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Citation: 2011 BYU L. Rev. 1561 2011



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Regulation, “Republican Moments,” and Energy Policy Reform

*David B. Spence**

During the last half decade or so, energy policy reform has made its way to the top of the American policymaking agenda, driven by a groundswell of concern over environmental issues (primarily climate change), energy security issues, and the desire for a more efficient and reliable energy delivery system. This groundswell has produced some recent policy changes, but they have not been enough to satisfy proponents of reform, who remain frustrated with the unwillingness of Congress to pass legislation aimed at fundamentally changing the way Americans produce and consume energy. This Article examines the reasons why fundamental energy policy reform has been so difficult.

Part I explores the historical context to the current reform debate, beginning with the energy policy reforms enacted in the 1970s. Part II examines more closely the current logic of reform, including the reasons why Congress is considering such fundamental energy policy change now, and the menu of policy instruments under consideration. Part III examines the political logic that governs legislative action and the contextual and issue-based reasons why the energy policy reforms under consideration are particularly difficult for Congress to enact compared with major regulatory reforms of the past. I argue here that Congress is capable of enacting regulatory reforms over the objections of well-organized interests (so-called “republican moments”), but Congress is particularly ill-equipped (or disinclined) to do so when, as here: (i) the issues are technically and politically complex, making the benefits of reform (or costs of inaction) seem unclear and remote to many voters, and (ii) the costs of reform fall upon current voters while many of the benefits accrue to others. Part IV offers some brief concluding

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thoughts about the kinds of developments that might change the current political dynamic so as to make reform more likely.

I. WHERE WE'VE BEEN: REFORM AND THE PATH TO (MORE)
REFORM

A. Regulatory Activity, 1970-2000

It has been approximately three decades since Congress, the President, and regulators last sought to fundamentally change the way Americans produce and consume energy. In the 1970s policymakers were motivated by environmental and energy security concerns. Environmentalism was at its peak as a motivating force for legislation in the 1970s, producing the Clean Air Act of 1970,¹ the Clean Water Act of 1972,² and major hazardous waste legislation.³ These new regulatory regimes imposed new pollution control costs on fossil fuels, requiring automobiles and industry alike to comply with new emissions standards. Meanwhile, the formation of the Organization of Petroleum Exporting Countries (OPEC)⁴ and the resultant oil shocks of the 1970s heightened energy security concerns, as did the widespread perception that the United States was running out of natural gas.⁵ The result was a portfolio of

1. Pub. L. No. 91-604, 84 Stat. 1676 (codified as amended in scattered sections of 42 U.S.C.).

2. Pub. L. No. 92-500, 86 Stat. 816 (codified as amended in scattered sections of 33 U.S.C.).

3. The two major statutes are the Resource Conservation and Recovery Act of 1976, Pub. L. No. 94-580, 90 Stat. 2795 (codified as amended in scattered sections of 42 U.S.C.) (regulating the ongoing management of hazardous waste), and the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, Pub. L. No. 96-510, 94 Stat. 2767 (codified as amended in scattered sections of 42 U.S.C.) (regulating the cleanup of the inactive hazardous waste sites).

4. During the 1970s, OPEC boycotts and production restrictions caused price volatility in oil markets, gasoline shortages, and rationing in the United States, as well as an increase in the market price of oil from less than four dollars a barrel to more than thirty dollars a barrel in 1981. For a good explanation of these developments see DANIEL YERGIN, *THE PRIZE: THE EPIC QUEST FOR OIL, MONEY, AND POWER* 501-681 (1991).

5. In the early 1970s U.S. proven reserves of natural gas had fallen to a little over two hundred trillion cubic feet. At that time, American consumption was in the neighborhood of twenty trillion cubic feet a year, leading some analysts to state that the United States had only ten years' worth of natural gas supply in reserve. See, e.g., Ed Edelson, *Why We're Running Out of Gasoline*, *POPULAR SCI.*, Apr. 1973, at 82, 83. Writing six months before the oil embargo Edelson observed, "If you haven't noticed, we're running out of natural gas. Reserves dropped by 7.1 percent in 1971, the fourth straight year in which the U.S. used more gas than was discovered." *Id.*

legislation and regulatory initiatives that represented, collectively, an attempt to reduce the United States’ dependence on oil and steer the economy toward cleaner and more efficient energy alternatives.

This legislative trend began in 1975 when Congress created national fuel economy standards for automobiles known as “CAFE standards.”⁶ That same year Congress established the Strategic Petroleum Reserve, the culmination of an effort on the part of the Nixon and Ford administrations to build up a reserve supply of oil to be used during future supply interruptions.⁷ The Reserve stores oil in various places throughout the United States and retains the capacity to provide about a month’s worth of oil consumption.⁸ Beginning in 1977, the Carter Administration made energy policy a priority, creating the new Department of Energy⁹ and securing the passage of a legislative package that addressed supply and shortage concerns in several ways. First, the Natural Gas Policy Act of 1978 (NGPA)¹⁰ deregulated the price of natural gas at the wellhead, ultimately stimulating both the discovery of new domestic sources of gas and greater efficiency in natural gas markets.¹¹ The Public Utility Regulatory Policies Act of 1978 (PURPA)¹² promoted conservation and “alternative” forms of electricity production by providing financial incentives to new, nonutility producers of renewable

6. These standards imposed average fuel economy requirements for cars, light trucks, and SUVs. Energy Policy and Conservation Act of 1975, Pub. L. No. 94-163, 89 Stat. 871 (codified as amended in scattered sections of 42 U.S.C.). “CAFE” stands for “corporate average fuel economy.”

7. BRUCE A. BEAUBOUF, *THE STRATEGIC PETROLEUM RESERVE* 15, 29 (2007). The Strategic Petroleum Reserve was also a part of the Energy Policy and Conservation Act of 1975. *Id.*

8. The United States Department of Energy manages the Strategic Petroleum Reserve. For more information about the Reserve, see U.S. Dep’t of Energy, *STRATEGIC PETROLEUM RES.*, <http://www.spr.doc.gov> (last visited Aug. 18, 2011).

9. Department of Energy Organization Act of 1977, Pub. L. No. 95-91, 91 Stat. 567 (codified as amended at 42 U.S.C. §§ 7111–7112, 7131 (2006)).

10. Natural Gas Policy Act of 1978, Pub. L. No. 95-621, 92 Stat. 3350 (codified as amended in scattered sections of 15 U.S.C.).

11. Prior to the NGPA, the Federal Energy Regulatory Commission had been attempting to regulate prices at the wellhead, having been ordered to do so by the U.S. Supreme Court in the 1950s. See *Phillips Petroleum Co. v. Wisconsin*, 347 U.S. 672, 684–85 (1954). For a good summary of the NGPA, its purpose and its consequences, see Richard J. Pierce, Jr., *Natural Gas Regulation, Deregulation, and Contracts*, 68 VA. L. REV. 63, 87–88 (1982).

12. Public Utility Regulatory Policies Act of 1978, Pub. L. No. 95-617, 92 Stat. 3117 (codified as amended in scattered sections of 7 U.S.C., 15 U.S.C., 16 U.S.C., 42 U.S.C., and 43 U.S.C.).

electricity and cogeneration.¹³ The Carter energy package included investment tax credits and accelerated depreciation for alternative energy projects,¹⁴ along with PURPA's powerful mandate that electric utilities purchase power from alternative energy producers (so-called "qualifying facilities" or "QFs") at favorable rates.¹⁵ The Carter Administration's last energy hurrah was the creation of the short-lived Synfuels Corporation in 1980, which provided federal seed money for research into synthetic fuels.¹⁶ While the corporation was abolished five years later, many of the ideas that germinated under its care have been put into practice since.¹⁷

Following the Carter administration's lead, state legislatures and regulators began to more actively promote conservation and cleaner energy. State public utility commissions, using their leverage over utility rates, began to mandate that utilities undertake investments in conservation¹⁸ and that utilities focus more on demand-side reductions in usage as another way of balancing supply and demand (along with the construction of new sources of electricity).¹⁹ In the

13. PURPA defined "alternative" energy facilities to include various forms of renewable energy like solar, wind, and geothermal, as well as small hydroelectric facilities and cogeneration plants. Cogeneration facilities produce electricity as well as usable heat energy, and most of the many hundreds of cogeneration facilities built after the passage of PURPA in the 1980s were gas-fired. 16 U.S.C. § 824a-3 (2006).

14. The Carter tax credits expired during the Reagan administration. In 1992, Congress established a production tax credit for renewable energy projects in the Energy Policy Act of 1992. Energy Policy Act of 1992, Pub. L. No. 102-486, 106 Stat. 2776 (codified in scattered sections of 15, 16, 38, and 42 U.S.C. (2006)). Congress has intermittently renewed short-term investment and/or production tax credits for renewable energy ever since, and production credits still remain in effect. Energy Tax Act of 1978, Pub. L. No. 95-618, 92 Stat. 3174 (codified in scattered sections of 23 and 26 U.S.C.).

15. Under PURPA, electric utilities were required to purchase power from certain qualified facilities at "avoided cost," the cost to the utilities of providing power from a new generating facility of their own. 16 U.S.C. § 824a-3 (2006).

16. The Synthetic Fuels Corporation was established as part of the Energy Security Act of 1980. Pub. L. No. 96-294, 94 Stat. 611 (codified as amended in scattered sections of 30 and 42 U.S.C.).

17. Janet Raloff, *Washington Deals Synfuels a Big Blow*, 128 SCI. NEWS 87, 87 (1985); *U.S. Treasury Takes Over Existing Synfuels Contracts*, 63 PLATT'S OILGRAM NEWS 4, 4 (1985) (reporting President Reagan's signature of legislation abolishing the corporation). Ideas incubated at the Synfuels Corp. include specific processes for creating liquid transportation fuel from coal (so-called "coal to liquids" or "CTL" processes) and natural gas ("gas to liquids," or "GTL" processes).

18. For a discussion of these state efforts, see FRED BOSSELMAN ET AL., *ENERGY, ECONOMICS AND THE ENVIRONMENT* 967-84 (3d ed. 2010).

19. Some states went so far as to adopt something called "integrated resources planning," under which utilities must undertake demand-side investments in conservation to

1980s and 90s states began establishing “renewable portfolio standards” (RPS), requiring electric utilities to buy a specified percentage (or, in some cases, amount) of electricity from renewable sources.²⁰ State RPS vary widely: each defines “renewable energy” differently and establishes different targets, and range from Minnesota’s requirement that 25% of all electricity come from renewables by the year 2025,²¹ to Texas’s rather modest goals, which are established not in percentages of power sold but rather in megawatts of capacity.²²

Collectively, these policy developments stimulated a great degree of entrepreneurial activity in the energy sector. The NGPA paved the way for the introduction of competitive wholesale markets in the natural gas industry in the 1980s by stimulating the entry of new gas producers into the market. PURPA and the Energy Policy Act of 1992²³ brought to the market new kinds of energy production by nonutility entrepreneurs—QFs and other so-called “independent power producers” or “IPPs.” These incentives also helped to bring down the cost of wind generation, which plummeted in the last three decades as wind-generated capacity in the United States increased rapidly.²⁴ Hydroelectric generation also grew significantly during the 1980s and 90s.²⁵ For its part, solar energy’s growth spurt

meet future imbalances in supply and demand if those demand-side investments are less expensive than constructing new plants. *Id.*

20. These targets and definitions of qualified sources vary by state. For up-to-date information about state RPS, see N.C. Solar Ctr. & The Interstate Renewable Energy Council, DSIREUSA, <http://www.dsireusa.org> (last visited Aug. 18, 2011).

21. MINN. STAT. § 216B.1691 (2010).

22. Texas’s goals are modest for two reasons. First, each time the legislature has raised the target the market has already built nearly that much capacity. Second, the goals are essentially voluntary, and there are no significant financial consequences for retail energy providers who fail to meet them. *See* TEX. UTIL. CODE ANN. § 39.904 (West 1999) (amended 2005) (amendment replacing the renewable capacity targets every two years from 2003–2009, with new targets every two years from 2007–2015).

23. *See* Energy Policy Act of 1992 § 721, Pub. L. No. 102-486, 106 Stat. 2915 (codified as amended at 16 U.S.C. § 824j) (provision for open access to transmission lines).

24. Troy Helming, *Uncle Sam’s New Year’s Resolution*, RENEWABLE ENERGY WORLD (Feb. 2, 2004), <http://www.renewableenergyworld.com/rea/news/article/2004/02/uncle-sams-new-years-resolution-10420>; *see also* ROBERT Y. REDLINGER ET AL., WIND ENERGY IN THE 21ST CENTURY 73–96 (2002) (covering the economics of wind energy and depicting the increasing efficiencies and decreasing capital and other costs of wind in the 1980s and 90s).

25. The Federal Energy Regulatory Commission experienced steady growth in hydroelectric license applications throughout the early 1980s, most of them small projects responding to federal incentives. For a summary of these developments, see David B. Spence, *Agency Discretion and the Dynamics of Procedural Reform*, 59 PUB. ADMIN. REV. 425, 425–72

was delayed until the early twenty-first century, when advances in the production of less expensive, more energy-efficient photovoltaic cells²⁶ and concentrated solar technology finally took hold.²⁷

The rise of nonutility, merchant power producers helped create the conditions necessary for the move to competitive markets in the electricity industry in the 1990s. By the turn of the century, competition and market pricing had largely replaced traditional public utility regulation of gas and electric wholesale markets in the United States,²⁸ and approximately twenty states had introduced retail competition and market pricing in the electric sector. However, during the California energy crisis of 2000–2001,²⁹ wholesale market prices for electricity soared to many times historic levels, slowing the move toward retail competition in the states and keeping regulators concerned over both the vulnerability of consumers to high and volatile prices and the ability of the aging electric grid to withstand the rapid increases in third-party power transactions.³⁰ The Federal Energy Regulatory Commission and electric grid managers continue to experiment with ways to shift demand during peak periods to off-peak periods, obviating the need to build expensive peaking plants. Many analysts believe that investment in a better, smarter, electric grid could help solve these problems by providing essential technical and price information to market participants and regulators alike.³¹

(1999).

26. Utility scale capacity for solar thermal/PV increased 91 MW in 2007, a 22% national increase. New capacity in Nevada—including the 64 MW Nevada Solar One (solar thermal) and a 14 MW PV-plant at Nellis Air Force Base—accounted for 79 MW. See *US Solar Installed Capacity Sees Fastest Growth in 2010*, BRIGHTSTAR SOLAR, <http://www.brightstarsolar.net/2011/03/us-solar-installed-capacity-sees-fastest-growth-in-2010/> (last visited Sept. 23, 2011).

27. See, e.g., Cyrus Moulton, *Introducing the Most Efficient Solar Power in the World*, 30 DISCOVER MAG. 17, 17 (2009), available at <http://discovermagazine.com/2009/oct/08-introducing-most-efficient-solar-power-in-world> (describing how 38-foot-wide reflective dishes used Stirling engines to accomplish a 31.25% efficiency benchmark in converting solar thermal energy to electricity).

28. See David B. Spence, *Can Law Manage Competitive Energy Markets?*, 93 CORNELL L. REV. 765, 765–66 (2008).

29. *Id.* at 779–80.

30. *Id.* at 785–89.

31. Because electricity cannot be stored in large amounts, operators of the grid must continuously balance supply and demand. A “smarter” grid would provide grid operators with more information, including granular information, about daily and seasonal changes in demand and about use of the various segments of the grid. This information could be used to allow grid operators to balance loads more effectively, thereby preventing the kind of blackouts experienced in the Northeast and Midwest in 2003; it could also lead to new rate structures to

Meanwhile, throughout the 1990s and early 2000s, changing environmental requirements put additional cost pressure on fossil fuels. Increasingly broad and stringent regulation of coal-fired power plants and oil refineries reduced emissions of sulfur dioxide, nitrogen oxides, and particulate matter from those sources.³² More specifically, the 1990 amendments to the Clean Air Act created the so-called “acid rain program,” which imposed additional sulfur dioxide regulation on previously grandfathered coal-fired power plants³³ through the first national tradable permit program in the United States. Several decades of litigation has extended the Clean Air Act’s stricter emissions standards for other pollutants to those grandfathered plants.³⁴ Meanwhile, the 1990 amendments also paved the way for the regulation of toxic mercury emissions from coal-fired power plants, though that process was also slowed considerably by litigation.³⁵ In the transportation sector, biofuels began to make inroads into the transportation fuels market in the 1990s, spurred by federal incentives for the production of corn ethanol³⁶ and Clean Air

induce electricity consumers to change their consumption patterns, thereby reducing load peaks and eliminating the need for construction of some peaking plants. *See, e.g.*, PETER FOX-PENNER, *SMART POWER: CLIMATE CHANGE, THE SMART GRID, AND THE FUTURE OF ELECTRIC UTILITIES* (2010).

32. Not only have standards for air emissions from coal-fired power plants grown more stringent over time, a series of legislative and regulatory developments have extended their coverage to older, previously grandfathered coal-fired power plants and oil refineries. For a summary of these developments, see BOSSELMAN ET AL., *supra* note 18, at ch. 4.

33. Clean Air Act Amendments of 1990, Pub. L. No. 101-549, 104 Stat. 2399 (codified as amended in scattered sections of 29 and 42 U.S.C.).

34. The Clean Air Act’s permitting standards apply to “new or modified” sources of air pollution. *Id.* Therefore, litigation focused on the question of whether plants that predated the Clean Air Act were nevertheless required to meet the Act’s standards because they had been “modified” (e.g., after parts were replaced or other upgrades were made). In 2007, the Supreme Court upheld an EPA interpretation of the word “modified” and effectively extended the Act’s permitting standards to many older plants. *Env’tl. Def. v. Duke Energy Corp.*, 549 U.S. 561, 562–64 (2007).

35. For a summary of the battle over mercury regulation, see *New Jersey v. EPA*, 517 F.3d 574 (D.C. Cir. 2008) (overturning the Bush EPA’s mercury rules and recounting their history), *cert. denied* 129 S. Ct. 1313 (2009). On February 6, 2009, the Obama EPA announced its intention to promulgate mercury rules under Section 112 of the Clean Air Act, including a Maximum Achievable Control Technology (MACT) standard for coal-fired power plants. Steven D. Cook, *EPA Plans Mercury Rules for Power Plants, Moves to Withdraw Supreme Court Petition*, 40 ENV’T REP. 317 (2009).

36. 42 U.S.C. § 7545 (2006). See 40 C.F.R. §§ 79.1–79.68 (2010) for the EPA’s regulations on gasoline additives.

Act requirements mandating the use of additives in gasoline to reduce tailpipe emissions.³⁷

B. Energy Policy Reform in the Twenty-First Century

Despite all this policy change, in the early twenty-first century Americans continue to rely heavily on imported oil and dirty, coal-fired power. Of the roughly eighty million barrels of oil³⁸ consumed daily in the world, Americans consume about twenty million barrels.³⁹ Net imports represent about three-fifths of those twenty million barrels.⁴⁰ In the last decade, gasoline prices in the United States, though volatile, have remained low relative to elsewhere in the developed world,⁴¹ feeding American drivers' addiction to oil. Some drivers have turned to ethanol, biodiesel, and electric and hybrid-electric cars, but the overwhelming majority of American cars continue to burn gasoline. Likewise, despite its growing regulatory burden, coal remains the dominant source of electric power in the United States, constituting about half of our total generating capacity.⁴² In percentage terms, renewable sources like wind are

37. Clean Air Act Amendments of 1990, Pub. L. 101-549, 104 Stat. 2399.

38. One barrel equals forty-two gallons. *General Tables of Units of Measurement*, NAT'L INST. OF STANDARDS & TECH., <http://ts.nist.gov/WeightsAndMeasures/Publications/appxc.cfm> (last updated Apr. 19, 2006).

