recycling companies have dramatically raised the rates they charge municipalities as China and other nations stopped or limited imports of U.S. waste intended for recycling).

201. Kevin Loria, *The Big Problem with Plastic*, CONSUMER REPS. (Sept. 8, 2021), https://www.consumerreports.org/environment-sustainability/the-big-problem-with-plastic [https://perma.cc/BV9X-4G3Z] (quoting Judith Enck, former EPA regional administrator, who stated that "[r]ecycling is sold as a means of not worrying about the problem").

202. Heather Barnes Truelove et al., *From Plastic Bottle Recycling to Policy Support: An Experimental Test of Pro-Environmental Spillover*, 46 J. ENV'T PSYCH. 55, 62–64 (2016) (finding some evidence that recycling behavior had negative spillover effects on support for pro-environmental policies).

203. Controversy surrounding the elimination of plastic grocery bags hints at the opposition that these alternative approaches would likely face. *See* James Osborne, *As Plastic Bans Spread, Industry Went on Attack*, HOUS. CHRON., https://www.houstonchronicle.com/business/energy/article/As-plastic-bans-spread-industry-went-on-attack-14273378.php [https://perma.cc/VF46-6ZXX] (Aug. 3, 2019, 6:37 PM).

204. Even recent U.N. publications continue to laud the CDM's contributions to climate change mitigation efforts. *See, e.g.*, U.N. FRAMEWORK CONVENTION ON CLIMATE CHANGE, ACHIEVEMENTS OF THE CLEAN DEVELOPMENT MECHANISM 2001-2018: HARNESSING INCENTIVE FOR CLIMATE ACTION, at v (2018) (touting CDM as "one of the chief tools to fight climate change" and highlighting "the contribution the mechanism has made to the cutting of greenhouse gas emissions").

205. *See infra* text accompanying notes 229–230.

As mentioned earlier, the Kyoto Protocol capped the GHG emissions of developed countries.[206] Through the CDM, developed countries could effectively increase their caps by obtaining emissions credits generated by projects in developing countries, termed "certified emissions reductions" (CERs).[207] To be valid, CERs must provide "real, measurable, and long-term benefits" in mitigating climate change.[208] Moreover, emissions reductions must be additional to those reductions that would have occurred without the project.[209] The basic idea behind CERs was that renewable energy and other low-carbon energy projects in developing countries could reduce GHG emissions as effectively, and at a lower cost, than the shutdown of high-carbon energy infrastructure in developed countries.[210]

The nearly eight-thousand projects registered under the CDM have generated billions of CERs.[211] However, demand for these credits fell in the wake of the 2009 recession, the European Union's decision to restrict the use of such credits, and decreased international participation in the Kyoto Protocol's second round of commitments.[212] Although the CDM technically remains operational, the 2015 Paris Agreement essentially replaced the CDM with another market mechanism.[213]

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206. Wara, *supra* note 38, at 1761–62.

207. *See id.* at 1761; *see also supra* Section I.C.

208. Kyoto Protocol to the United Nations Framework Convention on Climate Change, art. 12, Dec. 10, 1997, 37 I.L.M. 22, 27 [hereinafter Kyoto Protocol].

209. This additional requirement involves a comparison of projected emissions with a hypothetical baseline of emissions for the project in the absence of the CDM. Wara, *supra* note 38, at 1771.

210. *See id.* at 1774.

211. *See* WORLD BANK GRP., STATE AND TRENDS OF CARBON PRICING 2019, at 58–59 (2019).

212. BJÖRN DRANSFELD ET AL., PRACTICABILITY OF TRANSITIONING FROM CDM TO FUTURE CLIMATE POLICY INSTRUMENTS 1 (2015), https://www.carbon-mechanisms.de/fileadmin/media/dokumente/sonstige_downloads/UfoPlan_2015_CDM2NMM_Synthesis_eng.pdf [https://perma.cc/84AX-V972]. As of 2019, CERs were trading at approximately 30 cents per ton of carbon dioxide equivalent. WORLD BANK GRP., *supra* note 211, at 59.

213. Article 6.4 of the Paris Agreement established a voluntary sustainable development mechanism "[t]o promote the mitigation of greenhouse gas emissions while fostering sustainable development; [t]o incentivize and facilitate participation in the mitigation of greenhouse gas emissions by public and private entities . . . ; [t]o contribute to the reductions of emissions levels in the host Party . . . ; and [t]o deliver an overall mitigation in global emissions." Paris Agreement to the United Nations Framework Convention on Climate Change, art. 6, Dec. 12, 2015, T.I.A.S. No 16-1104 [hereinafter Paris Agreement]. Note that the details of that mechanism are still being worked out. *See* LUCA LO RE & MANASVINI VAIDYULA, MARKET

The CDM had two fundamental objectives: (1) assisting developing countries in achieving sustainable development and in contributing to climate change mitigation, and (2) reducing the cost of developed countries' compliance with Kyoto's emissions caps.[214] The CDM achieved the second objective, as it created a functioning international market in inexpensive carbon credits. However, the CDM was less successful in accomplishing the first objective: many projects did not advance sustainable development, and the CDM's effects on global GHG emissions were modest at best.[215] More than half of the emissions reduction credits—at least in the CDM's first few years—yielded little overall GHG reduction benefit because they were generated through projects other than low-carbon energy projects.[216] Nor did CDM projects necessarily promote sustainable development, as relatively few CDM projects were undertaken in least developed countries,[217] and competition to attract CDM investments encouraged countries to set weak sustainability standards.[218]

While some of the CDM's flaws can be traced to difficulties in implementation, others were inherent in its design. The CDM

NEGOTIATIONS UNDER THE PARIS AGREEMENT: A TECHNICAL ANALYSIS OF TWO UNRESOLVED ISSUES 25–36 (2019).

214. Kyoto Protocol, *supra* note 208, at 26–27.

215. *See* AXEL MICHAELOWA, STRENGTHS AND WEAKNESSES OF THE CDM IN COMPARISON WITH NEW AND EMERGING MARKET MECHANISMS 32–33 (2012) (finding no evidence that the availability of low-cost emission credits led countries to make stronger commitments to reduce emissions); Karen Holm Olsen, *The Clean Development Mechanism's Contribution to Sustainable Development: A Review of the Literature*, 84 CLIMATIC CHANGE 59, 67 (2007) (concluding from literature review that CDM favored lowest-cost emissions reductions at the expense of sustainable development).

216. *See* Wara, *supra* note 38, at 1779; Franck Lecocq & Philippe Ambrosi, *The Clean Development Mechanism: History, Status, and Prospects*, 1 REV. ENV'T ECON. & POL'Y 134, 147 (2007). Many of these projects involved the capture or elimination of HFC-23, a byproduct of the process for manufacturing HCFC-22—a refrigerant. Wara, *supra* note 38, at 1779. Because HFC-23 is an extremely potent greenhouse gas, projects aimed at eliminating HFC-23 generated huge quantities of CERs. Wara, *supra* note 38, at 1782. As a result, the CDM perversely incentivized the expansion of HCFC-22 production facilities and the subsequent capture and destruction of HFC-23. *See* David Campbell et al., *After Cancun: The Impossibility of Carbon Trading*, 29 U. QUEENSLAND L.J. 163, 180 (2010).

217. *See* Emily Boyd et al., *Reforming the CDM for Sustainable Development: Lessons Learned and Policy Futures*, 12 ENV'T SCI. & POL'Y 820, 821 (2009) (noting that a majority of the CERs were generated in China).

218. *See* Olsen, *supra* note 215, at 62, 65; Christoph Sutter & Juan Carlos Parreño, *Does the Current Clean Development Mechanism (CDM) Deliver Its Sustainable Development Claim? An Analysis of Officially Registered CDM Projects*, 84 CLIMATIC CHANGE 75, 76, 89 (2007).

created powerful incentives for strategic behavior that undermined the integrity of transactions.[219] Each of the primary participants to a transaction—the project developer, purchaser, and certifier—faced incentives to maximize the number of CERs a project would generate. Maximizing CERs would maximize project revenues for the developer, carbon credits for the purchasing nation, and future business prospects for the certifier.[220] In addition, CDM transactions involved a high potential for manipulation: CERs were calculated from a hypothetical baseline that was virtually impossible to verify, and the participants to a transaction had little motivation to ensure delivery of actual emissions reductions.[221]

What explains the adoption of such a flawed mechanism? CDM's economic attractiveness is clear: it offered developing countries financial support while reducing developed countries' costs of compliance. Politically, the CDM "contributed to keeping developing countries, and in particular the strategically important large emitters among them, involved in the global carbon market."[222] Such involvement was essential to the United States, which insisted that any climate agreement have meaningful developing country participation.[223] In short, reducing GHG emissions—the Kyoto Protocol's central objective—was never the primary purpose of the CDM.[224]

During the Kyoto negotiations, developing countries worried that emissions trading would enable developed countries to avoid having to reduce their own emissions at all.[225] Against this backdrop, Brazil proposed the establishment of a fund to collect penalties from developed countries with excess emissions and

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219. *See* Wara, *supra* note 38, at 1771; Robert Repetto, *The Clean Development Mechanism: Institutional Breakthrough or Institutional Nightmare?*, 34 POL'Y SCI. 303, 309, 311 (2001).

220. *See* Campbell et al., *supra* note 216, at 184–85.

221. *See* Repetto, *supra* note 219, at 309, 311. Adjustments to the CDM have addressed some of its weaknesses with respect to transaction costs, additionality, and standardization of sustainable development requirements. *See* MICHAELOWA, *supra* note 215, at 16, 43.

222. Lecocq & Ambrosi, *supra* note 216, at 148 (noting that the CDM fostered "increasing awareness about mitigation in developing countries, and g[ave] a large number of stakeholders in the developing world a sense of involvement in the Kyoto Protocol").

223. *See* Repetto, *supra* note 219, at 303.

224. *See* MICHAELOWA, *supra* note 215, at 32.

225. *See* Gudrun Benecke et al., *From Public-Private Partnership to Market: The Clean Development Mechanism (CDM) as a New Form of Governance in Climate Protection* 8 (DFG Rsch. Ctr, Working Paper No. 10, 2008).

redistribute the funds to support developing countries' GHG mitigation projects.[226] The United States then reframed the proposal as the CDM—an emissions trading system that would generate cheap emission reduction credits for developed countries and financial assistance for developing countries.[227] The reframed proposal catalyzed consensus behind the Kyoto Protocol, prompting the chair of the negotiations to dub the CDM the "Kyoto Surprise."[228]

Notably, the CDM was adopted despite concerns about its potential to undermine Kyoto's overall climate goals. Because CERs were generated in developing countries not subject to emissions caps and then sold to developed countries, these exchanges effectively raised developed countries' collective emissions ceiling and undercut the objective of reducing GHG emissions.[229] Negotiators were well aware of this danger; the chair of the Kyoto negotiations acknowledged that he facilitated the CDM's approval notwithstanding misgivings about it.[230] Efforts to restrict a country's reliance on CERs were limited to vague language in the Protocol stating that CERs could only "contribute to compliance" with part of a party's emission-reduction commitments.[231] Although the CDM has largely been superseded,[232] it flourished for a time thanks to the economic benefits it offered to developed countries, developing countries, and project developers.

