

ESSAY NINE

Red Lights to Green Lights

TOWARD AN INNOVATION-ORIENTED SUSTAINABILITY STRATEGY

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ENVIRONMENTAL LAW AND POLICY as framed in the 1970s and 1980s focused on “command and control” regulatory strategies under which the government told businesses (and to some extent individuals) what they should *not* do. It was a world of stop signs and *red lights* for polluters.¹ But this framework has proven to be incomplete. It has failed to offer signals as to what society needs businesses *to do*, including what problems to solve, what research and development to undertake, and what investments to make. So years have gone by and many environmental problems persist, including our dependence on polluting fossil fuels and reliance on the same costly and inefficient electrical system that was put in place more than 100 years ago, with electricity flowing across wires on poles.² To address these enduring problems, we need to reframe our approach to environmental protection—offering a systematically designed structure of incentives to encourage innovation and problem solving. In short, we need to complement our system of red lights with an expanded set of *green lights*.

PROGRESS, AT A PRICE

The *red lights* approach made sense five decades ago as the need to stop harm-causing behavior seemed obvious. From Cleveland’s Cuyahoga River catching fire to the thick smog that often hung over Los Angeles to the toxic waste and human health crisis of Love Canal, the problems seemed obvious.³ The

public demanded action. With a primitive base of environmental knowledge and limited theory about how to respond to pollution threats, government-defined regulatory mandates offered a path forward. And they worked—to some extent. Our air and water are much cleaner today. Chemicals are regulated, and waste disposal occurs under a regime of careful controls.

But this progress has come at a price. The command and control framework is now widely recognized as slow and inefficient insofar as the government does almost all of the environmental work—spotting problems, analyzing the causes of various harms, identifying safe pollution thresholds, spelling out standards, and sometimes even requiring specific “best available technologies” to be adopted by particular industries. This over-reliance on government as the central (and often sole) actor also leads to high costs, avoidable inefficiencies, constant litigation over standards, and disincentives for innovation.

Today, we know, moreover, that red lights are not enough. Limiting or even forbidding pollution is not the same as solving environmental problems. Just as a traffic intersection needs green lights as well as red ones to optimize the flow of vehicles, we need a policy framework that highlights for businesses and individuals across the nation and around the world where problems exist that require solutions—and thus where their innovative thinking would be particularly welcome. Fundamentally, while the red lights framework of the past helped us curb pollution, reduce waste, and limit chemical exposures, it did not spur transformative change in response to critical challenges such as the need for breakthroughs in clean energy or expanded funding for safe drinking water. It did not engage the business community and the financial markets as potential problem solvers. It did not harness their capacity for out-of-the-box thinking and the delivery of solutions. To put a sharp point on the limitations of the red lights approach, note that entrepreneurs do not get up early and stay at the office until very late in pursuit of their dreams of delivering a marketplace breakthrough because the government told them what *not* to do.

So while regulatory rules and prohibitions have a place in controlling pollution, our present environmental law and policy framework must be seen as incomplete. It should be rethought with an eye on creating incentives for problem solving and rewards for innovation—based on a structure of *green lights* as well as red ones.

Of course, we have had some policy efforts that fit the green lights model of providing incentives for innovation and signaling where entrepreneurial

activity would be welcome. The 1990 Clean Air Act, for example, set up an emissions allowance trading system to control sulfur dioxide emissions and reduce acid rain. This “cap and trade” approach spurred creative thinking about how best to reduce power plant emissions and led to a 50 percent reduction in acid-rain precursors. Likewise, the 33/50 toxic emissions reduction strategy of the Environmental Protection Agency (EPA), building on the mandated reporting of the Toxics Release Inventory, helped highlight opportunities to cut chemical release and rewarded companies that met ambitious pollution reduction goals. And the Department of Energy’s Advanced Research Projects Agency–Energy (ARPA-E) program has helped induce and leverage investments of private capital in energy efficiency and renewable power.

But more could be—and should be—done to promote innovation as a centerpiece of America’s energy and environmental strategies. The push for fresh thinking and new ideas should, of course, include technology development, but it should also promote innovation in policy approaches, public engagement, conservation, and finance for environmental infrastructure (including expanded funding for renewable power, electricity storage, drinking water systems, sewage treatment, clean technologies for industry, and low-emissions mobility). Law and policy should ensure that the work of environmental protection is not seen as solely the purview of the public sector. Rather, incentives should be in place to encourage broad engagement in environmental problem-solving that draws companies, inventors and creative spirits of all kinds, think tanks, research centers, universities, and other nongovernmental entities into the pursuit of a sustainable future.