39. The CIA assembles annual data on oil consumption. See *World Factbook, Country Comparison: Oil – Consumption*, CENT. INTELLIGENCE AGENCY, <https://www.cia.gov/library/publications/the-world-factbook/rankorder/2174rank.html> (last visited Sept. 23, 2011).

40. Most American oil imports come from Canada, Mexico, Venezuela, and the Middle East. See BP, BP STATISTICAL REVIEW OF WORLD ENERGY JUNE 2010, at 20 (2010).

41. Since 2000, gasoline prices in the United States have averaged between \$1.50 and \$3.50 a gallon. Because of differentials in delivery costs and state taxes, there has been considerable variation around those mean prices, but gasoline prices above \$4.00 a gallon have been very rare in the United States. U.S. ENERGY INFO. ADMIN., DEP'T OF ENERGY, RETAIL GASOLINE HISTORICAL PRICES (2011), available at http://www.eia.gov/oil_gas/petroleum/data_publications/wrgp/mogas_history.html. By contrast, prices in excess of \$8.00 a gallon are common in Europe, and have been over the last decade, primarily due to higher energy taxes in Europe. See Bruce Crumley, *Think Gas is High, Try Europe*, TIME WORLD (May 28, 2008), <http://www.time.com/time/world/article/0,8599,1809900,00.html>.

42. U.S. ENERGY INFO. ADMIN., DEP'T OF ENERGY, ELECTRIC POWER ANNUAL 2009, at 9 (2011), available at <http://www.eia.doe.gov/cneaf/electricity/epa/epa.pdf>. Across the individual American states there is great variety in their generation mixes. Some states rely on coal for as much as ninety percent of their generating capacity; others have little or no coal-fired capacity. U.S. ENERGY INFO. ADMIN., DEP'T OF ENERGY, ENERGY PRODUCTION ESTIMATES IN TRILLION BTU, at tbl.P2 (2009), available at http://205.254.135.24/state/seds/sep_prod/pdf/P2.pdf.

growing faster than coal-fired generation; however, renewables started from a very small base. In 2009, renewables (hydro, wind, solar, and geothermal) constituted more than 10% of American electric generation, and two-thirds of that 10% was hydroelectric power.⁴³ In fact, the lion's share of growth in electric generating capacity since the 1970s has been taken by natural gas-fired plants,⁴⁴ which are relatively inexpensive to build, produce fewer pollutants per unit of energy produced than coal, and have benefited from advances in turbine design that have driven down costs. They do, however, emit many of the same pollutants emitted by coal and oil combustion.⁴⁵

Increasing dissatisfaction with this pollution was already provoking renewed calls for comprehensive and fundamental energy policy reform before two important catalyzing events transformed those calls into a much louder chorus: (1) the September 11th attacks (and ensuing wars in Iraq and Afghanistan), which triggered growing concern about the effects of dependence on foreign oil on energy security and American foreign policy; and (2) the consensus within the last decade among climatologists that man-made greenhouse gas (GHG) emissions are contributing significantly to global warming,⁴⁶ a notion that in turn fed public concern about climate change. The war in Iraq contributed to a worldwide reduction in the supply of oil (as Iraq's production dropped from two million barrels per day to about 1.4 million barrels per day).⁴⁷ Since September 11th, Americans have become more acutely aware of their dependence upon oil imported from countries like Saudi Arabia, from which most of the September 11th hijackers came.

43. U.S. ENERGY INFO. ADMIN., DEP'T OF ENERGY, MONTHLY ENERGY REVIEW 95, at tbl.7.2b (2011), available at <http://205.254.135.24/totalenergy/data/monthly/pdf/mer.pdf>.

44. See U.S. ENERGY INFO. ADMIN., DEP'T OF ENERGY, ELECTRICITY NET GENERATION, at tbl.8.2a, available at <http://www.eia.gov/totalenergy/data/annual/txt/ptb0802a.html>.

45. *Clean Energy*, U.S. ENVTL. PROTECTION AGENCY, <http://www.epa.gov/cleanenergy/energy-and-you/affect/air-emissions.html> (last updated Dec. 28, 2007).

46. See INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, CLIMATE CHANGE 2007: SYNTHESIS REPORT (2008), available at http://www.ipcc.ch/pdf/assessment-report/ar4/syr/ar4_syr.pdf

47. See BP, PUTTING ENERGY IN THE SPOTLIGHT: BP STATISTICAL REVIEW OF WORLD ENERGY 2005, at 6 (2005), available at http://www.bp.com/liveassets/bp_internet/globalbp/globalbp_uk_english/publications/energy_reviews_2005/STAGING/local_assets/downloads/pdf/statistical_review_of_world_energy_full_report_2005.pdf.

Thus, September 11th highlighted a long-standing vulnerability, and in so doing, contributed to public support for greater energy independence.

Likewise, scientific concern over the effects of anthropogenic emissions of greenhouse gases is not new. The leading scientific organization for the study of global warming and climate change, the Intergovernmental Panel on Climate Change (IPCC), was created more than two decades ago.⁴⁸ However, within the last decade the consensus among world's climatologists that human activities (primarily, emissions of greenhouse gases⁴⁹ and deforestation) are significantly hastening global warming has grown stronger.⁵⁰ Global mean temperatures are behaving consistently with the models produced by climatologists, and we are already witnessing many of the effects projected by these models, such as excessive heat, more intense droughts, more severe storms, and the rapid shrinking of polar ice caps.⁵¹ Greenhouse gas concentrations in

48. The IPCC acts as a clearinghouse, aggregator, and evaluator of climate change research. For more information about its origins and work, see INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, <http://www.ipcc.ch> (last visited Sept. 27, 2011).

49. The primary greenhouse gases are carbon dioxide, methane, nitrous oxide, and various fluorocarbon compounds. Molecules of these gases tend to trap more solar radiation in the atmosphere than other air molecules. Among greenhouse gases, carbon dioxide tends to garner the most attention because its volume in the atmosphere dwarfs that of other greenhouse gases, even though other gases, such as methane, trap more heat on a molecule-by-molecule basis.

50. In the words of the IPCC, it is "very likely" that human activity is driving climate change. INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, *supra* note 46. Climatologists have reached this consensus as a result of models that examine factors that influence climate (as opposed to weather), both natural and man-made. Using data about these potential determinants of climate change, along with historical climate data, climatologists have found that models that ascribe significant effects to human activities do the best job of predicting climate change. For an accessible discussion of the impact of greenhouse gas emissions on climate, see PEW CTR. ON GLOBAL CLIMATE CHANGE, *THE CAUSES OF GLOBAL CLIMATE CHANGE: SCIENCE BRIEF 1* (2008).

51. See Justin Gillis, *In Weather Chaos, a Case for Global Warming*, N.Y. TIMES, Aug. 14, 2010, <http://www.nytimes.com/2010/08/15/science/earth/15climate.html?ref=temperaturerising> (quoting a representative of the National Climatic Data Center suggesting that these effects are consistent with climate change models); Leslie Kaufman, *Scientists' Report Stresses Urgency of Limiting Greenhouse Gas Emissions*, N.Y. TIMES, May 12, 2001, [http://www.nytimes.com/2011/05/13/science/earth/13climate.html?_r=1&scsp=1&sq=leslie kaufman nation%27 scientific establishment issued a stark&st=cse](http://www.nytimes.com/2011/05/13/science/earth/13climate.html?_r=1&scsp=1&sq=leslie%20kaufman%20scientific%20establishment%20issued%20a%20stark%20warning) (describing the National Research Council's warning that the risks of inaction on climate change are profound); Bryan Walsh, *Why an Antarctic Glacier Is Melting So Quickly*, TIME (June 27, 2011), <http://ecentric.blogs.time.com/2011/06/27/why-an-antarctic-glacier-is-melting-so-quickly/> (summarizing scientific understanding of shrinking polar ice caps).

the atmosphere have increased from their preindustrial level of 280 parts per million (ppm)⁵² to their current level of about 390 ppm.⁵³ Because greenhouse gases dissipate slowly in the atmosphere, today's emissions will have warming effects for many years to come. Over the last decade, climatologists and some political leaders have concluded that managing growth in greenhouse gas emissions to stabilize concentrations at a level of 450 ppm or lower should minimize the probability of catastrophic effects.⁵⁴

The catastrophic effects of global warming and the likelihood that humans contribute to the harm have fed public desire for cleaner, more secure sources of energy and kept energy policy reform on the public agenda over the last decade. The latter years of the George W. Bush administration produced at least three major energy bills,⁵⁵ and the Obama administration pledged that fundamental energy policy reform would be one of its top policy priorities.⁵⁶

II. THE LOGIC OF REFORM

A. Objectives and Constraints

We can discern three sets of objectives driving the current wave of energy policy reform in Congress and the executive branch, as suggested by Table 1 below. These include (i) environmental concerns, including the desire to reduce greenhouse gas emissions, (ii) security concerns, including the desire to reduce dependence upon imported oil, and (iii) efficiency and reliability concerns, including the desire to use energy efficiently or to maintain a reliable

52. This number represents a concentration of carbon dioxide or amounts of other greenhouse gases with equivalent heat trapping capabilities to carbon dioxide.

53. CO2Now.org tracks atmospheric concentrations of CO₂. See generally CO2NOW.ORG, <http://www.CO2now.org> (last visited Sept. 27, 2011).

54. The 450 ppm number represents an estimate of the maximum atmospheric concentration that is necessary to keep global mean temperature increases at 2°C or lower. However, there is considerable disagreement among climatologists and others over the desirable maximum concentration of greenhouse gases in the atmosphere. Some analysts argue that the 450 ppm figure is too high because climate change is taking place considerably faster than scientists had predicted only a short time ago. See, e.g., FRANK ACKERMAN ET AL., THE ECONOMICS OF 350: THE BENEFITS AND COSTS OF CLIMATE STABILIZATION 9 (2009); NICHOLAS STERN, THE STERN REVIEW: THE ECONOMICS OF CLIMATE CHANGE, at vii (2006).

55. See *infra* Part II.B.1.b.

56. See *Obama's Key Promises*, WASH. POST, <http://www.washingtonpost.com/wp-srv/special/politics/obamas-promises/> (last updated Jan. 20, 2010).

energy delivery system. Table 1 also suggests that the primary constraint preventing legislative action toward these goals is concern over the costs of action. Can we or should we bear the costs of reform, such as higher energy prices and higher prices for energy-intensive products? Will the benefits exceed the costs? Can we afford it? Collectively, these questions have been the focus of a great deal of policy and scholarly attention over the last decade or more. That attention has produced a great deal of information and analysis aimed at measuring the costs and benefits of pursuing the objectives listed on the left side of Table 1.

Table 1: Objectives and Constraints of Energy Policy Reform

Objectives	Constraints
<p>Environmental concerns; e.g.:</p> <ul style="list-style-type: none"> • Slow growth in GHG emissions to reach maximum 450 ppm goal • Mitigate and adapt to the effects of climate change • Reduce emissions of pollutants (other than CO₂) from fossil fuel combustion 	<p>Concern over direct costs (of energy to businesses and consumers); e.g.:</p> <ul style="list-style-type: none"> • gasoline prices • electricity prices • taxes (if reform is revenue-neutral to the federal budget)
<p>Security concerns; e.g.:</p> <ul style="list-style-type: none"> • Reduce dependence on oil • Reduce leverage of producing nations over U.S. policy • Address security issues associated with climate change 	<p>Concern over indirect costs; e.g.:</p> <ul style="list-style-type: none"> • increased price of goods due to costlier energy and other resource inputs • net job losses and other consequential effects
<p>Efficiency and reliability concerns; e.g.:</p> <ul style="list-style-type: none"> • Reduce consumption of energy and use energy more efficiently • Improve reliability and operation of electric grid • Reduce price volatility associated with supply/demand imbalances 	

1. Environmental concerns

Among environmental concerns, the lion's share of attention has been devoted to the impacts of greenhouse gas emissions on the climate. Less attention has been devoted to the other environmental impacts associated with the use of fossil fuels. Issues like the impacts of surface coal mining (e.g., on water quality), gasoline-powered vehicles (e.g., on smog levels), and mercury emissions from coal-fired power plants (e.g., on the safety of the food chain) remain important, but have received far less attention recently, perhaps because they are familiar, their impacts are more localized, and regulatory instruments already address those issues. Not so with greenhouse gas emissions. Assessing the costs and benefits of taking action to address climate change is an extraordinarily complicated task, one to which geoscientists and economists have devoted an enormous amount of attention. That literature is far too large to summarize fully here, but it is possible to identify some of its key conclusions and ideological fault lines.

Economists and geoscientists employ a variety of models, including so-called "integrated assessment models" (IAMs), to measure the costs and benefits of reducing greenhouse gas emissions. These models try to determine the optimal emissions path for society, taking into consideration a wide variety of characteristics about the natural carbon cycle, the impacts of human activity on that cycle, predictions about how natural and human systems will respond to climate change, and more.⁵⁷ These models also attempt to estimate a wide variety of impacts from increasing global temperatures, including damage to markets (such as changing crop yields) and property (such as the inundation of land), direct and indirect costs associated with the reduced availability of fresh water (such as health effects and relocation costs), damage from more extreme weather events or sea level rise (such as flooding), lost ecosystem services, and lost biodiversity. Some of these costs are far easier to quantify than others. In order to do so, researchers must sometimes make assumptions about how (and how successfully) humans and ecosystems will adapt to change. Likewise, estimating the cost of reducing greenhouse gas emissions requires assumptions

57. For a description of integrated assessment models, see MICHAEL D. MASTRANDREA, *CALCULATING THE BENEFITS OF CLIMATE POLICY* (2009) and LAWRENCE H. GOULDER & WILLIAM A. PIZER, *THE ECONOMICS OF CLIMATE CHANGE* 4–13 (2006).

about how the public and private sectors will pursue this goal. Will governments mandate emissions reductions? If so, how? Will the U.S. government impose a tradable permitting system? Will it impose environmental taxes? There are also questions about how modelers should discount the future, given that greenhouse gases remain in the atmosphere for a very long time, and the benefits of reducing emissions will accrue mostly to future generations while the current generation will bear the costs.

Different models answer these questions differently, employing different assumptions and discount rates. Naturally, these different models have led to varying estimates of the net benefits of reducing greenhouse gas emissions. Certainly, the worst case scenarios are bleak, but there is disagreement over the probability of encountering the worst case scenario. One 2005 meta-analysis, by Richard Tol, looked at twenty-eight climate-change IAM studies and attempted to summarize conclusions they reached. Tol discovered a very large range of estimates (from negative prices to prices in the hundreds of dollars per ton of carbon) and concluded that point estimates of prices were highly sensitive to discount rates and other assumptions. His “best guess” estimate was only \$5 per ton of carbon.⁵⁸ We can chalk up some of this variation to the difficulty of predicting how the climate system will react to temperature increases and how (and how effectively) humans will react and adapt to physical changes in the environment. On the other hand, there is much more certainty about (and much smaller confidence intervals around estimates of) the costs of reducing greenhouse gas emissions. For example, we are developing better data about the cost of capturing carbon and storing it, though this technology remains in its infancy.⁵⁹ We also now have much more experience with lower-polluting combined cycle natural gas plants and renewable energy, and we are learning more about the costs of electric cars and hybrid cars.

Despite the uncertainty, most economic studies of climate change conclude that the benefits of reducing emissions exceed the costs. A more recent meta-analysis commissioned by the British

58. Richard S.J. Tol, *The Marginal Damage Costs of Carbon Dioxide Emissions: An Assessment of the Uncertainties*, 33 ENERGY POL'Y 2064, 2072–73 (2005), available at <http://www.fnu.zmaw.de/fileadmin/fnu-files/publication/tol/enpolmargcost.pdf>.

59. For an accessible discussion of the cost of carbon capture and storage, see Int'l Energy Agency, *CO₂ Capture and Storage*, 2006 IEA ENERGY TECH. ESSENTIALS 1, 2, available at <http://www.iea.org/techno/essentials1.pdf>.

government, the so-called "Stern Review," reaches this conclusion and argues that recent experience with temperature change implies that the costs of warming will be far greater than earlier models anticipated. The Stern Review concludes that:

- The world will be unlikely to stabilize greenhouse gas concentrations at the equivalent of 450 ppm of CO₂; rather, a concentration in the neighborhood of 500 to 550 ppm is more likely.
- Stabilizing emissions at the 550 ppm level will cost approximately one percent of GDP, but it will avoid costs that are likely to be five to ten times greater than that.⁶⁰

Tol disputes the Stern Review's conclusions on a number of grounds, the most basic being his contention that the Stern Review underestimates the degree to which developing economies will grow and be better able to tackle problems that might otherwise be associated with climate change.⁶¹ On the other hand, in May of 2011, the National Research Council issued a report confirming the validity of climate science and endorsing strong regulatory action on climate change, concluding that the risks of inaction far outweigh the risks of action.⁶²

Scholars seem to agree that the impacts of climate change will be very unevenly distributed, with more costs falling on the developing nations of the tropics.⁶³ However, many scholars still disagree about (a) the ability of developing countries to adapt to climate change, with or without the help of richer countries, and (b) the degree to which wealthier countries can reduce emissions in sufficient quantities to stabilize greenhouse gas concentrations at acceptable levels. The first issue reflects a widely acknowledged problem with some of the IAM analyses of climate change; namely, their failure to account adequately for the effects of human adaptation to climate change as it occurs. For example, Tol's critique of the Stern Review includes the charge that it takes "a rather dim view of human ingenuity," and that it underestimates the ability of African countries

60. STERN, *supra* note 54, at xii fig.3.

61. RICHARD S.J. TOL, THE STERN REVIEW OF THE ECONOMICS OF CLIMATE CHANGE: A COMMENT 2-3 (2006) [hereinafter TOL, THE STERN REVIEW].

62. The NRC is an arm of the National Academy of Sciences. See COMM. ON AMERICA'S CLIMATE CHOICES, AMERICA'S CLIMATE CHOICES (2011), available at <http://americasclimatechoices.org/>.

63. *Id.*; STERN, *supra* note 54, at xxi.

and their wealthier world sponsors to mitigate or avoid many of the harshest costs associated with climate change.⁶⁴ Tol is less sanguine about human ingenuity as applied to the problem of pollution control, however, arguing that the Stern Review relies upon models that make “overly optimistic assumptions [about] technological progress and the costs of emission abatement.”⁶⁵ For its part, the Stern Review argues that adaptation is more difficult in developing countries, where poverty and poor governance hinder collective action.⁶⁶

Some analyses suggest that wealthy countries in temperate climates might even benefit overall from climate change, or at least that the costs to those countries of reducing emissions far exceed the benefits (avoided costs). Eric Posner and Cass Sunstein suggest that it would be more efficient for wealthy countries to make direct transfer payments to countries who bear the brunt of climate change costs than for those wealthier countries to try to reduce their emissions.⁶⁷ Others dispute these claims.⁶⁸ However, these claims raise a particularly difficult aspect of combating climate change: the requirement of worldwide collective action. As developing countries, China and India were not obligated to reduce their emissions under the Kyoto Protocol; now they are two of the largest emitters of greenhouse gases.⁶⁹ Some fear that in the absence of emissions reductions in China and India, the benefits of greenhouse gas emissions reductions may never be realized.⁷⁰ Thus, while the weight of scholarly opinion points toward the need for action to reduce

64. TOL, THE STERN REVIEW, *supra* note 61, at 2.

65. *Id.* at 3.