Whether the CDM qualifies as a too-easy solution depends on how one defines the problem. The CDM addressed the immediate challenges of reaching agreement at Kyoto, incorporating

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226. *See* Jacob Werksman, *The Clean Development Mechanism: Unwrapping the 'Kyoto Surprise,'* 7 REV. EUR. COMP. & INT'L ENV'T L. 147, 151 (1998).

227. *Id.* at 152; *see* Benecke et al., *supra* note 225, at 8; Lecocq & Ambrosi, *supra* note 216, at 135.

228. Werksman, *supra* note 226, at 147.

229. *See* Campbell et al., *supra* note 216, at 171; Lecocq & Ambrosi, *supra* note 216, at 135–36.

230. *See* Lecocq & Ambrosi, *supra* note 216, at 135.

231. Kyoto Protocol *supra* note 208, at 26; *see* Werksman, *supra* note 226, at 155; Amanda M. Rosen, *The Wrong Solution at the Right Time: The Failure of the Kyoto Protocol on Climate Change*, 43 POL. & POL'Y 30, 42 (2015) (discussing how "many" Annex I countries "avoid[ed] deep [emission] cuts at home while paying for reductions elsewhere").

232. Unlike the CDM, the Paris Agreement's Sustainable Development Mechanism requires that projects deliver an "overall mitigation in global emissions." Paris Agreement, *supra* note 213, at art. 6.4(d).

developing countries into the carbon market, and reducing developed countries' compliance costs.[233] However, the CDM itself did not address the root cause of climate change; contrary to widespread perceptions, the CDM's purpose was *not* to reduce GHG emissions. Indeed, the CDM undermined Kyoto's emissions-reduction objective by enabling developed countries to avoid emissions cuts within their own borders, and in some cases may have increased developing countries' GHG emissions.[234] Thus, from the perspective of the CDM being widely hailed as a tool to reduce emissions overall, both in its own right and in service to the success of the Kyoto Protocol, it was a fig leaf too-easy solution that only appeared to address the emissions problem.

B. Pipe Dreams

In contrast to fig leaves, pipe dreams are expected to solve the identified problem. However, pipe dreams' inherent flaws make them too good to be true. Multiple-use management of public lands and coastal armoring are examples of pipe dreams that fail to effectively address the root cause of environmental problems.

1. Multiple-Use Management of the Public Lands

Multiple-use management of the public lands has been a pipe dream. Although the federal government adopted the multiple-use philosophy with the expectation that it would reconcile conflicting uses of the public lands, that expectation has proven unrealistic because many envisioned uses are simply incompatible.

Historically, the federal lands have been subject to a wide range of frequently conflicting uses, including logging, mining, grazing, recreation, and preservation. While some federal lands are now dedicated to a predominant purpose—designated wil-

233. *See supra* text accompanying notes 214–232.

234. *See* TANGUY DU MONCEAU ET AL., POLITICAL LOCK-IN IN THE CONTEXT OF THE CDM 7 (2011) (suggesting that CDM may have facilitated increased carbon-intensive industries in developing countries or discouraged developing countries from adopting domestic GHG regulations).

derness areas, for example—the majority of federal lands remain under a multiple-use mandate.[235] The Multiple-Use Sustained-Yield Act (MUSYA) directs the Forest Service to administer the 188 million acres of national forests[236] "for outdoor recreation, range, timber, watershed, and wildlife and fish purposes."[237] Similarly, the Federal Land Policy and Management Act (FLPMA) directs the Bureau of Land Management (BLM) to manage 245 million acres of public land[238] for "a combination of balanced and diverse resource uses . . . including, but not limited to, recreation, range, timber, minerals, watershed, wildlife and fish, and natural scenic, scientific and historical values."[239] The multiple-use mandate of each agency grants broad discretion to adopt a "combination [of uses] that will best meet the present and future needs of the American people."[240]

Multiple use promised to solve the fundamental problem of competing demands on the public lands.[241] The philosophy traces its origins to Gifford Pinchot, who advocated the establishment of the national forests and became the Forest Service's head in 1905.[242] Rather than immediately exploiting forests for timber—or permanently preserving them—Pinchot argued for

235. *See* KATIE HOOVER ET AL., CONG. RSCH. SERV., IF10585, THE FEDERAL LAND MANAGEMENT AGENCIES (2021), https://sgp.fas.org/crs/misc/IF10585.pdf [https://perma.cc/A3N2-EAQZ].

236. Multiple-Use Sustained-Yield Act (MUSYA) of 1960, 16 U.S.C. §§ 528–531 (2018); *see also* U.S. FOREST SERV., 2019 LAND AREAS REPORT: TABLE 1 – NATIONAL AND REGIONAL AREAS SUMMARY (2019), https://www.fs.fed.us/land/staff/lar/LAR2019/LARTable01.pdf [https://perma.cc/ F4DW-DGZ8].

237. 16 U.S.C. § 528. Congress affirmed this mandate in the National Forest Management Act of 1976. 16 U.S.C. § 1604(e) (requiring that national forest plans provide for multiple use and "include coordination of outdoor recreation, range, timber, watershed, wildlife and fish, and wilderness").

238. *What We Manage*, U.S. DEP'T OF THE INTERIOR BUREAU OF LAND MGMT, https://www.blm.gov/about/what-we-manage/national [https://perma.cc/2RX3-DZE2].

239. Federal Land Policy and Management Act (FLMPA) of 1976, 43 U.S.C. §§ 1702(c), 1732(a) (2018).

240. 43 U.S.C. § 1702(c) (defining "multiple use" under the FLPMA); *accord* 16 U.S.C. § 531 (defining "multiple use" similarly under the MUSYA).

241. *See* Martin Nie, *Statutory Detail and Administrative Discretion in Public Lands Governance: Arguments and Alternatives*, 19 J. ENV'T L. & LITIG. 223, 231 (2004) (observing that the Forest Service's governing statutes allow it to "promise everything to everyone in the name of 'intensive management' and multiple use").

242. *See* Coggins, *supra* note 37, at 238; Michael C. Blumm, *Public Choice Theory and the Public Lands: Why "Multiple Use" Failed*, 18 HARV. ENV'T L. REV. 405, 413 (1994).

maximizing forests' long-term productive use in light of economic and scientific principles.[243] Pinchot saw multiple use as a means of accomplishing "the greatest good for the greatest number," which ideally would mean multiple compatible uses at sustained levels of productivity.[244] The MUSYA and its historical counterparts largely incorporated Pinchot's utilitarian approach.[245] However, the statute cautioned that multiple-use management should not "impair[] the productivity of the land," nor would it "necessarily [involve] the combination of uses that would give the greatest dollar return or the greatest unit output."[246] Multiple use, in other words, does not demand economically efficient management.[247] Enactment of the FLPMA in 1976 imposed a similar multiple-use mandate on the BLM.[248] Through this mandate, Congress rejected the traditional dominant use of BLM lands—grazing—in favor of a more publicly oriented and environmentally protective approach.[249]

The multiple-use mandate is politically appealing to key stakeholders.[250] It has allowed legislators "to avoid the inevitable and politically volatile hard choices."[251] It has given the agencies vast discretion to manage the land as they judge best.[252] Multiple use has promised extractive industries, recreationists, and other resource users, "the simultaneous satisfaction of a variety of desired uses of the land."[253] And for the public, the participatory mechanisms incorporated into multiple-use

243. James L. Huffman, *A History of Forest Policy in the United States*, 8 ENV'T L. 239, 252, 267 (1978).

244. Coggins, *supra* note 37, at 238–39.

245. *See id.* at 239–40.

246. Multiple-Use Sustained-Yield Act (MUSYA) of 1960, 16 U.S.C. § 531 (2018).

247. George Cameron Coggins, *The Law of Public Rangeland Management IV: FLPMA, PRIA, and the Multiple Use Mandate*, 14 ENV'T L. 1, 55–58 (1983).

248. Coggins, *supra* note 37, at 240.

249. Coggins, *supra* note 247, at 15.

250. *See* JAN G. LAITOS ET AL., NATURAL RESOURCES LAW 1142 (2d ed. 2012) (reporting remarks of Edward Crafts, one of the architects of MUSYA, that "[e]verything fell under multiple use, and who can argue against multiple use because it is all things to all people").

251. Coggins, *supra* note 37, at 241.

252. *See generally* Coggins, *supra* note 37, at 242; Blumm, *supra* note 242, at 414. A leading treatise describes agency discretion under multiple-use statutes as "almost unreviewable, even for abuse of discretion." GEORGE CAMERON COGGINS & ROBERT L. GLICKSMAN, 3 PUBLIC NATURAL RESOURCES LAW § 30:5 (2d ed. 2020) (1990).

253. Blumm, *supra* note 242, at 414.

planning processes has offered the prospect of meaningful input in public lands management.[254]

Notwithstanding these features, multiple use has proven to be a too-easy solution to the problem of competing land uses. The promise of multiple use is a mirage: in many instances, commodity production, preservation, and intensive recreation are inherently incompatible, making it impossible to satisfy different constituencies simultaneously.[255] Recognizing this incompatibility, agencies often manage multiple-use lands as lands subject to a single dominant use.[256] In theory, an agency might manage the land in a way that reflects public preferences or the public interest.[257] In practice, however, the phrase "multiple use" has often functioned as a shorthand for the continued dominance of extractive uses of the public lands.[258] Consistent with public-choice theory, the mining, ranching, and timber industries have taken advantage of agencies' broad discretion under multiple-use statutes to dominate agency decision-making.[259] These extractive uses, which rely on substantial subsidies, are unlikely to be economically efficient, let alone utility maximizing.[260] Unfortunately, industry domination of the public lands has come at a high cost to the environment, yielding a "landscape characterized by depleted streamflows, overgrazed rangelands, unreclaimed mines, overharvested forests, and endangered salmon."[261]

Multiple use has proven to be not only practically impossible but also scientifically indefensible. The key assumption underlying Pinchot's approach—that land management decisions can be scientifically determined—has given way to the realization

254. *See id.* at 415.

