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Naïve Energy Markets

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ARTICLES

NAÏVE ENERGY MARKETS

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Centrifugal forces dominate the twenty-first century American policy process. Ideologically, the two major political parties are more homogenous and further apart than at any time since the advent of the modern regulatory state.[1] Political scientists ascribe polarization in Congress to any number of factors, most of which fall within either of two categories: one focusing on the increasing ideological homogeneity in congressional districts,[2] and a second focusing on various kinds of institutional factors that affect how parties manage congressional business.[3] Legal scholars, for their part, have begun

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1 There are a variety of measures used to document this polarization. One of the better known is Keith Poole's 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 ET AL., POLARIZED AMERICA: THE DANCE OF IDEOLOGY AND UNEQUAL RICHES (2006) and Keith Poole's webpage, VOTEVIEW, http://voteview.com (last visited Nov. 15, 2016). On the subject of polarization generally, see JOHN H. ALDRICH, WHY PARTIES? THE ORIGIN AND TRANSFORMATION OF POLITICAL PARTIES IN AMERICA (1995); SEAN M. THERIAULT, PARTY POLARIZATION IN CONGRESS (2008); Geoffrey C. Layman et al., *Party Polarization in American Politics: Characteristics, Causes, and Consequences*, 9 ANN. REV. POL. SCI. 83 (2006); Richard H. Pildes, *Why the Center Does Not Hold: The Causes of Hyperpolarized Democracy in America*, 99 CALIF. L. REV. 273 (2011).

2 Some ascribe this increasing homogeneity to redistricting. *See, e.g.*, Jamie L. Carson et al., *Redistricting and Party Polarization in the U.S. House of Representatives*, 35 AM. POL. RES. 878 (2007). Others argue that voters are segregating themselves ideologically. *See, e.g.*, BILL BISHOP & ROBERT G. CUSHING, THE BIG SORT: WHY THE CLUSTERING OF LIKE-MINDED AMERICA IS TEARING US APART (2008); JEFFREY M. STONECASH ET AL., DIVERGING PARTIES: SOCIAL CHANGE, REALIGNMENT, AND PARTY POLARIZATION (2003).

3 For a good summary of the institutional explanations of party polarization, see THERIAULT, *supra* note 1, at 51–54.

to explore the implications of this ideological split for our understandings of American federalism,[4] modern American administrative law,[5] and more.[6] At the center of these ideological differences lies the fundamental dilemma of the regulatory state: namely, the question of when it is advisable for the state to intervene in the market.[7] Recent debates over the Affordable Care Act,[8] financial regulation,[9] antitrust regulation,[10] and net neutrality,[11] for exam-

4 *See, e.g.*, Jessica Bulman-Pozen, *Partisan Federalism*, 127 HARV. L. REV. 1077 (2014) (describing how states have become loci of partisan conflict over national policy goals); Heather K. Gerken, *Dissenting by Deciding*, 57 STAN. L. REV. 1745 (2005) (same); Gillian E. Metzger, *Agencies, Polarization, and the States*, 115 COLUM. L. REV. 1739 (2015) (exploring the role of state action in cooperative federalist regulatory programs in a polarized political environment).

5 *See, e.g.*, Jody Freeman & David B. Spence, *Old Statutes, New Problems*, 163 U. PA. L. REV. 1, 11–17, app. at 82–93 (2015) (exploring the impact of ideological conflict and gridlock over energy and the environment on federal administrative agencies); Michael S. Greve & Ashley C. Parrish, *Administrative Law Without Congress*, 22 GEO. MASON L. REV. 501 (2015) (arguing for less deference to agency decisionmaking in a polarized political environment); Metzger, *supra* note 4 (exploring the role of state action in cooperative federalist regulatory programs in a polarized political environment).

6 *See, e.g.*, Cynthia R. Farina, *Congressional Polarization: Terminal Constitutional Dysfunction?*, 115 COLUM. L. REV. 1689 (2015) (analyzing the causes of congressional polarization); Hari M. Osofsky & Jacqueline Peel, *Energy Partisanship*, 65 EMORY L.J. 695 (2016) (arguing that energy policymakers can circumvent partisan gridlock by focusing on policy subsets over which there is less disagreement, and by making policy in arenas other than Congress).

7 Political scientists describe the ideological divide captured by their data as one centered on the role of government intervention in the economy. *See, e.g.*, MCCARTY ET AL., *supra* note 1, at 11.

8 The Affordable Care Act actually refers to two separate pieces of legislation—the Patient Protection and Affordable Care Act, Pub. L. No. 111-148, 124 Stat. 119 (2010) (codified as amended in scattered titles of the U.S.C.) and the Health Care and Education Reconciliation Act of 2010, Pub. L. No. 111-152, 124 Stat. 1029 (codified as amended in scattered titles of the U.S.C.). Congressional Republicans' antipathy to the legislation, which they call "socialism," has been well documented. *See, e.g.*, Michael McAuliff, *House Passes 56th Anti-Obamacare Measure*, HUFFINGTON POST (Feb. 4, 2015, 5:12 PM), http://www.huffingtonpost.com/2015/02/03/repeal-obamacare_n_6607080.html.

9 This debate centers on the Dodd-Frank Wall Street Reform and Consumer Protection Act, Pub. L. No. 111-203, 124 Stat. 1376 (2010) (codified as amended in scattered titles of the U.S.C.), which has endured repeated attacks from Republicans in Congress since its passage. *See, e.g.*, Zach Carter, *Second Verse, Same as the First: Republicans Prepare Another Dodd-Frank Attack*, HUFFINGTON POST (Jan. 13, 2015, 9:24 PM), http://www.huffingtonpost.com/2015/01/12/republicans-dodd-frank-attack_n_6459722.html.

10 A growing debate over merger policy in antitrust lies on this same fault line. *See, e.g.*, Maureen K. Ohlhausen, Comm'r, U.S. Fed. Trade Comm'n, Remarks at Hogan Lovells, Hong Kong: Does the U.S. Economy Lack Competition, and If So What to Do About It? (June 1, 2016), https://www.ftc.gov/system/files/documents/public_statements/952273/160601doesuseconomylackcomp.pdf.

11 The D.C. Circuit recently vacated portions of the Federal Communication Commission's rule on net neutrality in *Verizon v. FCC*, 740 F.3d 623 (D.C. Cir. 2014). In 2011 the House of Representatives had voted to repeal the FCC order, but the Senate did not. *See* H.R.J. Res. 37, 112th Cong. (2011).

ple, divide the parties along this fault line. This "market versus regulation" divide has riven the American polity since Ronald Reagan first began to challenge the New Deal consensus[12] and the cross-party acceptance of the modern regulatory state.[13]

Nowhere is that divide more prominent today than within the field of energy law, a body of regulation that encompasses two basic challenges: (1) the problem of ensuring well-functioning energy markets, and fair energy prices,[14] and (2) the problem of managing the many and varied externalities associated with the production and delivery of energy. American policy has traditionally addressed the former objective through public utility and antitrust law, and the latter objective through environmental health and safety regulation. Both challenges pose the question of how best to allocate the costs and benefits of energy services: that is, when to rely on the market to allocate those costs and benefits, and when to use law to change that allocation.[15] Congressional gridlock over the last twenty years has shifted the battle over these questions from Congress to states, regulatory agencies, the courts, and quasi-governmental and private governance institutions.[16] The

12 Richard Hofstadter is sometimes credited with this description of bipartisan acceptance of the regulatory state after World War II. For a description of Hofstadter's role in popularizing this idea, see DAVID S. BROWN, RICHARD HOFSTADTER: AN INTELLECTUAL BIOGRAPHY (2006); IWAN W. MORGAN, BEYOND THE LIBERAL CONSENSUS: A POLITICAL HISTORY OF THE UNITED STATES SINCE 1965, at 12–20 (1994).

13 For a compelling account of how and why the idea of "the market" spread throughout policy and academic circles in the mid- to late twentieth century, see DANIEL T. RODGERS, AGE OF FRACTURE 41–76 (2011) ("In an age when words took on magical properties, no word flew higher or assumed a greater aura of enchantment than 'market.'").

14 The justification for this kind of regulation is sometimes traced back to the seminal case of *Munn v. Illinois*, 94 U.S. 113 (1877), which merely recognized a historical truth: that the law permits price regulation of businesses that are "affected with a public interest." *Id.* at 126 (internal quotation marks omitted) (quoting Lord Matthew Hale, De Portibus Maris, *reprinted in* 1 A COLLECTION OF TRACTS RELATIVE TO THE LAW OF ENGLAND 1, 78 (Francis Hargrave ed., Dublin, Lynch et al. ed. 1787)). Modern American public utility law grew out of state and federal legislation acknowledging the need for price regulation in the gas and electricity industries using this rationale. *See generally* JOEL B. EISEN ET AL., ENERGY, ECONOMICS AND THE ENVIRONMENT: CASES & MATERIALS (4th ed. 2015).

15 The question of when government ought to intervene is conceptually distinct from the question of which government institution (legislative or bureaucratic, state or federal) ought to intervene. The exploration of these governance questions is beyond the scope of this Article. For recent treatments of these issues in the energy policy context, see for example Bulman-Pozen, *supra* note 4; Hari M. Osofsky & Hannah J. Wiseman, *Dynamic Energy Federalism*, 72 MD. L. REV. 773 (2013); Jody Freeman, Network Federalism (Nov. 18, 2013) (unpublished manuscript), http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2356380 (exploring the division of authority both horizontally and vertically in electricity markets).

16 *See* Jim Rossi, *"Maladaptive" Federalism: The Structural Barriers to Coordination of State Sustainability Initiatives*, 64 CASE W. RES. L. REV. 1759, 1762 (2014); *see also* Freeman, *supra* note 15. For an explanation of the logic of congressional gridlock, and why members of Congress find it increasingly difficult to cobble together legislative majorities, see Freeman & Spence, *supra* note 5, at 11–17, app. at 82–93.

push to deregulate price and competition in energy markets has proven particularly successful at the federal level and in some states; the push to deregulate the externalities of energy production, much less so.[17]

Each of these competing visions of our energy future—one seeking ever-freer energy markets, and another seeking ever-cleaner energy markets—represents an ideologically coherent ideal that stands in contrast to a more complex and messy reality. The trend toward competition, market pricing, and less regulation in the energy industry embraces the logic and elegance of markets. It means that participants are exposed to more price risk than in the past;[18] and as William Boyd has illustrated with respect to public utilities, it represents a narrowing of both the notion of the public interest and the government's role in protecting that interest.[19] The vision of greener energy markets, on the other hand, is mostly a top-down vision pushed along by policy, mostly at the state level. California and New York, for example, are among those states using policy to drive reductions in the use of fossil fuels in their energy sectors, while other states are more or less content with the environmental status quo.[20] As political polarization worsens, energy policy seems to be approaching a kind of stalemate, as federal agencies and states try to address new energy policy problems without the help (and sometimes over the objections) of a gridlocked Congress.[21] Thus, in the last few decades, when Republicans have controlled the executive branch, states and regional entities have pursued their own clean energy and pollution control policies;[22] when Democrats have controlled the executive branch, federal

17 *See infra* notes 78–132 and accompanying text.

18 For a more detailed description of how and why energy market participants face more price risk than ever before, and how both markets and regulation have responded to that development, see David B. Spence & Robert Prentice, *The Transformation of American Energy Markets and the Problem of Market Power*, 53 B.C. L. REV. 131, 133–48 (2012).

19 William Boyd, *Public Utility and the Low-Carbon Future*, 61 UCLA L. REV. 1614 (2014) (exploring the historical origins of the public service obligations of electric utilities).

20 For summaries of state policies toward renewable energy and decarbonization of the energy sector, see *Renewable Energy in the 50 States*, ACORE, https://www.acore.org/interactive-report-renewable-energy-in-america (last visited Nov. 15, 2016).

21 *See* Freeman & Spence, *supra* note 5 (describing how federal regulators address air pollution and electricity market problems using old and aging enabling legislation). *But see* William Boyd & Ann E. Carlson, *Accidents of Federalism: Ratemaking and Policy Innovation in Public Utility Law*, 63 UCLA L. REV. (2016) (arguing that public utility law leaves room for state innovation, even in the face of congressional paralysis).

22 For example, Northeastern states upset with the George W. Bush Administration's reluctance to regulate greenhouse gases (GHGs) formed the Regional Greenhouse Gas Initiative (RGGI) in 2005, establishing their own cap and trade market for GHG emissions. *See* Regional Greenhouse Gas Initiative, Memorandum of Understanding (Dec. 20, 2005), https://www.rggi.org/docs/mou_final_12_20_05.pdf. Many of those same states sued the Bush Administration to force the EPA to regulate GHGs, an effort that culminated in the Supreme Court's decision in *Massachusetts v. EPA*, 549 U.S. 497, 532 (2007) (upholding the power of the EPA to regulate GHGs over the objections of the Bush EPA).

agencies pursue those same policies, often with active resistance from Republican states.[23]

Furthermore, political polarization exacerbates the tendency of each side to caricature the other, and to frame problems in starkly ideological terms, or as either/or choices. Proponents of regulation charge their adversaries with failure to understand environmental science,[24] and with lack of compassion for consumers.[25] Proponents of market solutions charge their adversaries with a failure to understand markets, and decry regulation as "central planning" or "socialism,"[26] sometimes employing the now ubiquitous "war on" language, as illustrated by the phrase "EPA's war on coal."[27] While neither caricature is fair, this Article addresses the impact of the latter caricature on our understanding of contemporary energy policy problems.[28]

Specifically, the focus here is on how two interrelated trends—the growing popularity within the GOP of the conservative intellectual challenge to the New Deal consensus,[29] and the rise to dominance of economic theory

23 For example, the set of EPA rules addressing pollution from coal-fired power plants have met with active resistance in some states. For a description of these interactions in that context, and of the political and economic factors driving state resistance, see David E. Adelman & David B. Spence, *Ideology vs. Interest Group Politics in U.S. Energy Policy*, 95 N.C. L. REV. 339 (2017).

24 This claim is at the core of former Vice President Gore's documentary, *An Inconvenient Truth*, and many scholarly rejoinders to anti-regulatory arguments that challenge climate science. *See* AN INCONVENIENT TRUTH (Paramount Pictures & Participant Media 2006).

25 David Freeman, former California energy czar, made this argument in testimony before Congress during the California electricity crisis. *See Electricity Markets: California: Hearing Before the Subcomm. on Energy & Air Quality of the H. Comm. on Energy & Commerce*, 107th Cong. 111 (2001) [hereinafter *Hearings*] (statement of David Freeman, General Manager, L.A. Dep't of Water & Power).

26 *See, e.g.*, Bernard S. Black & Richard J. Pierce, Jr., *The Choice Between Markets and Central Planning in Regulating the U.S. Electricity Industry*, 93 COLUM. L. REV. 1339, 1342 (1993) (likening state public utility commission resource planning processes to "systems previously used to govern the economies of eastern Europe and the former Soviet Union"); Stephen Dinan, *Obama Climate Czar Has Socialist Ties*, WASH. TIMES (Jan. 12, 2009), http://www.washingtontimes.com/news/2009/jan/12/obama-climate-czar-has-socialist-ties/; Charles Krauthammer, Opinion, *Charles Krauthammer on the New Socialism*, WASH. POST (Dec. 11, 2009), http://www.washingtonpost.com/wp-dyn/content/article/2009/12/10/AR2009121003163.html (contending that the EPA's "naked assertion of vast executive power in the name of the environment is the perfect fulfillment of . . . Czech President . . . Vaclav Klaus['s claim] that environmentalism is becoming the new socialism").