66. STERN, *supra* note 54, at xxi.

67. See Eric A. Posner & Cass R. Sunstein, *Climate Change Justice* (John M. Olin Law and Econ., Working Paper No. 354, 2007).

68. Jody Freeman and Andrew Guzmán argue that the United States will not benefit from climate change and that many analysts underestimate the impacts of climate change on the United States. Jody Freeman & Andrew Guzmán, *Seawalls Are Not Enough: Climate Change and U.S. Interests* (Univ. of Cal. Berkeley, Public Law Research Paper No. 1357690, 2009).

69. INT’L ENERGY AGENCY, CO₂ EMISSIONS FROM FUEL COMBUSTION 10 (2010), available at <http://www.ica.org/co2highlights/CO2highlights.pdf> (stating that the largest five CO₂ emitters are China, the United States, the Russian Federation, India, and Japan).

70. Since Kyoto, negotiations over next steps in combating climate change have broken down repeatedly over the question of whether developing nations like China and India ought to commit to emissions reductions. They have steadfastly refused to do so, which was a sticking point at the most recent negotiations in Copenhagen in December 2009. See John M. Broder, *Many Goals Remain Unmet in Five Nations Climate Deal*, N.Y. TIMES, Dec. 19, 2009, at A1.

greenhouse gas emissions, that action will require a worldwide collective effort.

Looking more broadly at the environmental costs of coal-fired power beyond those associated with climate change, we can ascribe significant costs and risks to the inhalation of fine particles and the effects of toxic emissions from coal as well. A 2011 Harvard study concluded that Americans' reliance on coal for energy is responsible for more than 10,000 premature deaths per year, as well as other health problems.⁷¹ It concluded that those costs, if reflected in the price of electricity, would more than double electricity costs on average.⁷² The growing body of evidence of harm associated with our reliance on coal may explain the Obama administration's increasing attention to emissions from coal-fired power plants.

2. Security concerns

Americans' discomfort with dependence upon foreign sources of oil dates back at least to the oil shocks of the 1970s. That discomfort was multiplied by the events of September 11, 2001. Climate change has added another foreign-policy concern, one tied to our reliance on fossil fuels generally, not simply those we import from elsewhere.

Quantifying these security and foreign-policy costs to the United States is at least as difficult as quantifying the social net benefits of climate change. How do we value the myriad ways in which dependence on foreign sources of oil affects our foreign-policy decisions? Certainly the costs of dependence upon foreign sources of oil are felt acutely by most Americans when the world price of oil goes up, something Americans have experienced since the oil shocks of the 1970s.⁷³ In 1973, when OPEC reacted to American support of Israel in the Yom Kippur war by imposing an oil embargo on the

71. See Paul R. Epstein et al., *Full Cost Accounting for the Life Cycle of Coal*, 1219 ANNALS N.Y. ACAD. SCI. 73, 85 (2011).

72. *Id.* at 74. For a summary of other studies estimating the external costs of coal, see *External Costs of Coal*, SOURCEWATCH.ORG, <http://tinyurl.com/42jtbdy> (last visited Sept. 28, 2011).

73. YERGIN, *supra* note 4, at chs. 29, 33 (detailing the American reaction to the oil crises of 1973 and 1979). On the other hand, price volatility has been a feature of oil markets since their inception, even in the early years when most American oil was domestically produced. During the middle and latter part of the 20th century, inexpensive oil from the Middle East displaced domestic production, much of it from Texas, leading to reduced production in Texas oil fields. See *id.* at 92–95, 499–500; see also BRYAN BURROUGH, *THE BIG RICH: THE RISE AND FALL OF THE GREATEST TEXAS OIL FORTUNES* 74–78, 152–54 (2009).

United States, the extent of American dependence upon foreign sources of oil became clear. While the energy reforms of the late 1970s were designed in part to reduce that dependence, acceptance of an integrated world market for oil became a staple of American policy in the 1980s and 90s.⁷⁴

Dependence upon foreign oil has shaped American defense policy and has been a part of defense planning for many decades. The U.S. Department of Defense (DoD) is the largest single purchaser of oil worldwide,⁷⁵ consuming several hundred thousand barrels of oil per day.⁷⁶ Several recent DoD studies have indicated that the American military does not see supply interruptions or shortages as a near-term risk, but it has focused more of its attention recently on developing alternative fuels, reasoning that doing so made good long-term strategic sense.⁷⁷ However, dependence upon foreign oil affects American security in more important ways; namely, by influencing foreign-policy decisions, including decisions that lead to war. For this reason more than any other, the September 11 attacks made integrated world oil markets seem even less acceptable to many Americans and brought renewed calls for greater energy independence.⁷⁸

Increased domestic production may lessen the pain associated with another oil embargo in the future, and the desire for greater oil independence seems to be behind the Obama administration's decision to support offshore drilling, a decision that was reversed (at least for the near term) in the aftermath of the Deepwater Horizon

74. See YERGIN, *supra* note 4, at chs. 32–36.

75. "Leap Ahead" *Technologies and Transformation Initiatives within Defense Science and Technology Program: Hearing before the Subcomm. on Emerging Threats and Capabilities of the Comm. on Armed Services*, 107th Cong. 4–5 (2001) (statement of Hon. Edward C. Aldridge Jr., Under Secretary of Defense for Acquisition, Technology, and Logistics and statement of Dr. Dolores M. Etter, Acting Director, Defense Research and Engineering; Deputy Under Secretary of Defense for Science and Technology).

76. Sohbet Karbuz, *How Much Energy Does the U.S. Military Consume*, DAILY ENERGY REP., <http://tinyurl.com/2g9zzfy> (last visited Sept. 24, 2011).

77. See Steve Vogel, *Pentagon Prioritizes Pursuit of Alternative Fuel Sources*, WASH. POST, Apr. 13, 2009, at A13.

78. See PEW RESEARCH CTR. FOR THE PEOPLE & THE PRESS, *ERODING RESPECT FOR AMERICA NOW SEEN AS A MAJOR PROBLEM: FOREIGN POLICY ATTITUDES NOW DRIVEN BY 9/11 AND IRAQ 19 (2004)* (poll finding seven-in-ten Americans say ensuring adequate energy supplies should be a top priority and stating the issue has gained "somewhat greater importance since the mid-1990s, when roughly six-in-ten said this should be a top priority").

oil spill.⁷⁹ However, the Council on Foreign Relations disputes the notion that domestic production can produce energy independence. It concluded in 2006 that the American defense policy establishment needs to let go of the idea that the United States can achieve energy independence through increased production or stockpiles of oil.⁸⁰ Rather, as the Council suggested, it seems likely that true energy independence will require changes in the way we fuel our transportation fleet.⁸¹

Moreover, the impacts of global warming can affect American foreign policy and security. In developing countries, higher temperatures may exacerbate water shortages and crop failures, producing dislocation and other conditions rife for armed conflict. A group of economists from Stanford, the University of California at Berkeley, New York University, and Harvard University attempted to estimate the increased number of war-related deaths in Africa that would be attributable to global climate change.⁸² Finding a strong historical correlation between warfare and temperature increases in Africa, they conclude that global warming will increase armed conflict in Africa (a continent from which the United States imports significant quantities of oil) by fifty-four percent, leading to nearly 400,000 additional warfare related deaths by 2030.⁸³ In 2004, a Pentagon analysis anticipated catastrophic resource shortages and an increased probability of warfare and other forms of conflict as a result of global warming.⁸⁴ Another report by the CNA Corporation found that "projected climate change poses a serious threat to America's national security," and that it has the "potential to create sustained natural and humanitarian disasters on a scale far beyond those we see

79. In announcing his rationale for the decision, President Obama said, "There will be . . . those who say we should not open any new areas to drilling. But . . . this announcement is part of a broader strategy that will move us from an economy that runs on fossil fuels and foreign oil to one that relies more on homegrown fuels and clean energy." President Barack Obama, White House, Remarks on Energy Security at Andrews Air Force Base (Mar. 31, 2010), available at <http://tinyurl.com/yfwdytc>.

80. See COUNCIL ON FOREIGN RELATIONS, INDEPENDENT TASK FORCE REPORT NO. 58, NATIONAL SECURITY CONSEQUENCES OF U.S. OIL DEPENDENCY 35 (2006).

81. See *id.* at 37-38.

82. Marshall B. Burke et al., *Warming Increases the Risk of Civil War in Africa*, 106 PROC. NAT'L ACAD. SCI. 20,670 (2009).

83. *Id.* at 20,672.

84. This classified report was leaked to a British newspaper, *The Observer*. Mark Townsend & Paul Harris, *Now the Pentagon Tells Bush: Climate Change Will Destroy Us*, THE OBSERVER, Feb. 22, 2004, at 3.

today”⁸⁵ The report predicts that the changes wrought by global warming will produce conditions that are rife for extremism, conflict, authoritarianism, and radical ideologies.⁸⁶ It recommends that the United States take a “stronger national and international role to help stabilize climate change at levels that will avoid significant disruption of global security and stability.”⁸⁷

None of these analyses place a dollar value on the national security threats associated with dependency on foreign oil or climate change. We can infer, however, that conclusions like those reached by the CNA Corporation reflect an implicit conclusion that the benefits associated with combating climate change exceed the costs.

B. Conservation and Efficiency

The logic of conservation and efficiency is simple. It is not oil or gas or electricity that we really want: rather, it is the services that they provide. If we can obtain those same services while using less oil, gas, or electricity, we can (i) save money, (ii) reduce the environmental impacts associated with exploiting those energy sources, and (iii) reduce our dependence upon foreign energy sources. Because we can save money by using energy more efficiently, many of the gains associated with maximizing energy efficiency are already being realized. According to the U.S. Energy Information Administration, the energy intensity of the American economy (measured in year 2000 dollars) declined from \$17.34 per BTU in 1949 to \$7.28 per BTU in 2009.⁸⁸ Businesses, in particular, have better exploited energy efficiency opportunities since the energy crises of the 1970s.⁸⁹

But there remain additional unrealized opportunities as well. The American economy generates more output per capita than other economies, but per capita energy consumption in the United States remains very high—nearly double that of the average Western

85. THE CNA CORP., NATIONAL SECURITY AND THE THREAT OF CLIMATE CHANGE 44–45 (2007).

86. *Id.* at 44.

87. *Id.* at 7.

88. U.S. ENERGY INFO. ADMIN., DEP’T OF ENERGY, ANNUAL ENERGY REVIEW 2009 (2010), available at <http://205.254.135.24/totalenergy/data/annual/pdf/aer.pdf>.

89. See *Energy Innovation, Efficiency Can Help Small Businesses Prosper*, BUSINESSNEWS DAILY, Sept. 23, 2011, <http://www.businessnewsdaily.com/national-energy-regulation-small-business-support-1814/>.

European.⁹⁰ Some analysts believe that energy efficiency holds great promise in the effort to reduce greenhouse gas emissions. Princeton professors Robert Socolow and Stephen Pacala suggest an approach to stabilizing greenhouse gas concentrations that focuses on so-called "stabilization wedges."⁹¹ These wedges represent individual steps (of roughly equal effect on carbon emissions) that society can take to reduce growth in the rate of greenhouse gas emissions, such as improving the efficiency of household energy consumption, implementing changes in the transportation sector's energy usage, and increasing reliance on renewable energy.⁹² Nearly half of the possible reductions Socolow and Pacala identify can be realized through various forms of conservation or efficiency. Many of these wedges are also among the more cost-effective approaches to combating climate change.

A recent study by the consulting firm McKinsey and Co. echoed the conclusions of Socolow and Pacala. McKinsey predicted that energy efficiency investments could yield a 23% reduction in energy demand in the United States and benefits that more than double the costs.⁹³ The problem, argued McKinsey, is that the various energy-

90. In 2006, United States per capita consumption of primary energy was 334.6 million Btu, compared to 146.2 million Btu per capita in Europe. U.S. ENERGY INFO. ADMIN., DEP'T OF ENERGY, WORLD PER CAPITA TOTAL PRIMARY ENERGY CONSUMPTION, 1980-2006 (2008), available at <http://www.cia.doe.gov/emeu/international/energyconsumption.html> (open the Excel document for "Most Countries" under "Per Capita (Per Person) Total Primary Energy Consumption (Million Btu per Person).") In 2007, estimates for electricity consumption as "kWh/capita" show that U.S. individual demand (13616 kWh) greatly exceeds demand in Germany (7185 kWh), Spain (6296 kWh), and the United Kingdom (6142 kWh). INT'L ENERGY AGENCY, KEY WORLD ENERGY STATISTICS 48-57 (2009), available at http://www.iea.org/textbase/nppdf/free/2009/key_stats_2009.pdf.

91. Robert Socolow & Stephen Pacala, *Stabilization Wedges: Solving the Climate Problem for the Next 50 Years with Current Technologies*, 305 SCI. 968 (2004).

92. *Id.* at 969-71. For a detailed description of the various energy efficiency law and policy improvements that might comprise these various wedges, see John Dernbach, *Stabilizing and Then Reducing U.S. Energy Consumption: Legal and Policy Tools for Efficiency and Conservation*, 37 ENVTL. L. REV. 10,003 (2007).

93. HANNAH CHOI GRANADE ET AL., MCKINSEY & CO., UNLOCKING ENERGY EFFICIENCY IN THE US ECONOMY, at iv (2009), available at http://www.mckinsey.com/Client_Service/Electric_Power_and_Natural_Gas/Latest_thinking/~/_media/McKinsey/dotcom/client_service/EPNG/PDFs/Unlocking%20energy%20efficiency/US_energy_efficiency_full_report.ashx. See also David Hodas, *Imagining the Unimaginable: Reducing U.S. Greenhouse Gas Emissions by Forty Percent*, 26 VA. ENVTL. L.J. 271 (2008) (making the case for larger productions); Michael Vandenbergh et al., *Regulation in the Behavioral Era*, 95 MINN. L. REV. 715 (2011) (detailing the literature on behavioral impediments to energy efficiency investments).

saving opportunities in the U.S. economy are fragmented, spread across “more than 100 million locations and billions of devices,” making coordinated solutions difficult.⁹⁴ Thus, part of the problem is that many of the remaining unrealized energy efficiency opportunities can be realized only by individuals, not businesses. They are attached to individual consumers’ decisions, such as purchasing relatively energy-inefficient homes, cars, and appliances, for example. Economist Stephen DeCanio calls this tendency of consumers to miss opportunities to save money through energy efficiency “the energy efficiency paradox.”⁹⁵

Some scholars ascribe these unrealized opportunities to behavioral heuristics that prevent people from recognizing the opportunities posed by efficiency investments, and they suggest that the problem is one of “norm activation.”⁹⁶ John Dernbach argues that people pass up opportunities to save energy and money because the issue of energy efficiency is not sufficiently salient to them.⁹⁷ Part of the salience of the problem is the “out of sight, out of mind” problem: if people are made more aware of the energy they are using to perform tasks, they will improve their energy efficiency.

The other part of the salience issue is the effect of social norms: generally speaking, people wish to conform to social norms and expectations. They lack information about the energy they are using, about opportunities to save money by using less energy, and (perhaps most importantly) about how much energy their peers are using.⁹⁸ Dernbach argues that governments and private standard-setting organizations can activate norms of energy efficiency by ensuring that consumers understand national and local energy efficiency goals and have access to information about their (and their peers’) energy usage.⁹⁹

94. GRANADE ET AL., *supra* note 93, at viii.

95. Stephen J. DeCanio, *The Efficiency Paradox: Bureaucratic and Organizational Barriers to Profitable Energy-Saving Investments*, 26 ENERGY POL’Y 441, 441 (1998).

96. See, e.g., Hunt Allcott & Sendhil Mullainathan, *Behavior and Energy Policy*, 327 SCI. 1204 (2010) (summarizing some of the literature on new norms and energy consumption, and suggesting ways to activate norms of conservation and efficiency investment); John C. Dernbach, *Overcoming the Behavioral Impetus for Greater US Energy Consumption*, 20 PAC. MCGEORGE GLOBAL BUS. & DEV. L.J. 15 (2007); Michael P. Vandenbergh & Anne C. Steinemann, *The Carbon-Neutral Individual*, 82 N.Y.U. L. REV. 1673 (2007).

97. Dernbach, *supra* note 92, at 10,028–31.

98. *Id.*

99. *Id.*

1. Translating objectives into policies

a. Policy instruments. There is no shortage of reasons to pursue fundamental energy policy reform. However, in its barest form, the logic of reform ignores distributional issues. That is, energy policy reform may yield positive net benefits to the world, but the world is not a unitary actor. Real action will be taken by a combination of government and private sector actors, both individual and collective. In China, if the government wishes to shift from coal-fired power to hydroelectric or nuclear power, it can do so by making a unilateral decision to build more hydroelectric plants and fewer coal-fired plants, because, in China, the energy sector is mostly in government hands. The U.S. government cannot simply throttle up or throttle down greenhouse gas emissions, oil imports, or efficiency in consumption. Rather, because most investment in energy production and distribution is undertaken by the private sector, the U.S. government must rely on law and regulation to steer private investment in favored directions. It must use policy mandates or incentives to influence private sector action.

Consequently, for government the true choice variables in the pursuit of energy policy reform are the regulatory instruments it employs to induce changes in production and consumption patterns. Table 2, below, organizes the relevant regulatory instruments into their essential categories. We can think of the energy sector as divided along two dimensions: the first distinguishes production from consumption, and the second distinguishes the transportation sector from the stationary (home or business) energy-use sector. For example, we can focus on producers of greenhouse gas emissions, like vehicles and stationary sources. We can tax their emissions, or impose a so-called "cap and trade" or "tradable permit" system that would auction or distribute progressively fewer marketable permits (rights to emit GHGs) to emitters over time. Or we can focus on consumers of energy by (i) mandating that they either purchase less energy (by way of mandatory efficiency standards for vehicles, appliances, and buildings) or energy from less polluting sources (as would a national RPS for electricity), (ii) subsidizing their purchases of clean fuels and technologies, and/or (iii) requiring investment in smart grid technology so as to enhance electric grid reliability.

Table 2: Selected Regulatory Instruments (Choice Variables) for Energy Policy Reform

	Transportation	Home/Business
Production & Distribution of Energy	<p>GHG emissions standards for vehicles. Likely alternative vehicle technologies:</p> <ul style="list-style-type: none"> • Ethanol (corn; cellulosic) • Biodiesel • Electric vehicles (EVs), hybrid electrics, and plug-in hybrid electrics (PHEVs) • Natural gas <p>Carbon (Gasoline) Tax</p> <p>Subsidies for manufacture of preferred technologies (production of alternatively fueled vehicles, mass transit, etc.)</p>	<p>National RPS Technologies:</p> <ul style="list-style-type: none"> • Wind • Solar • Biomass • Hydro (including tidal and wave energy) • Geothermal • Waste-to-energy (municipal solid waste, landfill gas, etc.) • Other <p>Subsidies for preferred technologies (e.g., renewables, nuclear power, etc.)</p> <p>Mandatory smart grid investments by utilities</p> <ul style="list-style-type: none"> • Grid improvements • Smart meters • Demand response tariffs <p>GHG emissions reduction:</p> <ul style="list-style-type: none"> • GHG standards under the CAA (including carbon capture and sequestration) • Marketable permit system (cap and trade) • Carbon tax
Consumption of Energy	<p>Purchase incentives (rebates, tax credits or deductions) for alternative fueled-vehicles (biofuels, EVs, PHEVs, hybrids)</p> <p>More stringent CAFE standards (fuel efficiency)</p>	<p>Mandatory smart grid investments by utilities (e.g. smart meters)</p> <p>Building codes</p> <p>Appliance efficiency standards</p> <p>Subsidies for purchase of efficient buildings and appliances, distributed (renewable) generation, etc.</p>

b. Recent steps toward reform. Within the last few years, regulators and legislators have begun to experiment with some of the regulatory instruments listed in Table 2. In 2005, the Bush administration issued more stringent CAFE standards for SUVs and light trucks.¹⁰⁰ However, environmental groups challenged these standards as insufficiently stringent, and they were overturned by the Ninth Circuit Court of Appeals in 2007.¹⁰¹ Between 2005 and 2008, Congress passed (and the President signed) three energy bills. On each of these occasions, proponents of greenhouse gas emissions regulation and strong federal action to mandate increased use of renewables came away disappointed. However, these three statutes—the Energy Policy Act of 2005 (EPA 2005),¹⁰² the Energy Information and Security Act of 2007 (EISA),¹⁰³ and the Energy Improvement and Extension Act of 2008 (EIEA),¹⁰⁴ along with the inclusion of some energy provisions in the American Recovery and Reinvestment Act of 2009 (ARRA),¹⁰⁵ did establish some important incentives for movement away from fossil fuels and toward more secure, cleaner technologies and fuels.