255. Jan G. Laitos & Thomas A. Carr, *The Transformation on Public Lands*, 26 ECOLOGY L.Q. 140, 205–06 (1999); Coggins, *supra* note 247, at 63–64 (noting that uses listed under multiple-use mandates "are more incompatible than compatible" and that different types of a specific use can conflict with each other).

256. Laitos & Carr, *supra* note 255, at 208–09.

257. Blumm, *supra* note 242, at 415.

258. GEORGE C. COGGINS ET AL., FEDERAL PUBLIC LAND & RESOURCES LAW 658 (7th ed. 2014); Laitos & Carr, *supra* note 255, at 211.

259. *See* Blumm, *supra* note 242, at 407.

260. *Id.* at 409–11, 421; Laitos & Carr, *supra* note 255, at 205; Robert B. Keiter, *Public Lands and Law Reform: Putting Theory, Policy, and Practice in Perspective*, 2005 UTAH L. REV. 1127, 1162.

261. Blumm, *supra* note 242, at 406.

that "resource allocation decisions are as much about value judgment as scientific fact."[262] Multiple-use management entrusts agencies with extremely broad discretion to make fundamentally political decisions.[263] This discretion undermines political accountability for such decisions and frequently entangles land management agencies in litigation and administrative appeals.[264]

Widely recognized as "obsolete," the multiple-use pipe dream has deep historical roots in public land management policies that are resistant to change.[265] Legislators have little incentive to replace vague multiple-use direction with prescriptive standards that would require difficult and politically risky choices.[266] Powerful economic interests invested in the status quo have successfully warded off legislative efforts to reform public land policies and move away from multiple use.[267] At the same time, key stakeholders have found multiple use to be sufficiently pliable to allow the executive branch to implement some of their desired policies.[268] Thus, despite its practical failure, multiple use persists as the default standard, in large part because no alternative approach can command sufficient political support.[269]

2. Coastal Armoring

Another example of a pipe dream too-easy solution is coastal armoring—the construction of seawalls, breakwaters, and other structures to protect the shoreline.[270] Coastal armoring appears to directly counter the erosive effects of ocean waves, rising sea

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262. Keiter, *supra* note 260, at 1162; *see also* Nie, *supra* note 241, at 272 (characterizing purported "'value-free implementation'" of scientific forest management as "often a sham").

263. *See* Nie, *supra* note 241, at 231.

264. *Id.* at 231, 265.

265. *See* George Cameron Coggins, *Commentary: Overcoming the Unfortunate Legacies of Western Public Land Law*, 29 LAND & WATER L. REV. 381, 389 (1994) (characterizing multiple use as "a product of history").

266. *See* Nie, *supra* note 241, at 263–65.

267. Blumm, *supra* note 242, at 421.

268. Keiter, *supra* note 260, at 1164.

269. *Id.* at 1163–64 ("No political consensus exists yet either to eliminate the multiple-use standard or modify science-based management principles. . . . As a matter of pure politics none of the various constituencies can muster sufficient votes in Congress to impose an alternate management standard on the public lands, leaving multiple-use as the default position.").

270. *See* MELIUS & CALDWELL, *supra* note 41, at 7.

levels, and climate-change-fueled storms. Armoring is a common policy response to coastal erosion,[271] and the public generally believes that such projects protect the coast.[272]

However, experts largely agree that coastal armoring is ineffective.[273] Armoring projects may offer short-term protection for specific parcels of land.[274] In the long term, however, coastal armoring harms the environment and defeats the fundamental purpose of preventing erosion.[275] Armoring structures impede natural beach replenishment as well as the inland migration of ecosystems.[276] Rather than halting erosion, these projects accelerate erosion of existing beaches, ecosystems, and neighboring properties, leaving coastal communities more vulnerable to storms and other disturbances.[277] They also often reduce beach access, harm the economic and social health of beach communities, and undermine shoreline property values.[278]

In California, where more than 10 percent of the coast is armored, armoring has been described as "the product of many ad hoc, individual public and private sector decisions favoring protection of the built environment over preservation of at-risk public trust resources . . . ."[279] Indeed, state and federal policies accommodate or even favor coastal armoring. The California Coastal Act, which generally protects beach access and coastal resources, directs the California Coastal Commission to allow armoring to protect existing structures.[280] At the federal level,

271. Gary B. Griggs, *The Impacts of Coastal Armoring*, 73 SHORE & BEACH 13, 15 (2005).

272. MELIUS & CALDWELL, *supra* note 41, at 3.

273. *See* Travis O. Brandon, *A Wall Impervious to Facts: Seawalls, Living Shorelines, and the U.S. Army Corps of Engineers' Continuing Authorization of Hard Coastal Armoring in the Face of Sea Level Rise*, 93 TUL. L. REV. 557, 571–77 (2019) (discussing negative impacts of coastal armoring).

274. MELIUS & CALDWELL, *supra* note 41, at 3.

275. *See id.* at 8–9; *see generally* Rachel K. Gittman et al., *Ecological Consequences of Shoreline Hardening: A Meta-Analysis*, 66 BIOSCIENCE 763 (2016); Karl F. Nordstrom, *Living with Shore Protection Structures: A Review*, 150 ESTUARINE, COASTAL & SHELF SCI. 11 (2014).

276. MELIUS & CALDWELL, *supra* note 41, at 3.

277. *Id.* at 8–9; John N. Kittinger & Adam L. Ayers, *Shoreline Armoring, Risk Management, and Coastal Resilience Under Rising Seas*, 38 COASTAL MGMT. 634, 642 (2010).

278. MELIUS & CALDWELL, *supra* note 41, at 9–11; ELLEN HANAK & GEORGINA MORENO, CALIFORNIA COASTAL MANAGEMENT WITH A CHANGING CLIMATE 9–10 (2008).

279. MELIUS & CALDWELL, *supra* note 41, at 3–4.

280. CAL. PUB. RES. CODE § 30235 (West 2018); *see* HANAK & MORENO, *supra* note 278, at 17 (noting that California has sought to ameliorate the effects of this

the U.S. Army Corps of Engineers authorizes coastal landowners to construct armoring structures up to five-hundred feet without having to obtain an individual federal permit.[281]

Public-choice dynamics are a powerful driving force for the widespread use of coastal armoring, as it enables private parties to protect their property at the expense of other landowners and public trust resources.[282] In addition, armoring offers an immediate and visible response that is psychologically appealing. Admittedly, coastal armoring can be expensive, as erecting a mile of seawall can cost tens of millions of dollars.[283] However, the alternatives—such as retreat and relocation—can impose even greater upfront costs and seem more disruptive to current residents.[284] For example, in Pacifica, California, a town where coastal erosion has destroyed cliffside structures or forced their demolition, city officials floated managed retreat as the most cost-effective option for some neighborhoods.[285] Those officials quickly backed down in response to heated opposition. In its sea-level-rise adaptation plan, the city declared its intent to extend existing seawalls and replaced the phrase "managed retreat" with "adaptation strategies."[286] Here and in other places, coastal

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direction through a "no further armoring" policy that incorporates into permits for new construction a prohibition against future armoring).

281. Issuance and Reissuance of Nationwide Permits, 82 Fed. Reg. 1860, 1986–87 (Jan. 6, 2017). The government reissued the nationwide permit for armoring structures in 2017 despite acknowledging the adverse impact of such structures on natural shoreline processes, habitats, and water bodies. *Id.* at 1892. Note, however, section 404 of the Clean Water Act requires permits for the discharge of dredge and fill material into the waters of the United States. Clean Water Act (CWA) § 404, 33 U.S.C. § 1344 (2018).

282. *See* Kittinger & Ayers, *supra* note 277, at 643–44 (contrasting shoreline management policies in Hawai'i, where coastal landowners can construct coastal armoring and shift the risk of erosion to the public, and North Carolina, where coastal landowners bear the risk of erosion); MELIUS & CALDWELL, *supra* note 41, at 11.

283. Rosanna Xia, *The California Coast Is Disappearing Under the Rising Sea. Our Choices Are Grim*, L.A. TIMES (July 7, 2019), https://www.latimes.com/projects/la-me-sea-level-rise-california-coast [https://perma.cc/6EKG-GLC2].

284. *See id.* (describing public opposition to "the very thought of turning prime real estate back into dunes and beaches" through the "un-American" option of managed retreat). *But see* HANAK & MORENO, *supra* note 278, at 13 (noting that retreat can be the best option, especially if costs to the ecosystem and public coastal access are considered).

285. *See* Xia, *supra* note 283.

286. *See id.*; ENV'T SCI. ASSOCS., LOCAL COASTAL PLAN POLICIES RELATING TO SEA-LEVEL RISE ADAPTATION 9 (2018), https://www.cityofpacifica.org/civicax/filebank/blobdload.aspx?t=65377.05&BlobID=15842 [https://perma.cc/M5AA-SE9Y] ("Managed retreat is not included in any of the near-term policies."); *cf.* ENV'T SCI.

armoring's political and psychological appeal keeps this pipe dream alive and well.

C. Myopic Approaches

Myopic approaches, the third subcategory of too-easy solutions, are partial solutions that can become an obstacle to further action on an environmental problem. These approaches can be beneficial and worthwhile but often should be combined with other measures. Examples of myopic approaches include fish consumption advisories and pollution control.

1. Fish Consumption Advisories

Fish consumption advisories, which began as a partial and temporary response to toxic contamination of waterways, are a common policy tool for addressing the danger of consuming contaminated fish.[287] Unfortunately, over time they have become a myopic approach that has weakened the impetus to address the underlying contamination.

Fish consumption advisories were first issued in the United States during the early 1970s as various lakes—and the fish in them—demonstrated hazardous levels of mercury.[288] Mercury winds up in waterways after its release by coal-fired power plants, chlor-alkali plants, incinerators, and former gold mining operations.[289] Microorganisms convert this elemental form of mercury into methylmercury, a powerful neurotoxin that bioaccumulates in wildlife.[290] Mercury remains the leading chemical

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ASSOCS., SEA-LEVEL RISE ADAPTATION PLAN: PACIFICA, CA 23 (2018), https://www.cityofpacifica.org/civicax/filebank/blobdload.aspx?t=58348.79&BlobID=14632 [https://perma.cc/62TZ-S74T] ("While the cost-benefit results indicate that managed retreat/realignment may be a long-term cost effective option in many subareas, the immediate costs and impacts to the City's adopted goals would be severe compared to the benefits speculated in the long-term future, which makes this option difficult to support and implement in the near-term.").