INCENTIVES TO INNOVATE

The expanded framework of green lights that I envision would take many forms. Perhaps the greatest spur to innovation and a transformed future would be a commitment to adopt the *polluter pays principle* and to insist on an “end to *externalities*”—meaning that those who inflict environmental harms on society must pay for them. Implementation of this principle would require that those who cause air or water pollution or chemical exposures and spill harms beyond their own property lines—or who consume natural resources without paying for their full value—be charged for their emissions or other negative impacts. These *harm charges* would establish a very substantial incentive (or green light) that would signal where efforts to remake products or production processes would find a payoff.

The expectation that harm causers should stop the activities that burden society or pay for these impacts is as American as apple pie. It derives from one of the fundamentals of law: the constitutional principle of protecting property rights, which my Yale colleague Carol Rose has described as the “keystone” right for building a fair and prosperous society.⁴ Indeed, the concept of protecting property rights, including against environmental infringements, goes back at least four centuries in the Anglo-American legal tradition. Specifically, the polluter pays principle can be traced to a 1611 court decision (*Aldred’s case*) in which an English pig farmer was required to get rid of his smelly animals or compensate his neighbors for the nuisance. Reinvigorating this principle through adoption of a broad-based rule that puts a price on causing environmental harms would sharply focus those facing these charges on the need to rethink their activities with an eye toward reducing their impacts. Such price signals would also induce innovation and encourage problem solvers to find ways to reduce these harms with the hope that they might sell their solutions to those paying harm charges.

The success of this approach to environmental problems has been demonstrated many times over. As noted above, the 1990 Clean Air Act required electric utilities to buy “emissions allowances” for the acid-rain-causing sulfur dioxide they were sending up their power plant smokestacks. The prospect of having to pay for their emissions induced these companies to rethink their activities and led most to switch to low-sulfur coal as a way to cut their pollution and their costs.

Likewise, when a class of “miracle chemicals” called chlorofluorocarbons, or CFCs—used to blow Styrofoam, clean semiconductors, produce spray deodorants, and cool refrigerators—was found to be causing the Earth’s protective ozone layer to thin, the U.S. government put in place an escalating per-pound CFC charge. This economic incentive—another green-light-signaling opportunity to inventors—induced such significant process and product innovation that ozone-layer-damaging CFCs were driven out of the market in under a decade.

Green lights can take other forms and spur innovation in other domains. For example, one of the biggest mistakes in our current environmental protection regime has been the assumption that once pollution control requirements were in place, the money to implement them would follow. And while big industries have spent millions of dollars on smokestack scrubbers and effluent controls, much less investment in pollution control technologies has been made by small businesses, households, and other entities with limited

access to capital. But in recent years, innovative financing tools, such as Green Banks and Green Bonds, have created new incentives that encourage investment in environmental infrastructure.⁵ These “sustainable finance” green lights make capital available at attractive rates for borrowers—a model that could easily be expanded.

Another green light that could be scaled up centers on incentives that steer the flow of private capital toward businesses and projects that contribute to a sustainable future—and away from enterprises with business models that cause environmental degradation.⁶ Specifically, a growing number of mainstream investors want to align their stock holdings with their issue interests and values. For many people, this alignment means that they want to be sure that the companies in their investment portfolios have good track records on critical sustainability issues. The rise of *sustainable investing* has driven up demand for corporate performance metrics on a range of environmental/social/governance (ESG) issues.⁷ The strength of this signal and therefore the scale of capital flows could be enhanced if the government were to require mandatory ESG reporting on a structured basis—just as the Securities and Exchange Commission requires corporate accounting according to a specified framework and methodology. By ensuring comparability across companies and strengthening investor confidence and trust in the data, an ESG framework could emerge as a powerful green light. These stronger ESG requirements would induce business leaders to pay attention to their environmental results so as to make their companies attractive to sustainability-minded investors.

CAREFUL POLICY DESIGN

As discussed earlier, our existing environmental policy framework includes some green lights, but their success as incentives has been muted by poor design and uneven implementation. Notably, the Department of Energy offers Investment Tax Credits and Production Tax Credits for projects generating electricity from renewable sources. But the strength of these tax credits as green lights for innovation and investment in renewable energy has been dulled by ongoing uncertainty over whether Congress will continue to fund these programs.⁸ It turns out that unpredictability and unreliability severely undermine business confidence in the value of incentives. So just as drivers will act with caution on a road where the traffic lights are intermittently failing, clean energy investors have tended to pull back in the face of uncertainty over the future of the government’s clean energy incentives.

Similarly, many states have adopted Renewable Portfolio Standards (RPSs) setting out targets and timetables for expanded wind and solar power. For example, when I became commissioner of Connecticut's Department of Energy and Environmental Protection, the state had a goal of 20 percent renewable power by 2020. But little progress had been made toward this goal. And when I pressed as to the reasons for the ineffectiveness of the millions of ratepayer dollars being devoted to driving clean energy innovation, I learned not only that Connecticut was falling way short of its RPS targets but also that the bulk of the money was funding biomass projects. Thus, the precious ratepayer innovation-inducing dollars were being spent on burning wood—an energy source that has been around for 20,000 years.