What did these federal laws do? For the most part, they created new or extended financial incentives such as loan guarantees and tax credits for (i) the production and consumption of renewable and other domestic sources of energy, (ii) greater efficiency in consumption, and (iii) investments in energy security and reliability. The EPA 2005 focused on energy security over environmental objectives, creating powerful new financial incentives to jumpstart the moribund American nuclear power industry¹⁰⁶ and allocating

100. Average Fuel Economy Standards for Light Trucks, Model Years 2008-2011, 71 Fed. Reg. 17,566 (Apr. 6, 2006) (to be codified at 49 C.F.R. pts. 523, 533, 537).

101. *Ctr. for Biological Diversity v. Nat'l Highway Traffic Safety Admin.*, 508 F.3d 508 (9th Cir. 2007), *vacated and withdrawn*, 538 F.3d 1172 (9th Cir. 2008).

102. Energy Policy Act of 2005, Pub. L. No. 109-58, 119 Stat. 594 (codified in scattered sections of 26 and 42 U.S.C.).

103. Energy Independence and Security Act of 2007, Pub. L. No. 110-140, 121 Stat. 1492 (codified in scattered sections of 2, 15, 29, 42, 46, and 49 U.S.C.).

104. Energy Improvement and Extension Act of 2008, Pub. L. No. 110-343, 122 Stat. 3808 (codified in scattered sections of 26 U.S.C.).

105. American Reinvestment and Recovery Act of 2009, Pub. L. No. 111-5, 123 Stat. 116 (codified in scattered sections of the U.S. Code).

106. Most importantly, the statute extended insurance guarantees contained in the Price Anderson Nuclear Industries Indemnity Act through 2025 and added additional loan guarantees, a production tax credit, and additional financial protections for cost overruns and delays. Energy Policy Act of 2005 tit. VI. Some of these provisions apply only to the first six

large sums of money in the form of tax benefits for domestic fossil fuel production as well as renewables and efficiency.¹⁰⁷ On the other hand, the statute did mandate increases in the use of ethanol as a gasoline additive to 7.5 billion gallons by 2012.¹⁰⁸ This mandate was strengthened two years later with the passage of EISA, which established a target of 36 billion gallons by 2022.¹⁰⁹ This statute, along with EIEA, focused more directly on efficiency and renewables, strengthening and extending some of the financial incentives found in EAct 2005,¹¹⁰ repealing some existing subsidies for oil and gas development,¹¹¹ and imposing new efficiency standards for appliances.¹¹² The 2009 stimulus bill, ARRA, added money to the pot for efficiency,¹¹³ alternative fuels,¹¹⁴ and infrastructure development.¹¹⁵

Perhaps the two most important products of this barrage of legislation were (i) the long-term extension of the production tax credit for renewables¹¹⁶ and (ii) strengthened CAFE standards for automobiles. Since their inception in the late 1970s, tax credits for

new nuclear power plants licensed and built after passage of the statute. *Id.* § 638(b).

107. SENATE COMM. ON ENV'T & NATURAL RES., IMPACTS OF THE ENERGY POLICY ACT OF 2005, *available at* <http://tinyurl.com/3qlctwk>.

108. Energy Policy Act of 2005 § 1501. As an additive to gasoline for standard engines, ethanol comprises ten percent of the fuel mix, a mix that would be denoted “E-10.” This provision of the EAct 2005 did not apply to higher mixes of ethanol, *id.*, such as E-85, which cannot be burned in standard engines, and requires special or modified engines. In some parts of the country, such as the upper Midwest, use of E-85 is not uncommon.

109. Energy Independence and Security Act of 2007, Pub. L. No. 110-140, § 202, 121 Stat. 1492, 1521 (codified in 42 U.S.C. 7545(o)(2)).

110. *Id.* § 231 (extending and increasing EAct 2005 funds for “bioenergy” research).

111. Energy Policy Act of 2005 § 1502 (amending I.R.C. § 167(h)(5) to prolong the amortization of geological and geophysical expenditures for certain major integrated oil companies); An Act of Oct. 3, 2008, Pub. L. No. 110-343, Division B—Energy Improvement and Extension Act of 2008. §§ 401–402, 122 Stat. 3807, 3851–54 (amending revenue provisions for oil and gas industry on domestic production deduction and foreign tax credit).

112. Energy Improvement and Extension Act of 2008 §§ 301–308 (efficiency standards for appliances and lighting).

113. American Recovery and Reinvestment Act, Pub. L. No. 111-5, Division A—Appropriations Provision, tit. IV, 123 Stat. 116, 467–96 (appropriating an additional \$16.8 billion for “Energy Efficiency and Renewable Energy” to the Department of Energy).

114. *Id.* § 1123 (amending I.R.C. § 30C to create a temporary credit for “alternative fuel vehicle refueling property”).

115. *Id.* at div. A, tit. XII (appropriating an additional \$27.5 billion for “Highway Infrastructure Investment” to the Federal Highway Administration).

116. *Id.* § 1101 (extending the “Credit for Electricity Produced from Certain Renewable Sources” at I.R.C. § 45).

renewable electricity-generating facilities were renewed by Congress sporadically, one or two years at a time.¹¹⁷ Because some renewable technologies depend on the credit to remain cost competitive, the inability to depend on that subsidy (about two cents per kilowatt hour for the production tax credit)¹¹⁸ made it difficult for sponsors of wind, solar, and other renewable facilities to plan and invest. After extending the production credit briefly under EIEA,¹¹⁹ Congress extended the credit to 2014 for certain renewable technologies and to 2011 for wind and solar in ARRA.¹²⁰ As for CAFE standards, EISA raised standards for automobiles from the current 27.5 mpg for cars and 20.7 for SUVs and light trucks to 35 mpg for the entire fleet by 2020, a significant increase.¹²¹

However, as during the early years of the environmental movement in the 1960s, these early steps toward energy policy reform by the federal government have been cautious and measured, and it was left to states to experiment with bolder action. Proponents of strong action called for limits on emissions of carbon dioxide and other greenhouse gases (which have not traditionally been regulated under the Clean Air Act) from automobiles and stationary sources, a national RPS for electricity, and standards mandating more efficient consumption, including appliance standards, changes to building codes, and even more stringent CAFE standards. Many such proposals were introduced in Congress during the first Bush administration,¹²² however, because they lacked the support of both

117. See *supra* note 14.

118. I.R.S. Form 8835, Renewable Electricity, Refined Coal, and Indian Coal Production Credit (OMB No. 1545-1362) (2010), available at <http://www.irs.gov/pub/irs-pdf/f8835.pdf>.

119. An Act of Oct. 3, 2008, Pub. L. No. 110-343, Division B—Energy Improvement and Extension Act of 2008 § 101(a)(1), 122 Stat. 3807, 3808 (extending, *inter alia*, the I.R.C. § 45 credit for wind facilities through January 1, 2010).

120. American Recovery and Reinvestment Act § 1101 (extending the "Credit for Electricity Produced from Certain Renewable Resources" at I.R.C. § 45).

121. Energy Independence and Security Act of 2007, Pub. L. No. 110-140, § 102(b)(2), 121 Stat. 1492, 1499 (codified in 49 U.S.C. § 32902 (2006)).

122. Bills proposing carbon dioxide regulation during the Bush Administration include the Clean Power Act of 2002, S. 556, 107th Cong. (2002); The Clean Power Plant and Modernization Act of 2001, S. 1131, 107th Cong. (2001); The Clean Air Planning Act of 2002, S. 3135, 107th Cong. (2002); Clean Smokestacks Act of 2003, H.R. 2042, 108th Cong. (2003); and Climate Stewardship and Innovation Act of 2005, S. 1151, 109th Cong. (2005). See also H.R. 5756, 107th Cong. (2002) (seeking to establish a national RPS); Automobile Fuel Economy Act of 2001, S. 804, 107th Cong. (2001). These are just a sample of a much larger set of at least twenty-five bills addressing these issues. Several of those bills

the President and the Republican majority, none of those bills were enacted into law.

By comparison, state regulators have taken a much more direct approach to the problem of global warming and climate change in the last five years. For example, in 2006, California enacted AB 32, a law establishing a statewide program of greenhouse gas emission regulation that aims to reduce emissions in the state to 1990 levels by the year 2020.¹²³ Using its unique power to establish independent automotive standards under the Clean Air Act,¹²⁴ in 2005 the State of California sought EPA permission to regulate carbon dioxide emissions from vehicles.¹²⁵ That same year, a group of Northeastern states formed the Regional Greenhouse Gas Initiative (RGGI), a cooperative effort to regulate greenhouse gases within their borders using a marketable permit system,¹²⁶ not unlike the one already in place in the European Union.¹²⁷ Under the RGGI program, most marketable permits (called “emissions allowances”) are auctioned off to emitters, and the proceeds are invested in energy efficiency, renewable energy, and other clean energy technologies. This marks a

had bipartisan support, including one sponsored by 2008 Republican presidential nominee, John McCain. See *Climate Stewardship Act of 2005*, H.R. 759, 109th Cong. (2005).

123. This law has proven controversial, surviving a recall petition and a judicial challenge brought by environmental justice advocates challenging the cap-and-trade portions of the bill. See *Ass'n of Irrigated Residents v. Cal. Air Res. Bd.*, No. CPF-09-5059562 (Cal. Sup. Ct. Mar. 18, 2011), available at <http://www.scribd.com/doc/51242057/AIR-v-CARB>.

124. California is the only state authorized to establish its own standards for automobiles. The other forty-nine states may choose to apply either the federal standards or the California standards.

125. California's petition to regulate carbon dioxide emissions from cars was rejected by the (Bush) EPA on the grounds that carbon dioxide is not a “pollutant” under the Clean Air Act. In *Massachusetts v. EPA*, the Supreme Court determined that EPA does have the power to regulate carbon dioxide as a pollutant under the Clean Air Act. 549 U.S. 497 (2006). In July of 2009, the (Obama) EPA reversed its position and granted California permission to regulate carbon dioxide emissions from cars. Notice of Decision Granting a Waiver of Clean Air Act Preemption, 74 Fed. Reg. 32, 744 (July 8, 2009).

126. Under RGGI, participating states are seeking a ten percent reduction in carbon dioxide emissions from within their borders by 2019. Memorandum from the New England Power Generators Association, Inc. to the Regional Greenhouse Gas Initiative Working Group 1 (Nov. 15, 2007), available at <http://www.rggi.org/docs/nepga.pdf>.

127. For more on the European Union's carbon trading scheme, see A. Danny Ellerman & Barbara K. Buchner, *The European Union Emissions Trading Scheme: Origins, Allocation, and Early Results*, REV. ENVTL. ECON. & POL'Y, Winter 2007, at 66, available at <http://reep.oxfordjournals.org/content/1/1/66.full.pdf+html>.

contrast with the acid rain program, in which most pollution rights are distributed to emitters free of charge based on past emissions.¹²⁸

However, state regulation is not a substitute for coordinated federal efforts; recent initiatives seem only to tinker around the edges of energy policy. The modest nature of these recent policy changes is reflected in the United States Energy Information Administration's (EIA) 2010 projections for the United States' energy future. While the EIA projects rapid growth in renewables, it also foresees continued dominance of fossil fuels through 2035. Fossil fuel consumption as a percentage of total consumption of energy liquids will decline from 84% to 78% (due to increased use of biofuels in transportation), and the total amount of liquid fossil fuels Americans consume will remain relatively steady.¹²⁹ This means that Americans will continue to rely heavily on imported oil, with all of the foreign-policy complications that reliance entails. Likewise, the EIA projects an *increase* in the use of coal-fired electricity generation in the next twenty-five years.¹³⁰ If these projections hold true, the United States will continue to emit more greenhouse gases per capita than most other countries, making the possibility of achieving stable greenhouse gas concentrations at or below the 450 ppm level very remote.¹³¹

Most of the regulatory instruments listed in Table 2 are coercive in nature, designed to force, rather than encourage, change. Mandatory greenhouse gas emissions limits for automobiles and stationary sources, for example, would force fundamental change in the production of automobiles and the way we generate electricity in the United States. More stringent CAFE standards would force manufacturers to produce, and consumers to buy, smaller, lighter vehicles. A national renewable portfolio standard for electricity generation would force electric utilities to acquire renewable electricity (or renewable energy credits representing the generation of renewable electricity), rather than merely encourage its

128. The European Union's carbon trading scheme also distributes its pollution rights free of charge, for the most part. *Id.* at 73.

129. U.S. ENERGY INFO. ADMIN., DEP'T OF ENERGY, ANNUAL ENERGY OUTLOOK 2010: EARLY RELEASE OVERVIEW 6 (2009), available at <http://www.eia.gov/oiaf/aeo/pdf/overview.pdf>.

130. U.S. ENERGY INFO. ADMIN., DEP'T OF ENERGY, DOE/EIA-0383 ANNUAL ENERGY OUTLOOK 2010, at 79 (2010), available at http://www.marad.dot.gov/documents/DWP_-_Annual_Energy_Outlook_2010_%28with_projections_to_2035%29.pdf.

131. STERN, *supra* note 54, at 201.

production. Whereas Bush administration energy legislation offered more carrots than sticks,¹³² the national elections of 2008 brought calls for stronger federal action aimed at curbing greenhouse gas emissions and promoting efficiency and renewables.

Reflecting this preference for stronger regulation, the Obama administration (the “Administration”) has initiated the process of regulating carbon dioxide emissions from automobiles and stationary sources under the Clean Air Act¹³³ and is further strengthening rules governing emissions of conventional and toxic pollutants from coal-fired power plants.¹³⁴ In July 2011, the Administration announced a plan to drastically tighten CAFE standards further to 54.5 miles a gallon between 2017 and 2025.¹³⁵ Once these more efficient automobiles have fully penetrated the market, these new CAFE standards will reduce American oil consumption by more than ten

132. See discussion *supra* Part II.B.1.b.

133. The Supreme Court’s decision in *Massachusetts v. EPA*, 549 U.S. 497 (2007), paved the way for regulation of carbon dioxide under the Clean Air Act, though several interest groups have indicated that they are likely to challenge the EPA’s efforts in court. The EPA has acknowledged that regulation of greenhouse gas emissions through new legislation is preferable to administrative action but is pressing forward with its plans to regulate. See Limitation of Approval of Prevention of Significant Deterioration Provisions Concerning Greenhouse Gas Emitting-Sources in State Implementation Plans, 75 Fed. Reg. 82,536 (Dec. 30, 2010) (to be codified at 40 C.F.R. pt. 52) (establishing rules for permitting GHG emissions for major new sources); Action to Ensure Authority to Issue Permits Under the Prevention of Significant Deterioration Program to Sources of Greenhouse Gas Emissions: Finding of Failure to Submit State Implementation Plan Revisions Required for Greenhouse Gases, 75 Fed. Reg. 81,874 (Dec. 29, 2010) (to be codified at 40 C.F.R. pt. 52) (establishing EPA process for reviewing GHG emissions impacts in permit renewals); see also John M. Broder, *E.P.A. Expected to Regulate Carbon Dioxide*, N.Y. TIMES, Feb. 19, 2009, at A15, available at <http://www.nytimes.com/2009/02/19/science/earth/19epa.html?pagewanted=all>.

134. The EPA’s “Cross-State Air Pollution Rule,” finalized in the summer of 2011, targets emissions of ozone precursors and fine particulates from power plants. Federal Implementation Plans: Interstate Transport of Fine Particulate Matter and Ozone and Correction of SIP Approvals, 76 Fed. Reg. 48,208 (Aug. 8, 2011) (to be codified at 40 C.F.R. pts. 51, 52, 72, 78, and 97). A few months before, the EPA had proposed new rules governing the emissions of mercury and other toxic pollutants from fossil-fueled power plants. See National Emission Standards for Hazardous Air Pollutants From Coal and Oil-Fired Electric Utility Steam Generating Units and Standards of Performance for Fossil-Fuel-Fired Electric Utility, Industrial-Commercial-Institutional, and Small Industrial-Commercial-Institutional Steam Generating Units, 76 Fed. Reg. 24,976 (May 3, 2011).

135. Sharon Terlep, *High Test: 54.5 MPG Cars Promise to Arrive by 2025*, WALL ST. J., July 28, 2011, at B.1. An earlier 2009 plan had sought more modest goals. The White House Office of the Press Secretary, *President Obama Announces National Fuel Efficiency Policy*, THE WHITE HOUSE (May 19, 2009), http://www.whitehouse.gov/the_press_office/president-obama-announces-national-fuel-efficiency-policy/.

percent (2.2 million barrels per day).¹³⁶ Indeed, the Union of Concerned Scientists believes these standards could reduce greenhouse gas emissions by more than 10%.¹³⁷ In 2009, the Administration proposed limits on greenhouse gas emissions from stationary sources as well,¹³⁸ and the Department of Energy has continued to seek improved appliance efficiency standards.¹³⁹

Energy bills introduced by the Democratic majority during the 111th Congress represented by far the most comprehensive and fundamental attempt at regulatory reform in quite some time. In the summer of 2009, the House of Representatives passed House Bill 2454, the American Clean Energy and Security Act of 2009, also known as the "Waxman-Markey" bill.¹⁴⁰ Among other things, the bill

- established a national RPS effective in 2012 (with an ultimate goal of requiring utilities to secure 20% of their electricity from renewable sources by the year 2020),¹⁴¹
- required the EPA Administrator to promulgate regulations creating a marketable permit system for GHG emissions effective in 2012 (with an ultimate goal of reducing emissions to 17% of 2005 levels by the year 2050),¹⁴²
- required a 65% reduction in carbon dioxide emissions from electric generating units by 2020,¹⁴³
- authorized the EPA Administrator to establish GHG emissions standards for new heavy-duty vehicles,¹⁴⁴ and

136. *Driving Efficiency: Cutting Costs for Families at the Pump and Slashing Dependence on Oil*, THE WHITE HOUSE, <http://tinyurl.com/3opytg3> (last visited Oct. 22, 2011).

137. That is, by about 190 million metric tons of carbon dioxide equivalent, as against annual emissions of just over one billion metric tons. Press Release, Union of Concerned Scientists, House Energy Bill Analysis (Dec. 5, 2007), *available at* <http://www.commondreams.org/news2007/1205-23.htm>.

138. Prevention of Significant Deterioration and Title V Greenhouse Gas Tailoring Rule, 74 Fed. Reg. 57,126 (Nov. 4, 2009).

139. Press release, U.S. Dep't of Energy, Secretary Chu Announces More Stringent Standards for Home Water Heaters and Other Heating Products (Apr. 1, 2010), *available at* http://apps1.eere.energy.gov/news/news_detail.cfm/news_id=17429.