287. Catherine A. O'Neill, *supra* note 32, at 279.

288. *See* Valoree S. Gagnon, Ojibwe Gichigami *("Ojibwa's Great Sea"): An Intersecting History of Treaty Rights, Tribal Fish Harvesting, and Toxic Risk in Keweenaw Bay, United States*, 8 WATER HIST. 365, 375 (2016).

289. Catherine A. O'Neill, *Risk Avoidance, Cultural Discrimination, and Environmental Justice for Indigenous Peoples*, 30 ECOLOGY L.Q. 1, 7 (2003).

290. NAT'L RSCH. COUNCIL, TOXICOLOGICAL EFFECTS OF METHYLMERCURY 15–16 (2000).

contaminant responsible for fish consumption advisories today.[291] These advisories, which include federal guidelines pertaining to the consumption of commercially produced seafood,[292] as well as state, tribal, and local warnings concerning fish from recreational and subsistence activities, cover almost half of the lake acreage, river miles, and coastlines in the United States.[293]

Fish consumption advisories are often part of a broader program that also encompasses pollution prevention, control, and cleanup.[294] The initial intent behind such advisories was to protect consumers temporarily until these other efforts reduced water pollution and fish contamination to safe levels.[295] Yet even

291. OFF. OF INSPECTOR GEN., EPA, 17-P-0174, EPA NEEDS TO PROVIDE LEADERSHIP AND BETTER GUIDANCE TO IMPROVE FISH ADVISORY RISK COMMUNICATIONS 1 (2017) [hereinafter OIG]; EPA, 2011 NATIONAL LISTING OF FISH ADVISORIES 4–6 (2013) (reporting that 81 percent of all fish advisories involved mercury).

292. *See* Mark Holden, *FDA–EPA Public Health Guidance on Fish Consumption: A Case Study on Informal Interagency Cooperation in "Shared Regulatory Space,"* 70 FOOD & DRUG L.J. 101, 119 (2015) (noting that the FDA exercises authority over mercury contamination in commercial seafood based on its assessment that mercury constitutes an added substance under the Food, Drug, and Cosmetic Act); *id.* at 126 (noting that the EPA, pursuant to its Clean Water Act authority over water quality, issues guidelines regarding contamination in noncommercial fish to assist states in issuing fish consumption advisories); *id.* at 128 (noting that, since 2004, the FDA and the EPA have begun issuing joint consumer advisory guidance on safe seafood consumption by women and young children in an effort to reduce confusion generated by potentially inconsistent guidance); Robert E. Reinert et al., *Risk Assessment, Risk Management, and Fish Consumption Advisories in the United States*, 16 FISHERIES 5, 5 (1991); *Advice about Eating Fish*, FDA (Dec. 29, 2020), https://www.fda.gov/food/consumers/advice-about-eating-fish [https://perma.cc/K2H8-FV83].

293. EPA, *supra* note 291, at 1–2; VALOREE S. GAGNON ET AL., ELIMINATING THE NEED FOR FISH CONSUMPTION ADVISORIES IN THE GREAT LAKES REGION: A POLICY BRIEF 3 (2018).

294. *See* EPA, 823-B-96-006, GUIDANCE FOR ASSESSING CHEMICAL CONTAMINATION DATA FOR USE IN FISH ADVISORIES: VOLUME III: OVERVIEW OF RISK MANAGEMENT 2-4, 2-10, 2-31 (1996); Gagnon, *supra* note 288, at 375.

295. *See* EPA, *supra* note 294, at 1-9 ("The ultimate goal of a fish contamination risk reduction program is to return waterbodies to a condition in which fish are no longer contaminated at a level that will pose unacceptable risks to human health."); *id.* at 1-19 (noting that "many state, local, and tribal [fish advisory] programs" share this goal). In 1971, the State of Michigan adopted some of the first advisories in the United States and, although the advisories were supported by substantiated health concerns, Native tribes suspected that the advisories were aimed at undercutting hard-fought judicial recognition of the tribes' treaty fishing rights. Gagnon, *supra* note 288, at 377. Decades later, many tribal members perceive present-day advisories as yet another policy aimed at discouraging traditional subsistence practices. *Id.* at 378.

early advisories sometimes acknowledged the government's limited ability to address the underlying toxic contamination. For example, the Food and Drug Administration's 1974 proposed rule governing mercury content in fish stated bluntly that "[m]ercury contamination of fish and shellfish is unavoidable" and noted "there are no means of removing the mercury from these [polluted] waters . . . and no method of processing fish or shellfish so as to remove or reduce the mercury contamination."[296]

Over time, these advisories have been fine-tuned to reach high-risk subpopulations and to better inform individual behavior.[297] Despite their original framing as "regrettable, temporary and exceptional responses,"[298] these advisories frequently have become a permanent part of the regulatory landscape.[299] Introduced initially as stopgap measures, fish advisories often function today as too-easy solutions. EPA has developed an extensive advisory program and made it an important part of its current risk management strategy.[300] In the Great Lakes region, where fish consumption advisories were first widely adopted, those advisories have persisted as mercury contamination has proven to be a global problem and not merely a regional concern.[301] Reducing mercury to safe levels in the Great Lakes requires not only the relatively successful control efforts in the United States and Canada to date, but also additional efforts in China and other countries.[302] Regardless of such efforts, consumption advisories will be necessary for the foreseeable future because mercury circulates in the environment for decades.[303]

Consumption advisories can be an important component of a broader public health strategy. But they can constitute a too-easy solution if they are offered as a narrow substitute for risk reduction. In the case of Great Lakes fish consumption advisories, these "temporary" measures are now entering their sixth decade—with no end in sight—because the underlying pollution

296. Action Level for Mercury in Fish and Shellfish, 39 Fed. Reg. 42,738, 42,738 (proposed Dec. 6, 1974) (to be codified at 21 C.F.R. pt. 122).

297. *See* GAGNON ET AL., *supra* note 293, at 5.

298. Catherine A. O'Neill, *Mercury, Risk, and Justice*, 34 ENV'T L. REP. 11070, 11107 (2004).

299. O'Neill, *supra* note 32, at 275.

300. O'Neill, *supra* note 289, at 11.

301. GAGNON ET AL., *supra* note 293.

302. *Id.* at 8–11.

303. *Id.* at 10, 12.

problem has proven more complex and intractable than originally thought.[304] The danger that advisories might substitute for risk reduction is illustrated by the George W. Bush Administration's approach to regulating mercury emissions from coal-fired power plants. Under that approach, EPA established a nationwide cap on total mercury emissions, allocated emissions allowances to individual sources, and permitted those sources to trade allowances with each other to take advantage of differing costs of pollution control.[305] This cap-and-trade system, which followed years of utility industry success in blocking any regulation of mercury emissions from these sources,[306] was predicted to generate pollution hot spots.[307] In response to the concern that Native American subpopulations would consume fish with elevated mercury concentrations as a result, EPA touted the protection that fish consumption advisories would offer.[308] In other words, EPA essentially relied on the advisories as a substitute for regulations that would have reduced contamination for all populations at risk.[309]

Consumption advisories provide one illustration of the potential inadequacies of risk avoidance as a strategy to address toxic risk. Risk-avoidance strategies also include use-restricted cleanups, air pollution alerts, pesticide contact warnings, beach advisories and closures, and boil-water notices.[310] Difficulties may arise in implementing such strategies, as poor risk communication, contradictory information, mistrust, or language barri-

304. *Id.* at 8–12.

305. O'Neill, *supra* note 298, at 11082.

306. *Id.* at 11090.

307. *Id.* at 11098–106.

308. Proposed National Emissions Standards for Hazardous Air Pollutants; and, in the Alternative, Proposed Standards for Performance for New and Existing Stationary Sources: Electric Utility Steam-Generating Units, 69 Fed. Reg. 4,652, 4,709 (proposed Jan. 30, 2004) (to be codified at 40 C.F.R. pts. 51, 72, 75, 96); Standards of Performance for New and Existing Stationary Sources: Electric Utility Steam-Generating Units, 70 Fed. Reg. 28,606, 28,641–42 (May 18, 2005) (codified at 40 C.F.R. pts. 60, 72, 75). EPA's mercury emissions trading scheme was vacated in *New Jersey v. EPA*, 517 F.3d 574, 578 (D.C. Cir. 2008).

309. O'Neill, *supra* note 32, at 301 (discussing a National Mining Association comment letter that "called for reliance on risk avoidance in the form of fish consumption advisories, citing advisories' cost effectiveness relative to decreasing mercury emissions" (quoting Nat'l Mining Ass'n, Comment Letter on Proposed Rule on National Emission Standards for Hazardous Air Pollutants (May 13, 2004), https://www.regulations.gov/comment/EPA-HQ-OAR-2002-0056-2434 [https://perma.cc/UP3L-3GG4])).

310. *See id.* at 274, 278–92.

ers keep information from reaching target audiences effectively.[311] More importantly, risk-avoidance strategies face inherent limitations. Risk avoidance shifts the burden of responding to risk to those who would be exposed and requires them to forego important activities or resources.[312] Recipients of fish consumption advisories may have to give up a vital protein source or important traditional cultural practices; persons subject to air pollution alerts may have to avoid outdoor activities.[313] Furthermore, some harms cannot be avoided, and risk-avoidance strategies do nothing to address harm to wildlife and the environment.[314]

A primary reason for the adoption of risk-avoidance strategies is economic: warnings are almost invariably cheaper than pollution controls or cleanup.[315] Politically, risk-avoidance strategies can serve as "pragmatic compromises" when Congress is unable to agree on substantive regulation.[316] Public-choice theory highlights a further reason for the appeal of risk avoidance: these measures shift the burden of dealing with pollution from industry to the general public or to politically weak subpopulations.[317] Risk-avoidance strategies are also consistent with societal preferences for autonomy and minimal regulation.[318] Rather than coercing conduct, they allow individuals—in theory—to decide for themselves whether to heed the warnings.[319]

Speaking generally of why policymakers find risk-avoidance strategies attractive, William Rodgers highlights the political and psychological factors at work:

> Typically, interest in warnings does not dwell extensively on the accuracy of the message or the utility of it. . . . They afford an appearance of action without significant disruption of the status quo. They divert attention from systematic failures to

311. GAGNON ET AL., *supra* note 293, at 7; OIG, *supra* note 291, at 8; O'Neill, *supra* note 287, at 312–16.

312. O'Neill, *supra* note 32, at 274.

313. *Id.* at 274, 290.

314. GAGNON ET AL., *supra* note 293, at 6; O'Neill, *supra* note 32, at 307–09.

315. O'Neill, *supra* note 32, at 300. CBAs often do not account for the full costs of implementing risk avoidance measures nor the measures' failure to address environmental harms and indirect health harms. *Id.* at 326–30.