27 A November 2016 Google search of the phrase "war on coal" revealed more than two million hits. *See, e.g.*, Jeff Nesbit, *Is There Really a War on Coal?*, U.S. NEWS (June 3, 2014), http://www.usnews.com/news/blogs/at-the-edge/2014/06/03/is-there-really-a-war-on-coal (evaluating the characterization of the EPA's initiatives as a war on coal).

28 For a discussion of the former caricature, see David B. Spence, *Paradoxes of Decarbonization*, 82 BROOKLYN L. REV. (forthcoming 2017).

29 According to the DW-NOMINATE data, *see supra* note 1, most of the growth in the ideological distance between the parties since 1970 reflects the rightward movement of the

within regulatory and energy policy debates[30]—have obscured the importance of regulation to well-functioning energy markets. This happens in part because conservative politicians increasingly embrace neoclassical economic views of regulation that are in turn the product of economists' scientific aspirations. Those aspirations lead the discipline to turn a blind eye to the social and emotional drivers of individual preferences that once sat at the center of classical political economy, and that bear directly on the question of when governments should intervene in markets. While many institutional economists, behavioral economists, and scholars in other disciplines seem to understand the blind spot, mainstream economics has not fully embraced its importance. This issue seems particularly lost on political decisionmakers, who use economic models selectively and instrumentally in the "government versus markets" debate. This, in turn, contributes to a misunderstanding of the role of regulation and government institutions in markets.

This Article uses contemporary energy policy disputes to illustrate how and why energy markets can never resemble the idealized markets of economic theory that have become so popular in conservative policy discourse. Part I of this Article examines the ideological conflict at the root of the energy policy debate. That discussion traces the struggle between those who would tame price volatility in energy markets and those who would embrace freely floating prices as the agents of "creative destruction."[31] This examination includes a review of how the thinking of Adam Smith and Friedrich Hayek has come to shape the conservative challenge to the New Deal consensus, and how modern proponents of that challenge see the history of energy markets as a march toward less regulation and more competition and market pricing. Part II looks more closely at the fundamental precepts of the neoclassical model of competition, and how it can miss important considerations in the policy process, in at least two ways. First, it examines how the economist's goal of allocative efficiency does not necessarily subsume notions of fairness and risk management that are important to voters and policymakers.

Republican Party, complemented by a slight leftward movement of the Democratic Party. For a graphical depiction of this data, see Freeman & Spence, *supra* note 5, at 90 fig.A-8.

30 The list of recent Nobel laureates in economics is littered with the names of scholars whose work continues to loom large in the debate. Some of those Nobel laureates in economics have been psychologists or political scientists, reflecting the Nobel Committee's interest in these market-versus-regulation questions. The Nobel Prize in economics has been awarded annually since 1969, and this Article cites eleven winners: Paul Samuelson, Kenneth Arrow, Friedrich von Hayek, Milton Friedman, Herbert Simon, George Stigler, Ronald Coase, Amartya Sen, Daniel Kahneman, Elinor Ostrom, and Oliver Williamson. *See Economist Nobel Laureates*, AM. ECON. ASS'N, https://www.aeaweb.org/about-aea/honors-awards/nobel-laureates (last visited Nov. 15, 2016). A twelfth Nobel winner, Jean Tirole, also contributed to the literature on network industries like public utilities, but is not otherwise cited here.

31 An Austrian economist, Joseph Schumpeter, coined the phrase "creative destruction" that is often invoked to describe (and sometimes trumpet) the way markets promote disruptive innovation. *See* JOSEPH A. SCHUMPETER, CAPITALISM, SOCIALISM AND DEMOCRACY 81–86 (1976).

Second, economic models continue to have trouble incorporating important lessons from behavioral research, lessons that are important to understanding the operation of energy markets. Part III examines how these shortcomings implicate the problem of ensuring a reliable, reasonably priced energy supply, given markets' inability to fully capture risk, uncertainty, and externalities in energy prices. Specifically, this Part explores how the discrepancy between real and idealized markets explains why regulators continue to intervene in American energy markets in ways disfavored by economic theory and contemporary conservative doctrine.[32] Part IV concludes with some observations about the inevitability of regulation in energy markets (something both Smith and Hayek probably would have accepted), and some further observations about how ideological polarization shapes policymaking in the modern regulatory state.

I. The Economics of Energy Regulation

Debates over the proper role of government in energy markets are almost as old as energy markets themselves. Section I.A briefly traces the regulation of modern energy markets since their inception in the nineteenth century, documenting the recent trends toward competition, market pricing, and greener energy supply; Section I.B examines the case for continuing and expanding the deregulatory trend, as advanced by political conservatives and some economists.

A. The Energy Policy Debate

In the nineteenth century John D. Rockefeller lamented the destructive effects of competition and boom-bust cycles in the oil industry,[33] recommending that the government leave his Standard Oil monopoly unregulated so that it might bring price stability to the industry.[34] The unpopularity of this stance led to the breakup of his company,[35] and to state regulation of oil and gas production aimed in part at stabilizing prices.[36] Rockefeller's contemporary, electricity titan Samuel Insull, by contrast, sought that same price stability through government regulation of the electricity industry, and is credited with creating the first modern electric utility, Commonwealth

32 At the same time, in even the most regulated American energy markets we continue to rely on private capital and markets to provide energy services. Government does not decide which facilities to build or to use; the private sector does. This is another truth that is sometimes underappreciated by proponents of ever-greener energy markets. See *infra* Part IV for a discussion of this issue.

33 Ron Chernow, Titan: The Life of John D. Rockefeller, Sr. 143–52 (1998).

34 Daniel Yergin, The Prize: The Epic Quest for Oil, Money & Power 23–25 (2008); *see also* Chernow, *supra* note 33, at 148.

35 *See* Standard Oil Co. of N.J. v. United States, 221 U.S. 1, 78, 81–82 (1911).

36 For a history of this regulation, see Stephen L. McDonald, Petroleum Conservation in the United States: An Economic Analysis (1971).

Edison.[37] Insull's views enjoyed more sway than Rockefeller's, and since at least the early twentieth century governments have used *ex post* regulation (antitrust suits) to try to tame price volatility and unfair competition in the oil industry,[38] and *ex ante* price regulation (public utility law) to achieve the same objectives in the natural gas and electricity industries.[39] For example, the Federal Power Act[40] and the Natural Gas Act[41] impose a fairness requirement on wholesale electric and gas prices, respectively, while state public utility statutes accomplish the same objective in retail markets.[42] Environmental and health and safety regulation of the energy industry is of a more recent vintage, but neither is it new. Between 1968 and 1980, the U.S. Congress erected most of the modern environmental and health and safety regulatory state, passing the Clean Air Act Amendments,[43] the Clean Water Act,[44] solid and hazardous waste management regulatory statutes,[45] workplace safety reg-

37 JOHN F. WASIK, THE MERCHANT OF POWER: SAM INSULL, THOMAS EDISON, AND THE CREATION OF THE MODERN METROPOLIS 105 (2006). The first state public utility commission was created in the late nineteenth century. This was the Massachusetts Board of Gas and Electric Light Commission. *See* Alfred E. Forstall, *Government Control of the Price of Gas*, 3 PUB. POL'Y: MEDIUM FOR DIFFUSING CORRECT ECON. INSTRUCTION ON QUESTIONS PUB. POL'Y 329, 332 (1900) (describing the Massachusetts commission as the "only organized attempt at government control of the gas business in the United States"). The National Association of Regulatory Utility Commissioners was established in 1889, offering testimony to the existence of multiple state commissions by that point. It was not until the twentieth century, however, that Insull built the first modern investor-owned *electric* utility.

38 Indeed, the federal government used antitrust law against the oil industry repeatedly in the first half of the twentieth century. *See, e.g.*, *Standard Oil*, 221 U.S. 1 (ordering the breakup of Standard Oil into thirty-four smaller companies for abuse of monopoly power); *see also* United States v. Socony-Vacuum Oil Co., 310 U.S. 150 (1940) (upholding the conviction of several oil companies, including progeny of the original Standard Oil Co., for colluding to fix prices on spot markets for oil in east Texas and the Midwest); *see also* Daniel A. Crane, *The Story of* United States v. Socony-Vacuum*: Hot Oil and Antitrust in the Two New Deals*, *in* ANTITRUST STORIES 91 (Eleanor M. Fox & Daniel A. Crane eds., 2007); D. Bruce Johnsen, *Property Rights to Cartel Rents: The* Socony-Vacuum *Story*, 34 J.L. & ECON. 177, 184 (1991).

39 In the first few decades of the twentieth century, Progressives advocated government ownership of the electric power industry, a vision that did not carry the day but the vestiges of which can be seen in today's municipal utilities and federal power agencies (such as the Bonneville Power Administration and the Tennessee Valley Authority (TVA)). For a good description of the public power movement, see ROBERT A. CARO, THE YEARS OF LYNDON JOHNSON: THE PATH TO POWER 516–28 (1982).

40 Federal Power Act of 1935, 16 U.S.C. § 791a (2012).

41 Natural Gas Act of 1938, 15 U.S.C. § 717w (2012).

42 For a more detailed description of the parallel development of antitrust and public utility law, see Spence & Prentice, *supra* note 18, at 133–48.

43 Clean Air Amendments of 1970, Pub. L. No. 91-604, 84 Stat. 1676 (codified as amended in scattered sections of 42 U.S.C.).

44 Clean Water Act of 1977, Pub. L. No. 95-217, 91 Stat. 1566 (codified as amended in scattered sections of 33 U.S.C.).

45 The two major waste management 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

ulation,[46] numerous land management and preservation statutes,[47] and more.[48]

All of these statutes constrain the behavior of energy producers, and their application has evolved as American energy markets have grown more competitive over time. Crude oil markets became global markets after World War II, eluding the government's (or any single nation's) ability to regulate prices.[49] In the last few decades, federal (and some state) regulators have introduced more competition and market pricing into natural gas and electricity markets than ever before.[50] Competition has spurred technological advances that, in turn, have triggered political and legal conflict over the production of oil and gas, both onshore and offshore,[51] and the construction and siting of transmission lines[52] and pipelines,[53] the siting of energy facili-

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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 inactive hazardous waste sites). The Toxic Substances Control Act, Pub. L. No. 94-469, 90 Stat. 2003 (codified as amended in scattered sections of 15 U.S.C.), and the Federal Insecticide, Fungicide, and Rodenticide Act Amendments of 1988, Pub. L. No. 100-532, 102 Stat. 2654 (codified as amended at 7 U.S.C. § 136 (2012)), regulated introduction of various toxic chemicals into the marketplace.

46 The primary statute is the Occupational Safety and Health Act of 1970, Pub. L. No. 91-596, 84 Stat. 1590 (codified as amended in scattered sections of 29 U.S.C.).

47 Perhaps the most prominent examples are the Wild and Scenic Rivers Act, Pub. L. No. 90-542, 82 Stat. 906 (codified as amended in scattered sections of 16 U.S.C.), and the Endangered Species Act of 1973, Pub. L. No. 93-205, 87 Stat. 884 (codified as amended in scattered titles of the U.S.C.).

48 National Environmental Policy Act of 1969, Pub. L. No. 90-190, 83 Stat. 852 (codified as amended in scattered sections of 42 U.S.C.).

49 *See* ANDREW P. MORRISS & ROGER E. MEINERS, COMPETITION IN GLOBAL OIL MARKETS: A META-ANALYSIS AND REVIEW 1, 8–9 (2012).

50 For a summary of the legislative and regulatory initiatives that introduced competition into the natural gas and electricity industries, see David B. Spence, *Can Law Manage Competitive Energy Markets?*, 93 CORNELL L. REV. 765 (2008); *infra* notes 91–97 and accompanying text.

51 The so-called "shale revolution" has led to sharp increases in onshore oil and gas production in the United States, and has sparked intense conflict over whether and where to permit the use of hydraulic fracturing to produce oil and gas in the United States. For a fuller discussion of these conflicts, see David A. Dana & Hannah J. Wiseman, *A Market Approach to Regulating the Energy Revolution: Assurance Bonds, Insurance, and the Certain and Uncertain Risks of Hydraulic Fracturing*, 99 IOWA L. REV. 1523 (2014); David B. Spence, *The Political Economy of Local Vetoes*, 93 TEX. L. REV. 351 (2014); *infra* notes 52–62 and accompanying text. Disputes over offshore oil and gas development have been a constant feature of the American energy policy landscape since the Santa Barbara oil spill in 1969. More recently, the Deepwater Horizon accident has fueled these disputes, as has the Obama Administration's 2015 proposal to lift the moratorium on offshore exploration off the Atlantic coast. *See generally* ADAM VANN, CONG. RESEARCH SERV., RL33404, OFFSHORE OIL AND GAS DEVELOPMENT: LEGAL FRAMEWORK (2014), https://www.fas.org/sgp/crs/misc/RL33404.pdf.

52 Growth in bulk power markets and renewables generation has highlighted the need for extensive investment in new transmission. For a fuller discussion of transmission line siting issues, see Alexandra B. Klass & Elizabeth J. Wilson, *Interstate Transmission Challenges*

ties,[54] and the price of energy.[55] At the same time, increasingly stringent environmental regulation of fossil-fueled electricity production has triggered charges that the Environmental Protection Agency (EPA) is waging a "war on coal."[56] These trends, toward more competition and market pricing of energy and toward a greener energy mix, are not the product of some broad national consensus. Rather, they represent political victories won (and defended) in an increasingly contentious political environment. Some states embrace competitive gas and electricity markets; others oppose them with equal resolve.[57] Similarly, the battle over whether and how to green the energy mix is continuous. On one side of the political spectrum, informal networks of ideologically like-minded individuals seek repeal of state renewable energy policies;[58] on the other, activist groups organize to oppose traditional sources of electricity, such as the effort to ban hydraulic fracturing to produce oil and gas.[59] At the federal level, the EPA's efforts to use the Clean

for Renewable Energy: A Federalism Mismatch, 65 VAND. L. REV. 1801 (2012); Alexandra B. Klass, *The Electric Grid at a Crossroads: A Regional Approach to Siting Transmission Lines*, 48 U.C. DAVIS L. REV. 1895 (2015); *infra* notes 263–82 and accompanying text.

53 The Keystone Pipeline is of course the most prominent example. For a recent summary of the politics of that dispute, see Coral Davenport, *Experts Say That Battle on Keystone Pipeline Is over Politics, Not Facts*, N.Y. TIMES (Jan. 8, 2015), http://www.nytimes.com/2015/01/09/us/senate-panel-approves-keystone-pipeline-bill.html?_r=0.