140. H.R. 2454, 111th Cong. (2009). The named sponsors are Congressman Henry Waxman of California and Congressman Ed Markey of Massachusetts.

141. *Id.* § 101(d)(1)-(2).

142. *Id.* § 311.

143. *Id.* § 116.

144. *Id.* § 821.

- authorized the Secretary of Energy to establish national building code energy efficiency targets and to oversee a program of peak demand reduction for electric utilities.¹⁴⁵

For its part, the Senate took no final action on energy legislation in the 111th Congress. The bill that garnered the most attention was Senate Bill 1733, the Clean Energy Jobs and American Power Act, also known as the “Kerry-Boxer” bill.¹⁴⁶ Kerry-Boxer was never reported out of committee in the Senate, and the Waxman-Markey bill (which passed narrowly in the House) was pronounced dead on arrival in the Senate by various commentators.¹⁴⁷ During the spring of 2010, a bipartisan group of three senators—known as the “Gang of Three”—worked to reconfigure the bill so as to increase its chances of Senate passage.¹⁴⁸ However, even that resuscitation effort seemed to fail when Senate Majority Leader Harry Reid announced in August 2010 that he had abandoned efforts to pass a comprehensive bill in the Senate.¹⁴⁹ Comprehensive energy legislation has not been pursued in any serious way by the 112th Congress, perhaps reflecting majority opposition in the Republican-controlled House of Representatives.

III. THE POLITICAL LOGIC OF ENERGY POLICY REFORM

If the benefits of energy policy reform exceed the costs, as many seem to believe, why has fundamental reform eluded the government’s grasp so far? Have voters failed to recognize the

145. *Id.* § 201.

146. S. 1733, 111th Cong. (2009). The named sponsors are Senator John Kerry of Massachusetts and Senator Barbara Boxer of California. Kerry-Boxer would impose many of the same new requirements as Waxman-Markey, with a few differences. For example, it did not contain a national RPS.

147. Harry Fuller, *Repubs Say the Waxman-Markey Bill Is DOA in Senate*, *GreenTech Pastures*, ZDNET (June 28, 2009, 4:32 PM), <http://www.zdnet.com/blog/green/repubs-say-the-waxman-markey-bill-is-doa-in-senate/5667>.

148. Those senators were Republican Lindsey Graham of South Carolina, Independent Joe Lieberman of Connecticut, and Democrat John Kerry of Massachusetts. Joe Walsh, *Kerry and Graham Renew Bipartisan Energy on Climate Bill*, RED GREEN AND BLUE (Jan. 26, 2010), <http://tinyurl.com/yb2br85>.

149. On August 2, 2010, Reid abandoned an effort to pass a watered-down bill that would have addressed energy efficiency and various issues associated with the Deepwater Horizon disaster, but which omitted provisions curbing greenhouse gas emissions or establishing a national RPS. David M. Herzehorn, *Energy Bill a No Go in the Senate*, *The Caucus*, N.Y. TIMES, Aug. 3, 2010, 7:39 PM, <http://thecaucus.blogs.nytimes.com/2010/08/03/energy-bill-a-no-go-in-the-senate/?partner=rss&emc=rss>.

benefits of reform? Has Congress failed to translate voter preferences into policy decisions? Has it instead responded to powerful business interests at the expense of the public?

A. The Logic of Legislative Action

Political science literature offers some insight into these questions. Like legal scholarship, political science has been affected profoundly by the debate between economists' rational actor model of human behavior and competing models arising out of behavioral and evolutionary psychology. Both perspectives have something to say about the politics of energy reform, and together they suggest an explanation for Congress's inability to enact comprehensive energy policy reform to date.

It is commonplace in rational actor analyses of congressional behavior to begin with two generally accepted premises. The first is that members of Congress are motivated by a mixture of goals, but the desire to be reelected is preeminent among them.¹⁵⁰ Thus, legislators may seek particular policy goals, prestige, career advancement within the institution, etc.; however, in order to accomplish any of these goals, a legislator must remain in office.¹⁵¹ The second premise is that voters are rationally ignorant; that is, they remain relatively uninformed about most policy decisions.¹⁵² It is rational for voters to be relatively less informed about policy choices because they lack the time, resources, and (sometimes) inclination to become fully informed. Therefore, they delegate the process of making informed decisions to their elected representatives. If legislators act as good Burkean trustees,¹⁵³ the legislature ought to

150. This is the working assumption of most Congressional scholars in political science. See generally DAVID MAYHEW, *CONGRESS: THE ELECTORAL CONNECTION* (2d ed. 2004) (often credited as the best argument for this working assumption).

151. RICHARD F. FENNO, JR., *HOME STYLE: HOUSE MEMBERS IN THEIR DISTRICTS* 137 (1978).

152. Economist Anthony Downs popularized this notion. See generally ANTHONY DOWNS, *AN ECONOMIC THEORY OF DEMOCRACY* (1957).

153. The British philosopher Edmund Burke is credited with first articulating this model of representation: namely, the elected representative as trustee making decisions on behalf of constituents, rather than acting on their specific instructions. Edmund Burke, *Speech at the Conclusion of the Poll 3 November 1774*, in 3 *THE WRITINGS AND SPEECHES OF EDMUND BURKE* 63, 68–70 (W. M. Elofson with John A. Woods eds., 1996).

produce decisions that reflect the wishes of the fully informed median voter.¹⁵⁴

From these two propositions we can deduce some important conclusions about how individual legislators make policy choices. The first conclusion is obvious: if a legislator's first goal is reelection, then calculations of the electoral risk associated with different courses of action will drive the initial stages of the legislator's decision making process. Political scientists distinguish between the legislator's "geographical constituency" and her "reelection constituency,"¹⁵⁵ and it is the latter to which the legislator must attend to preserve her job.¹⁵⁶

At the same time, rational ignorance complicates the legislator's choice. Legislators know that voters do not care about all issues equally. Therefore, for each policy choice a legislator faces, including questions of energy policy reform, she must try to anticipate the electoral risk of her action alternatives.¹⁵⁷ That calculation, in turn, will depend upon several factors:

- The *electoral vulnerability* of the legislator (the safety of the legislator's seat and the reservoir of trust, or "leeway,"¹⁵⁸ the legislator has developed among her reelection constituency).

154. That is, if we assume that preferences over policy alternatives can be represented as points distributed along a single dimension (i.e., points on a line), some voters (and legislators) will have preferences, represented by points in either tail of the distribution, while others will have preferences represented by points near the center or middle of the distribution. One voter's preference will be represented by the median point in the distribution. We call this person the median voter. To suggest that the legislative choice should reflect the preferences of the fully informed median voter is to propose an economic description of the Burkean concept of representation. See FENNO, *supra* note 151.

155. FENNO, *supra* note 151, at 8; see also, GARY C. JACOBSON, *THE POLITICS OF CONGRESSIONAL ELECTIONS* 63–64 (7th ed. 2009) (describing the central task of congressional candidates: namely, to decide which parts of a heterogeneous constituency to write off, which to court, and how to reach the latter group).

156. This is because constituents will base their voting decisions in part on their retrospective evaluations of candidates' performance in office. See R. DOUGLAS ARNOLD, *THE LOGIC OF CONGRESSIONAL ACTION* (1990); WILLIAM T. BIANCO, *TRUST: REPRESENTATIVES AND CONSTITUENTS* (1994); MORRIS P. FIORINA, *RETROSPECTIVE VOTING IN AMERICAN NATIONAL ELECTIONS* (1981).

157. Arnold notes that a vote can rouse the "attentive public," a risk to which legislators must constantly attend. ARNOLD, *supra* note 156, at 64–68.

158. If the legislator enjoys the support of a very large majority of her constituents, she may have "leeway" to vote against their interests or preferences. That reserve of leeway can dwindle if she does so too often. BIANCO, *supra* note 156, at 79–80.

- The legislator’s perception of how *salient* the issue is to voters—i.e., how much voters know about the issue, and how likely it is that voters will become aware of the legislator’s choice.¹⁵⁹
- The legislator’s perception of voters’ *preference intensity*—i.e., the importance of the issue to voters relative to other issues on which the legislator has taken a position.
- The *traceability* of the consequences of the vote, both negative (the risk of blame) and positive (the ability to claim credit),¹⁶⁰ which in turn is partly a function of the issue’s salience and other factors.

Thus, if the legislator faces no electoral risk of any kind—because her seat is safe, and/or few if any constituents care about the issue now or are likely to care later—the legislator is free to vote as she wishes without electoral consequence. At the other extreme, when electoral risk is high—because the issue is highly salient or important to all voters, and the legislator’s seat is not safe—the legislator’s choice should reflect the preferences of the median voter in her constituency.¹⁶¹ For example, Figure 1 depicts two possible distributions of constituent preferences: one approximates a normal distribution, and the other is bimodal.¹⁶² In both of these two hypothetical examples, the median voter’s (MV) position is the same;

159. The term “salient” is sometimes used in ways that conflate the notions of voter awareness and preference intensity, as in the sentence “Abortion policy is highly salient to right-to-life organizations.” I will use the term to refer to the level of current or likely future voter awareness of an issue or policy choice. I use the term “preference intensity” to refer to the issue of how much voters care about the issue.

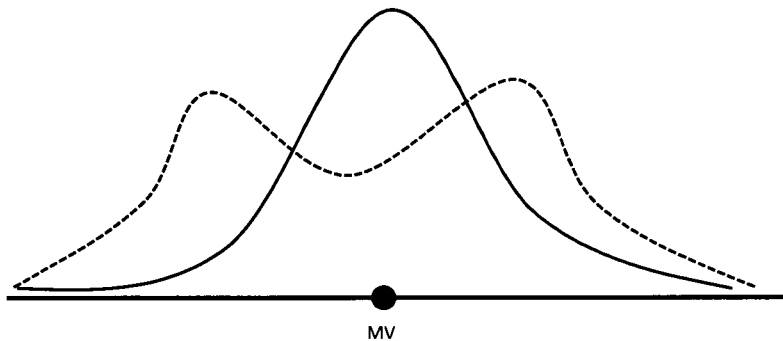
160. See ARNOLD, *supra* note 156, at 47; FENNO, *supra* note 151, at 141–46.

161. In the linear model of voter position discussed earlier, *supra* note 154, and represented in Figure 1, we are assuming that each *individual* voter and each politician has a utility distribution that is at its highest point at the voter’s/politician’s ideal policy choice (her ideal point), and that individual utility over other choices falls as the distance between the individual’s ideal point in the policy choice grows. In the parlance of spatial modeling, we assume that individual preferences here are “single peaked”; collective preferences need not be single-peaked in order for the collective (in this case, say, a legislature) to make a rational choice. See *supra* text accompanying notes 153–154; *infra* Figure 1.

162. This figure depicts the distribution of voters corresponding to preferences at each point on the line. Thus, collective preferences need not be single-peaked. In this depiction, we inferred that the legislator chooses the median voter’s ideal point in order to maximize her chances of reelection.

we might assume in this simple example that the legislator (L) seeking reelection will be motivated to adopt the median voter's position.

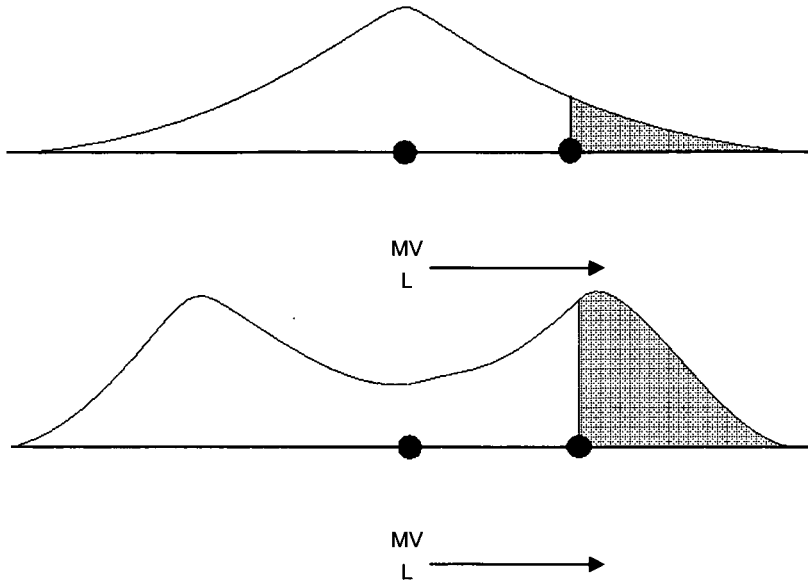
Figure 1: Two Potential Distributions of Voter Opinion in a Hypothetical Legislative District



However, in between these two extremes lies the far more interesting and common situation in which the legislator faces some electoral risk because the issue is salient and important to some voters but not others, and/or because some voters might become unhappy with the legislator's choice later ("traceability"). In these situations, legislators might pursue their electoral goals by choosing policies that serve the interests of an attentive minority for whom the issue is particularly salient or important, at the expense of the remaining constituents' (and the median constituent's) preferences.¹⁶³ Figure 2 depicts situations like this. In Figure 2, the shaded portions of the diagram represent voters to whom the policy issue at stake is more salient or more important; we might call these voters "high demanders" on this issue. Presumably, these high demanders are more likely to base their votes for or against the legislator at the next election on how the legislator votes on this policy issue in Congress. In that situation, it is rational for the legislator to move to a position that lies somewhere within the shaded portion of the diagram.

163. ARNOLD, *supra* note 156, at 82-87.

Figure 2: Legislator's Choice When Salience and/or Preference Intensity Differs Among Voters



Social scientists have long argued that the wealthy and business groups benefit from this phenomenon, exerting disproportionate influence over the policy process. Speaking long ago about the role of interest group pressure in the policy process, political scientist E.E. Schattschneider said, "The flaw in the pluralist heaven is that the heavenly chorus sings with a strong upper-class accent. Probably about 90 per cent of the people cannot get into the pressure system."¹⁶⁴ Economist Mancur Olson offered a logical explanation for this perception, arguing that small, organized groups face fewer transaction costs when organizing and have more to gain from organizing to pressure government;¹⁶⁵ hence, they will have an easier

164. E.E. SCHATTSCHNEIDER, *THE SEMISOVEREIGN PEOPLE: A REALIST'S VIEW OF DEMOCRACY IN AMERICA* 35 (1960).

165. MANCUR OLSON, JR., *THE LOGIC OF COLLECTIVE ACTION: PUBLIC GOODS AND THE THEORY OF GROUPS* 141-46 (Schocken Books 1968) (1965). Olson's work gave birth to a huge literature that conceptualized interest group activity and the regulatory process as a prisoner's dilemma game, one in which members of groups representing diffuse interests have much more of a temptation to free ride than members of groups representing tightly organized

time being heard by government officials.¹⁶⁶ When legislators attend to the interests of these highly motivated, better informed minorities, Congress can produce decisions that deviate from majority opinion or from the fully informed preferences of the median voter.

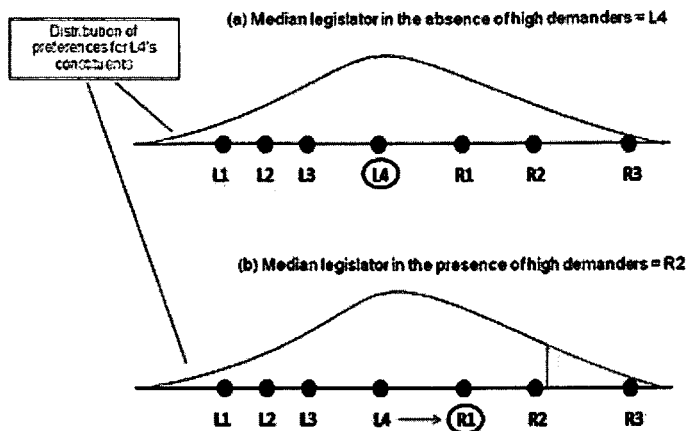
Figure 3 depicts one way in which the presence of high demanders can alter legislative choice. Assume in this legislature that there are seven members: four belong to the Left Party, and three to the Right Party. Imagine that each legislator's position on the policy continuum represents the position of the median voter in his or her district. That is, we might imagine seven distributions of voter preferences—one for each legislator's district—surrounding each legislator's position on the policy continuum. In panels (a) and (b) of Figure 3, the distribution of preferences for legislator L4's constituents are shown. Assuming relatively weak parties,¹⁶⁷ if the issue is equally salient and important to all constituents, L4 will be the median voter in this legislature, and her position should prevail. This is the situation depicted in panel (a). However, if L4's constituency includes high demanders, as depicted in panel (b), those high demanders move L4, making R1 the new median voter within the legislature.

interests, further exacerbating the underrepresentation of nonbusiness interests. Two good post-Olsonian examinations of Olson's ideas are RUSSELL HARDIN, *COLLECTIVE ACTION* (1982) and TODD SANDLER, *COLLECTIVE ACTION: THEORY AND APPLICATIONS* (1992).

166. OLSON, *supra* note 165, at 33–34.

167. In this context the term “weak parties” means that the party in the legislature exerts no voting discipline over its members. If parties were strong enough to determine and enforce a party position on an issue, the majority party (the Left Party, in this example) might select a favorite party position at, say, L3, and all four members of the left party might vote for that policy. The assumption of weak parties, as used here, eliminates that possibility and hypothesizes that legislators will vote in accordance with the preferences of their median constituent in the absence of high demanders.

Figure 3: Legislative Choice in 2-Party Legislature (weak parties)



In this way, organized interests can exert outsized influence over legislative choices. However, we know from experience that sometimes these organized interests can be overcome. The history of American environmental law has seen so-called “republican moments”—instances in which the broad interest in environmental protection has overcome powerful, organized interests to produce national legislative victories.¹⁶⁸ A series of republican moments produced one major piece of environmental legislation after another during the 1970s.¹⁶⁹ These republican moments benefited from

168. This idea comes from James Gray Pope, *Republican Moments: The Role of Direct Popular Power in the American Constitutional Order*, 139 U. PA. L. REV. 287 (1990). Dan Farber adapted it to environmental politics in Daniel A. Farber, *Politics and Procedure in Environmental Law*, 8 J.L. ECON. & ORG. 59, 60 (1992).

169. Indeed, for this reason, the 1970s (or, more accurately, the period running from 1969 through 1980) is sometimes referred to as “the environmental decade.” See, e.g., LETTIE M. WENNER, *THE ENVIRONMENTAL DECADE IN COURT* (1982). In addition to the Clean Air Amendments of 1970, Pub. L. No. 91-604, 84 Stat. 1676 (codified as amended at 42 U.S.C. §§ 7401–77671q (2006)) and the Federal Water Pollution Control Act Amendments of 1972, Pub. L. No. 92-500, 86 Stat. 816 (codified as amended at 33 U.S.C. §§ 1251–1387 (2006)), several other foundational environmental laws were enacted during this period, including the Endangered Species Act of 1973, Pub. L. No. 93-205, 87 Stat. 884 (codified as amended at 16 U.S.C. §§ 1531–1544 (2006)), the Resource Conservation and Recovery Act of 1976, Pub. L. No. 94-580, 90 Stat. 2795 (codified as amended at 42 U.S.C. § 6901 (2006)), the Toxic Substances Control Act, Pub. L. No. 94-469, 90 Stat. 2003 (codified as amended at 15 U.S.C. §§ 2601–2692 (2006)), and the Comprehensive Environmental Response, Compensation and Liability Act of 1980, Pub. L. No. 96-510, 94 Stat. 2767, 42

changes during the 1960s in three of the four elements of electoral risk outlined above. First, the growth of mass media and popularization of the science of ecology¹⁷⁰ helped make environmental issues more salient to the general public. Second, according to public opinion polling, people cared about environmental protection more than ever before (preference intensity).¹⁷¹ Third, voters ascribed to Congress the power and responsibility to remedy the problem, since neither states¹⁷² nor courts¹⁷³ had been able to do so (traceability). In this setting, members of Congress acted as political entrepreneurs, concluding that it was to their political advantage to respond to this groundswell.