It became clear that Connecticut needed more carefully crafted incentives (green lights) to drive funding into truly innovative projects. This gap led us to launch the first-in-the-nation Green Bank, with a commitment to use limited public money to leverage private capital and scale up clean energy innovation and project deployment. Connecticut thus moved to the use of “reverse auctions” (in which the project developer that promises the *lowest* electricity prices wins) to select renewable energy projects with the promise of a Power Purchase Agreement (a commitment to buy the electricity generated for 15 years) for winning bidders. By harnessing the power of competition—including a requirement that wind, solar, fuel cells, and other clean energy options compete against each other—renewable energy prices were driven down. Moreover, while the promise that Connecticut would someday receive 20 percent of its electricity from renewable sources had provided insufficient certainty to past projects to enable them to get bank financing, the presence of a 15-year electricity supply contract made the projects “bankable.”

To be fair, some states have backed their RPS goals with a structure of “feed-in tariffs” or Renewable Energy Credits that has induced a ramp-up in solar and wind power, but often at very high costs. So once again, the lesson is that the presence of incentives is not enough. The green lights framework must be carefully considered and sharply focused on driving innovation and scaling up the engagement of private capital to deliver on public policy goals. Simply put, the goal cannot be “clean power.” It needs to be cheaper, cleaner, and more reliable energy supplies.

Some might ask why certain activities—such as clean energy development—deserve government attention and green lights prioritization while others do not. The answer is straightforward: these projects offer public benefits alongside the private gains of the project developers. Indeed, insofar

as a commitment to the “end of externalities” and the polluter pays principle means that those causing harms to society should pay for their *negative* externalities, it also implies that those delivering *positive* externalities—benefits to society—should be compensated. This logic means that not only should clean energy get government help but so too should private landowners whose property provides habitat for endangered species.

CONTINUOUS IMPROVEMENT

I recognize that my call for much greater attention to incentives for action and innovation inescapably requires political decisions about what issues get tagged for *green light* focus and prioritization. Given this reality, there will be disputes over the framework of incentives created and the sorts of signals that get sent out. But I hope the broader point about needing to refresh America’s approach to sustainability—and to bring an emphasis on innovation to the energy and environmental arenas—does not get lost.

Change is never easy, especially within a fraught political context. But whether we call it continuous improvement or regular revitalization, the importance of *innovation* leading to new and better ways of doing essential activities—including our approaches to energy strategy and environmental protection—needs to be highlighted.⁹ Indeed, one of the most significant findings in social science of recent decades centers on the importance of *innovation* to healthy organizations.¹⁰

Baseball teams pick players today in a very different way than they did in the 1970s. Rather than tobacco-chewing scouts making recommendations based on intuition and their “gut,” teams now rely on data geeks such as Theo Epstein, whose pioneering approach to baseball data analytics has delivered world championships for the long-denied Boston Red Sox and Chicago Cubs. Epstein’s fresh thinking about the underpinnings of success in pitching, hitting, and fielding—built on advanced data analytics and new metrics (such as a focus on on-base percentage rather than batting average)—has now been adopted by all the major league teams.

Likewise, corporate leaders in every industry have come to learn that they must constantly reinvent their business models and corporate strategies to stay competitive and profitable.¹¹ As a result, companies today market their products and target their customers in very different ways from a generation ago. They rely on new data science, microtargeting of potential buyers, and constant testing, tracking, and refining of sales pitches to stay ahead of the market.

Other institutions, including government entities, have similarly learned to remake themselves to stay vibrant. Some parts of our administrative state have been fundamentally re-engineered for the twenty-first century. In fact, recast telecommunications regulations helped usher in the smartphone era.¹² Major regulatory reforms have also transformed the airline industry, railroads, and other sectors of society.¹³

But the foundations of energy and environmental policy have remained largely static for decades—and this must not continue.¹⁴ So even if there will be disputes over the structure of green lights and the direction of change, that conversation will be important. We cannot possibly meet the demands of the emerging “sustainability imperative”¹⁵ with a twentieth-century policy framework that has failed to capitalize on recent breakthroughs in mapping pollution flows, tracing ecological and epidemiological effects, and understanding chemical exposure thresholds and so many of the other advances in knowledge that have emerged in the past four decades. It is time to put Big Data, the internet, advanced sensors, omnipresent telecommunications links, and other tools of our Digital Age to work on energy and environmental challenges. A commitment to incentives—green lights—that facilitate innovation needs to be at the heart of a remade sustainability policy framework.

NOTES

This essay builds on the author’s prior published article, “Red Lights to Green Lights: From 20th Century Environmental Regulation to 21st Century Sustainability,” *Environmental Law* 47, no. 1 (2017): 1–80. In addition to his positions at Yale, the author is a principal of Constellation Research and Technology (www.constellationresearch.com), a New York-based financial technology firm that provides advanced ESG metrics and data analytics for investors.

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