54 The most prominent example of this type of siting dispute is the Cape Wind project, a proposed offshore wind farm off the coast of Massachusetts. For a recent summary of the politics of that dispute, see Katharine Q. Seelye, *Plan for Offshore Wind Farm in Nantucket Sound Hits a Snag*, N.Y. TIMES (Jan. 7, 2015), http://www.nytimes.com/2015/01/08/us/plan-for-offshore-wind-farm-in-nantucket-sound-hits-a-snag.html; see *infra* notes 263–82 for further discussion of that issue.

55 The California electricity crisis of 2000–2001 is the most prominent example of this kind of conflict. *See* STAFF OF THE FED. ENERGY REGULATORY COMM'N, DOCKET NO. PAO2-2-000, FINAL REPORT ON PRICE MANIPULATION IN WESTERN MARKETS (2003) [hereinafter FERC, FINAL REPORT], http://www.ferc.gov/legal/maj-ord-reg/land-docs/PART-I-3-26-03.pdf.

56 For a summary of the various EPA rules alleged to comprise the war on coal, see JAMES E. MCCARTHY & CLAUDIA COPELAND, CONG. RESEARCH SERV., R41914, EPA'S REGULATION OF COAL-FIRED POWER: IS A "TRAIN WRECK" COMING? (2011), http://www.lawandenvironment.com/uploads/file/CRS-EPA.pdf.

57 For a summary of the current status of state treatment of retail rates, see AM. PUB. POWER ASS'N, RETAIL ELECTRIC RATES IN DEREGULATED AND REGULATED STATES: 2013 UPDATE (2014), https://publicpower.org/files/PDFs/RKW_Final_-_2013_update.pdf.

58 The American Legislative Exchange Council (ALEC), for example, works to repeal clean energy policies in the states and to promote pro-market, anti-regulatory policies generally. *See* Brad Plumer, *State Renewable-Energy Laws Turn Out to Be Incredibly Hard to Repeal*, WASH. POST (Aug. 8, 2013) (describing ALEC's largely unsuccessful efforts to secure repeal of renewable energy standards), http://www.washingtonpost.com/blogs/wonkblog/wp/2013/08/08/state-renewable-energy-laws-turn-out-to-be-really-hard-to-repeal/. About ALEC more generally, see Bulman-Pozen, *supra* note 4, at 1104 & n.110 (describing ALEC's efforts to undermine state implementation of the Affordable Care Act), 1128 n.232 (describing ALEC's state-level efforts to influence environmental and educational policy).

59 Americans Against Fracking is an umbrella group of national, state, and local organizations offering assistance to local communities opposing hydraulic fracturing (fracking)

Air Act to regulate emissions from coal-fired power plants have produced increasingly high-stakes litigation,[60] and increasingly shrill opposition,[61] as has the Federal Energy Regulatory Commission's (FERC) efforts to promote conservation.[62]

Energy policymaking was not always so polarized. In the 1970s, Richard Nixon, a Republican, created the EPA[63] and Jimmy Carter, a Democrat, oversaw the deregulation of natural gas prices;[64] as recently as the early 1990s, Congress came together to address the problem of acid rain in major amendments to the Clean Air Act,[65] and George H.W. Bush, a Republican, ran for reelection as "the environmental president."[66] Congress contained more bridge-building moderates in both parties during these years, people who

within their borders. See the Americans Against Fracking website at AM. AGAINST FRACKING, http://www.americansagainstfracking.org/about-the-coalition/members/ (last visited Nov. 15, 2016).

60 *See, e.g.*, Michigan v. EPA, 135 S. Ct. 2699 (2015) (rejecting the EPA's rule governing mercury and air toxics emissions from coal-fired power plants); Util. Air Regulatory Grp. v. EPA, 134 S. Ct. 2427 (2014) (reviewing the EPA's so-called "tailoring rule" governing the regulation of GHG emissions from large stationary sources that are already subject to Clean Air Act regulation); EPA v. EME Homer Generation, L.P., 134 S. Ct. 1584 (2014) (reviewing the EPA's rule governing cross-state air pollution from power plants). Since the Supreme Court overturned the mercury rule in 2015 on procedural grounds, the EPA has taken action that it says corrects the procedural defect at the heart of the Court's decision, leaving the rule in effect. Supplemental Finding That It Is Appropriate and Necessary to Regulate Hazardous Air Pollutants from Coal- and Oil-Fired Electric Utility Steam Generating Units, 81 Fed. Reg. 24,420 (Apr. 25, 2016).

61 For examples of the adversarial nature of the political debate over energy regulation, see Jean Chemnick, *Jay Rockefeller—The Evolution of a Coal-State Senator*, N.Y. TIMES (Jan. 18, 2011), http://www.nytimes.com/gwire/2011/01/18/18greenwire-jay-rockefeller-the-evolution-of-a-coal-state-s-4772.html?pagewanted=all; Caroline May, *Manchin on EPA Rule: Obama Administration 'Deniers'*, BREITBART (June 3, 2014), http://www.breitbart.com/Big-Government/2014/06/03/Manchin-on-EPA-Rule-Obama-Administration-Deniers (describing Senator Manchin's opposition to the EPA rule); Nick Wing, *Joe Manchin Shoots Cap-and-Trade Bill with Rifle in New Ad*, HUFFINGTON POST (Oct. 11, 2010, 3:53 PM), http://www.huffingtonpost.com/2010/10/11/joe-manchin-ad-dead-aim_n_758457.html.

62 *See* Fed. Energy Regulatory Comm'n v. Elec. Power Supply Ass'n, 136 S. Ct. 760 (2016) (upholding FERC Order 745, promoting the use of demand response in energy markets).

63 Richard Nixon established the EPA from parts of other agencies by executive action in 1970. *See* U.S. ENVTL. PROT. AGENCY, EPA HISTORICAL PUBL'N-1, THE GUARDIAN: ORIGINS OF THE EPA (1992), https://archive.epa.gov/epa/aboutepa/guardian-origins-epa.html#intro.

64 Jimmy Carter signed into law the Natural Gas Policy Act of 1978, 15 U.S.C. § 3301 (2012), which deregulated wellhead prices in the hopes of stimulating more exploration for natural gas. For a description of the early effects of the Natural Gas Policy Act, see Richard J. Pierce, *Reconsidering the Roles of Regulation and Competition in the Natural Gas Industry*, 97 HARV. L. REV. 345 (1983).

65 Clean Air Act Amendments of 1990, Pub. L. No. 101-549, 104 Stat. 2399, 42 U.S.C. § 7651 (2012).

66 This was George H.W. Bush in 1992. *See* Lynda Lee Kaid et al., *An Analysis of George Bush's 1988 and 1992 Campaign Advertising: Revisiting the Definition of a Presidential Candidate*,

facilitated cross-party cooperation and compromise.[67] Today, Democrats and Republicans are at ideological loggerheads over issues such as climate change, and the parties cannot agree even on the factual premises of the policy debate. As of this writing President-Elect Trump has appointed as EPA Administrator an Oklahoma Republican who questions climate science and was a leader of the effort to overturn the Obama EPA's environmental rules.[68] Republican leaders in Congress continue to express skepticism about climate science and most environmental regulatory initiatives, and oppose regulation on that basis; Democrats point to an overwhelming scientific consensus that the climate is warming largely as a result of human energy consumption, and to cost-benefit analysis supporting the new regulation of coal-fired combustion.[69] All of which has put the EPA in the political crosshairs as it tries to address the most important externalities associated with energy production.[70]

In this polarized environment, it has become increasingly popular among conservatives to cite economic theory in support of deregulatory positions. Beyond general appeals to the wisdom of the market and the failures of government, more conservatives are appealing to specific economic thinkers, such as Austrian economist Friedrich Hayek's arguments in favor of the market's ability to promote innovation, and against certain types of economic

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in HONOR AND LOYALTY: INSIDE THE POLITICS OF THE GEORGE H.W. BUSH WHITE HOUSE 7, 8 (Leslie D. Feldman & Rosanna Perotti eds., 2002).

67 See Freeman & Spence, *supra* note 5, at 82–93, for a discussion of the data demonstrating the disappearance of moderates in Congress over time.

68 Coral Davenport & Eric Lipton, *Trump Picks Scott Pruitt, Climate Change Denialist, to Lead EPA*, N.Y. TIMES (Dec. 7, 2016), https://www.nytimes.com/2016/12/07/us/politics/scott-pruitt-epa-trump.html?_r=0; *see also* Joshua S. Hill, *Leaked Transition Team Memo Outlines Trump's Catastrophic Energy Agenda*, CLEAN TECHNICA (Dec. 8, 2016), http://snip.ly/ih5ln#https://cleantechnica.com/2016/12/08/leaked-transition-team-memo-outlines-trumps-catastrophic-energy-agenda/ (quoting a transition team official's plan to "adopt pro-energy and pro-market policies").

69 *See* Ned Resnikoff, *Senate Committee Again Debates Existence of Climate Change*, MSNBC (Jan. 30, 2014), http://www.msnbc.com/all/senate-republicans-what-climate-change (describing how Senator Jim Inhofe repeated his views that climate change science is a hoax); *see also, e.g.*, NAT'L CLIMATE ASSESSMENT & DEV. ADVISORY COMM., DRAFT FOR PUBLIC REVIEW OF THE NATIONAL CLIMATE ASSESSMENT REPORT 1, 1 (2013), https://downloads.globalchange.gov/nca/nca3-drafts/NCAJan11-2013-publicreviewdraft-fulldraft.pdf; Intergovernmental Panel on Climate Change, *Summary for Policymakers*, *in* CLIMATE CHANGE 2013: THE PHYSICAL SCIENCE BASIS 3, 13 (T.F. Stocker et al. eds., 2013). Anti-regulatory forces do not have a monopoly on scientifically specious claims.

70 In 2011 Newt Gingrich expressed support for abolishing the EPA. *See* Kasie Hunt, *Newt Proposes Abolishing EPA*, POLITICO (Jan. 25, 2011), http://www.politico.com/news/stories/0111/48143.html. That same year a group of sixteen Senate Republicans co-sponsored a bill to abolish the EPA by merging it into the Department of Energy. Press Release, Richard Burr, U.S. Senator for N.C., Burr Bill Cuts Spending, Increases Efficiency by Combining Dept. of Energy and EPA (May 5, 2011), http://www.burr.senate.gov/press/releases/burr-bill-cuts-spending-increases-efficiency-by-combining-dept-of-energy-and-epa.

regulation as "serfdom."[71] Indeed, appeals to "Austrian economics" have been particularly popular among Republican presidential aspirants in twenty-first century election cycles. In the run up to the 2012 GOP presidential nomination, candidates Ron Paul, Rick Perry, Michele Bachmann,[72] and Paul Ryan[73] pledged allegiance to Hayek's philosophy,[74] as have some GOP candidates since.[75] These appeals echo conservative economists who characterize some remaining energy market regulation as destructive to freedom, and likely to distort markets and reduce welfare.[76] They serve not only to buttress candidates' conservative bona fides with Republican primary voters,[77] but also as evidence that the scholarly economic critique of regulation has penetrated public debates over regulation, including the regulation of energy markets, more than ever before. Therefore, a closer look at that critique is in order.

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71 FRIEDRICH A. HAYEK, THE ROAD TO SERFDOM (1944). The term "Austrian economics" has several specific connotations within economics, historically. Some ascribe to the Austrian school a preference for methodological individualism, as well as a skepticism toward econometrics. Many of the American economists associated with the Austrian school are associated with the application of economic methods to social choice and political phenomena, and that is the way in which the term is used in this Article. *See* Peter J. Boettke, *Austrian School of Economics*, THE CONCISE ENCYCLOPEDIA OF ECONOMICS (David R. Henderson ed., 2d ed. 2008) [hereinafter THE CONCISE ENCYCLOPEDIA OF ECONOMICS], http://www.econlib.org/library/Enc/AustrianSchoolofEconomics.html.

72 *See* Tamara Keith, *Austrian School Economist Hayek Finds New Fans*, NPR (Nov. 15, 2011), http://www.npr.org/2011/11/15/142307737/austrian-school-economist-hayek-finds-new-fans (quoting Bachmann to the effect that she read Hayek at the beach, and Perry's claim that Hayek helped him understand that "John Maynard Keynes absolutely knew nothing about economics").

73 *See* Adam Davidson, *Prime Time for Paul Ryan's Guru (the One Who's Not Ayn Rand)*, N.Y. TIMES MAG. (Aug. 21, 2012), http://www.nytimes.com/2012/08/26/magazine/prime-time-for-paul-ryans-guru-the-one-thats-not-ayn-rand.html?_r=0 (detailing the connection between Hayek's thought and Ryan's policy proposals).

74 During the 2012 campaign Ron Paul declared that "we are all Austrians now." Justin Ptak, *Ron Paul: 'We Are All Austrians Now.'*, CHRISTIAN SCI. MONITOR (Jan. 9, 2012), http://www.csmonitor.com/Business/The-Circle-Bastiat/2012/0109/Ron-Paul-We-are-all-Austrians-now.

75 *See* Sam Tanenhaus & Jim Rutenberg, *Rand Paul's Mixed Inheritance*, N.Y. TIMES (Jan. 25, 2014), http://www.nytimes.com/2014/01/26/us/politics/rand-pauls-mixed-inheritance.html (describing the ideological connections between Austrian thinkers, the American Tea Party movement, and Senator Rand Paul's philosophy).

76 *See infra* Section I.B.

77 *See infra* Section I.B. Furthermore, by invoking "Austrian economics," candidates can allude to a group that includes not only Hayek, but more conservative thinkers such as Ludwig von Mises, who is sometimes credited as a founder of libertarianism. *See* Israel Kirzner, *Ludwig von Mises: A Primer*, IMAGINATIVE CONSERVATIVE (Oct. 14, 2016), http://www.theimaginativeconservative.org/2016/10/ludwig-von-mises-a-primer-israel-kirzner.html. Despite his nationality, there is considerable debate over whether Schumpeter belongs in the Austrian school, either methodologically or ideologically. *See, e.g.*, Viktor J. Vanberg, *Schumpeter and Mises as 'Austrian Economists'*, 25 J. EVOLUTIONARY ECON. 91 (2013).

B. The Neoclassical Economic Critique of (Energy) Regulation

Welfare economists seek allocative efficiency, a distribution of costs and benefits that maximizes the social net benefit.[78] The stylized, neoclassical model of perfect competition yields this optimal allocation, as Adam Smith foreordained more than two centuries ago.[79] If individuals are free to pursue their economic self-interest—free to exchange goods and services, and to enter and exit markets—the freely floating prices attached to those exchanges will allocate capital and labor to their highest uses, thereby maximizing social net benefits.[80] It is true that the route to allocative efficiency in energy markets is fraught with disruption and price volatility, but to devotees of free markets that sort of creative destruction is the price of innovation. Thus, Hayekians celebrate the very destructive competition that Rockefeller lamented,[81] and tend to see regulation as a welfare-reducing damper on that mostly beneficial process.[82]

1. Market Solutions to Market Failure?

Economists acknowledge that markets may not always tend toward competitive equilibria, or may produce externalities that are not reflected in the price of a good, creating a kind of social inefficiency.[83] Hence the United States government's use of antitrust law to police monopoly in the oil indus-

78 For a useful illustration of allocative efficiency, see HAL R. VARIAN, INTERMEDIATE MICROECONOMICS: A MODERN APPROACH 14–18 (4th ed. 1996).