316. ARCHON FUNG ET AL., FULL DISCLOSURE: THE PERILS AND PROMISE OF TRANSPARENCY 14 (2007) (discussing examples).

317. O'Neill, *supra* note 32, at 297.

318. *Id.* at 302.

319. *Id.*

> deal with the problem by other means. They shift responsibility from public decision-makers to an amorphous public at large.[320]

In other words, single action bias and status quo bias favor the adoption and persistence of risk-avoidance measures. Fish consumption advisories, air pollution alerts, and the like have become a regrettable but accepted myopic feature of the status quo as society has become increasingly accustomed to environmental contamination.[321]

2. Pollution Control

Even traditional pollution control strategies, the workhorses of environmental law, may constitute a myopic solution if they hinder the development of more effective approaches. In general, there are three basic strategies for responding to environmental pollution: (1) pollution prevention, (2) pollution control, and (3) risk reduction.[322] Pollution prevention aims to avoid pollution in the first instance by altering existing production processes or other pollution-generating activities.[323] Pollution control takes existing processes as a given and attempts to reduce emissions at the smokestack or discharge pipe.[324] And risk reduction, which includes risk-avoidance strategies as well as pollution cleanup, focuses on reducing exposure to environmental pollution.[325] This Section considers whether pollution control

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320. William H. Rodgers, Jr., *Improving Laws, Declining World: The Tort of Contamination*, 38 VAL. L. REV. 1249, 1258 (2004).

321. O'Neill, *supra* note 32, at 298; Rodgers, *supra* note 320, at 1258.

322. FIORINO, *supra* note 49, at 189.

323. *Id.* Outside the United States, the term "cleaner production" is typically used instead of pollution prevention. *See* FRANCISCO JOSÉ GOMES DA SILVA & RONNY MIGUEL GOUVEIA, CLEANER PRODUCTION: TOWARD A BETTER FUTURE 1–5 (discussing definitions of cleaner production and noting that cleaner production and pollution prevention are synonyms); W. BURTON HAMNER, WHAT IS THE RELATIONSHIP AMONG CLEANER PRODUCTION, POLLUTION PREVENTION, WASTE MINIMIZATION AND ISO 14000? 7 (1996), https://edisciplinas.usp.br/pluginfile.php/4059868/mod_resource/content/1/AULA%204%20-%20DEBATE%2002586.pdf [https://perma.cc/2YY4-CWZ3] (describing cleaner production as "broader in scope" than pollution prevention in that the former term "explicitly includes product design and use"). The concept of cleaner production was developed in the early 1990s as a strategy for industry to operationalize environmental sustainability. L. Hens et al., *On the Evolution of "Cleaner Production" as a Concept and a Practice*, 172 J. CLEANER PROD. 3323, 3324 (2018).

324. FIORINO, *supra* note 49, at 189.

325. *Id.*

is a myopic solution in light of the potential and limitations of pollution prevention. While pollution control is not inherently a too-easy solution, too-easy-solutions analysis draws attention to the potential for pollution control to hinder pollution prevention efforts.

a. Pollution Control—and Pollution Prevention as a Possible Alternative

Historically, efforts to address environmental pollution have relied primarily on pollution control.[326] Pollution control focuses on limiting pollution after it is generated rather than on altering production processes to prevent pollution.[327] However, mandates to install pollution control technologies or limit pollution releases can impose substantial costs and constrain business flexibility.[328] The tendency for marginal costs of pollution control to rise as controls become more stringent[329] has prompted increased consideration of pollution prevention as an alternative or complement to end-of-pipe controls.[330] The core idea behind pollution prevention is to reduce resource use or pollution emissions at the source through more efficient manufacturing processes.[331] Pollution prevention can involve changes in product design, process inputs or technology, plant management, or use of recycled materials.[332]

Pollution prevention measures may curb pollution more effectively than end-of-pipe technologies. They also may reduce

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326. Johnson, *supra* note 44, at 153; Manuel Frondel et al., *End-of-Pipe or Cleaner Production? An Empirical Comparison of Environmental Innovation Decisions Across OECD Countries*, 16 BUS. STRATEGY & ENV'T 571, 574 (2007) ("[E]nvironmental regulations relied far more on end-of-pipe in the past than on cleaner production technologies.").

327. Kurt A. Strasser, *Cleaner Technology, Pollution Prevention and Environmental Regulation*, 9 FORDHAM ENV'T L.J. 1, 2–3 (1997).

328. Cass R. Sunstein, *Problems with Rules*, 83 CALIF. L. REV. 953, 1019 (1995).

329. Cole & Grossman, *supra* note 43, at 894.

330. Gary Miller et al., *Advancing Pollution Prevention and Cleaner Production – USA's Contribution*, 16 J. CLEANER PROD. 665, 666 (2008). Another alternative is product innovations, where new or improved goods have reduced environmental impacts. Frondel et al., *supra* note 326, at 572–73.

331. Johnson, *supra* note 44, at 157; Frondel et al., *supra* note 326, at 572–73.

332. Johnson, *supra* note 44, at 157; Frondel et al., *supra* note 326, at 573; OFF. OF TECH. ASSESSMENT, U.S. CONG., OTA-ITE-317, SERIOUS REDUCTION OF HAZARDOUS WASTE: FOR POLLUTION PREVENTION AND INDUSTRIAL EFFICIENCY 78–84 (1986) [hereinafter OTA].

workplace exposure to pollutants, generation of byproducts, and transfer of pollutants to other media.[333] Further potential benefits for industry include increased production efficiency, lower pollution control costs, reduced liability exposure, and improved reputation.[334] However, whether pollution prevention is more cost-effective than pollution control is empirically uncertain and context-dependent.[335]

Notwithstanding its potential advantages, pollution prevention has seen only limited incorporation into environmental law, and end-of-pipe approaches have remained predominant.[336] The most prominent effort to promote pollution prevention in the United States, the 1990 Pollution Prevention Act (PPA), has had, at best, limited effectiveness. The PPA expressly recognizes that "source reduction"—the term the statute employs to refer to pollution prevention—"is fundamentally different and more desirable than waste management and pollution control."[337] Declaring that "disposal or other release into the environment should be employed only as a last resort," the statute promotes a hierarchy of approaches led by pollution prevention or reduction, followed by recycling and treatment.[338]

"[D]esigned as a first step toward accomplishing pollution prevention objectives," the PPA establishes a framework for pollution prevention rather than a comprehensive program.[339] The PPA directs EPA to, inter alia: (1) develop a source reduction strategy,[340] (2) implement a pollution prevention grant program,[341] and (3) establish an information clearinghouse of source reduction approaches.[342] Regulated entities must submit

333. Johnson, *supra* note 44, at 157; OTA, *supra* note 332, at 14, 18.

334. Timothy F. Malloy, *Principled Prevention*, 46 ARIZ. ST. L.J. 105, 136–37 (2014); DA SILVA & GOUVEIA, *supra* note 323, at 4; Johnson, *supra* note 44, at 159–61.

335. Malloy, *supra* note 334, at 137.

336. Fiorino, *supra* note 90, at 738 ("[T]he PPA has not been able to compete with mainstream regulatory laws.").

337. Pollution Prevention Act (PPA) of 1990, 42 U.S.C. § 13101(a)(4) (2018). The PPA also notes that existing law, by focusing on treatment and disposal and failing to encourage multi-media pollution management, may serve as a barrier to pollution prevention. *Id.* § 13101(a)(3).

338. *Id.* § 13101(b).

339. S. REP. NO. 101-526 (1990).

340. 42 U.S.C. § 13103(b).

341. *Id.* § 13104.

342. *Id.* § 13105.

a toxic chemical source reduction report to EPA[343] but need not prepare or implement a pollution prevention plan.[344] This limited approach reflects the PPA's overall strategy of encouraging, but not mandating, pollution prevention.[345]

The PPA's voluntary approach acknowledges the difficulty in setting and enforcing pollution prevention standards for facilities that vary widely in equipment, physical layout, materials, and other features.[346] In contrast to pollution control strategies, where regulators might more readily mandate a single standard, there may be multiple ways to reduce pollution within a production process.[347] Evaluating possible process changes and setting standards requires substantial resources and expertise.[348] Compounding the difficulties, industry often asserts confidentiality and trade secret protections over production process information, making between-facility comparisons and public oversight challenging.[349] Even if regulators could identify feasible pollution prevention measures for a specific site, they also would have to overcome industry resistance to government oversight of production processes.[350]

From the outset, EPA has struggled to effectively measure the results of PPA implementation. Direct outputs of a pollution prevention program, such as the number of consultations or participants,[351] may not reflect genuine environmental improvements. Calculating actual pollution prevented is preferable but "much more difficult" than measuring reductions in end-of-pipe pollution.[352] When a company replaces a toxic chemical in its production process with another chemical of unknown toxicity, for example, simply measuring the change in volume of chemical

343. *Id.* § 13106; GEN. ACCT. OFF., GAO-01-283, ENVIRONMENTAL PROTECTION: EPA SHOULD STRENGTHEN ITS EFFORTS TO MEASURE AND ENCOURAGE POLLUTION PREVENTION 14–18 (2001) [hereinafter GAO] (discussing the limitations of the PPA's reporting requirements).

344. Johnson, *supra* note 44, at 189.

345. *Id.* at 170.

346. OTA, *supra* note 332, at 4, 30; *see also* OFF. SOLID WASTE & EMERGENCY RESPONSE, EPA, EPA/530-SW-86-033, REPORT TO CONGRESS: MINIMIZATION OF HAZARDOUS WASTE, at xv (1986) (stating that performance standards for waste minimization "would be costly and time consuming to design").

347. OTA, *supra* note 332, at 55–56.

348. Johnson, *supra* note 44, at 185.

349. *Id.* at 193.

350. OTA, *supra* note 332, at 32.

351. OFF. POLLUTION PREVENTION & TOXICS, EPA, EPA 742-R-97-001, POLLUTION PREVENTION 1997: A NATIONAL PROGRESS REPORT 220 (1997).

352. *Id.* at 217.

used is clearly inadequate.[353] Not surprisingly, a 2001 GAO report concluded that "[q]uantitative data on the extent to which companies have implemented pollution prevention efforts are limited, and national data on emissions reduced through pollution prevention measures do not exist."[354] Further complicating matters, pollution prevention may not be readily identifiable because it can occur under broader rubrics, such as sustainable consumption, corporate social responsibility, eco-design, and green chemistry.[355] Aside from difficulties in identifying and measuring pollution prevention, establishing causal links between pollution prevention programs and pollution reductions has not been possible.[356] Moreover, the biennial reports mandated by the PPA have not been produced regularly—and apparently not at all in recent years.[357] Based on the limited data available, the general consensus seems to be that pollution prevention remains underutilized and unevenly implemented.[358]

353. *Id.* at 226, 229 (suggesting measuring changes in the quantity of individual pollutants, while acknowledging the lack of a system for ranking or comparing the hazard potential of different chemicals).