It may also be that these kinds of political choices are about more than mere logical calculation. They are also about voters' emotional attachments to favored positions or policies and *rationalization*: the brain's ability to conflate one's self-interest with one's idea of what is best or right.¹⁷⁴ Behavioral psychologists have documented how various psychological "biases" can distort our

U.S.C. §§ 9601–9675 (2006), better known as "CERCLA" or "Superfund."

170. Rachel Carson's seminal best-seller, *Silent Spring*, was probably the best known popularization of the ecological framework. RACHEL CARSON, *SILENT SPRING* (1962).

171. For a good summary of how the public mobilized to support environmental legislation in the early 1970s, see Michael E. Kraft & Norman J. Vig, *Environmental Policy from the 1970s to the 1990s: Continuity and Change*, in ENVIRONMENTAL POLICY IN THE 1990S: TOWARD A NEW AGENDA 3 (Norman J. Vig & Michael E. Kraft eds., 2d ed. 1994).

172. For a summary of state and local efforts to regulate air emissions prior to the Clean Air Act, see PETER S. MENELL & RICHARD B. STEWART, ENVIRONMENTAL LAW AND POLICY 241–48 (1994).

173. Perhaps the quintessential example of the inability or unwillingness of courts to provide a comprehensive solution to pollution problems is found in *Boomer v. Atlantic Cement Co.*, 257 N.E.2d 870 (N.Y. 1970), in which the New York Court of Appeals refused to enjoin pollution from a cement plant, noting:

A court performs its essential function when it decides the rights of parties before it. Its decision of private controversies may sometimes greatly affect public issues. . . .

Effective control of air pollution is a problem presently far from solution

A court should not try to do this on its own as a by-product of private litigation and it seems manifest that the judicial establishment is neither equipped in the limited nature of any judgment it can pronounce nor prepared to lay down and implement an effective policy for the elimination of air pollution. This is an area beyond the circumference of one private lawsuit.

Id. at 871.

174. MAX H. BAZERMAN & ANN E. TENBRUNSEL, BLIND SPOTS: WHY WE FAIL TO DO WHAT'S RIGHT AND WHAT TO DO ABOUT IT 72–76 (2011).

ability to gather information and make choices dispassionately and objectively.¹⁷⁵ Indeed, long before behavioral psychology emerged as a discipline, James Madison understood the power of rationalization in politics, noting that "[a]s long as the connection subsists between [man's] reason and his self-love, his opinions and his passions will have a reciprocal influence on each other."¹⁷⁶ Thus, it is not simply that we voters (and interest groups and firms) want what we want; we also interpret the world in ways that justify what we want. Most of this rationalization happens on a subconscious level.¹⁷⁷ Therefore, when business groups pull their legislator away from the median voter's position, neither they nor the legislator see it as a subversion of the public interest. Rather, both groups rationalize the choice as the "best" possible choice for all concerned. The same can be said for republican moments. The environmental movement of the 1960s and 70s was motivated not only by logic and science, but also by emotion, moral certainty, and passion.¹⁷⁸ Political entrepreneurs (politicians and lobbyists) aroused that passion. Indeed, political entrepreneurs are particularly adept at understanding and influencing the way voters perceive issues and constructing appeals that lead voters toward some positions and away from others.¹⁷⁹ This is part of what republican moments are about: not merely the *education* of

175. The so-called "confirmation bias," in particular, can lead voters to seek out information (and interpret information) so as to confirm their predispositions or beliefs. See generally, SCOTT PLOUS, *THE PSYCHOLOGY OF JUDGMENT AND DECISION MAKING* (1993); Raymond S. Nickerson, *Confirmation Bias: A Ubiquitous Phenomenon in Many Guises*, 2 REV. GEN. PSYCHOL. 175 (1998).

176. THE FEDERALIST NO. 10, at 78 (James Madison) (Clinton Rossiter ed., 1961).

177. In the words of cognitive psychologist Steven Pinker:

Some debates are so entwined with people's moral identity that one might despair that they can ever be resolved by reason and evidence. Social psychologists have found that with diverse moral issues, especially those on which liberals and conservatives disagree, all combatants are intuitively certain that they are correct and that their opponents have ugly ulterior motives. They argue out of respect for the social convention that one should always provide reasons for one's opinions, but when an argument is refuted, they don't change their minds but work harder to find a replacement argument.

STEVEN PINKER, *THE BLANK SLATE: THE MODERN DENIAL OF HUMAN NATURE* 281 (2002).

178. See e.g., JOHN S. DRYZEK, *THE POLITICS OF THE EARTH: ENVIRONMENTAL DISCOURSES* 27-50, 183-202 (2d ed. 2005).

179. This may be what Henry Adams meant when he defined politics as "the systematic organization of hatreds." HENRY ADAMS, *THE EDUCATION OF HENRY ADAMS* 7 (1918). It may also be what Sir Lewis Namier had in mind when he said that "what matters most about political ideas is the underlying emotions, the music to which ideas are a mere libretto, often a very inferior quality." SIR LEWIS NAMIER, *PERSONALITIES AND POWERS* 4 (1955).

voters, but the *activation* of voters' interest and passion about the problem the regulatory legislation seeks to address.

Why, then, haven't the efforts of today's political entrepreneurs to activate the greater mass of voters in favor of fundamental energy policy reform borne more fruit? If climatologists are correct that the earth is warming, that human activity is significantly contributing to that warming, and that this poses a significant risk to human welfare, why are average voters so much less united in support of those same propositions?¹⁸⁰ If most economic analyses suggest that the costs of continuing to consume fossil fuels at current rates (in terms of energy security, climate change, etc.) are likely to be large, and likely to exceed the costs of combating climate change, why hasn't Congress enacted major energy policy reform? The short answer is that both the issue environment and the political environment are different and less supportive of a republican moment now than in the 1970s. Organized interests have more at stake now, and the central issues in the energy policy debate are more complex, both technically and politically. Consequently, a republican moment in favor of energy policy reform in 2010 is more difficult to achieve.

B. Organized Interests and Energy Policy Reform

Obviously, energy policy reform threatens well-heeled, well-organized, and powerful business interests. The central provisions of

180. Indeed, the relative apathy and division that characterizes American opinion on climate change issues stands in stark contrast to the relative unity among climatologists. Polling data seem inconclusive on these issues. In a 2009 poll, Americans were asked, "Do you believe climate change is a major threat, a minor threat, or no real threat?" Fifty-eight percent responded that it was either a minor threat or no threat at all. *Environment*, POLLINGREPORT.COM, <http://www.pollingreport.com/enviro.htm> (last visited Sept. 23, 2011). In another poll, only thirty-six percent of Americans attributed global warming to human activity, and less than half had heard of "cap and trade" schemes being proposed to address it. Press Release, The Pew Research Center, Fewer Americans See Solid Evidence of Global Warming 2-3 (Oct. 22, 2009), available at <http://people-press.org/2009/10/22/fewer-americans-see-solid-evidence-of-global-warming>. On the other hand, polling by Stanford University's Jon Krosnick points toward majority American support for action to combat climate change, though that support does not approach the kind of consensus found in the scientific community. See Jon A. Krosnick, Op-Ed., *The Climate Majority*, N.Y. TIMES, June 8, 2010, at A25; see also Jon Krosnick, *Large Majority of Americans Support Government Solutions to Address Global Warming*, WOODS INST. FOR THE ENV'T (June 9, 2010), <http://woods.stanford.edu/research/americans-support-govt-solutions-global-warming.html>; *Environment*, POLLINGREPORT.COM, <http://www.pollingreport.com/enviro.htm> (last accessed Nov. 5, 2011) (the data assembled by PollingReport.com seems to support this kind of conceptual support for action).

the Waxman-Markey and Kerry-Boxer bills pose real risks for businesses in the oil and gas industry, the coal industry, the public utility industry, the automobile industry, and the real estate and homebuilding industries, among others. These industries know much more about energy policy reform than the average voter. More importantly, they have more at stake in this fight and have active lobbyists.¹⁸¹ An older EIA analysis estimated that reducing American greenhouse gas emissions to Kyoto levels would reduce coal-fired generation by about 50% because a sizable minority of existing coal-fired power plants would be unable to compete in electricity markets.¹⁸² That same analysis predicted about a 33% increase in electric rates (from 6.1 cents per kwh to 8.1 cents per kwh) were the United States to commit itself to meeting its greenhouse gas reduction commitments under the Kyoto accord.¹⁸³ A more recent analysis of the Waxman-Markey bill (which would have back loaded those costs to utilities by freely allocating pollution allowances in the early years of the program) projects only minimal electricity price increases at first, but ultimate increases of about 19% (above the reference case) by 2030.¹⁸⁴

Oil refineries would face similar costs. Many of these costs would be passed on to consumers. Expensive electricity or gasoline not only upsets consumers (read: voters), but also poses a risk to the already struggling American auto industry whose congressional representatives come from political swing states in the Midwest. Some fossil fuel companies have indicated that they would favor a carbon tax over Clean Air Act regulation or a marketable permit system,¹⁸⁵ but they prefer no emissions reductions at all.¹⁸⁶ Of course,

181. One article referred to the Waxman-Markey bill as a "Super Bowl" for lobbyists. Lisa Lerer & Erika Lovley, *Warming Bill the Super Bowl for Lobbyists*, POLITICO (June 4, 2008), <http://www.politico.com/news/stories/0608/10813.html>. One 2009 analysis indicated that in 2008 about fifteen percent of all Washington lobbyists were working on the subject of climate change. Marianne Lavelle, *The Climate Change Lobby Explosion*, CENTER FOR PUB. INTEGRITY (Feb. 24, 2009), <http://www.iwatchnews.org/node/4593>.

182. ENERGY INFO. ADMIN., U.S. DEP'T OF ENERGY, ANALYSIS OF STRATEGIES FOR REDUCING MULTIPLE EMISSIONS FROM ELECTRIC POWER PLANTS WITH ADVANCED TECHNOLOGY SCENARIOS, at xiv tbl.ES2 (2001), *available at* [http://www.eia.gov/oiaf/servicerpt/eppats/pdf/sroiaf\(2001\)05.pdf](http://www.eia.gov/oiaf/servicerpt/eppats/pdf/sroiaf(2001)05.pdf).

183. *Id.*

184. ENERGY INFO. ADMIN., U.S. DEP'T OF ENERGY, ENERGY MARKET AND ECONOMIC IMPACTS OF H.R. 2454, THE AMERICAN CLEAN ENERGY AND SECURITY ACT OF 2009, at 36-48 (2009), *available at* <http://www.eia.doc.gov/oiaf/servicerpt/hr2454/index.html>.

185. *See Opinion Leaders*, CARBON TAX CENTER (May 11, 2009), <http://>

these interests perceive mandatory greenhouse gas emissions reductions as a threat regardless of the regulatory instrument used to pursue that goal.

The Waxman-Markey bill's proposal for a national RPS also has opponents. Some claim that the RPS would lead to a rise in retail electricity prices for many customers, not only because renewable sources of electricity are more expensive, but also because of the need for new high-voltage transmission lines.¹⁸⁷ For its part, the EIA does not project increases in the national average electricity price from a national RPS until after the year 2020, with "peak effects" on national average prices remaining below three percent.¹⁸⁸ The EIA's analysis of the Waxman-Markey bill projects that it would produce significant increases in renewable resources, increases that would come at the expense of natural gas and coal generation, threatening the coal and gas value chains.¹⁸⁹ Not surprisingly, representatives of coal and gas interests oppose the bill, arguing that it will increase energy costs¹⁹⁰ and could lead to job losses that would far

www.carbontax.org/who-supports/opinion-leaders (quoting past statements supportive of a carbon tax from CEOs of Exxon-Mobil, Sempra, Dynegy, and Duke Energy).

186. Greg Pullian, *The Advantages of a Revenue-Neutral Carbon Tax for Emissions Reduction*, 3 LAMP 25–26 (2009), available at http://www.exxonmobil.com/corporate/files/news_pub_lamp_2009-3.pdf (Exxon Mobil Vice President of Environmental Policy and Planning proposing that the carbon tax rate be "updated periodically based on actual performance versus the emissions goals established by policy makers").

187. PATRICK SULLIVAN ET AL., NAT'L RENEWABLE ENERGY LAB., COMPARATIVE ANALYSIS OF THREE PROPOSED ELECTRICITY STANDARDS 5 (2009), available at <http://www.nrel.gov/docs/fy09osti/45877.pdf>. Proponents have disputed this claim, however, and insist that transmission would be much less of an issue for biomass power development in the South, which would either require no new infrastructure or involve shorter distances, smaller volumes, and lower costs than that which could be required for, for example, remote farm locations in the Midwest. FRED SISSINE, CONG. RESEARCH SERV., RL 34116, RENEWABLE ENERGY PORTFOLIO STANDARD (RPS): BACKGROUND AND DEBATE OVER A NATIONAL REQUIREMENT 8–9 (2007), available at http://assets.opencrs.com/rpts/RL34116_20071205.pdf.

188. See U.S. DEP'T OF ENERGY, ENERGY INFO. ADMIN., IMPACTS OF A 25-PERCENT RENEWABLE ELECTRICITY STANDARD AS PROPOSED IN THE AMERICAN CLEAN ENERGY AND SECURITY ACT, at v–vi (2000) (discussion draft).

189. *Id.* at v.

190. The EIA has indicated that a national RPS would have only a moderate effect on average prices, adding less than two cents per kwh to rates. ENERGY INFO. ADMIN., U.S. DEP'T OF ENERGY, IMPACTS OF A 15-PERCENT RENEWABLE PORTFOLIO STANDARD, at v (2007), available at <http://www.eia.doe.gov/oiaf/servicert/prps/index.html>. However, this mean effect may belie widely varying effects in different parts of the country; in most places, two cents per kwh represents a fifteen to thirty percent increase in electricity rates. The U.S. Department of Energy's Green Power Network publishes an index of the premiums

outnumber any jobs created to meet a government-mandated RPS.¹⁹¹ If members of Congress suspect that their constituents are unwilling to pay two cents more per kwh for electricity, they are unlikely to support a national RPS.

Politicians from the southeastern United States argue further that a national RPS represents a wealth transfer from "renewable resource poor" parts of the country (largely in the Southeast) to renewable resource rich parts of the country (the windy plains and coasts, and the sunny Southwest).¹⁹² This argument is not terribly compelling because the status quo benefits states that are blessed with natural deposits of fossil fuels or that chose to shift environmental costs to the rest of us by burning those fuels.¹⁹³ Nonetheless, the fact remains that legislators from the southeastern United States appear to see the national RPS as threat to their constituents, and they oppose it.

Certainly, the legislative process to date reflects the impact of industry and regional opposition to fundamental energy policy reform. During early consideration of the Waxman-Markey bill, Republicans in the Energy and Commerce Committee offered more than 400 amendments in an unsuccessful attempt to kill the bill. Energy industry lobbyists secured the removal of the original provision requiring that 100% of the tradable greenhouse gas emissions permits be auctioned off to industry; that provision was replaced by one calling for (mostly) free distribution of permits. For its part, the Kerry-Boxer bill did not include provision for a national

electric utilities charge for renewable power in various states. While these data do not measure the overall cost impacts of an RPS, they do seem to reflect a larger than two cents per kwh premium for renewable power in some parts of the country. See U.S. Dep't of Energy, *GREEN Pricing Utility Programs by State*, GREEN POWER NETWORK (Dec. 16, 2010), <http://apps3.eere.energy.gov/greenpower/markets/pricing.shtml?page=1>.

191. 110 CONG. REC. H9849, 9851 (daily ed. Aug. 4, 2007).

192. Specifically, they have claimed that a renewables standard would "create hardship for states and regions with low amounts of renewable resources . . ." These opponents have cited the southeastern states as an example, claiming that even though these states are producing some biomass power technologies, these technologies are "not yet ready for commercial use." SISSINE, *supra* note 187, at 8-10, 12.

193. That is, there is no inherent justice in the status quo, and no inherent injustice in a policy change that alters that status quo. Second, even if the southeastern states cannot exploit solar and wind resources, they have an ample supply of biomass, which qualifies as a renewable resource under the national RPS provisions contained in the Waxman-Markey bill. H.R. 2454, 111th Cong. § 126 (2009).

RPS at all, in part because of opposition of southeastern state senators.

Consequently, the Kerry-Boxer bill was stalled in the Senate in October of 2009 when the “Gang of Three” Senators Kerry and Graham (not yet joined by Lieberman) first announced their plans to seek the sixty votes needed to force a climate bill onto the Senate floor. They indicated that they would include additional nuclear power incentives and domestic drilling provisions in their proposed legislative language to “win over undecided Democrats and at least a handful of Republicans.”¹⁹⁴ They apparently also included provisions allocating funding for carbon sequestration technology (to appease Democrats from states that produce or use large amounts of coal)¹⁹⁵ and lowered the greenhouse gas emissions reduction requirements below those proposed in the Kerry-Boxer bill, in part to appease Senator Max Baucus (D-Mont.), who had voted against Kerry-Boxer in committee.¹⁹⁶ Other concessions included exempting the oil industry from cap-and-trade regulation and instead subjecting transportation fuels to a carbon tax,¹⁹⁷ and delaying the imposition of cap-and-trade requirements on manufacturers.¹⁹⁸ In making these changes, the Gang of Three’s goal seems to have been to win business and regional support or to reduce business and regional opposition to this legislation.¹⁹⁹

194. Dean Scott, *Kerry Sees Delay in Unveiling Framework; Murkowski Ponders “Net Zero” Carbon Tax*, 40 ENVTL. REP. CURRENT DEV. 2755, 2756 (2009).

195. Coral Davenport, *Climate Bill Advances in GOP’s Absence*, 2009 CQ WEEKLY 2594, available at <http://library.cqpress.com.ezproxy.lib.utexas.edu/cqweekly/weeklyreport111-000003243411>.

196. Leora Falk, *Senators Seek 17 Percent Emissions Cut, Support for Nuclear Power in Compromise*, 40 ENVTL. REP. CURRENT DEV. 2814, 2815 (2009).

197. While oil companies have fiercely opposed any new regulations or fees, “they like that as an industry they will not be hit with new production fees, since the cost will go directly to consumers.” Coral Davenport, *A Plan Designed to Stem Opposition*, 2010 CQ WKLY. 976.

198. *Id.* This concession was sought by the National Association of Manufacturers and Rust Belt lawmakers. The National Association of Manufacturers had earlier issued an analysis of the Waxman-Markey bill that had predicted it would reduce American GDP levels by as much as 2.4 % (or \$571 billion). AM. COUNCIL FOR CAPITAL FORMATION & NAT’L ASS’N OF MFRS., ANALYSIS OF THE WAXMAN-MARKEY BILL 4 (2009), available at http://www.accf.org/media/dynamic/3/media_387.pdf. Still, Rust Belt Democrats want an even better deal and have indicated that their support for the delayed cap-and-trade program is contingent upon other “sweeteners such as new government loans for clean energy technology manufacturing, cost-containment measures for manufacturers facing higher energy bills, and the creation of a ‘carbon tariff’ imposing fees on imported goods from countries that don’t regulate carbon pollution.” Davenport, *supra* note 197, at 977.