79 In Smith's famous words:

> [E]very individual necessarily labours to render the annual revenue of the society as great as he can. He generally, indeed, neither intends to promote the public interest, nor knows how much he is promoting it. . . . [H]e intends only his own gain, and he is in this, as in many other cases, led by an invisible hand to promote an end which was no part of his intention. . . . By pursuing his own interest he frequently promotes that of the society more effectually than when he really intends to promote it.

ADAM SMITH, AN INQUIRY INTO THE NATURE AND CAUSES OF THE WEALTH OF NATIONS 199 (Edinburgh, A. & C. Black 4th ed. 1850).

80 There are, of course, additional predicates to this conclusion that have been formalized by modern neoclassical economics. These include the absence of market externalities, perfect information and factor mobility, and non-increasing returns to scale. *See, e.g.*, VARIAN, *supra* note 78, at 563–74.

81 L. LYNNE KIESLING, DEREGULATION, INNOVATION AND MARKET LIBERALIZATION: ELECTRICITY REGULATION IN A CONTINUALLY EVOLVING ENVIRONMENT 6–12 (2009) (arguing that public utility regulation stifles innovation that provides consumer benefits).

82 Former TVA chief David Freeman argues that "[a] completely free market for electricity and natural gas is too volatile for either the producer or the consumer." *See Hearings*, *supra* note 25.

83 *See, e.g.*, VARIAN, *supra* note 78, at 571–74.

try,[84] and state regulation of oil and gas production to manage boom-bust volatility in that industry.[85]

The framers of public utility laws began with the proposition that the provision of electric and gas service is a natural monopoly.[86] Therefore, to protect consumers from monopoly pricing, governments created public utility commissions, and charged commissions with overseeing natural gas and electric services so as to ensure (something closer to) a competitive price.[87] Rate regulation not only protected consumers against monopoly pricing, but also ensured utilities a reasonable return on their investments in plants, transmission and distributions facilities, and other capital equipment.[88] Policymakers used antitrust law to contain the tendency toward monopoly in oil markets; but after World War II, regulators lost what leverage they had over crude oil prices when oil markets became global markets.[89] Consequently, those markets have come to resemble the kind of dynamic, competitive market described by Hayek, one with many producers and relatively low barriers to entry.[90]

In the latter half of the twentieth century, economists began to revise their views of the electricity and natural gas markets. They advocated the unbundling of energy sales from energy delivery, the introduction of competition into the energy sales segment of the electric and gas industries, and the opening of the (still-regulated) energy delivery network to all on equal terms.[91] Thus, the 1980s and 1990s saw the introduction of competition and

84 HERBERT HOVENKAMP, FEDERAL ANTITRUST POLICY: THE LAW OF COMPETITION AND ITS PRACTICE 8–14 (1994); *see also* United States v. Socony-Vacuum Oil Co., 310 U.S. 150, 210–31 (1940) (upholding a conviction of several oil companies for colluding to fix prices on spot markets); Standard Oil Co. of N.J. v. United States, 221 U.S. 1, 81–82 (1911) (breaking up Rockefeller's Standard Oil monopoly).

85 *See* Spence & Prentice, *supra* note 18, at 131, 134–41 (discussing regulators' loss of leverage over oil markets after 1960).

86 Generally, economists define a natural monopoly as an industry (or discrete segment of an industry) over which the costs of production are increasing over the entire range of output. *See* VARIAN, *supra* note 78, at 416–22.

87 For a summary of the history of rate regulation, see Robert E. Cleaves, IV, Note, *Constitutional Protection for the Utility Investor: The Confiscation Doctrine After* Cleveland Electric Illuminating Co. v. Public Utilities Commission of Ohio, 12 B.C. ENVTL. AFF. L. REV. 527, 533–34 (1985).

88 For a thorough discussion of ratemaking principles, see Duquesne Light Co. v. Barasch, 488 U.S. 299 (1989); Jersey Cent. Power & Light Co. v. Fed. Energy Regulatory Comm'n, 810 F.2d 1168 (D.C. Cir. 1987); EISEN ET AL., *supra* note 14, at 646–99 (describing the basic principles of rate regulation).

89 *See* MORRISS & MEINERS, *supra* note 49, at 8–9.

90 The so-called shale revolution illustrates this point. Relatively small companies perfected the technique of hydraulic fracturing, and dominated shale gas production during its early phases. For accounts of this history, see GREGORY ZUCKERMAN, THE FRACKERS (2013).

91 The introduction of competition was part of a trend in economic thinking in the 1970s and 1980s, which saw increased faith in the ability of markets to achieve efficient outcomes through competition, and reduced faith in the ability of governments to achieve efficient outcomes through regulation. For discussions of this issue, see SIDNEY A. SHAPIRO

market pricing into wholesale electricity and gas markets,[92] and some retail markets.[93] When California's newly-competitive electricity markets failed spectacularly in 2000–2001,[94] Hayekians and other conservatives did not blame the sellers who were subsequently fined for manipulating those markets; rather, they blamed regulation.[95] While the California crisis slowed the transition to competition, competitive markets survived in most places where they existed prior to the crisis; while market overseers (like the FERC and so-called independent system operators (ISOs) and regional transmission organizations (RTOs)[96]) responded by establishing market monitors to guard against market manipulation in electricity markets.[97]

Contemporaneous with this late twentieth-century march toward competitive energy markets were efforts by policymakers to address another kind of market failure—namely, pollution as a cost of production that is not borne by the firm but rather shifted to society at large (an externality)—via the

& JOSEPH P. TOMAIN, REGULATORY LAW AND POLICY 33–34 (1st ed. 1993) (describing a move away from regulation in general and noting the effect on natural gas and electricity industries).

92 This restructuring in wholesale natural gas and electricity markets was accomplished largely by the Federal Energy Regulatory Commission, through a series of rulemakings forcing the unbundling of energy sales from the provision of energy delivery services over networks (natural gas pipelines and electric transmission lines). *See, e.g.*, Regulation of Natural Gas Pipelines After Partial Wellhead Decontrol; Order Denying Rehearing and Clarifying Order Nos. 636 and 636-A, 57 Fed. Reg. 57,911 (Nov. 27, 1992) (to be codified at 18 C.F.R. pt. 284) (forcing the unbundling of natural gas sales from transmission services); Promoting Wholesale Competition Through Open Access Non-Discriminatory Transmission Services by Public Utilities; Recovery of Stranded Costs by Public Utilities and Transmitting Utilities, 61 Fed. Reg. 21,540 (May 10, 1996) (to be codified at 18 C.F.R. pts. 35, 385) [hereinafter Promoting Wholesale Competition] (forcing the unbundling of electricity sales from transmission services).

93 For a discussion of the history of restructuring of retail markets for natural gas and electricity, see David B. Spence, *Can Law Manage Competitive Energy Markets?*, 93 CORNELL L. REV. 765, 767–76 (2008).

94 Daily average prices on the California wholesale market soared to more than twenty times historical averages, triggering the bankruptcy of one major utility and the near bankruptcy of another, an Enron-centered market manipulation scandal, and more. For a full description of the California electricity crisis, see FERC, FINAL REPORT, *supra* note 55.

95 *See, e.g.*, ROBERT L. BRADLEY, JR., CAPITALISM AT WORK: BUSINESS, GOVERNMENT, AND ENERGY 89 (2009) (ascribing the Enron-led gaming of California energy markets in 2000–2001 to "*government failure* and the unintended social consequences of *political capitalism*, not free-market failure"); *cf.* KIESLING, *supra* note 81, at 26, 116–17 (acknowledging that "restructuring in a complex network industry is harder than neoclassical theory would predict," but blaming price caps and barriers to entry for the poor functioning of competitive markets).

96 As part of its restructuring of the electricity industry, the FERC pushed owners of transmission lines to form ISOs and RTOs to help manage the provision of transmission services and oversee wholesale power markets. *See* Regional Transmission Organizations, 65 Fed. Reg 809 (Jan. 6, 2000) (to be codified at 18 C.F.R. pt. 35); Promoting Wholesale Competition, *supra* note 92.

97 For a fuller description of the regulatory effort to address market manipulation in energy markets generally, see Spence & Prentice, *supra* note 18, at 159–64.

passage of laws to encourage firms to internalize that cost. Economists had long recognized externality problems as a tragedy of the commons,[98] or a prisoner's dilemma problem,[99] a cooperation problem in the face of powerful individual incentives not to cooperate. Most economists favor pollution taxes as the optimal solution,[100] though some advocate other forms of regulation,[101] privatizing the commons,[102] or privately negotiated solutions.[103] All of those options entail efforts to "get prices right" and let the market allocate these environmental costs of economic activity accordingly. In practice, however, policymakers have tended to favor systems of prescriptive and proscriptive rules, permitting and enforcement[104] over environmental taxes, though some environmental laws embrace economists' second-best solution—tradable permits.[105]

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

99 For a very thorough exploration of the prisoner's dilemma and its application to regulatory policy, see RUSSELL HARDIN, COLLECTIVE ACTION (1982); TODD SANDLER, COLLECTIVE ACTION: THEORY AND APPLICATIONS (1992).

100 Economists have preferred environmental taxes to so-called mandates and individual permitting since the time of A.C. Pigou, who first advocated taxing pollution. *See* ARTHUR CECIL PIGOU, THE ECONOMICS OF WELFARE (4th ed. 1932); *see also* WILLIAM J. BAUMOL & WALLACE E. OATES, THE THEORY OF ENVIRONMENTAL POLICY (2d ed. 1988).

101 Garrett Hardin advocated government regulation within a democracy ("mutual coercion, mutually agreed upon") as a solution to his tragedy of the commons. Hardin, *supra* note 98, at 1247. Within the prisoner's dilemma literature this is sometimes referred to at the Leviathan solution, echoing Thomas Hobbes's social contract. *See* Sofia Guedes Vaz, Note, *The Tragedy of the Commons and Leviathan. A Small Insight into Environmental Political Philosophy*, 22 PHILOSOPHICA 65, 66 (2003) (discussing and critiquing the Leviathan solution to prisoner's dilemma problems).

102 *See, e.g.*, Armen A. Alchian & Harold Demsetz, *The Property Rights Paradigm*, 33 J. ECON. HIST. 16 (1973); Harold Demsetz, *Toward a Theory of Property Rights*, 57 AM. ECON. REV. 347 (1967).

103 *See infra* notes 107–12 and accompanying text (discussing the Coase Theorem). The empirical work of Nobel laureate Elinor Ostrom suggests the possibility of cooperative solutions to public goods management problems, at least within relatively small societies or social groups. *See* ELINOR OSTROM, GOVERNING THE COMMONS: THE EVOLUTION OF INSTITUTIONS FOR COLLECTIVE ACTION (1990); Elinor Ostrom, *Institutional Arrangements for Resolving the Commons Dilemma: Some Contending Approaches*, *in* THE QUESTION OF THE COMMONS: THE CULTURE AND ECOLOGY OF COMMUNAL RESOURCES 250, 250–65 (Bonnie J. McCay & James M. Acheson eds., 1987); *see also* ROBERT AXELROD, THE EVOLUTION OF COOPERATION (1984) (suggesting that experimental game theory supports the possibility of cooperative solutions to prisoner's dilemma problems).

104 Most pollution regulation fits this description. For a more thorough discussion of pollution regulation as a command-and-control system, see David B. Spence, *The Shadow of the Rational Polluter: Rethinking the Role of Rational Actor Models in Environmental Law*, 89 CALIF. L. REV. 917 (2001).

105 For example, the Clean Air Act Amendments of 1990 established the first major permit trading program for older coal-fired power plants to trade sulfur dioxide emissions rights. Pub. L. 101-549, 104 Stat. 2399 (codified as amended in scattered sections of the U.S.C.).

2. Government Failure: The Economic Critique of Regulation

In addition to suggesting market-based remedies for market failure, economic thought also addressed the "government versus markets" problem in another way, by applying the tools of economic analysis to government policymaking. The period from the 1940s through the 1970s, in particular, saw the publication of seminal economic critiques of government decisionmaking and regulation. These analyses, which gained influence in the American policy debate in the ensuing decades, almost invariably suggested flaws in the regulatory process.[106] The Coase Theorem, for example, challenged the notion that externality problems necessitated a regulatory response.[107] Coase demonstrated that the most efficient policy response to a pollution problem is not command-and-control regulation or even a pollution tax, but rather the establishment of property rights that will enable the holders of those rights to bargain to an efficient solution.[108] Crucially, said Coase, it does not matter to which party we assign the superior rights: whether we assign the polluting firm the right to pollute or the nearby residents the right to be free from pollution. So long as we assign property rights to one or the other, bargaining between them will produce a more efficient solution than government regulation.[109]

Coase's work has spawned a strain of law and economics scholarship that looks particularly skeptically on regulatory responses to externality problems. In 2014, the Property and Environment Resource Center (PERC) noted that "[f]ocusing on the externality takes us away from the liberty and responsibil-

106 Economists approached this problem in several ways, and their efforts have given rise to labels like "public choice," "Chicago School," and "new institutional economics" (NEI). The first two strains of economic thinking are sometimes considered to be descendants of Austrian economics. NEI represents a strain of economic thought that seeks to incorporate legal and governmental variables within economic models, and to account for the effect of transaction costs in economic theorizing about the market and government alike. All of these schools of thought, however, employ standard economic assumptions when modeling government decisionmaking or market-government interactions. In this way, they stand in contrast to both classical political economy and more recent behavioral economics. For a straightforward description of the differences between these strains of economic thinking, see Christos Pitelis, *On the Nature of the Firm*, *in* MARKET EVOLUTION: COMPETITION AND COOPERATION (Arjen van Witteloostuijn ed., 1995). For a discussion of the differences between behavioral economics and neoclassical approaches (including Chicago School, public choice, and NEI), see *infra* Part III.

107 *See* R.H. Coase, *The Problem of Social Cost*, 3 J.L. & ECON. 1 (1960).

108 *Id.* The Coasean analysis implies that, where one party's pollution or waste injures another party, government intervention requiring the polluter to internalize those externalities would more than likely be inefficient, or relatively so. *Id.* This is because the true value the parties place on those externalities will be more accurately gauged by their willingness to pay each other to accept or stop the pollution than by government's attempts to measure those values. *Id.* Coase acknowledges in the article that his assumptions rarely apply, suggesting a role for government in such situations; however, his caveats have been frequently ignored in subsequent discussions of "Coasean" solutions to externality problems. *Id.*

109 *Id.*

ity that individuals have to work out problems."[110] Writing shortly after Coase, James Buchanan and William Craig Stubblebine concluded that private negotiation will in fact internalize non-pecuniary externalities so long as a few of the bearers of external costs have an incentive to negotiate.[111] Harold Demsetz has also endorsed the superiority of Coasean solutions to pollution problems.[112] While these views have not prevailed in policymaking, they offer theoretical support for the conservative hostility to the EPA and its initiatives within the GOP.