354. GAO, *supra* note 343, at 14. Similarly, a 2015 report by EPA's inspector general found that the agency is unable to determine the effectiveness of its pollution prevention grants. OFF. OF INSPECTOR GEN., EPA, 15-P-0276, EPA NEEDS ACCURATE DATA ON RESULTS OF POLLUTION PREVENTION GRANTS TO MAINTAIN PROGRAM INTEGRITY AND MEASURE EFFECTIVENESS OF GRANTS 10 (2015).

355. *See* DA SILVA & GOUVEIA, *supra* note 323, at 9; Hens et al., *supra* note 323, at 3326–28; Malloy, *supra* note 334, at 152.

356. OFF. OF POLLUTION PREVENTION & TOXICS, EPA, EVALUATION OF EPA EFFORTS TO INTEGRATE POLLUTION PREVENTION POLICY THROUGHOUT EPA AND AT OTHER FEDERAL AGENCIES 55 (2008); Linda T.M. Bui & Samuel Kapon, *The Impact of Voluntary Programs on Polluting Behavior: Evidence from Pollution Prevention Programs and Toxic Releases*, 64 J. ENV'T ECON. & MGMT. 31, 44 (2012) (finding correlation between voluntary pollution prevention programs and reductions in pollution released but cautioning that "[i]t is yet to be determined . . . just how those effects have come about").

357. E-mail from Thomas Tillman, Deputy Dir., Chem., Econ., & Sustainable Strategies Div., Off. of Pollution Prevention and Toxics, EPA, to Chad Oliver, Rsch. Assistant to Albert Lin, Professor of L., Univ. of California, Davis, Sch. of L. (June 19, 2020) (on file with author). During the 1990s, EPA issued two reports on its pollution prevention efforts. OFF. OF POLLUTION PREVENTION & TOXICS, *supra* note 351; OFF. OF POLLUTION PREVENTION & TOXICS, EPA, EPA 21P-3003, POLLUTION PREVENTION 1991: PROGRESS ON REDUCING INDUSTRIAL POLLUTANTS (1991).

358. GAO, *supra* note 343, at 21.

b. *Is Reliance on Pollution Control a Too-Easy Solution?*

Given the potential merits of pollution prevention, continued heavy reliance on pollution control can be viewed as a too-easy solution, at least in some circumstances. This is not to suggest that pollution control is easy. Pollution controls are often costly to install and operate. Nor is pollution control politically easy: new pollution control requirements are often hotly contested in the courts, and enacting new statutory standards—at least at the federal level—seems almost unimaginable. Still, pollution control approaches may be understood as a too-easy solution to the extent that they not only fail to address the underlying pollution-generating activity itself but also can hinder efforts to do so.

What explains the failure of pollution prevention to displace pollution control? First, path dependence has played an important role: the pollution control approach is central to the Clean Air Act, the Clean Water Act, and other foundational environmental laws and has proven resistant to change over decades of legislative gridlock.[359] Accustomed to end-of-pipe controls that focus on pollution in compartmentalized ways, companies, employees, regulators, and other stakeholders may find it difficult to consider alternatives.[360] Status quo bias favors the continuation of existing regulatory structures, and single action bias impedes efforts to append pollution prevention to those structures. Second, pollution prevention is generally more complex than pollution control; it may involve not only technological change but also reassessment and realignment of product design and manufacturing processes.[361] Changing complex processes can introduce uncertainties, and a company might reasonably

359. David W. Case, *The Lost Generation: Environmental Regulatory Reform in the Era of Congressional Abdication*, 25 DUKE ENV'T L. & POL'Y F. 49, 60–62 (2014).

360. Johnson, *supra* note 44, at 165–66; Letícia Canal Vieira & Fernando Gonçalves Amaral, *Barriers and Strategies Applying Cleaner Production: A Systematic Review*, 113 J. CLEANER PROD. 5, 14 (2016); Manik Roy, *Pollution Prevention, Organizational Culture, and Social Learning*, 22 ENV'T L. 189, 236–37 (1992) (contending that the compartmentalized approach to pollution control has hindered pollution-prevention efforts by fostering a distinct culture around each pipe within regulatory agencies, legislative staff, consultants, and the regulated community); *see* Frondel et al., *supra* note 326, at 572, 581.

361. Vieira & Amaral, *supra* note 360, at 13; Johnson, *supra* note 44, at 164–65; Frondel et al., *supra* note 326, at 572.

prefer pollution control as a more straightforward option.[362] Furthermore, while pollution prevention may be economically preferable in the long run, it may impose significant upfront costs that companies or corporate decision-makers are unwilling or unable to bear.[363] These upfront costs may play an outsized role in CBAs of pollution prevention, which often do not account for the economic savings that can result from increased energy efficiency or decreased use of raw materials.[364]

The dry-cleaning industry provides one example in which pollution control has acted as a barrier to pollution prevention.[365] Despite the development of wet-cleaning technology that cleans garments effectively without toxic chemicals, traditional dry cleaning with toxic chemicals has remained the norm.[366] Reluctant to interfere in the industry's production processes, regulators in one jurisdiction refrained from specifying wet cleaning as the legally mandated technology and instead relied on design and performance standards for traditional dry cleaning.[367] Permitting and enforcement staff were unaware of studies—funded by their own agency—demonstrating that wet cleaning was a technically and economically viable substitute for dry cleaning.[368] In addition, that staff understood its mandate "as limited to identifying appropriate pollution control technologies," as opposed to "encouraging the diffusion of new process technologies such as wet cleaning."[369]

Pollution prevention is not a complete replacement for pollution control. Pollution prevention may not be technically feasible in some cases, and it may not eliminate all pollution.[370] Indeed, pollution prevention and pollution control interact in diverse ways. On the one hand, the existence of pollution control mandates can divert resources and attention away from pollu-

362. GAO, *supra* note 343, at 8.

363. Johnson, *supra* note 44, at 164–65; Frondel et al., *supra* note 326, at 572; Vieira & Amaral, *supra* note 360, at 13.

364. Ackerman & Heinzerling, *supra* note 99, at 1580–81.

365. Timothy F. Malloy & Peter Sinsheimer, *Innovation, Regulation and the Selection Environment*, 57 RUTGERS L. REV. 183 (2004).

366. *Id.* at 199–200.

367. *Id.* at 210, 214–15.

368. *Id.* at 215.

369. *Id.* at 216.

370. *See* Malloy, *supra* note 334, at 150; *cf.* HAMNER, *supra* note 323, at 7 (explaining that the focus of cleaner production is "on doing better, not on creating no pollution at all").

tion prevention and weaken firms' incentives to explore more innovative approaches.[371] On the other hand, pollution control requirements can incentivize pollution prevention efforts.[372] Firms may undertake pollution prevention to avoid the enactment or application of end-of-pipe requirements.[373] Indeed, one study of the adoption of pollution prevention techniques concluded that "maintaining a strong regulatory framework and a credible threat of mandatory regulations can be effective" in encouraging firms to adopt environmental management systems aimed at pollution prevention.[374] Moreover, pollution control requirements sometimes can be satisfied through pollution prevention. For example, rather than singling out a specific control technology, regulations often set out performance standards that allow companies flexibility in achieving those standards.[375]

Because pollution prevention cannot wholly substitute for pollution control, the persistence of pollution control, by itself, should not be viewed as a failure. Nor should pollution control necessarily be deemed a too-easy solution. Pollution control often does address root causes by reducing pollution substantially and cost effectively. The critical issue is the extent to which industry has thoughtfully integrated pollution prevention into economic activity; some companies and sectors have done so, but far more needs to be done.[376]

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371. Madhu Khanna et al., *Adoption of Pollution Prevention Techniques: The Role of Management Systems and Regulatory Pressures*, 44 ENV'T RES. ECON. 85, 91 (2009); GAO, *supra* note 343, at 41.

372. Michele Ochsner, *Pollution Prevention: An Overview of Regulatory Incentives and Barriers*, 6 N.Y.U. ENV'T L.J. 586, 596–97 (1998).

373. Khanna et al., *supra* note 371, at 91–92, 102; GAO, *supra* note 343, at 7.

374. Khanna et al., *supra* note 371, at 103; *see also* Xiang Bi & Madhu Khanna, *Inducing Pollution Prevention Adoption: Effectiveness of the 33/50 Voluntary Environmental Program*, 60 J. ENV'T PLAN. & MGMT. 2234, 2250 (2017) (finding that participants in EPA's voluntary 33/50 program were more likely to reduce toxic releases, but suggesting that the absence of credible threats of end-of-pipe regulation may explain the ineffectiveness of voluntary programs to reduce greenhouse gas emissions).

375. GAO, *supra* note 343, at 29 (noting that the Clean Air Act acid rain program set stringent performance standards for sulfur dioxide emissions that could be satisfied by installing scrubbers or by switching fuel from high-sulfur coal to low-sulfur coal or natural gas).

376. Vieira & Amaral, *supra* note 360, at 6; Khanna et al., *supra* note 371, at 86 (noting case studies of firms that used environmental management systems to implement pollution prevention techniques).

Too-easy solutions come in different forms and serve various functions. While some of these policies help address environmental problems, their shortcomings point to a need to reconsider these policies.

IV. APPLYING TOO-EASY-SOLUTIONS ANALYSIS PROSPECTIVELY AND MORE BROADLY

More than a tool for reevaluating difficult policy choices, too-easy-solutions analysis also can be applied prospectively with the hope of avoiding the pitfalls of too-easy solutions. To illustrate prospective analysis, the discussion below considers solar radiation management as a too-easy solution to climate change. Too-easy-solutions analysis also can be applied beyond the environmental arena to other policymaking subjects, such as criminal law and consumer protection. Mandated disclosures in consumer protection law provide a powerful example of too-easy solutions in some circumstances.

A. Solar Radiation Management: A Too-Easy Solution to Climate Change?

Reducing GHG emissions is essential in responding to climate change. Adaptation is also necessary to address unavoidable climate impacts. However, continued high emission levels have prompted exploration of further options, including removal of carbon dioxide from the atmosphere and solar radiation management (SRM). This Section considers how SRM might be framed as a too-easy solution to climate change and suggests steps that might be taken to counter such a result.