199. As Senator Graham said, “At the end of the day, if the environmental policies we are

The energy industry may have another reason to be even more determined in its opposition to current energy legislation now than it was to energy and environmental legislation in the 1970s. In the era before restructuring of gas and electricity markets, gas and electric utilities were much more vertically integrated than they are now, and most of the costs imposed on the gas and electric utility industry by statutes like the NGPA, PURPA, the Clean Air Act, and the Clean Water Act were recoverable from their customers through rates.²⁰⁰ Wholesale and retail electric rates were set by regulators (the Federal Energy Regulatory Commission and state PUCs, respectively); these agencies permitted utilities to recover fuel and regulatory costs from their customers.²⁰¹ Consequently, while price increases back then might have led to some conservation and fuel switching, individual companies had no need to fear widespread loss of customers as a result of these policy changes. By contrast, today's energy utilities face a much less secure environment. As described above in Part I, wholesale sellers (and some retail sellers) now compete for customers and sell their energy at market rates. Companies whose electric generation mix is heavily dependent upon coal will be hit harder by greenhouse gas emissions regulation. We can expect those companies to be doubly nervous about energy policy reform.

C. The Issue Environment and Party Politics

Irrespective of the strength and determination of the opponents of reform, the question remains why pro-reform political entrepreneurs have not been better able to activate voters in support of reform. After all, the energy and environmental legislation of the 1970s also posed risks to the energy industry. By deregulating natural gas wellhead prices, the NGPA of 1978 posed a risk to gas utilities that the gas they purchased might become much more

seeking are not good for business, we will not get 60 votes." Falk, *supra* note 196, at 2815; see also Press Release, U.S. Senator Lindsey Graham, Graham on Energy Independence and Climate Change (Jan. 27, 2010), available at <http://tinyurl.com/yjgall9>.

200. Fuel costs are routinely passed through in traditional rate cases. Investments in technology to comply with environmental regulation are part of the utility's "rate base," the capital investment on which it is authorized to earn a fair return. Only investments which are deemed to be imprudently made are disallowed, and investments associated with mandatory environmental controls will always be considered prudent.

201. U.S. ENERGY INFO. ADMIN., DEP'T OF ENERGY, THE CHANGING STRUCTURE OF THE ELECTRIC POWER INDUSTRY (2000), available at http://www.eia.gov/cneaf/electricity/chg_stru_update/update2000.pdf.

expensive, and the price more volatile. Its companion, PURPA, posed a similar risk to electric utilities by requiring them to purchase power from new merchant electric generating plants. Likewise, the Clean Air Act increased the cost of exploiting fossil fuels for energy, and triggered stiff opposition from the energy industry. If that opposition could be overcome then, what makes the politics of energy policy reform today any different?

1. Technical complexity and salience

The technical complexity of the issues involved complicates the task of rallying mass support for reform and can make the current generation of environmental, energy security, and efficiency problems seem less salient. The energy and environmental legislation of the 1970s was aimed at problems that were, compared to the problem of climate change, relatively immediate and tractable. Politicians could make a relatively straightforward case to voters that passage of regulatory legislation would address easily identifiable harms of pollution or security of energy supply. Voters in the 1970s worried about the price of energy, but they worried far more about perceived threats to energy security or to health and the environment. When the Clean Air Act and Clean Water Act were enacted in the early 1970s, voters could see (and smell) the harm that the laws would avoid. Air pollution in cities was far worse than it is today. The Santa Barbara oil spill, the Cuyahoga River fire, and the “death” of Lake Erie, all represented tangible, immediate costs that voters wanted to avoid. Simultaneously, the oil shocks of the 1970s created real fears about energy security. These catalyzing events helped political entrepreneurs activate pro-reform voters and mobilize support for environmental and energy legislation of the 1970s.

Today’s political entrepreneurs have been attempting to use catalyzing events to mobilize support for fighting climate change and increasing energy security. Former Vice President Al Gore and the Intergovernmental Panel on Climate Change (IPPC) won (jointly) a Nobel Peace Prize for their efforts to educate the public about the risks associated with climate change.²⁰² The Pew Center for Climate Change and countless other nongovernmental organizations seek the

202. Walter Gibbs, *Gore Shares Peace Prize for Climate Change Work*, N.Y. TIMES, Oct. 13, 2007, at A1.

same goals. The sponsors of energy policy reform legislation in the House and Senate are political entrepreneurs as well. Despite these efforts, the political calculus remains difficult. The effects of climate change—receding polar ice caps and glaciers, and the threat of slowly rising sea levels—are important; but they are not nearly as immediate to most American voters as were the environmental problems voters faced in the 1970s. Moreover, climatologists do not agree on the nature and distribution of the likely impacts of climate change, their magnitude, the degree to which humans will be able to adapt in ways that minimize impacts, etc. Opponents of reform can exploit these divisions, portraying the science behind climate change as shaky or uncertain.²⁰³ Consequently, while opponents can make relatively confident and specific claims about the costs associated with greenhouse gas emissions limitations, efficiency codes, tighter CAFE standards, or a national RPS, proponents of reform cannot respond nearly as confidently or specifically about the costs of inaction.²⁰⁴

2. Traceability

During the 1970s, it was clear that the benefits of reform legislation would accrue mostly to Americans.²⁰⁵ Congress reasonably

203. Indeed, opponents have done just that, particularly in connection with a series of revelations in late 2009 and early 2010 which they called "climategate." These included revelations of errors in the most recent IPCC assessment and disclosure of embarrassing e-mails from a major climate research center. These revelations did not really undermine the scientific foundation of the case for anthropogenic-based global warming. In a recent edition of the journal *Science*, 255 members of the National Academy of Sciences published a letter addressing climategate, stating that

[T]here is nothing remotely identified in the recent events that changes the fundamental conclusions about climate change:

(i) The planet is warming due to increased concentrations of heat-trapping gases in our atmosphere [and]. . . .

(ii) Most of the increase in the concentration of these gases over the last century is due to human activities, especially the burning of fossil fuels and deforestation.

Jennifer Sills, ed., *Climate Change and the Integrity of Science*, 328 *SCIENCE* 689, 689 (2010). Nevertheless, climategate seems to have undermined public confidence in climate change science. The Climate Action Network, which follows public opinion polling data in the wake of climategate demonstrates this phenomenon. See *Tracking Public Attitudes About Climate Change—Latest Polls*, CLIMATE ACTION NETWORK (June 16, 2011), <http://www.usclimatenetwork.org/hot-topics/climate-polling>.

204. See MASTRANDREA, *supra* note 57, at 30–35 (discussing the effect of assumptions about adaptation on cost estimates).

205. Certainly, the Clean Air Act benefited Canadians by imposing emissions controls on midwestern American power plants. Furthermore, we were not certain of it at the time, but

expected then that most voters would see those benefits within their lifetimes.²⁰⁶ Thus, voters could expect not only to bear the costs of pollution control, but also to capture most of the benefits. Likewise, it was relatively easy for voters in 1978 to see how deregulating natural gas prices might lead to increases in supply and decreases in consumption, thereby alleviating the perceived natural gas shortage. It was easy to understand how PURPA's financial incentives for alternative energy projects might lead to a more diversified and efficient electricity supply. Consequently, legislators could take credit for addressing these problems and for any progress that could be traced back to those statutes. Indeed, as it happened, most of these statutes produced results relatively quickly. The deregulation of natural gas prices rebalanced gas markets by increasing supply and reducing demand far more quickly than legislators expected.²⁰⁷ The Clean Air Act and the Clean Water Act represent enormous success stories, having drastically reduced air and water emissions in real terms, despite growth in population, economic activity, and vehicle miles traveled since their passage.²⁰⁸

By contrast, greenhouse gas emissions reductions, increased energy efficiency, and a national RPS are all aimed (at least partly) at the problem of climate change; their costs will fall on today's voters, while most of the benefits will accrue to future generations of Americans and to citizens of other countries. This makes it far more difficult for political entrepreneurs to activate today's voters in favor of reform. Since some greenhouse gases persist in the atmosphere for more than fifty years after being emitted, the benefits of action now will accrue not so much to this generation or the next, but to the ones after that. Similarly, some voters fear that in the absence of emissions reductions in China and India,²⁰⁹ the benefits of

Europeans were to benefit from American emissions reductions as well. We now know that some pollutants travel across the oceans to be deposited on continents other than those from which they were emitted.

206. The effects of most emissions under the Clean Air Act were felt locally. We now have a better understanding of the way in which sulfur dioxide and nitrogen oxides are transported in the atmosphere and recognize that they can sometimes cross entire oceans to be deposited on different continents. However, this is the exception rather than the rule.

207. Pierce, *supra* note 11.

208. Robin Lloyd, *Success Stories: Cleaning Up Planet Earth*, LIVE SCIENCE (April 22, 2009, 4:33 AM), <http://www.livescience.com/environment/090422-earth-day-success.html>.

209. Since Kyoto, negotiations over the next steps in combating climate change have broken down repeatedly over the question of whether developing nations like China and India ought to commit to emissions reductions. They have steadfastly refused to do so, which was a

greenhouse gas emissions reductions may never be realized. It is one thing for members of Congress to urge voters to incur the costs of combating global warming because the United States has contributed so much to the problem; it is more difficult to do so if the benefits may never be realized because emissions growth in the developing world will overwhelm American emissions reductions.²¹⁰

Even if one accepts the sensible rejoinder that the industrialized world ought to be the first mover on this issue because it built its wealth on the back of uncontrolled fossil fuel emissions,²¹¹ the nature of the greenhouse effect is such that emissions reductions in the United States (or Europe or anywhere) accrue to the benefit of the entire world. This is the tragedy of the commons²¹² on its grandest (and, therefore, most powerful) scale yet. It may only be fair to future generations and to citizens of the world for the United States to reduce its greenhouse gas emissions now, but it is very difficult for members of Congress to enact legislation when the costs will fall entirely on their constituents and most of the benefits will fall elsewhere and in the distant future. For members of Congress, the politics of energy policy reform are very difficult indeed.

3. Policy complexity

Just as the technical complexity of climate change (the relative uncertainty about the magnitude and distribution of its effects) makes it harder for political entrepreneurs to mobilize support for energy policy reform, so too does its policy complexity. Even where there is agreement on the need for action, there is widespread disagreement among social scientists and policy analysts about *how* to

sticking point at the most recent negotiations in Copenhagen in December 2009. John M. Broder, *Many Goals Remain Unmet in Five Nations Climate Deal*, N.Y. TIMES, December 19, 2009, at A1, available at <http://www.nytimes.com/2009/12/19/science/earth/19climate.html>.

210. There is evidence that voters care more about local environmental issues than global ones. See David M. Konisky et al., *Environmental Policy Attitudes: Issues, Geographical Scale, and Political Trust*, 89 SOC. SCI. Q. 1066 (2008).

211. The developing world is at a point on its growth curve that the developed world was at long before it began regulating air emissions from fossil fuel combustion. There is a strong argument that it would be unfair for Americans to insist now that China foregoes the kind of growth that Americans enjoyed—that is, growth based upon the exploitation of cheap energy without regulation designed to internalize social and environmental costs. According to this argument, at the very least, the United States ought to limit its own greenhouse gas emissions before it insists that China do so.

212. Garrett Hardin, *The Tragedy of the Commons*, 162 SCIENCE 1243 (1968).

reform our energy policy. These disagreements undermine the ability of political entrepreneurs to make a simple and straightforward case for reform to their constituents.

For example, economists extol the virtues of carbon taxes, arguing that a tax (once set at the correct level) is the most efficient way to internalize the costs of greenhouse gas emissions.²¹³ Regulated firms also tend to prefer taxes to tradable permit systems because they provide cost certainty: the cost of acquiring tradable permits can vary over time according to the forces of supply and demand, while the tax rate tends to be more stable and predictable.²¹⁴ However, environmental groups care less about cost certainty and more about predicting the level of pollution.²¹⁵ A cap and trade marketable permit system provides the certainty environmentalists want by capping total emissions at a predetermined level.

Because new taxes seem to be a political nonstarter in the American policy debate, both the Waxman-Markey and Kerry-Boxer bills propose tradable permit systems for managing greenhouse gas emissions. While cap and trade is more cost efficient than traditional permitting,²¹⁶ it is vulnerable to other criticisms. For example, some critics of tradable permits point to problems with the European Union's carbon trading scheme²¹⁷ and to fears that speculators will make prices in these markets high or volatile.²¹⁸ These criticisms feed

213. Economists have preferred environmental taxes since the time of A.C. Pigou, who first advocated taxing pollution. *See* A.C. PIGOU, *THE ECONOMICS OF WELFARE* (1932); *see also* WILLIAM J. BAUMOL & WALLACE E. OATES, *THE THEORY OF ENVIRONMENTAL POLICY* (2d ed. 1975).

214. ExxonMobil, for example, has taken this position. Pullian, *supra* note 186.

215. *See, e.g.*, James Hansen et al., *Target Atmospheric CO₂: Where Should Humanity Aim?*, 2 *OPEN ATMOSPHERIC SCI. J.* 217, 229 (2008), available at http://pubs.giss.nasa.gov/docs/2008/2008_Hansen_etal.pdf (high-profile climatologist suggesting "an initial objective of reducing atmospheric CO₂ to 350 ppm," which later inspired a 350 movement largely organized by the environmental group, 350.org).

216. It is more efficient in that it sought to allow firms within an industry to accomplish pollution reductions at a lower cost than traditional permitting.

217. The EU scheme unfolded in two stages. During the first stage, too many permits were distributed (and hoarded by their owners). When the glut of permits was revealed, the price of permits dropped precipitously, from a high of more than thirty euros per ton to a low of less than four euros per ton. Frank J. Convery & Luke Redmond, *Market and Price Developments in the European Union Emissions Trading Scheme*, 1 *REV. OF ENVTL. ECON. POL'Y* 88, 103 (2007).

218. *See, e.g.*, Robert J. Shapiro & Elaine C. Kamarck, *Goldman Scandal Erodes Case for Cap and Trade*, *HUFFINGTON POST*, Apr. 10, 2010, <http://>

into a public perception that these kinds of markets may be unworkable and risky. Opponents of reform have tried to exploit this disagreement and confusion over the efficacy of various regulatory instruments by, for example, calling the cap and trade proposals of Waxman-Markey “cap and tax.”²¹⁹ From the left, environmental justice advocates worry that a marketable permit program can create emissions “hotspots” around facilities that buy permits, though this issue is more of a concern with respect to emissions of pollutants other than GHGs, which tend to disperse in the atmosphere.²²⁰

Some proponents of reform are lukewarm—even skeptical—about our ability to attack the problem at the tailpipe or smokestack. The real problem, they say, is not how much pollution we emit, but rather our use of fossil fuels in the first place. Proponents of this view tend to favor policies that promote technological change, efficiency, and conservation. One proponent of a national RPS, Lincoln Davies, argues that the RPS is a more effective way to combat climate change than emissions regulations.²²¹ A closely related view contends that the only reasonable policies are those that focus on developing the low-carbon or carbon-free technologies that developing countries like China or India can use to grow. According to this view, until the developed world recognizes the developing world’s right to use as much energy per capita as the developed world does now, we cannot make any reasonable progress on the issue of climate change.²²² For

www.huffingtonpost.com/robert-j-shapiro/goldman-scandal-erodes-ca_b_554137.html (contributor to progressive news website questioning the ability of regulators to “effectively oversee a new carbon market”).

219. See, e.g., Editorial, *The Cap and Tax Fiction*, WALL ST. J., June 26, 2009, at A12.

220. However, a forthcoming assessment by David Adelman shows that in most parts of the country, industrial sources contribute a small percentage of the cancer risk from air toxics, even in places where those industrial emissions are concentrated. David Adelman, *The Collective Origins of Toxic Air Pollution: Implications for Greenhouse Gas Trading Regimes and Industrial Hot Spots* (2011) (unpublished manuscript) (on file with author).

221. See Lincoln Davies, *Power Forward: The Argument for a National RPS*, 42 CONN. L. REV. 1341, 1341–1403 (2010).

222. Rutgers’s law professor Howard Latin takes this view. He says,

Even Herculean mitigation efforts will take several decades at best before we can make major progress in transforming these GHG sources into climate-safe alternatives. Utopian visions of avoiding climate “tipping points” in the next decade are completely unrealistic. If there are looming tipping points, which may well be true, they are inescapably going to be tipped or tripped over. My concern is that emergency efforts to prevent what cannot be avoided are likely to lead to waste, foolishness, international conflicts and general disillusionment on an epic scale. I believe we must start NOW to begin the transition to a carbon-free energy system

their part, energy efficiency proponents see far more promise in energy efficiency than in emissions regulation; this reflects the belief that there is more environmental bang for the buck in efficiency improvements, and the fear that emissions reduction legislation seems like a politically intractable problem.²²³ When supporters of reform cannot agree on the wisdom of the instruments of reform, it makes the job of pro-reform political entrepreneurs that much more difficult.

There is another way in which policy complexity can undermine the mobilization of support for energy reform, particularly in connection with large, complex bills like Waxman-Markey. Each of the regulatory instruments included in the bill advances some of the bill's goals, but undermines others. For example, policies promoting the substitution of renewable electricity for fossil fuels will produce environmental benefits (reductions in greenhouse gas and other fossil fuel emissions) and reduce dependence on foreign oil; however, they also reduce reliability of supply because renewable sources like wind and solar power are intermittent.²²⁴ Similarly, policies promoting the substitution of electric vehicles for gasoline powered vehicles reduce dependence upon foreign oil, bringing all of the security and foreign policy benefits that reduced energy dependence entails. However, if the electricity used to power electric cars comes in large part from coal (as it does in most of the country today), that transition may exacerbate the global warming problem. Likewise, we

and economy. Efforts to solve global warming by GHG emissions reductions strategies, rather than GHG replacement strategies, cannot realistically succeed over the short-term or the long-term or any term

Howard Latin, Comment to *Varied Views on Poverty and Climate*, NY TIMES DOT EARTH (Nov. 28, 2007 5:05 AM), <http://dotearth.blogs.nytimes.com/2007/11/27/varied-views-on-poverty-and-climate-change/>.

223. See Dernbach, *supra* note 92, at 10,003–18.

224. We do not yet have the capability to store electricity in large amounts, and these sources produce power only when the wind blows or the sun shines. Some wind and solar stations are backed up by more conventionally fueled plants, like natural gas facilities. The need for this kind of support adds costs to what are already relatively expensive technologies for producing electricity. Researchers and entrepreneurs are working on coupling wind and solar power with on-site storage capabilities, such as compressed air and flywheels, but none of these technologies has developed sufficiently to be commercialized. See Arnold W. Reitze, Jr., *Electric Power in the Carbon Constrained World*, 34 WM. & MARY ENVTL. L. & POL'Y REV. 821, 870 n.444 (2010) ("Other storage systems that have yet to be commercially proven include batteries, compressed air storage, pumped hydroelectricity, fly wheels, and molten salts."); Drew Thornley, *Texas Wind Energy: Past, Present, and Future*, 4 ENVTL. & ENERGY L. & POL'Y J. 69, 97–103 (2009).

can reduce emissions of greenhouse gases significantly by moving away from coal-fired power to solar power; however, coal is a relatively cheap and plentiful domestic source of energy, while most solar photovoltaic cells are made with imported silicon.²²⁵

Thus, modern energy policy reform requires an extraordinary number of hard choices that involve tradeoffs and great uncertainty. These tensions complicate an already difficult and complex debate even further.