Arrow's Theorem offered another example of the use of formal logic to challenge the capacity of government to address market failures by demonstrating mathematically that no social choice mechanism—legislative or otherwise—could produce choices that satisfy certain basic democratic principles.[113] Arrow's analysis was highly stylized and included some debatable criteria among his democratic minima,[114] but became a pillar of public choice analysis by supporting the inference that government cannot serve any "public interest" because no such interest exists.[115] Subsequent public choice analyses complemented Arrow by characterizing regulation as the product of rent-seeking by industry rather than attempts to address market failure, and regulators as prone to "capture" by the very industries they oversee.[116]

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110 Terry Anderson, *Externalities Versus Liberty*, PROP. & ENV'T RESEARCH CTR. (July 23, 2014), http://perc.org/blog/externalities-versus-liberty.

111 James M. Buchanan & Wm. Craig Stubblebine, *Externality*, 29 ECONOMICA 371, 380–83 (1962); *see also* David D. Haddock, *Irrelevant Internalities, Irrelevant Externalities, and Irrelevant Anxieties* (Nw. Univ. Sch. of Law, Working Paper No. 27, 2003), http://law.bepress.com/nwwps-lep/art27.

112 Harold Demsetz, Fallacies in the Economic Doctrine of Externalities (July 19, 2010) (unpublished manuscript), http://lawweb.usc.edu/assets/docs/contribute/Demsetz.pdf.

113 Kenneth J. Arrow, *A Difficulty in the Concept of Social Welfare*, 58 J. POL. ECON. 328 (1950). Arrow's Theorem echoed earlier work by mathematicians like Condorcet, who demonstrated the sensitivity of collective choice outcomes to manipulation of the voting agenda. For a summary of this pre-Arrow scholarship on voting theory, see WILLIAM H. RIKER, LIBERALISM AGAINST POPULISM (1982); Nicholas R. Miller et al., *The Geometry of Majority Rule*, 1 J. THEORETICAL POL. 379 (1989); Amartya Sen, *Nobel Lecture: The Possibility of Social Choice*, 1998 ECON. SCI. 178, 179–80.

114 *See, e.g.*, Howard F. Chang, *A Liberal Theory of Social Welfare: Fairness, Utility, and the Pareto Principle*, 110 YALE L.J. 173 (2000) (attempting to reconcile notions of fairness and the Pareto principle); Miller et al., *supra* note 113 (summarizing responses to Arrow's theorem in the spatial modeling literature); Sen, *supra* note 113; Amartya Sen, *The Impossibility of a Paretian Liberal*, 78 J. POL. ECON. 152 (1970) (challenging Pareto optimality).

115 *See* William F. Shughart II, *Public Choice*, THE CONCISE ENCYCLOPEDIA OF ECONOMICS, *supra* note 71 (explaining the public choice critique of the notion of "public interest").

116 On capture theory generally, see WILLIAM A. NISKANEN, JR., BUREAUCRACY AND REPRESENTATIVE GOVERNMENT (1971); and Joseph P. Kalt & Mark A. Zupan, *The Apparent Ideological Behavior of Legislators: Testing for Principal-Agent Slack in Political Institutions*, 33 J.L. & ECON. 103 (1990); Sam Peltzman, *Toward a More General Theory of Regulation*, 19 J.L. & ECON. 211 (1976); George J. Stigler, *The Theory of Economic Regulation*, 2 BELL J. ECON. & MGT. SCI. 3 (1971). There are at least two different varieties of capture theory. One posits capture with the complicity of congressional committees, via "iron triangles." *See*

It is difficult to overstate the enormous influence economic and public choice analyses have exerted over scholarship within the field of energy law. It is not uncommon for scholars to dismiss the notion of the public interest, and to dismiss regulation as just so much rent-seeking by private interests.[117] More specifically, public choice antitrust scholars began to look more benignly on the effects of monopoly and oligopoly, reasoning that markets are often self-correcting, because barriers to entry are lower, and economies of scale more common, than traditional antitrust analysis assumed.[118] Public choice scholarship also fed the deregulatory impulse that produced the restructuring of American natural gas and electricity markets in the 1980s and 1990s: that is, that transition was inspired both by the perceived failures of regulation[119] and by economic analyses suggesting that competition and market pricing would benefit consumers.[120] That the federal bench includes

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DOUGLASS CATER, POWER IN WASHINGTON: A CRITICAL LOOK AT TODAY'S STRUGGLE TO GOVERN IN THE NATION'S CAPITAL (1964); J. LEIPER FREEMAN, THE POLITICAL PROCESS: EXECUTIVE BUREAU-LEGISLATIVE COMMITTEE RELATIONS (1955); Stigler, *supra*. Another version argues that after an initial burst of interest in regulation, the general public eventually loses interest in agency policymaking, leaving only regulated interest groups to participate in the process. Eventually, the agency is persuaded to adopt the policy preferences of the regulated industry, based in part upon the skewed information set with which the agency is presented. *See generally* GABRIEL KOLKO, RAILROADS AND REGULATION 1877–1916 (1965); John A. Ferejohn, *The Structure of Agency Decision Processes*, *in* CONGRESS: STRUCTURE AND POLICY (Mathew D. McCubbins & Terry Sullivan eds., 1990).

117 David Schoenbrod has conceived of regulation, including Clean Air Act regulation, in starkly public choice terms, as the product of rent-seeking. DAVID SCHOENBROD, POWER WITHOUT RESPONSIBILITY: HOW CONGRESS ABUSES THE PEOPLE THROUGH DELEGATION (1993); *see also* BRADLEY, *supra* note 95, at 162–67 (describing energy regulation in public choice terms).

118 For a summary of public choice scholarship's effects on antitrust law, see HOVENKAMP, *supra* note 84, at 61–63.

119 *See, e.g.*, Richard J. Pierce, Jr., *Reconstituting the Natural Gas Industry from Wellhead to Burnertip*, 9 ENERGY L.J. 1 (1988) (summarizing the disastrous experiment with regulating producer sales and the road to deregulation of such sales). As Professor Pierce notes, the FERC was ordered to regulate natural gas wellhead sales by the Supreme Court, a decision that ultimately resulted in massive natural gas shortages in the 1970s. *Id.* Later, scholars began to question the wisdom of rate regulation of wholesale sales in electricity markets. *See, e.g.*, Paul L. Joskow, *Regulatory Failure, Regulatory Reform, and Structural Change in the Electrical Power Industry*, 1989 BROOKINGS PAPERS ON ECON. ACTIVITY: MICROECONOMICS 125; Richard J. Pierce, Jr., *A Proposal to Deregulate the Market for Bulk Power*, 72 VA. L. REV. 1183 (1986).

120 *See, e.g.*, Stephen Breyer, *Analyzing Regulatory Failure: Mismatches, Less Restrictive Alternatives, and Reform*, 92 HARV. L. REV. 547, 551, 609 (1979) (providing a basic framework for analyzing regulation and concluding that the energy market is a good candidate for "less restrictive alternatives" to regulation); Harold Demsetz, *Why Regulate Utilities?*, 11 J.L. & ECON. 55 (1968) (making the economist's case for restructuring); George J. Stigler & Claire Friedland, *What Can Regulators Regulate? The Case of Electricity*, 5 J.L. & ECON. 1 (1962); Oliver E. Williamson, *Franchise Bidding for Natural Monopolies—In General and with Respect to CATV*, 7 BELL J. ECON. 73 (1976) (arguing for a loosening of regulation).

public choice scholars[121] also facilitated the penetration of these ideas into judicial decisions.[122]

Friedrich Hayek's writings are credited with providing much of the intellectual foundation for public choice scholarship. Writing two centuries after Smith, Hayek argued that "it is essential that the entry into the different trades should be open to all on equal terms," and that "[a]ny attempt to control prices or quantities of particular commodities deprives competition of its power" to promote efficiency.[123] Hayek questioned the ability of regulators to have the foresight to regulate wisely,[124] and explored the market as a kind of complex adaptive system likely to allocate benefits and costs on its own better than regulators ever could.[125] This is because knowledge in this kind of system is not centralized: rather, it is diffuse and unevenly distributed among economic agents. Yet, said Hayek, the price signal transmits knowledge from agent to agent over time, unleashing a process not of equilibrium, but of constant adaptation to constant change. From this process of constant adaptation comes a kind of "spontaneous" or "emergent" order.[126] Crucially, this process produces better outcomes, said Hayek, than will government

121 Three examples of public choice examinations of antitrust doctrine by scholars who became prominent federal judges are ROBERT BORK, THE ANTITRUST PARADOX: A POLICY AT WAR WITH ITSELF (1978); RICHARD A. POSNER, ECONOMIC ANALYSIS OF LAW 309–47 (5th ed. 1998); Frank H. Easterbrook, *The Limits of Antitrust*, 63 TEX. L. REV. 1 (1984).

122 HOVENKAMP, *supra* note 84, at 61 (calling the public choice "revolution . . . a full assault on the New Deal . . . conception of the frailty of markets and the appropriate scope of antitrust intervention," but characterizing the courts as stopping short of full adoption of public choice ideas (footnote omitted)).

123 HAYEK, *supra* note 71, at 27.

124 Hayek's basic critique of regulators is laid out in *The Road to Serfdom*:

> [G]overnment in all its actions is bound by rules fixed and announced beforehand—rules which make it possible to foresee with fair certainty how the authority will use its coercive powers in given circumstances, and to plan one's individual affairs on the basis of this knowledge. Though this ideal can never be perfectly achieved, since legislators as well as those to whom the administration of the law is entrusted are fallible men, the essential point, that the discretion left to the executive organs wielding coercive power should be reduced as much as possible, is clear enough.

Id. at 54 (footnote omitted). Presaging Arrow's Theorem, Hayek denies that government can be impartial, or reflect the public interest, noting that any collectivist state "must, of necessity, take sides," thereby becoming a "'moral' institution . . . [that] imposes on its members its views on all moral questions." *Id.* at 57.

125 FRIEDRICH A. HAYEK, INDIVIDUALISM AND ECONOMIC ORDER 169–70 (1948) (critiquing public utility regulation as wasteful central planning).

126 David Rehr sees Hayek's notion of "spontaneous order" as the further development of Adam Smith's "invisible hand" idea. David Rehr, Fed. Reserve Bank of Minneapolis, *Hayek's Legacy of Spontaneous Order*, REGION (June 1, 1992), http://www.minneapolisfed.org/publications_papers/pub_display.cfm?id=3747. Indeed, Scottish Enlightenment scholar Adam Ferguson first wrote of the concept of spontaneous order in Adam Smith's day. ADAM FERGUSON, AN ESSAY ON THE HISTORY OF CIVIL SOCIETY (1768); *cf.* Michelle A. Schwarze & John T. Scott, *Spontaneous Disorder in Adam Smith's* Theory of Moral Sentiments*: Resentment, Injustice, and the Appeal to Providence*, 77 J. POL. 463 (2015) (attributing to

planning.[127] Hayek did not explicitly apply his framework to energy markets, but others have, challenging the notion that public utility regulation, in particular, can "get prices right" or otherwise create conditions that mimic textbook competition.[128]

Energy economists and their allies within the legal academy cite this logic to advocate the completion of the deregulatory project within electricity markets. They celebrate the fact that governments no longer seek to regulate price or supply in oil markets, and wholesale electricity and gas markets (for the most part); but they lament vestigial government regulation of competition and retail prices in electricity and natural gas markets, as well as regulation in the markets for energy derivatives,[129] as an impediment to the innovation and efficiency the unfettered market would bring, given the chance.[130] Proponents of free energy markets lament the market distortions created by continued regulation of retail natural gas and electricity prices in many states, and caps on wholesale natural gas and electricity prices. They oppose regulatory incentives for particular energy investments (such as renewables) on similar grounds, and licensing regimes, which they see as barriers to entry.[131] These arguments are rooted, often explicitly, in the distrust of government and faith in markets popularly associated with Austrian economics and Adam Smith.[132]

Smith a belief in the importance of remediating injustices, and challenging the notion that Smith's world view supports Hayekian spontaneous order).

127 HAYEK, *supra* note 71, at 32–42 ("Economic liberalism . . . regards competition as superior [to planning] because it is in most circumstances the most efficient method known, [and] because it is the only method by which our activities can be adjusted to each other without coercive or arbitrary intervention of authority.").

128 *See generally* KIESLING, *supra* note 81 (conceptualizing electricity markets as complex adaptive systems in which price signals will stimulate innovation and create value).

129 Energy derivatives are financial contracts through which parties can guarantee the right to purchase or sell energy at guaranteed future prices. Energy derivatives are regulated by the Commodity Futures Trading Commission. For a discussion of these instruments, their role in energy markets, and their regulation, see Spence & Prentice, *supra* note 18.

130 *See, e.g.*, BRADLEY, *supra* note 95; HAYEK, *supra* note 125; ALFRED E. KAHN, THE ECONOMICS OF REGULATION: PRINCIPLES AND INSTITUTIONS (1970); KIESLING, *supra* note 81.

131 *See, e.g.*, *Economic Issues Associated with the Restructuring of Energy Industry: Hearing Before the S. Comm. on Homeland Sec. & Gov't Affairs*, 107th Cong. 2–3 (2001) (statement of William W. Hogan, Professor, Harvard University) (blaming government interventions in the California electricity market for severe price spikes in that market); KIESLING, *supra* note 81, at 115–35 (explaining why the price signal does a better job of providing reliable electric service than market interventions); Severin Borenstein & James Bushnell, *The U.S. Electricity Industry After 20 Years of Restructuring* (Energy Inst. at Haas, Working Paper No. 252R, 2015) (attributing higher than efficient electricity prices to government subsidies for inefficient renewables).

132 See for example BRADLEY, *supra* note 95, at 21–35 (discussing Adam Smith's views on the interaction of markets and morality); *id.* at 97–113 (discussing Austrian economics, particularly von Mises and Schumpeter); KIESLING, *supra* note 81, whose work cites the ideas of Hayek throughout.

Why, then, does the deregulatory project remain incomplete? Why do governments erect unequal barriers to entry for different kinds of energy projects? Why have modern energy markets stopped short of the free market ideal to date? The answer lies, at least partly, in the realization that the economist's highly stylized view of human nature is incomplete: it is mostly limited to that which can be deduced from the idealized abstraction that is *homo economicus*. It mostly ignores *homo politicus*.

II. THE *POLITICAL* ECONOMY OF ENERGY LAW

While economics seeks allocative efficiency, voters and their agents in Congress care not only about what is efficient, but also what is just, or fair. Consequently, voters and policymakers sometimes use collective action to seek a more just distribution, or to organize collective responses to risk.[133] The distinction between efficiency and fairness, in turn, implicates a set of long-debated issues in welfare economics, political science, and philosophy. This Part traces the reasons why the traditional tools of economic analysis have failed to account for considerations that are important to understanding energy regulation. Section I.A uses the extensive philosophical and behavioral critique of economic models to identify and explain the blind spots in economic analyses of regulation. This is well-plowed ground, but fertile ground nonetheless for understanding the shortcomings of economic models of political decisionmaking. Section I.B illustrates how that philosophical and behavioral critique offers good reasons why regulators continue to intervene in energy markets, even as those markets have moved in the direction of economists' competitive ideal.