SRM—also known as solar geoengineering or albedo modification—refers to proposed techniques to ameliorate some of climate change's effects by reducing the amount of radiation absorbed by the Earth.[377] These techniques, which have been the subject of very limited research, are by no means ready for deployment.[378] Nonetheless, SRM has attracted growing interest

377. Albert C. Lin, *The Missing Pieces of Geoengineering Research Governance*, 100 MINN. L. REV. 2509, 2514 (2016).

378. NAT'L ACADS. OF SCIS., ENG'G, & MED., REFLECTING SUNLIGHT: RECOMMENDATIONS FOR SOLAR GEOENGINEERING RESEARCH AND RESEARCH GOVERNANCE 4–5 (2021); NAT'L RSCH. COUNCIL, CLIMATE INTERVENTION: REFLECTING SUNLIGHT TO COOL EARTH 5–9 (2015).

because it promises more rapid cooling than GHG emissions reductions or atmospheric carbon dioxide removal, which would take decades or longer to cool the Earth's climate.[379]

Initial discussions suggested SRM as an option for responding to a climate emergency.[380] Today, however, SRM is framed primarily as a potential mechanism for buying time to reduce GHG emissions.[381] Under this "peak shaving" scenario, SRM would be deployed for decades or longer to reduce the warming impact of increased GHG concentrations, but its use would eventually be phased out.[382] Meanwhile, societies would transition to a net-zero carbon economy by drastically reducing GHG emissions and removing substantial amounts of carbon dioxide from the atmosphere.[383] Phasing out SRM as atmospheric GHG concentrations gradually decline would sidestep the so-called "termination problem,"[384] in which the abrupt termination of SRM would result in sudden climate impacts and leave societies and ecosystems unable to adapt.[385]

Among several hypothesized SRM methods, stratospheric aerosol injection (SAI) has received the most attention. SAI would involve the release of sulfur particles or other aerosols into the stratosphere, where they would be expected to remain for more than a year, blocking a portion of the sun's radiation.[386] In theory, a single nation or private actor could undertake SAI for a few billion dollars per year using a small fleet of specially designed high-altitude aircraft.[387] In order to maintain the aerosols' cooling effect and avoid a sudden temperature rise, deploy-

379. *See* NAT'L RSCH. COUNCIL, *supra* note 378, at 3, 5.

380. Ken Caldeira & David W. Keith, *The Need for Climate Engineering Research*, 37 ISSUES SCI. & TECH., 1, at 57, 62 (2010). For criticisms of this framing, see, for example, Joshua B. Horton, *The Emergency Framing of Solar Geoengineering: Time for a Different Approach*, 2 ANTHROPOCENE REV. 147 (2015); Nils Markusson et al., *'In Case of Emergency Press Here': Framing Geoengineering as a Response to Dangerous Climate Change*, 5 WIREs CLIMATE CHANGE 281 (2014).

381. Buck et al., *supra* note 11, at 502.

382. *See* NAT'L ACADS. OF SCIS., ENG'G, & MED., *supra* note 378, at 114.

383. *See* Jane C.S. Long & John G. Shepard, *The Strategic Value of Geoengineering Research*, *in* GLOBAL ENVIRONMENTAL CHANGE: HANDBOOK OF GLOBAL ENVIRONMENTAL POLLUTION 757, 765 (Bill Freedman ed., 2014).

384. *Id.*

385. NAT'L RSCH. COUNCIL, *supra* note 378, at 52–54.

386. *See id.* at 2.

387. Wake Smith & Gernot Wagner, *Stratospheric Aerosol Injection Tactics and Costs in the First 15 Years of Deployment*, 13 ENV'T RSCH. LETTERS 1, 9 (2018).

ment would likely need to continue for decades, or even centuries.[388] Potential risks associated with SAI include ozone depletion, changed precipitation patterns, and ecological damage.[389]

Commentators have described SAI as a stopgap measure or an ecological fix. Those who characterize SAI as a stopgap measure argue that it would buy time for a long-term climate change solution and mitigate immediate climate harms, though incompletely.[390] SAI would not relieve ocean acidification resulting from elevated atmospheric GHG concentrations, and SAI's hazards likely would grow exponentially as the magnitude of its implementation increases.[391]

Kevin Surprise, on the other hand, contends that SAI constitutes an ecological fix to the climate-change-related degradation that threatens capitalist systems.[392] In contrast to more costly and slow-acting decarbonization efforts, SAI promises to rapidly dampen the warming associated with higher GHG concentrations—and thereby reduce the economic devastation from droughts, floods, climate extremes, social upheaval, and other climate impacts.[393] Managing the rate of climate change through SAI might thereby "allow not only for timely effectuation of green capitalism and the deferral of climate crisis but the expansion of capital accumulation in an otherwise finite system."[394]

Would SAI also constitute a too-easy solution? At first glance, the unequivocal answer appears to be "yes." Politically and economically, SAI appears easy in comparison to the daunting task of eliminating GHG emissions, like a pipe dream. The direct costs of implementing SAI—if one ignores potential harms

388. NAT'L RSCH. COUNCIL, *supra* note 378, at 49–52.

389. *See id.* at 94–97.

390. Buck et al., *supra* note 11, at 499, 502; Scott Barrett, *The Incredible Economics of Geoengineering*, 39 ENV'T RES. ECON. 45, 47 (2008) ("Geoengineering is a stopgap measure, a 'quick fix,' a 'Band-Aid.'").

391. NAT'L RSCH. COUNCIL, *supra* note 378, at 34, 36.

392. Surprise, *supra* note 25, at 1231, 1235.

393. *Id.* at 1235.

394. *Id.* at 1240; *accord* Jennie C. Stephens & Kevin Surprise, *The Hidden Injustices of Advancing Solar Geoengineering Research*, 3 GLOB. SUSTAINABILITY 1, 3 (2020) ("SAI enables wealthy, corporate-connected philanthropists to support moderate climate policies rather than more transformative, systemic changes that would directly threaten their own concentrations of wealth and power.").

and uncertainties—would be much lower than the cost of mitigating emissions.[395] If the technical details are worked out, SAI would noticeably impact the climate within months, rather than decades.[396] Moreover, a single nation might implement SAI unilaterally, whereas eliminating or drastically reducing GHG emissions would require global cooperation.[397] Further satisfying the definition of a too-easy solution, SAI would not address the root cause of climate change: elevated GHG concentrations in the atmosphere.[398]

Nonetheless, the framing of SAI as a stopgap measure forces a more nuanced examination of whether it constitutes a too-easy solution or merely a stopgap. As explained at the outset, the key distinction between a stopgap measure and a too-easy solution is that the latter generally purports to resolve a problem permanently.[399] However, the "peak shaving" scenario expressly presents SAI as temporary: it envisions an end to SAI after decarbonization policies have sufficiently reduced GHG concentrations.[400] Accepting the premises of the "peak shaving" scenario thus leads to the conclusion that SAI is a stopgap rather than a too-easy solution.

Even so, characterization of SAI as a stopgap is not inherent to the technology itself; rather, it is dependent on the particulars of the "peak shaving" scenario. Under this scenario, "temporary" refers to a period lasting at least several decades and perhaps centuries.[401] SAI may technically constitute a stopgap, but for

395. Barrett, *supra* note 390, at 49 (characterizing the economics of geoengineering as "incredible").

396. *Id.* at 47.

397. *See id.* at 46; *see also* Thomas C. Schelling, *The Economic Diplomacy of Geoengineering*, 33 CLIMATIC CHANGE 303, 305 (1996) (arguing that SAI "totally transforms the greenhouse issue from an exceedingly complicated regulatory regime to a simple—not necessarily easy, but simple—problem in international cost sharing").

398. Even proponents of SAI research repeatedly emphasize the importance of prioritizing the mitigation of GHG emissions. *See* David W. Keith & Peter J. Irvine, *Solar Geoengineering Could Substantially Reduce Climate Risks—A Research Hypothesis for the Next Decade*, 4 EARTH'S FUTURE 549, 550 (2016); Jesse L. Reynolds, *Solar Geoengineering to Reduce Climate Change: A Review of Governance Proposals*, 475 PROC. ROYAL SOC'Y A 1, 4 (2019).

399. *See supra* Section I.A.

400. NAT'L ACADS. OF SCIS., ENG'G & MED., *supra* note 378, at 114.

401. *Id.*

practical purposes, it would function as a permanent response.[402] Furthermore, the stopgap framing rests on questionable assumptions that (1) decarbonization policies would be implemented even with SAI in place, (2) decarbonization would be sufficiently effective to allow SAI's phaseout, and (3) SAI would be phased out and dismantled as decarbonization policies grow in magnitude.

With respect to the first of these assumptions, it is uncertain how SAI implementation might affect decarbonization efforts. Some commentators have suggested that support for mitigating GHG emissions may rise as SAI's limits and risks become clearer.[403] However, SAI could have the opposite effect of easing the pressure to reduce GHG emissions, consistent with fig leaf and myopic approaches.[404] States and individual actors may be inclined to free-ride off of SAI efforts.[405] Politicians, focused on short-term reelection prospects, may hesitate to support GHG mitigation activities that impose substantial costs or changes.[406] Even aggressive GHG mitigation would not be sufficient to allow SAI's phaseout; vigorous—and potentially expensive—efforts to remove carbon dioxide from the atmosphere would also be needed but might be undermined by SAI.[407]

The second assumption—that decarbonization would be sufficiently effective to allow SAI's phaseout—is also open to debate. Under an optimistic view, initial implementation of decarbonizing technologies may lead to increasing returns, lower costs, and technological advances.[408] The economic and technical feasibility of renewable energy technologies has improved

402. Shinichiro Asayama & Mike Hulme, *Engineering Climate Debt: Temperature Overshoot and Peak-Shaving as Risky Subprime Mortgage Lending*, 19 CLIMATE POL'Y 937, 943 (2019).

403. *See* Duncan McLaren, *Mitigation Deterrence and the "Moral Hazard" of Solar Radiation Management*, 4 EARTH'S FUTURE 596, 598 (2016) (noting mitigation galvanization arguments).

404. Buck et al., *supra* note 11, at 503 (discussing the possibility of mitigation deterrence).

405. *See* McLaren, *supra* note 403, at 598.

406. Albert C. Lin, *Does Geoengineering Present a Moral Hazard?*, 40 ECOLOGY L.Q. 673, 707 (2013).

407. Christopher J. Preston, *Climate Engineering and the Cessation Requirement: The Ethics of a Life-Cycle*, 25 ENV'T VALUES 91, 96 (2016) (noting that it would take "painfully long"—perhaps one-thousand years or more—for Earth's systems to naturally reabsorb carbon already emitted into the atmosphere).