4. Party, ideology, and emotion

Finally, the partisan political environment in 2010 seems less conducive to a pro-reform republican moment than the partisan political environment of the 1970s. Whether or not American politics was less ideological or partisan in the 1970s (and it is not clear that it was), it is clear that in the 1970s the two major political parties did not differ so distinctly on energy and environmental policy issues as they do now. At the time the Clean Air Act and Clean Water Act were passed, both major political parties claimed the mantle of environmental leadership. A Republican president, Richard Nixon, signed into law both of these landmark environmental statutes, having previously created the Environmental Protection Agency by executive order.²²⁶ A Democrat, Jimmy Carter, signed the NGPA, a statute whose deregulatory policy aims we might associate with the Republican Party today. Even as recently as twenty years ago, Republican George H. W. Bush signed the 1990 Clean Air Act amendments creating the acid rain program and ran for office claiming to be "the environmental president."²²⁷ We do not see that sort of bipartisanship on environmental and energy issues much anymore; to the contrary, partisan differences are now the norm.²²⁸ The 2010 Senate's Gang of Three represented an

225. There are, of course, rejoinders to these arguments. Some photovoltaic solar technologies use cadmium or other silicon substitutes. Concentrated solar technologies do not rely upon rare elements like silicon. And solar power is not the only alternative to coal. Nuclear power is a more likely substitute, since both coal and nuclear energy serve as base load sources of supply. Uranium is a relatively secure fuel source in that we produce it domestically and can import it from stable, friendly regimes (e.g., Canada or Australia).

226. See Reorganization Plan No. 3 of 1970, 35 Fed. Reg. 15,623 (July 9, 1970), reprinted in 42 U.S.C. 4321 (2010), and in 84 Stat. 2086 (1970).

227. LESLIE DALE FELDMAN & ROSANNA PEROTTI, HONOR AND LOYALTY: INSIDE THE POLITICS OF THE GEORGE H.W. BUSH WHITE HOUSE 8 (2002).

228. Riley Dunlap, a leading authority on environmental opinion, has documented this

attempt at bipartisanship in the Senate; but three senators does not a “gang” make, and the gang lost its only Republican member shortly after its creation due to an unrelated partisan dispute.²²⁹ Lately, conflict over energy and the environment—like other conflicts over major healthcare, financial, and energy legislation—seems to break sharply along partisan lines.²³⁰

Ideological polarization within Congress on energy and environmental issues is part of a larger trend. Political scientists agree that party polarization in Congress has been increasing over the last forty years.²³¹ This polarization manifests itself in a variety of ways, including increases in party line voting and differences between the

polarization process, tracing it to the early 1980s. He says that opinion on environmental issues is most polarized among elites. See Riley E. Dunlap & Aaron M. McCright, *A Widening Gap: Republican and Democratic Views on Climate Change*, 50 ENV'T 26, 28 (2008); see also Konisky et al., *supra* note 210, at 1066, 1077–78 (finding partisan differences between Democrats and Republicans on support for environmental policy initiatives and a strong connection between political ideology and support for environmental regulation).

229. See Stephen Power, *U.S. News: One Top Obama Goal, Climate Bill, at Risk*, WALL ST. J., Apr. 26, 2010, at A4 (reporting that Republican Sen. Lindsey Graham announced his departure from the effort because Democratic leaders wanted to address immigration legislation in advance of energy legislation).

230. Richard Lazarus recounted the growing partisan division on environmental issues in 2003. Using the League of Conservation Voters environmental scorecard of members of Congress, Lazarus illustrates a growing partisanship in voting on environmental issues in Congress. See Richard J. Lazarus, *A Different Kind of “Republican Moment” in Environmental Law*, 87 MINN. L. REV. 999, 1011–13 (2003). Of course, the League of Conservation Voters assign members of Congress voting scores based upon its desire to move members toward a more pro-environmental position. In that sense, its scores are not objective measures of environmentalism. However, Lazarus’s observations seem consistent with the dwindling numbers of liberal and moderate Republicans and conservative Democrats in Congress since 1970. See *infra* notes 23131–34 and accompanying text.

231. There are a variety of measures used to document this polarization. One of the better known is Keith Poole and Howard Rosenthal’s so-called “DW-NOMINATE” data, which places members of Congress on an ideological spectrum based upon their voting behavior. For a thorough explanation of these data and how they document increasing polarization in American politics, see NOLAN MCCARTY, KEITH T. POOLE & HOWARD ROSENTHAL, *POLARIZED AMERICA: THE DANCE OF IDEOLOGY AND UNEQUAL RICHES* (2006). For a striking visual illustration of polarization in Congress, see Keith Poole’s webpage at <http://voteview.com/polarizedamerica.asp>. For a good overview of the various databases and theories of congressional polarization, and an integration of some of those theories and data, see SEAN M. THERIAULT, *PARTY POLARIZATION IN CONGRESS* (2008); see also JOHN H. ALDRICH, *WHY PARTIES?: THE ORIGINS AND TRANSFORMATION OF POLITICAL PARTIES IN AMERICA* (1995); KEITH T. POOLE & HOWARD ROSENTHAL, *CONGRESS: A POLITICAL-ECONOMIC HISTORY OF ROLL CALL VOTING* (1997); Morris P. Fiorina & Samuel J. Abrams, *Political Polarization in the American Public*, 11 ANN. REV. POL. SCI. 563 (2008); Morris P. Fiorina, Paper presented at the Midwest Political Science Association Annual Meeting at Chicago, Illinois, *Whatever Happened to the Median Voter?* (Apr. 15–17, 1999).

parties' voting behavior.²³² This trend has been ascribed by political scientists to a number of factors, including increasing ideological homogeneity in congressional districts²³³ and various kinds of institutional changes that affect how parties manage congressional business.²³⁴ Whatever the reasons, parties have become more ideologically pure and ideologically further from one another over time, making bipartisan cooperation toward energy reform that much more difficult.

There is another important difference in the political setting today compared with the 1970s. The environmental legislation of the 1970s was part of a family of left-leaning social movements, which included the civil rights movement, the consumer movement, and the antiwar movement. The environmental movement produced republican moments in Congress in part because the fervor and energy of the general public was behind it. The same can be said of the energy bills of the late 1970s, which then President Jimmy Carter described as "the moral equivalent of war."²³⁵ Because of this fervor, members of Congress in the 1970s might reasonably have worried more about how their actions might affect the votes of those favoring regulation and reform than those opposing it. That does not seem to be the case today. To the contrary, nowadays most of the populist energy seems to be coming from the right wing of the political spectrum: right wing populists (who often oppose federal regulation of the private sector) seem to be the modern analogues of the left-wing populists of the 60s and 70s (who demanded federal regulation). To today's member of Congress, environmental issues

232. POOLE & ROSENTHAL, *supra* note 231, at 88; THERIAULT, *supra* note 231, at 3–9.

233. Some ascribe this increasing homogeneity to redistricting. *See e.g.*, Jamie Carson, Michael H. Crespin, Charles J. Finocchiaro, & David W. Rohde, Paper presented at the Annual Meeting of the Midwest Political Science Association, Linking Congressional Districts Across Time: Redistricting and Party Polarization in Congress (2004). Others argue that voters are segregating themselves ideologically. *See, e.g.*, JEFFREY M. STONECASH, MARK D. BREWER, & MARK D. MARIANI, DIVERGING PARTIES: SOCIAL CHANGE, REALIGNMENT, AND PARTY POLARIZATION (2003); Delia Baldassarri & Andrew Gelman, *Partisans Without Constraint: Political Polarization and Trends in American Public Opinion*, 114 AM. J. SOC. 408 (2008). Still others see party activists as exacerbating partisan conflict. Geoffrey C. Layman et al., *Activists and Conflict Extension in American Party Politics*, 104 AM. POL. SCI. REV. 324 (2010).

234. For a good summary of the institutional explanations of party polarization, see generally THERIAULT, *supra* note 231, at 3–9.

235. Jimmy Carter, President of the U.S., Speech to the Nation (Apr. 18, 1977), available at http://www.pbs.org/wgbh/amex/carter/filmmore/ps_energy.html.

may seem far more salient to those who oppose action than to those who favor it.

There may be another dynamic at work here, one that helps explain the inability of pro-reform political entrepreneurs to move public opinion and activate voters. Some analysts point to psychological factors—the confirmation bias and the more general human tendency to rationalize to reduce cognitive dissonance—that can lead voters to harden their positions on “hot button” issues like climate change. In a recent paper, Dan Kahan, Hank Jenkins-Smith, and Donald Braman examined the question of why voters cling to assessments of risk—including assessment of the risks posed by climate change—that differ so significantly from the prevailing opinion of experts or scientists.²³⁶ The authors chose a series of issues on which (i) experts had reached something close to consensus, but (ii) public opinion lagged behind that consensus. The authors hypothesized that people who tend toward more hierarchical and individualistic worldviews (“hierarchical individualists”), would tend to discredit the scientific basis of global warming than people who tend toward more egalitarian and communitarian worldviews (“egalitarian communitarians”). They found that when presented with a fictional scientific expert advocating the propositions that global temperatures are increasing and that human activity is causing global warming hierarchical individualists were more likely to discredit the expertise of the expert making those claims.²³⁷ The subjects of the experiment tended to rationalize to avoid cognitive dissonance.²³⁸ Certainly, this “cultural cognition of risk” could be part of the reason why public perceptions of climate change risks (and support for reform) lag behind those of climatologists and other experts.

236. Dan Kahan, Hank Jenkins-Smith & Donald Braman, *Cultural Cognition of Scientific Consensus* (Yale Law Sch., Research, Working Paper No. 205, 2011).

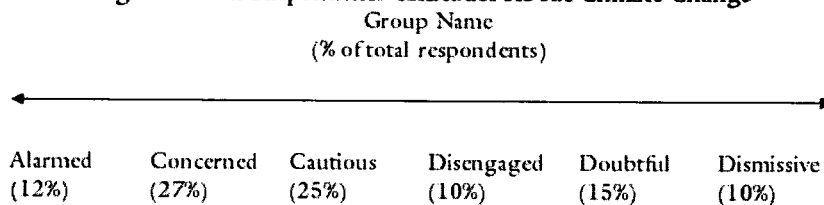
237. As the authors note, this experiment builds upon work in psychology on “identity-protective cognition,” which says that individuals tend to resist factual claims that behavior and importance to their cultural roles is harmful and should be regulated. See David K. Sherman & Geoffrey L. Coleman, *The Psychology of Self-Defense: Self Affirmation Theory*, 38 *ADVANCES EXPERIMENTAL SOC. PSYCHOL.* 183 (2006). Another mechanism supporting this hypothesis would be the “assimilation bias,” which contends that people assimilate facts in ways that support their cultural predispositions and undermine opposing predispositions.

238. Kahan et al., *supra* note 236, at 13. This kind of rationalization is not limited to hierarchical individualists. The authors found that egalitarian communitarians discredited the existence of a scientific consensus in favor of the safety of geological disposal of nuclear waste. *Id.* at 16.

Data from a recent poll seem to support the notion that climate change skeptics have hardened their positions in this way. A May 2011 joint report issued by Yale University's Project on Climate Change Communication and George Mason University Center on Climate Change Communication separated poll respondents into six groups representing the continuum of climate change opinion, as reflected in Figure 4. Those at the left end of the continuum had the strongest belief in global warming science, were most concerned about the problem, and were the most motivated to do something about it. Those at the right end of the continuum had the weakest belief in climate change science and were the least concerned and motivated to take action.

Respondents in the "Dismissive" group reported that they were

Figure 4: Poll Respondents' Attitudes About Climate Change*



*Data source: Global Warming's Six Americas in May 2011, Yale University's Project on Climate Change Communication and George Mason University Center on Climate Change Communication.

less uncertain than any other group about the science of climate change and more likely than any other group to say that they were well-informed about the subject. While there was "low" recognition of the extent of scientific agreement on climate science among all the respondents, only five percent of the Disengaged, Doubtful, and Dismissive recognized the actual levels of scientific agreement on the subject. Not surprisingly, these groups were also far less likely to trust expert scientific groups on the subject of climate change.²³⁹

If a hardening of opinion is indeed occurring, one wonders if it is associated with changes in the way voters obtain information.

239. ANTHONY LEISEROWITZ ET AL., YALE UNIVERSITY'S PROJECT ON CLIMATE CHANGE COMM'N & GEORGE MASON UNIV. CTR. ON CLIMATE CHANGE COMM'N, GLOBAL WARMING'S SIX AMERICAS IN MAY 2011, at 6-7 (2011) available at <http://environment.yale.edu/climate/files/SixAmericasMay2011.pdf>.

Behavioral psychologists have long documented the tendency of humans to seek affirmation of their preexisting views.²⁴⁰ Is this easier to do in the information age? In the 1970s, most voters got their policy and political information from the relatively few (and largely mainstream) news sources available. Now voters face a much wider variety of news sources. This means that voters can find more and better information if they are willing to look for it. It also means that it is much easier for voters to find information sources that are tailored to their particular point of view or which tend to confirm their worldviews.²⁴¹ In the Yale/George Mason report, those on the left hand side of the climate change opinion spectrum reported more interest in gathering new information about climate change than those on the right hand side of the spectrum. If those on the right are turning a blind eye to climate change science, this dynamic makes it harder for political entrepreneurs to move public opinion, thereby reducing the likelihood of an energy policy reform republican moment in the near future.

IV. CONCLUSION: WHERE TO FROM HERE?

All of this sounds very pessimistic. Even if it is true that the benefits of energy policy reform exceed the costs, it seems as though the truth cannot prevail. Have organized interests become too adept at exploiting voters' rational ignorance and psychological predispositions? Are voters unwilling to face "inconvenient truths" and/or make the investments necessary to prevent harm to future generations? Or is it simply that these issues are not yet politically mature, such that the voting public does not yet fully understand or appreciate the kind of fundamental energy policy reforms Congress is now considering?

First, we should remember that the absence of congressional action is not the absence of progress. Significant minorities of the American public are activated on energy policy reform issues and are

240. See PINKER, *supra* note 177.

241. Some offer this as an explanation for increasing political polarization generally. See, e.g., CASS SUNSTEIN, *ECHO CHAMBER: BUSH V. GORE, IMPEACHMENT AND BEYOND* (2001). Margaret Heffernan argues that the issue of climate change is beset by this problem, that we are willfully blind because the conflict between the comfort we derive from cheap fossil-fueled energy and the fact that global warming produces more cognitive dissonance than we can handle. So we seek out news sources that remove that dissonance. See MARGARET HEFFERNAN, *WILLFUL BLINDNESS: WHY WE IGNORE THE OBVIOUS AT OUR PERIL* (2011).

pressing forward in other policymaking arenas. As noted above, in the absence of congressional action states have begun to regulate greenhouse gas emissions and establish RPS within their borders.²⁴² Even if Congress is not yet ready to mandate energy-efficient new building codes, states have begun adopting model building efficiency codes that will significantly reduce energy consumption within buildings.²⁴³ Private litigants have begun using theories of tort liability to sue emitters of greenhouse gases, although those efforts suffered a recent setback when the U.S. Supreme Court dismissed nuisance actions brought against greenhouse gas emitters by the state of Connecticut.²⁴⁴ As I have noted, the Obama EPA has begun to regulate carbon dioxide as an air pollutant under the Clean Air Act.²⁴⁵ This is to say nothing of the myriad private and voluntary efforts aimed at a cleaner, more secure, more efficient, and more reliable energy future.²⁴⁶ Indeed, some analysts believe that individual private action may eventually do far more to reduce greenhouse gas emissions than the regulation of larger sources ever will. According to Michael Vandebergh and Anne Steinmann, behaviors over which individuals have direct, substantial control account for about 4.1 trillion pounds of emissions of CO₂ equivalent per year. This comprises almost a third of total emissions and represents more than the entire emissions of the United States

242. See *supra* notes 18–20 and accompanying text.

243. See U.S. Dep't. of Energy, *Status of State Energy Codes*, BUILDING ENERGY CODES PROGRAM, <http://www.energycodes.gov/states/> (last visited Mar. 22, 2011) (providing maps and current status for commercial and residential building energy codes operable at state levels).

244. See, e.g., *Am. Elec. Power Co. v. Connecticut*, 131 S. Ct. 2527 (2011) (affirming a trial court's dismissal of public nuisance claims brought by state governments against coal-fired power plant owners seeking to enjoin the emission of greenhouse gases from those facilities). The Second Circuit had held that the district court erred in dismissing global warming claims premised on the federal common law of nuisance as nonjusticiable. *Connecticut v. Am. Elec. Power Co.*, 582 F.3d 309 (2d Cir. 2009), *rev'd*, 131 S. Ct. 2527 (2011); see also *Comer v. Murphy Oil USA*, 585 F.3d 885 (5th Cir. 2009) (holding plaintiffs had standing to proceed with claims for damages caused by global warming based on state common law claims of nuisance, trespass, and negligence).

245. See *supra* note 35. Indeed, the EPA has already imposed greenhouse gas emissions in some Clean Air Act Permits. See *San Francisco Area Regulators Include Greenhouse Gas Caps in Power Plant Permit*, 41 ENV'T REP. 288 (2010).

246. These are too numerous to list. They include voluntary action on the part of companies to reduce their environmental (including carbon) footprints and use energy more efficiently, and private sector pressure groups who try to induce companies and their products to become greener, etc.

industrial sector.²⁴⁷ If political entrepreneurs can activate norms of conservation and efficiency in individual actors, it might prove as effective a tool of reform as any mandate. Furthermore, even if the prospects are bleak for fundamental energy policy reform in the near term, the mere fact that public support is currently insufficient to produce a republican moment in Congress does not mean that this will always be the case. Not only will all of these state, local, and private efforts continue to bring real (albeit incremental) progress on issues at the core of energy policy reform, they are also controversial and are provoking reactions from opponents of reform. As a result, the issues at the core of reform will remain a part of the public debate.

Furthermore, if that interim progress remains insufficient, concentrations of greenhouse gases in the atmosphere will continue to increase and the United States will remain dependent on foreign sources of energy. Presumably, this means that mankind will experience more and more of the adverse effects of this state of affairs, further increasing the salience of these issues in the minds of American voters. Indeed, this process ought to produce more of the kinds of catalyzing events that activate voters to mobilize in favor of reform: the modern equivalents of the Cuyahoga River fire or Santa Barbara oil spill. Likewise, Americans will continue to experience the costs associated with dependence upon oil imports and world markets for oil—markets that may once again be disrupted for geopolitical reasons. We can expect growing pressure on the United States from our allies (particularly among the world's industrialized democracies) to take stronger action to develop cleaner, more efficient energy sources.²⁴⁸ That international pressure, in turn, might stimulate real movement toward cooperative solutions that include developing countries like India and China. A worsening situation might create an environment in which both the developed and the developing countries are more willing to bargain and sacrifice in order to develop a cooperative solution to climate change and other pressing energy issues.

The American policymaking process was not built for speed; to the contrary, it was built to resist demands for change from

247. Vandenbergh & Steinemann, *supra* note 96, at 1693–94.

248. American public opinion already lags behind that of most industrialized democracies on this issue.

temporary "factions" and to respond instead only to the permanent interests of the larger community. So far, at least, Congress does not yet recognize the need for a costly transition to cleaner energy, energy independence, or greater efficiency and reliability as among the public's permanent interests.²⁴⁹ Relying upon a worsening situation to generate the political will to act is not a happy prospect. However, if the experts are correct that the costs of inaction exceed the costs of action, we can expect the march of time to help voters come to understand the costs of inaction; in that event, we can expect increasing percentages of voters to support fundamental energy policy reform over time.

249. Of course, the statement implies that the legislative process does not respond to factions and does respond to permanent interests, which certainly is arguable. Perhaps a more precise way to put it would be to say that public support for fundamental energy policy reform has not yet grown sufficiently strong to overcome the impediments the Framers built into the American legislative process, irrespective of whether those impediments serve the purposes the Framers intended.