A. Blind Spots in the Economic Critique

The economic critique of regulation struggles with the distinction between the positive and the normative, and does so in ways that can bias economic analyses toward faith in markets and away from regulation in at least two ways. First, aspiring to be a positive science, economics's embrace of the goal of economic efficiency masks value judgments, particularly when economists insist that the scientific imperative implies reliance on Pareto effi-

133 One cannot explain the broad body of public utility regulation or environmental regulation as mere rent-seeking or capture, at least not very persuasively. For a more complete explanation of the broad public protection impulses that motivated American public utility laws, see Boyd, *supra* note 19, at 1635–75. For an explanation of the broad public protection impulses that motivated American environmental laws, see Anthony Downs, *Up and Down with Ecology—The "Issue-Attention Cycle"*, 28 PUB. INT. 38 (1972); Christopher H. Schroeder, *Rational Choice Versus Republican Moment—Explanations for Environmental Laws, 1969–73*, 9 DUKE ENVTL. L. & POL'Y F. 29, 33–56 (1998). For an argument that public choice analyses of policymaking improperly conflate economic methods with anti-regulatory ideology, see David B. Spence & Frank Cross, *A Public Choice Case for the Administrative State*, 89 GEO. L.J. 97 (2000); David B. Spence, *A Public Choice Progressivism, Continued*, 87 CORNELL L. REV. 397, 419–43 (2001).

ciency[134] as a decision criterion. Second, despite the power of both institutional economics and the behavioral revolution[135] in economics, the neoclassical model still holds great sway. In particular, economic models of policymaking have only just begun to engage the lessons of behavioral psychology, despite a steadily growing behavioral critique of economics stretching back to the work of Herbert Simon more than a half-century ago.[136] In the intervening years, behavioral psychology, neuropsychology, and cultural anthropology have given us a much clearer and more nuanced picture of human motivation (including the motivations of both *homo economicus* and *homo politicus*) than that suggested by the neoclassical economic model.

1. Economics as Positive Science and the Efficiency Criterion

Economics aspires to be a positive science, like physics:[137] positing assumptions, and deducing conclusions from those assumptions, often using mathematical or formal logic. Ideally, this system of logic yields testable conclusions about the real world, which are then subjected to rigorous empirical tests.[138] Of course, economists' first principles begin with the idea that individuals are rational maximizers of their self-interest (utility-maximizers), and will behave in purposeful, sometimes strategic, ways in pursuit of that goal. In this way modern economics has formalized Adam Smith's argument that perfectly competitive markets produce Pareto efficient outcomes.[139] As with physicists' models of the natural world, to many economic theorists it does not matter that the assumptions on which the theory of perfect competition is built rarely exist in the real world. The theory is useful as a starting point, from which we can begin to understand how real markets work by comparing

134 A distribution is Pareto efficient when no one can be made better off without making someone else worse off. For a fuller discussion of why this criterion looms large in welfare economics, see *infra* notes 145–65 and accompanying text.

135 Richard H. Thaler & Sendhil Mullainathan, *Behavioral Economics*, THE CONCISE ENCYCLOPEDIA OF ECONOMICS, *supra* note 71 (summarizing the influence of behavioralism in economics).

136 *See, e.g.*, Herbert A. Simon, *A Behavioral Model of Rational Choice*, 69 Q.J. ECON. 99 (1955) (introducing the psychological critique of the rational actor model, and the notions of "bounded rationality" and "satisficing").

137 Political scientists Kevin Clarke and David Primo accuse economics, political science, and sociology of "physics envy." Kevin A. Clarke & David M. Primo, Opinion, *Overcoming 'Physics Envy'*, N.Y. TIMES (Mar. 30, 2012), http://www.nytimes.com/2012/04/01/opinion/sunday/the-social-sciences-physics-envy.html?_r=0.

138 For a more sophisticated discussion of the relationship between models and theory, and an argument that models are good for more than simply testing hypotheses, see Kevin A. Clarke & David M. Primo, *Modernizing Political Science: A Model-Based Approach*, 5 PERSP. ON POL. 741 (2007).

139 In another emulation of physics, this conclusion is sometimes called the First Theorem of Welfare Economics. Allan M. Feldman, *Welfare Economics*, *in* THE NEW PALGRAVE DICTIONARY OF ECONOMICS (Steven N. Durlauf & Lawrence E. Blume eds., 2d ed. 2008) (describing the Theorem). This labelling echoes physicists' fundamental laws of thermodynamics.

them to the competitive ideal. In positive science, they say, the value of the theory lies not in the realism of its assumptions but in its ability to illuminate that which is logical,[140] or to yield accurate predictions of aggregate behavior.[141]

Both Arrow's Impossibility Theorem and the Coase Theorem are examples of theories built in this way (though the former uses much more formal logic than the latter). From the assumption of purposeful rationality, both Arrow and Coase used logical analysis to reach conclusions about political and legal problems, respectively.[142] Since those conclusions implicate law and policy, several generations of legal scholars and political scientists have engaged both of these theorems[143] in ways that illustrate that the conclusions of each are dependent upon disputable assumptions.[144] For example, both theorems posit the desirability of Pareto efficiency.[145] However, if politics is

140 STEVEN J. BRAMS, PARADOXES IN POLITICS: AN INTRODUCTION TO THE NONOBVIOUS IN POLITICAL SCIENCE (1976) (discussing the use of formal/mathematical logic in political science to deduce nonobvious conclusions about political phenomena).

141 Milton Friedman argued that economic models ought to be judged "by the precision, scope, and conformity with experience of the predictions [they yield]. In short, positive economics is, or can be, an 'objective' science, in precisely the same sense as any of the physical sciences." MILTON FRIEDMAN, *The Methodology of Positive Economics*, *in* ESSAYS IN POSITIVE ECONOMICS 3, 4 (1953); *cf.* Russell Korobkin, *Daniel Kahneman's Influence on Legal Theory*, 44 LOY. U. CHI. L.J. 1349, 1351 (2013) ("I always found [Friedman's] claim to be extremely unpersuasive [because i]f people don't actually optimize, then why would their behavior be consistent with optimization?").

142 In that sense, both theorems are examples of positive political theory—the application of economic reasoning to political/legal problems.

143 For a summary of the issues raised by responses to the Coase Theorem since its publication, see Steven G. Medema & Richard O. Zerbe, Jr., *The Coase Theorem*, *in* 1 ENCYCLOPEDIA OF LAW AND ECONOMICS 836, 836–78 (Boudewijn Bouckaert & Gerrit De Geest eds., 2000), http://encyclo.findlaw.com/0730book.pdf.

144 Indeed, some scholars have levelled especially sharp criticism at formal models and public choice theory. *See, e.g.*, DONALD P. GREEN & IAN SHAPIRO, PATHOLOGIES OF RATIONAL CHOICE THEORY 5–7 (1994) (arguing public choice scholars have not met the burden of demonstrating empirical support for their embrace of instrumental rationality as the most important motivator of political behavior); THEODORE J. LOWI, THE END OF LIBERALISM: THE SECOND REPUBLIC OF THE UNITED STATES 310–13 (1979) (criticizing economic models of politics); Cynthia R. Farina, *Faith, Hope, and Rationality or Public Choice and the Perils of Occam's Razor*, 28 FLA. ST. U. L. REV. 109, 114 ("Taken at its word and applied with logical rigor, public choice theory is useless to [us]."). For their part, formal theorists sometimes characterize less mathematical methods with barely disguised disdain. *See, e.g.*, PETER C. ORDESHOOK, GAME THEORY AND POLITICAL THEORY ix (1986) ("[T]his research seeks to satisfy a rigid definition of 'theory,' and not some ambiguous criteria of good journalism and insightful comment . . . .").

145 Arrow's Theorem posits Pareto efficiency as one of several necessary characteristics of any democratic collective choice mechanism. Arrow, *supra* note 113, at 329–30 (describing the goal of collective choice as a state in which "no individual can be made better off without making someone worse off," which is the definition of a Pareto optimum). Coase concludes that under the conditions he posits, private bargaining is more likely to approach a Pareto efficient solution to externality problems than government regulation or Pigovian taxes. Coase, *supra* note 107, contends that regulation of externality problems

(axiomatically) a zero-sum game, economists' embrace of the Pareto criterion to evaluate policy or policymaking processes seems to expel political tradeoffs from their discipline's domain.[146]

There is an historical reason for this. It is an outgrowth of economics's aspiration to be a positive science, and to disavow the normative in economic analysis. Economics rejected the normative questions at the heart of utilitarian philosophy[147] sometime prior to the mid-twentieth century. It did so by rejecting as "unscientific" interpersonal utility comparisons (and the idea that we can aggregate utility across individuals), based upon the premise that we cannot observe or measure individual utility; rather, we can only measure individual choices, from which we can infer individual preferences.[148] It was this so-called "ordinal revolution" that elevated Pareto efficiency as the dominant goal in welfare economics.[149] Accordingly, Arrow endorses this view explicitly, rejecting Kaldor-Hicks efficiency[150] in favor of the Pareto criterion.[151]

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is bound to err by sometimes permitting activities with a negative net benefit, and prohibiting activities with a positive net benefit, and that when property rights are well defined and bargaining costless, those errors can be avoided. That is, under those circumstances, bargaining will result in a Pareto superior distribution of costs and benefits, compared to regulation.

146 *See* POSNER, *supra* note 121, at 14–15 ("The conditions for Pareto superiority are almost never satisfied in the real world, yet economists talk quite a bit about efficiency."); *see also* COLIN F. CAMERER, BEHAVIORAL GAME THEORY (2003) (calling the neoclassical model unrealistic).

147 The utilitarianism of Bentham embraced the goal of maximizing utility, not simply maximizing the number of happy people. JEREMY BENTHAM, A FRAGMENT ON GOVERNMENT AND AN INTRODUCTION TO THE PRINCIPLES OF MORALS AND LEGISLATION (1967); *see also* Sen, *supra* note 113, at 182 (describing the Benthamite utility-maximization rule that dominated welfare economics into the early twentieth century).

148 LIONEL ROBBINS, AN ESSAY ON THE NATURE AND SIGNIFICANCE OF ECONOMIC SCIENCE (1932) (making the case for rejecting interpersonal utility comparisons as unscientific). For an explanation of the spread of Robbins's argument throughout the profession, see D. Wade Hands, *The Positive-Normative Dichotomy and Economics*, 13 HANDBOOK OF THE PHILOSOPHY OF SCIENCE 219, 222–24 (Dov M. Gabbay et al. eds., 2012).

149 The term "ordinal revolution" comes from the notion that *cardinal* utility cannot be measured. Rather, we can only measure *ordinal* utility: that is, we can infer preference rankings from choice behavior. For a full description of this revolution and its impacts, see Andrew Caplin & Paul W. Glimcher, *Basic Methods from Neoclassical Economics*, *in* NEUROECONOMICS: DECISION MAKING AND THE BRAIN 3, 6–7 (Paul W. Glimcher & Ernst Fehr eds., 2d ed. 2014) [hereinafter NEUROECONOMICS] (describing the interests of nineteenth-century economists in cardinal utility, and how their theories were "brought to a crashing halt" by Pareto); and Hands, *supra* note 148, at 224 (explaining that the "the earlier utilitarian policy criterion (maximize total or average utility) was replaced by the Pareto criterion").

150 A distribution is Kaldor-Hicks superior to the status quo if it increases overall utility and it is possible for the winners to compensate the losers. Of course, the first condition implies the ability to aggregate utility across individuals.

151 More specifically, Arrow stated that "the search for a clear definition of optimum social welfare has been plagued by the difficulties of interpersonal comparisons," and

It should be obvious, however, that the Pareto criterion is not value-free. To the contrary, it is by definition a rejection not only of redistributive policy, but also of the intuition that disparities in wealth influence the amount of utility different individuals derive from a given quantity of goods or income.[152] If the only legitimate inferences about welfare are those we can make from individual market decisions,[153] it is little wonder that modern welfare economic analyses favor market solutions over government regulation: by that logic, only through individual voluntary exchange can welfare ever be maximized.[154] If economics does not explicitly endorse this narrow, unrealistic view of social efficiency as *normatively* best, it effectively endorses it nevertheless by concluding that Pareto efficiency is the only *scientifically* justified decision criterion, and by employing it as the touchstone of "efficiency" across a wide spectrum of policy problems.

Of course, Pareto efficiency seems a limited and inadequate decision criterion to scholars concerned with the distributional impacts of policies, or who recognize the ubiquity of zero-sum decisions in policymaking.[155] Hence, some political economy scholars reject Pareto efficiency as the only defensible criterion by which to judge policy choices. Judge Posner, for example, concludes that Pareto efficiency is of limited value as a measure of social good because it depends upon "the distribution of wealth—willingness to pay, and hence value, being a function of that distribution."[156] Economist

rejected Kaldor-Hicks efficiency on both "ethical" and practical grounds. Arrow, *supra* note 113, at 329–30.

152 *See* Hands, *supra* note 148, at 222 (describing economists' rejection on scientific grounds of the law of diminishing marginal utility that had been embraced by earlier welfare economists, including Pigou); *see also* DANIEL M. HAUSMAN & MICHAEL S. MCPHERSON, ECONOMIC ANALYSIS, MORAL PHILOSOPHY, AND PUBLIC POLICY 67–68 (2d ed. 2006) (referring to the efficiency criterion as a "Trojan horse smuggling ethical commitments into the theoretical citadel of positive mainstream economics").

153 Within the economic profession, there are dissenters from the view that only choice can reveal preferences. *See, e.g.*, Botond Koszegi & Matthew Rabin, *Choices, Situations, and Happiness*, 92 J. PUB. ECON. 1821 (2008) (arguing that choice behavior alone can never reveal which outcomes make people better off, and that ancillary assumptions about utility, or other measures of utility, are always necessary to make inferences about individual welfare).

154 Some of the more purist strains of the Austrian economic school have embraced a version of the Pareto criterion as a normative basis for opposing most government action as tyrannical or illegitimate. Murray Rothbard, an American associated with the Austrian school, advocated a society based on a series of voluntary private exchanges, and characterized most government regulation as a form of violent coercion. *See* MURRAY N. ROTHBARD, MAN, ECONOMY, AND STATE: A TREATISE ON ECONOMIC PRINCIPLES (1962).

155 This discussion focuses on the kind of consequentialist critiques of the Pareto criterion that tend to dominate law and the social sciences, not those critiques that emanate from deontological philosophy, and that fault all utilitarian and consequentialist decision rules for failing to articulate an *a priori* theory of the good. Marc Fleurbaey, *Economics and Economic Justice*, THE STANFORD ENCYCLOPEDIA OF PHIL. (May 30, 2012), http://plato.stanford.edu/archives/win2014/entries/economic-justice/.

156 POSNER, *supra* note 121, at 15. Michael Dorff echoes Posner when he observes that "there is general agreement that the Pareto principle is largely irrelevant in policymaking

Amartya Sen devoted a good portion of his 1998 Nobel address to a plea for welfare economics to move beyond the Pareto criterion and embrace interpersonal utility comparisons in order to make a more meaningful contribution to discussion of important policy problems.[157] Similar concerns dominate seminal works in political science.[158] Nonetheless, the goal of Pareto efficiency retains its perch atop welfare economics, and is responsible for a kind of disconnect between economic theory and political reality, at times.