408. *See generally* Pierson, *supra* note 68.

dramatically in recent years,[409] and carbon dioxide removal technologies may experience similar improvements with time.[410] On the other hand, carbon mitigation or removal efforts presumably are beginning with the low-hanging fruit; as those efforts expand, they may encounter increasingly steep marginal costs.[411] Some GHG emissions, such as those associated with aviation, will be very difficult to eliminate.[412] Moreover, land-intensive carbon dioxide removal efforts, if conducted at a scale sufficient to make a dent in the climate problem, may conflict with existing uses of land for food production or wildlife preservation.[413]

The final assumption, that SAI will be phased out and dismantled when decarbonization efforts have had sufficient effect, is likewise questionable. Policy inertia is a common theme of several case studies discussed in this Article: all three types of too-easy solutions often continue because they are difficult to eliminate, not because they are rational to retain. The nature of SAI, a technology that will require significant infrastructure and investment, makes it susceptible to becoming locked in place.[414] Deploying SAI for decades or more will favor the rise of a supporting industry with a vested interest in its continuation.[415] Status quo bias and single action bias also may make SAI difficult to dislodge and undermine other strategies to counter climate change.

Analyzing SAI as a too-easy solution challenges its characterization as a stopgap measure—and the plausibility of the "peak shaving" scenario itself. A governance framework, designed to ensure that "peak shaving" actually occurs, is essential, yet such a framework has yet to be developed or even proposed.[416] Such a framework would have to endure for decades or

409. *See* Mickey Francis, *U.S. Renewable Energy Consumption Surpasses Coal for the First Time in Over 130 Years*, ENERGY INFO. ADMIN. (May 28, 2020), https://www.eia.gov/todayinenergy/detail.php?id=43895 [https://perma.cc/9F8R-4UUS].

410. *See* NAT'L ACADS. OF SCIS., ENG'G, & MED., NEGATIVE EMISSIONS TECHNOLOGIES AND RELIABLE SEQUESTRATION: A RESEARCH AGENDA 7 (2019).

411. *Id.* at 3.

412. *Id.*

413. *Id.* at 10.

414. Albert C. Lin, *Avoiding Lock-In of Solar Geoengineering*, 47 N. KY. L. REV. 139, 144–45 (2020).

415. Rose C. Cairns, *Climate Geoengineering: Issues of Path-Dependence and Socio-Technical Lock-In*, 5 WIRES CLIMATE CHANGE 649, 651 (2014).

416. *See* Buck et al., *supra* note 11, at 503.

perhaps centuries, while integrating global efforts on mitigation and carbon dioxide removal.

The more plausible—and less desirable—framing is that SAI could become a permanent yet myopic response to climate change. Introduced as a stopgap, SAI would be prone to becoming a too-easy solution that could hamper GHG emission reduction and removal efforts. To prevent such an outcome, mechanisms to provide careful oversight of SAI and to ensure decarbonization occurs even as SAI is implemented would be essential.[417]

B. Too-Easy-Solutions Analysis Beyond Environmental Law

Too-easy-solutions analysis need not be confined to environmental law. The dynamics considered in Part II are not unique to environmental policymaking, and policymakers in other areas are likewise prone to adopt fig leaves, pipe dreams, and myopic approaches.

In the criminal law context, various commentators have criticized symbolic legislation aimed at calming public fears while demonstrating politicians' responsiveness to crime.[418] Examples of such legislation include the federalization of certain crimes backed by little intent or ability to enforce those crimes,[419] as well as heightened sentencing requirements that are unlikely to achieve retribution or deterrence goals.[420] These measures have been criticized as unnecessary, unfair, and ineffective in addressing the problems that prompted legislative attention in the first place.[421] Symbolic criminal legislation is a too-easy solution that appears responsive to public concerns

417. For recommendations along these lines, see Lin, *supra* note 406.

418. William J. Stuntz, *The Pathological Politics of Criminal Law*, 100 MICH. L. REV. 505, 532–33 (2001); *see also* Sara Sun Beale, *Federalizing Hate Crimes: Symbolic Politics, Expressive Law, or Tool for Criminal Enforcement?*, 80 B.U. L. REV. 1227 (2000); Brian T. FitzPatrick, *Congressional Re-Election Through Symbolic Politics: The Enhanced Banking Crime Penalties*, 32 AM. CRIM. L. REV. 1, 29 (1994); Nancy E. Marion, *Symbolic Policies in Clinton's Crime Control Agenda*, 1 BUFF. CRIM. L. REV. 67, 67 (1997); Paul J. Larkin, Jr., *Public Choice Theory and Overcriminalization*, 36 HARV. J.L. & PUB. POL'Y 715, 731–35 (2013).

419. FitzPatrick, *supra* note 418, at 31–33.

420. Stuntz, *supra* note 418, at 530.

421. *See* FitzPatrick, *supra* note 418, at 40–45; Stuntz, *supra* note 418, at 526 (suggesting that political activity should focus on policing and punishment, rather than the substance of criminal law, to address the rising concern about crime).

about crime while requiring minimal expenditures.[422] For the most part, these measures are fig leaves: what they appear to do, as opposed to what they actually do, is what matters to the policymakers who adopt them.

Another example of too-easy solutions—found in a wide range of policy contexts—are mandated disclosure requirements.[423] Truth-in-lending laws require lenders to disclose interest rates, fees, and other details of credit obligations.[424] Informed-consent mandates require medical professionals and researchers to disclose information about risks and other matters that a reasonable person would deem relevant to making a decision.[425] The common law requires consumer contracts to include details regarding warranties, dispute resolution, and remedies.[426]

Mandated disclosures aim to address individuals' poorly informed decision-making, and they rest on a reasonable view that more information will help people make better decisions.[427] In some circumstances, these requirements can serve as actual solutions. For example, nutrition labeling has increased awareness of nutrition facts and influenced consumers' food purchasing behavior.[428] Furthermore, disclosures aimed at sophisticated informational intermediaries, such as labor unions and institutional investors, can yield benefits more broadly for individual consumers.[429] In most circumstances, however, mandated disclosure constitutes a too-easy solution to poor consumer decision-making.[430] Omri Ben-Shahar and Carl Schneider pronounce mandated disclosure's failure "inevitable" because disclosure "rests on false assumptions about how people live, think,

422. Stuntz, *supra* note 418, at 525–26.

423. *See* Omri Ben-Shahar & Carl E. Schneider, *The Failure of Mandated Disclosure*, 159 U. PA. L. REV. 647 (2011).

424. *Id.* at 653–54.

425. *Id.* at 655.

426. *Id.* at 657.

427. *Id.* at 650–51.

428. *Id.* at 675.

429. *Id.* at 732.

430. *See id.* at 681–82 (explaining that mandated disclosure appears attractive because it resonates with free-market and autonomy principles, "requires almost no government expenditures," and "looks easy" to implement).

and make decisions" and "about the decisions it intends to improve."[431] In their view, disclosure typically "requires an impossibly long series of unlikely achievement by lawmakers, disclosers, and disclosees."[432]

Depending on the circumstances, mandated disclosure can be a fig leaf, pipe dream, or myopic approach—or even a combination of all three too-easy solution types. The Clery Act, which requires institutions of higher education to issue an annual report of campus crime statistics,[433] exemplifies a fig leaf. Enacted in response to criminal incidents on college campuses, the statute has the ostensible goal of enabling students and their families to make informed decisions as consumers of higher education.[434] Nonetheless, experts have characterized the Clery Act's disclosure requirements as purely symbolic measures that have not increased campus safety, and it is doubtful whether they have yielded better informed students and families.[435]

The Truth in Lending Act can be characterized as both a myopic approach and a pipe dream. The act's core feature, a requirement that lenders disclose the annual percentage rate on consumer loans, has been largely ineffective in informing consumers or enabling them to shop for credit.[436] This approach is myopic in that legislators fixated on using disclosure as the central mechanism, rather than first defining the overarching objectives of their legislative efforts. As a result, they failed to consider other substantive mechanisms for protecting consumers from deceptive lending practices.[437] The Truth in Lending Act's disclosure requirements also could be understood as a pipe dream: conscientious legislators acted on the good faith belief that disclosure would enhance consumer welfare.[438] Unfortunately, that belief rested on unwarranted assumptions about

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431. *Id.* at 651.

432. *Id.*

433. The Clery Act of 1990, 20 U.S.C. § 1092(f) (2018).

434. Ben-Shahar & Schneider, *supra* note 423, at 702–03.

435. *See id.* at 703–04; *see also* Bonnie S. Fisher et al., *Making Campuses Safer for Students: The Clery Act as a Symbolic Legal Reform*, 32 STETSON L. REV. 61, 88 (2002) (describing the Clery Act "as a symbolic effort at 'doing something' about crime and crime-related issues").

436. Ben-Shahar & Schneider, *supra* note 423, at 666–67; *see also* Edward L. Rubin, *Legislative Methodology: Some Lessons from the Truth-in-Lending Act*, 80 GEO. L.J. 233, 236, 238–39 (1991).

437. Rubin, *supra* note 436, at 280–89.

438. *Id.* at 285.

consumers' financial literacy and ability to process complex information.[439]

Too-easy solutions can be found outside of environmental law, whether as symbolic criminal legislation, mandated disclosures, or other measures. In these various contexts, too-easy-solutions analysis can help identify inadequacies in existing approaches and point to more effective alternatives.

CONCLUSION

Too-easy solutions are recurrent in environmental law, offering a reminder that policymaking rarely reflects comprehensively rational choices. Too-easy solutions can be classified as fig leaves, pipe dreams, or myopic solutions, depending on their origins and functions. Fig leaves, such as plastics recycling and the CDM, appear to do something about a problem without necessarily solving it. Pipe dreams, as exemplified by multiple-use management of the public lands and coastal armoring, are inherently unable to solve the problems they purportedly address. And myopic solutions, such as fish consumption advisories and some pollution control efforts, address part of identified problems while impeding their overall resolution. Too-easy solutions obscure failures to effectively address problems, divert attention and resources away from alternative or additional solutions, and can even create new problems. Despite these shortcomings, too-easy solutions often find their way into policy as a result of political compromise, interest-group pressure, institutional biases, and cognitive heuristics.

Too-easy-solutions analysis refocuses attention on the specific problem at hand and its underlying root causes. Such analysis encourages consideration of alternative ways of defining the problem as well as alternative ways of addressing it. In making more transparent the factors that shape policy, it also can counter their influence. As these factors are not unique to environmental law and policy, too-easy-solutions analysis can be usefully applied to other areas of law as well.

439. Ben-Shahar & Schneider, *supra* note 423, at 666–67; *see also* Rubin, *supra* note 436, at 236.