For example, consider the problem of monopoly pricing, which loomed so large in the history of public utility law. In neoclassical economics, monopoly pricing is inefficient not because it enables the (monopoly) firm to capture more (and consumers fewer) benefits than under pure competition, but because it produces a so-called "deadweight loss" representing potential benefits captured neither by firms nor consumers.[159] However, we know that legislators enacted antitrust laws[160] and public utility laws not so much to rid the market of deadweight losses, but rather for fairness reasons: that is, to ensure that prices were "just and reasonable"[161] for firms and consumers alike.[162] Similarly, American environmental law eschews reliance on Coasean solutions, not only because those solutions are practically unworkable (in most cases, they are),[163] but also because they frequently offend

because it is almost never true that a change in policy will make everyone better-off." Michael B. Dorff, *Why Welfare Depends on Fairness: A Reply to Kaplow and Shavell*, 75 S. CAL. L. REV. 847, 858–59 (2002).

157 Sen, *supra* note 113, at 187–202 ("We cannot even understand the force of public concerns about poverty, hunger, inequality, or tyranny, without bringing in interpersonal comparisons in one form or another.").

158 *See, e.g.*, ROBERT A. DAHL, A PREFACE TO DEMOCRATIC THEORY 134 (1956) (noting that while preference intensities cannot be directly measured, they can be reflected in levels of political activity).

159 HOVENKAMP, *supra* note 84; VARIAN, *supra* note 78.

160 Leonard W. Weiss, *The Structure-Conduct-Performance Paradigm and Antitrust*, 127 U. PA. L. REV. 1104, 1104–05 (1979) ("[I]t seems certain that Congress never thought in terms of [deadweight loss] when it passed the antitrust laws and that the public and Congress do not concern themselves with it today.").

161 Both the Federal Power Act and the Natural Gas Act charge the Federal Energy Regulatory Commission with ensuring that wholesale prices are "just and reasonable." *See* 16 U.S.C § 824d (2012) (Federal Power Act); 15 U.S.C. § 717c (2012) (Natural Gas Act).

162 For example, the Supreme Court has said that the primary aim of the Natural Gas Act was to "protect consumers against exploitation at the hands of natural gas companies." FPC v. Hope Nat. Gas Co., 320 U.S. 591, 610–11 (1944) (articulating, also, the rights of firms to fair rates); *see also* William Boyd, *Public Utility and the Low-Carbon Future*, 61 UCLA L. REV. 1614, 1635–75 (2014) (arguing that the public utility law was a distinctly Progressive-Era concept focused on the "social control of business").

163 Coase's basic argument assumes away collective action problems. Where multiple parties are affected by pollution from a single firm, the injured parties may have difficulty acting collectively, which can lead to inefficient results. Coase, *supra* note 107, at 17. As others have observed, the incentive to "free ride" can undermine that conclusion even when multiple affected parties can overcome other obstacles to bargaining. *See* HARDIN, *supra* note 99, at 212.

most voters' sense of fairness.[164] Even if unregulated markets could have produced Pareto efficiency, these policy choices were not guided by that decision rule. Thus, in these ways economics's aspirations to positive science tilt the discipline's conclusions toward disregard of collective notions of fairness and the influence of wealth disparities on utility, and toward greater skepticism about regulatory solutions to important distributional problems.[165]

2. Individual Decisionmaking and the Behavioral Revolution

Scholars in behavioral economics and behavioral game theory have been working for decades to address this defect in modern welfare economics, and have broadened our understanding of human decisionmaking in the process.[166] However, a large segment of mainstream economics continues to resist those lessons or to deny their usefulness, or to pay them no more than lip service by way of oversimplified nods toward "bounded rationality."[167] Much of this resistance is traceable to the ordinal revolution and the belief that economic models (ought to) "make no assumptions and draw no conclusions about the physiology of the brain,"[168] or that theorizing about behavioral departures from rationality is ad hoc.[169]

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164 Coase's analysis ignores some important dimensions of fairness, such as the question of whether the polluter came to the injured party or the injured party came to the polluter, or the effects of distribution of wealth on willingness to pay, and more. Coase, *supra* note 107, at 15–16. For a discussion of the effects of status quo bias on notions of fairness in bargaining over land use conflicts, see David B. Spence, *The Political Economy of Local Vetoes*, 93 TEX. L. REV. 351, 395–97 (2014).

165 The prominent debates within legal philosophy over these questions tend to acknowledge the importance of distributional concerns, and follow the longstanding fault lines between deontological (rights- or duty-based) approaches and consequentialist (utilitarian) approaches. Perhaps the most prominent example is the debate provoked by Kaplow and Shavell's argument that policy should be judged on utilitarian grounds, and that utility includes individuals' distributional concerns. *See* Louis Kaplow & Steven Shavell, *Fairness Versus Welfare*, 114 HARV. L. REV. 961 (2001); *see also* Dorff, *supra* note 156 (responding to Kaplow and Shavell).

166 *See, e.g.*, Richard Thaler, *Toward a Positive Theory of Consumer Choice*, 1 J. ECON. BEHAV. & ORG. 39 (1980) (considered a seminal and pioneering work within behavioral economics). The work of Colin Camerer illustrates an analogous effort within game theory. *See, e.g.*, CAMERER, *supra* note 146 (summarizing key lessons in behavioral game theory).

167 *See supra* notes 135–66 and accompanying text.

168 *See, e.g.*, Faruk Gul & Wolfgang Pesendorfer, The Case for Mindless Economics 2 (Nov. 2005) (unpublished manuscript) (on file with author). Gul and Pesendorfer also defend traditional welfare economics by noting that "[a]n institution's effectiveness at maximizing the true happiness of its participants cannot justify the persistence of that institution if the criterion for true happiness conflicts with the participants' revealed preferences." *Id.* at 4.

169 CAMERER, *supra* note 146, at 11 ("[E]conomists resist [new theories of utility] because it seems too easy to introduce a new factor in the utility function . . . . "); *see also* Gul & Pesendorfer, *supra* note 168, at 4 (rejecting the notion that utility can be separated

Nevertheless, less doctrinaire social scientists, philosophers, and legal scholars seek to understand how "normal people," or "people with emotions and cognitive limits, . . . behave,"[170] and to grapple with the distributional issues at the center of policymaking and law. Hence the greater influence of behavioral research within philosophy, political science, and law than in economics.

The behavioral revolution challenges economists' assumptions about individual rationality directly,[171] a skepticism that was probably always present outside the discipline. Herbert Simon was skeptical "about substituting *a priori* postulates about rationality for factual knowledge of human behavior,"[172] and the subsequent work of Kahneman and Tversky[173] and others within the fields of psychology, sociology, anthropology, and neurobiology has illustrated myriad ways in which human motivation and human action deviates from the assumptions underlying the neoclassical rational choice model.[174] This is apparently true for *homo economicus*, but is especially true

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from choice behavior). Camerer contends, however, that behavioral experiments have generated scientific "social preference theories" in that they are suggested by observable choice behavior. CAMERER, *supra* note 146, at 11–12; *see also* Ernst Fehr & Ian Krajbich, *Social Preferences and the Brain*, *in* NEUROECONOMICS, *supra* note 149, at 193–215 (explaining elements of social preference theory).

170 CAMERER, *supra* note 146, at xiii.

171 Early dialogue between economics and behavioralism produced a distinction between instrumental rationality, which assumed only purposeful, goal-oriented behavior and avoided assumptions about the goal itself ("thin rationality"), and economic rationality, which coupled instrumental behavior with the assumption of selfishness ("thick rationality"). For a discussion of this dialogue, see JON ELSTER, SOUR GRAPES: STUDIES IN THE SUBVERSION OF RATIONALITY 10 (1983) (contrasting "rational man," who merely acts purposively and logically, with "economic man," who is selfish as well). Behavioral research challenges both types of rationality. Russell B. Korobkin & Thomas S. Ulen, *Law and Behavioral Science: Removing the Rationality Assumption from Law and Economics*, 88 CALIF. L. REV. 1051, 1060–68 (discussing thin and thick rationality, and their application to law and economics); Amartya K. Sen, *Rational Fools: A Critique of the Behavioral Foundations of Economic Theory*, 6 PHIL. & PUB. AFF. 317 (1977) (arguing that cognitive limitations aside, humans often do not always act instrumentally but are often guided instead by social norms—duty, altruism, and the like—or the desire to act expressively); Michael Taylor, *Battering RAMs*, 9 CRITICAL REV. 223, 228–31 (1995) (crediting expressive behavior and intrinsic motivations—not instrumental rationality—with greater explanatory power in models of political and social behavior).

172 Herbert A. Simon, *Human Nature in Politics: The Dialogue of Psychology with Political Science*, 79 AM. POL. SCI. REV. 293, 297 (1984).

173 *See, e.g.*, Amos Tversky & Daniel Kahneman, *The Framing of Decisions and the Psychology of Choice*, 211 SCIENCE 453 (1981) (an early seminal work); *see also* DANIEL KAHNEMAN, THINKING FAST AND SLOW (2011) (summarizing his work with Tversky).

174 For a good example of Kahneman and Tversky's experiments in this vein, see Amos Tversky & Daniel Kahneman, *Judgment Under Uncertainty: Heuristics and Biases*, 185 SCIENCE 1124 (1974).

for *homo politicus* as well.[175] Consequently, the behavioral critique contains important lessons for understanding modern energy policy.

While the behavioral literature is far too large to summarize here,[176] four of its fundamental lessons have particular significance for current debates over energy markets and their regulation. First, behavioral models emphasize *the importance of emotion* in motivating choice behavior. The sense that a particular outcome (energy prices, for example, or the allocation of pollution risk) is unfair, for example, is in part an emotional reaction. The coupling of neuro-imaging with choice experiments confirms that for many of the choices that deviate from expectations generated by rational actor models, the parts, processes, and systems of the brain that govern emotions sometimes dominate the analytical reasoning parts of the brain.[177] Scholars sometimes ascribe these tendencies to evolutionary causes, reasoning that they were evolutionarily advantageous to our ancestors.[178]

Second, among these evolutionarily advantageous instincts is a *concern for the welfare of the group.* Experimental psychologists have repeatedly demonstrated the importance of social forces in explaining (seemingly irrational) behavior, including our impulses to conform to the norms of the group,[179]

175 In his critique of the Pareto criterion and the application of rational actor models to political questions, Mark Sagoff put it this way: "[N]ot all of us think of ourselves simply as consumers. Many of us regard ourselves as citizens as well. We act as consumers to get what we want for ourselves. We act as citizens to achieve what we think is right or best for the community." Mark Sagoff, *At the Shrine of Our Lady of Fatima* or *Why Political Questions Are Not All Economic*, 23 ARIZ. L. REV. 1283, 1286 (1981) (emphasis omitted).

176 Many scholars research the applications of behavioral findings to legal issues. *See, e.g.*, RICHARD H. THALER & CASS R. SUNSTEIN, NUDGE: IMPROVING DECISIONS ABOUT HEALTH, WEALTH, AND HAPPINESS (2008) (summarizing and expanding upon earlier articles applying behavioralism to legal topics); Chris Guthrie et al., *Judging by Heuristic: Cognitive Illusions in Judicial Decision Making*, 86 JUDICATURE 44 (2002); Robert A. Prentice, *The Case of the Irrational Auditor: A Behavioral Insight into Securities Fraud Litigation*, 95 NW. U. L. REV. 133 (2000); Jeffrey J. Rachlinski & Forest Jourden, *The Cognitive Components of Punishment*, 88 CORNELL L. REV. 457 (2003); Jeffrey J. Rachlinksi, *The Psychology of Global Climate Change*, 2000 U. ILL. L. REV. 299.

177 Kahneman distinguishes the former (more reflexive, automatic decision processes) from the latter (more deliberative, analytical decision processes) when he speaks of "thinking fast and slow." Kahneman calls the former "system 1" thinking, and the latter "system 2" thinking. KAHNEMAN, *supra* note 173, at 10 (discussing the distinction between action motivated by a simple desire, and action motivated by a plan, requiring calculation).

178 *See* DANIEL GOLEMAN, WORKING WITH EMOTIONAL INTELLIGENCE 199–201 (1998) (summarizing the evolutionary explanation for development of social intelligence); *see also* DACHER KELTNER, BORN TO BE GOOD: THE SCIENCE OF A MEANINGFUL LIFE 8–11, 243–46 (2009) (describing the evolution of social preferences).

179 The famous Asch experiment demonstrated that a surprising percentage of subjects would provide an obviously incorrect answer to a simple question once it had become the apparent dominant view within the group. Solomon E. Asch, *Effects of Group Pressure upon the Modification and Distortion of Judgments*, *in* GROUPS, LEADERSHIP AND MEN: RESEARCH IN HUMAN RELATIONS 177, 177–90 (Harold Steere Guetzkow ed., 1951). Irving Janis's notion of "groupthink" emphasized this same point, though Janis used *ex post* analysis of high-profile group decisions rather than experiments. IRVING L. JANIS, VICTIMS OF GROUPTHINK:

to cooperate,[180] and to treat each other fairly (concern for others' welfare).[181] Summarizing this literature, science writer Daniel Goleman explains human "radar for friendliness and cooperation" as essential to group survival for early humans.[182] Behavioral psychologists often cite the robust results in "ultimatum game" experiments[183] as evidence for individuals' instinctive preference for fair allocations. Wealthier, more sophisticated energy consumers may not be adverse, for example, to cross-subsidies in energy prices that help poorer consumers. Significantly, *homo politicus* is

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A PSYCHOLOGICAL STUDY OF FOREIGN-POLICY DECISIONS AND FIASCOES (1972). More recently, Dan Kahan's experiments at the Yale Cultural Cognition Project have shown how people's beliefs, and evaluation of empirical evidence, are biased by their need to be consistent with the views of those with whom they share a political ideology and cultural identity. Dan M. Kahan & Donald Braman, *Cultural Cognition and Public Policy*, 24 YALE L. & POL'Y REV. 147 (2006); Dan M. Kahan et al., The Cultural Cognition Project at Yale Law Sch., *The Second National Risk and Culture Study: Making Sense of—and Making Progress in—the American Culture War of Fact* 5 (Yale Law Sch., Pub. Law Working Paper No. 154, 2007). Finally, cultural cognition theory is an outgrowth of cultural theory. *See, e.g.*, MARY DOUGLAS & AARON WILDAVSKY, RISK AND CULTURE: AN ESSAY ON THE SELECTION OF TECHNOLOGICAL AND ENVIRONMENTAL DANGERS (1983) (presenting early work on cultural theory).

180 Prisoner's dilemma game experiments demonstrate that cooperative norms can arise within the context of the game, even though the payoff structure suggests that noncooperation is the behavioral equilibrium. *See* AXELROD, *supra* note 103 (illustrating the long-term superiority of a particular cooperative strategy in computer simulations). Elinor Ostrom's research offers empirical support for the same conclusion. OSTROM, *supra* note 103. Interestingly, studying economics may be associated with a relative disinclination to cooperate in cooperation games. *See* Robert H. Frank et al., *Does Studying Economics Inhibit Cooperation?*, 7 J. ECON. PERSP. 159 (1993).

181 Ernst Fehr, *Social Preferences and the Brain*, *in* NEUROECONOMICS: DECISION MAKING AND THE BRAIN 215, 217 (Paul W. Glimcher et al. eds., 1st ed. 2009) (stating that "a large body of experimental [laboratory] evidence in economics and psychology indicat[es] that a substantial percentage of people . . . [have social] preferences and that neither concerns for the well-being of others nor for fairness and reciprocity can be ignored in social interactions" (citation omitted)).

182 GOLEMAN, *supra* note 178, at 200, 201 (noting that in human evolution, "social intelligence made its appearance well before the emergence of rational thought," and is governed by the neocortex, which "evolved from more ancient structures in the emotional brain, like the amygdala, and so is heavily laced with circuitry for emotion").

183 In the ultimatum game, two players decide how to divide a sum of money between them. The first player may propose a division (any division) of the proceeds, and the second player chooses whether or not to accept the proposed division. If the second player rejects the proposal, neither player receives any of the money. An individually rational second player should accept any proposed allocation that provides him with a positive return (as a Pareto improvement over the status quo, and the alternative); knowing this, a rational first player should propose a division in which she commands the lion's share of the money. However, in actual experiments, the first player will often propose far more even divisions of the dollar, and the second player will reject as unfair proposals of particularly uneven divisions. This sense of fairness apparently trumps the desire for more, rather than less. Werner Güth et al., *An Experimental Analysis of Ultimatum Bargaining*, 3 J. ECON. BEHAV. & ORG. 367 (1982); Martin A. Nowak et al., *Fairness Versus Reason in the Ultimatum Game*, 289 SCIENCE 1773 (2000).

often not motivated by pecuniary self-interest, or if she is, she cares less about her absolute wealth and more about her position relative to others. If one is devoted to the modern, scientific neoclassical model of welfare economics, one might be tempted to dismiss these choices as ethically-suspect cognitive errors, but that is not necessarily true, and any such inference is the product of the biases of the neoclassical model.

Third, experimental research supports the conclusion that our brains' emotional circuitry is also built to help us *avoid risk, or danger.* Indeed, one of the early heuristics identified by Kahneman and Tversky was our heightened sensitivity to the risk of loss.[184] That is, we experience a smaller increase in utility from a gain of $\$X$ than the decrease in utility we experience from losing $\$X$. This is a very robust experimental result, and may be an artifact of the need for early humans to preserve gains in order to survive, and to be vigilant against threats to those gains. We may experience more pain, for example, from an unexpected spike in energy prices than the pleasure we derive from a price drop; we may experience more pain from the imposition of new health risks associated with energy production nearby than the pleasure we experience when an existing health risk diminishes (due to a plant closure, for example). In any case, loss aversion is apparently a part of our utility functions, and a powerful instinct that can be exploited by marketers and politicians alike to influence our decisionmaking.[185] It may also explain voters' willingness to support policies that socialize risk.

A fourth fundamental lesson of behavioral research confirms that we humans become *emotionally wedded to beliefs* in ways that insulate those beliefs against challenge by reason or evidence. Psychologists explain this phenomenon as confirmation bias, or the notion that people are motivated to defend and protect cherished beliefs.[186] For example, experimental subjects recall evidence supporting their pre-existing beliefs better than they recall contradictory evidence,[187] and sometimes interpret contradictory evidence as supportive of their beliefs.[188] A conceptually distinct, alternative explanation for

184 Daniel Kahneman & Amos Tversky, *Choices, Values, and Frames*, 39 AM. PSYCHOLOGIST 341 (1984) (illustrating individuals' stronger preference for avoiding losses than for realizing equivalent gains).

185 Neurobiologist Dean Buonomano warns that "we should be most concerned about how vulnerabilities in our fear circuits are exploited by others." DEAN BUONOMANO, BRAIN BUGS: HOW THE BRAIN'S FLAWS SHAPE OUR LIVES 138 (2011). He adds that "we are all too well prepared to learn to fear through observation. . . . Because vicarious learning is in part unconscious, it seems to be partially resistant to reason . . . ." *Id.* at 141.

186 Leon Festinger's pioneering work on cognitive dissonance and rationalization presaged the notion of confirmation bias. LEON FESTINGER, A THEORY OF COGNITIVE DISSONANCE (1957).

187 D.N. Perkins et al., *Everyday Reasoning and the Roots of Intelligence, in* INFORMAL REASONING AND EDUCATION 83 (James F. Voss et al. eds., 1991).

188 Charles G. Lord et al., *Biased Assimilation and Attitude Polarization: The Effects of Prior Theories on Subsequently Considered Evidence*, 37 J. PERSONALITY & SOC. PSYCH. 2098, 2108 (1979); Gordon F. Pitz et al., *Sequential Effects in the Revision of Subjective Probabilities*, 21 CANADIAN J. PSYCH. 381, 391 (1967).

this same phenomenon comes from anthropology, and emphasizes how prior "cultural commitments" shape our beliefs.[189] According to this view, our commitments to our social identities "operate as a kind of heuristic" that prevents the rational processing of information on public policy matters.[190] Thus, once we have formed opinions about energy policy issues, those opinions are resistant to change.

None of these findings should surprise students of politics and regulation, nor would they have surprised classical political economists working before the ordinal revolution. Indeed, in the words of Daniel Kahneman, "the definition of rationality in . . . [modern] economic theory is so outlandish that it is not a major achievement to find objections to it."[191] Using behavioralism's broader conception of human motivation, an increasing number of legal scholars seek to nudge regulatory policy toward a greater appreciation of behavioralist reality[192]—for example, within securities law,[193] the Federal Reserve's management of monetary policy,[194] and in environmental enforcement policy.[195] Significantly, these behavioral lessons can explain the persistence of energy regulatory regimes that the economic critique deems inefficient or unnecessary, as explained in Part III.[196]

189 Kahan & Braman, *supra* note 179, at 148.

190 This phenomenon does not imply duplicity, but rather a kind of unconscious case-building—the use of logic to serve an emotionally determined end. *Id.* at 149.

191 Daniel Kahneman, *Behavioral Economics and Investor Protection: Keynote Address*, 44 LOY. U. CHI. L.J. 1333, 1334 (2013).

192 *See generally* THALER & SUNSTEIN, *supra* note 176; Korobkin & Ulen, *supra* note 171.

193 Michael J. Kaufman, *Foreword: Behavioral Economics and Investor Protection*, 44 LOY. U. CHI. L.J. 1323, 1325 (2013) ("Despite Kahneman's transformative research . . . the presumption that individuals are rational utility-maximizers still permeates the law and policy governing the protection of investors from securities fraud.").

194 Kara Scannell & Sudeep Reddy, *Greenspan Admits Errors to Hostile House Panel*, WALL ST. J. (Oct. 24, 2008), http://www.wsj.com/articles/SB122476545437862295 (reporting Federal Reserve Chairman Alan Greenspan's regret that he had opposed regulation of the financial industry based upon his erroneous belief that "banks' ability to assess risk and their self-interest would protect them from excesses").

195 *See, e.g.*, David B. Spence, *The Shadow of the Rational Polluter: Rethinking the Role of Rational Actor Models in Environmental Law*, 89 CALIF. L. REV. 917 (2001) (discussing problems with environmental enforcement based upon the rational actor model).

196 THALER & SUNSTEIN, *supra* note 176, at 183–96 (using examples from energy policy and regulation to illustrate the value of behavioral nudges); *see also* HANNAH CHOI GRANADE ET AL., MCKINSEY & CO., UNLOCKING ENERGY EFFICIENCY IN THE U.S. ECONOMY 7 (2009) (discussing behavioral impediments to realizing win-win energy efficiency savings); Hunt Allcott & Sendhil Mullainathan, *Behavior and Energy Policy*, 327 SCIENCE 1204 (2010) (summarizing some of the literature on new norms of energy consumption, and suggesting ways to activate norms of conservation and efficiency investment); Stephen J. DeCanio, *The Efficiency Paradox: Bureaucratic and Organizational Barriers to Profitable Energy-Saving Investments*, 26 ENERGY POL'Y 441, 453–54 (1998) (noting that many unrealized energy efficiency opportunities can be realized only by individuals, not businesses); John C. Dernbach, *Overcoming the Behavioral Impetus for Greater U.S. Energy Consumption*, 20 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).

III. Risk, Uncertainty, and Externalities in Energy Markets

Energy markets offer an ideal illustration of why the law continues to resist the vision of self-regulating and self-correcting markets that enjoys growing support in the conservative policy community. As suggested in Part II, the reasons lie in the inability of that vision to provide adequate answers to the foundational questions of energy policy. How will society manage risk and uncertainty (about energy supply and energy prices) in energy markets? How will it manage the distribution of external costs and benefits not captured by market prices? These are not only questions of efficiency, they are also political questions on which voters, firms, and interest groups bring their interests and ideologies to bear. Like the market, the political process by which these questions are answered is imperfect,[197] but it seems to reflect at least a generalized collective preference for a variety of regulatory interventions in energy markets. Some of these interventions aim directly at distributional questions; others address voters' and regulators' dissatisfaction with market failures. The following discussion looks specifically at regulation aimed at managing risk and externalities in competitive energy markets, and how that regulation responds to problems unlikely to be addressed satisfactorily by free markets.

A. Managing Risk and Uncertainty

In modern, competitive energy markets, a fundamental problem centers on the role that governments (or other planners) ought to play in helping market participants manage price and supply risk and uncertainty.[198] Energy markets are no exception to the rule that market participants value the risk of losses more highly than the equivalent risk of gains;[199] they also avoid situations characterized by uncertainty, where the risk cannot be estimated with sufficient precision.[200] This is the problem to which John D. Rockefel-

197 *See* Boyd, *supra* note 19, at 1657 ("[C]omparing an ideal view of markets to real-world regulation was never going to go in regulation's favor . . . ."); Paul L. Joskow, *Inflation and Environmental Concern: Structural Change in the Process of Public Utility Price Regulation*, 17 J.L. & Econ. 291, 292 (1974) (criticizing comparisons of real-world regulation with idealized versions of markets).

198 Frank Knight is often credited with first articulating the distinction between "risk," an uncertain future event to which a quantitative probability can be attached, and "uncertainty," an uncertain future event for which no probability can be assigned. Frank H. Knight, Risk, Uncertainty and Profit 231–32 (1921).

199 *See generally* Kahneman & Tversky, *supra* note 184.

200 *See* Daniel Ellsberg, *Risk, Ambiguity, and the Savage Axioms*, 75 Q.J. Econ. 643 (1961) (describing the problem of ambiguity aversion). *But cf., e.g.*, William F. Sharpe, *Capital Asset Prices: A Theory of Market Equilibrium Under Conditions of Risk*, 19 J. Fin. 425 (1964) (discussing finance models that try to capture the risk of expected value estimates by using both the mean and variance of a probability distribution in determining the value of a choice option; the capital asset pricing model is a variant of this approach). Real investors rarely behave consistently with these mean-variance optimization models. Indeed, Ellsberg's original experiments demonstrated as much. *See* Colin F. Camerer, *Prospect Theory*

ler offered monopoly as a solution, and which fed the political impulse to regulate energy markets in the early twentieth century. The recent deregulatory trend in energy markets has revived this problem, on both the production (or supply) side and the consumption (or demand) side of energy markets.

1. The Supply Side

On the production side of the market, energy law has long focused on the question of whether price signals alone can attract sufficient private capital investment in energy supply to ensure a reliable, reasonably priced supply of energy when it is needed. Critics of regulation sometimes ascribe supply shortages to permitting regimes, characterizing those regimes as inefficient barriers to entry.[201] However, for certain kinds of highly capital-intensive, long-lived, fixed-asset investments, investors are risk- or loss-averse, doubly so because of the tremendous amount of uncertainty in energy markets. For the prospective investor in an expensive, forty-year asset, it is next to impossible to estimate the probability that the competitively priced energy produced by the asset will produce a sufficient return over its lifetime (compared to existing or yet-to-be-invented alternatives), or whether the asset will be rendered obsolete or uncompetitive by new regulation. Economists characterize this "asset specificity" problem as a rational reaction to the possibility of strategic behavior by counterparties,[202] or to uncertainty about the opportunity cost of investing. However, to most other scholars, investor reticence is better explained in behavioral terms, as a form of risk- or loss-aversion,[203] or an emotional reaction to uncertainty. Indeed, Judge Posner explains the latter phenomenon this way:

> One response to uncertainty that is common to most economic actors, whether producers or consumers, is to freeze. The impulse is natural. . . . By freezing, one tries to preserve the status quo in the hope that time will bring information, enabling the correct response to be determined. . . .

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in the Wild: Evidence from the Field, *in* CHOICE, VALUES, AND FRAMES 288 (Daniel Kahneman & Amos Tversky eds., 2000).

201 Christopher Weare, *The California Electricity Crisis: Causes and Policy Options*, PUB. POL'Y INST. CAL. (2003). Some analysts blamed the California electricity shortages of 2000–2001 on this problem, arguing that the market would have corrected itself but for licensing barriers to entry erected by California. CONG. BUDGET OFFICE, CAUSES AND LESSONS OF THE CALIFORNIA ELECTRICITY CRISIS x (2001), https://www.cbo.gov/sites/default/files/107th-congress-2001-2002/reports/californiaenergy.pdf.

202 That is, for these kinds of investments the firm faces the risk that its contractual counterparties (those from whom it buys or to whom it sells) will act opportunistically, taking advantage of the firm's lack of alternative options to "hold up" the firm on price. *See generally* Benjamin Klein et al., *Vertical Integration, Appropriable Rents, and the Competitive Contracting Process*, 21 J.L. & ECON. 297 (1978) (noting the particular trouble asset specificity poses for spot markets).

203 *See* JAMES MONTIER, BEHAVIOURAL INVESTING: A PRACTITIONER'S GUIDE TO APPLYING BEHAVIOURAL FINANCE 447 (2007) ("[T]he psychological evidence suggests that its [sic] very much the downside we fear.").

> Freezing may be sensible, but it is not a product of calculation. What actuates freezing is fear, specifically fear of the unknown.[204]

In situations like these, investors do not make investment decisions on expected value bases, but rather are reluctant to invest, consistent with behavioral experiments on loss-aversion.[205]

Some policymakers believe that the construction of liquefied natural gas (LNG) terminals has been plagued by this problem.[206] In modern, competitive natural gas markets, LNG terminals are part of the network delivery infrastructure. The presence of ample LNG trading capacity would operate as a relief valve in natural gas markets, enabling gains from trade as imports temper supply shortages, and exports to do the same for supply gluts. Regulators traditionally treated LNG terminals as common carriers, part of the open access system designed to promote trade in natural gas. However, it has become evident that the principal barrier to construction of LNG terminals is not the permitting process, but rather the problem of attracting investment by risk-averse holders of capital. This has been true recently, when market conditions seemed conducive to the export of LNG, and in the early 2000s, when market conditions seemed to favor imports of LNG. Recognizing that this was the primary hurdle to capital investment in LNG terminals, the FERC began exempting LNG terminals from the obligation to operate as common carriers,[207] thereby allowing their owners to sign long-term contracts tying up the terminal capacity for a period of decades. Congress subsequently endorsed this change in legal status,[208] which provided the kind of guaranteed revenue stream that risk-averse investors need in order to feel comfortable supplying such large amounts of capital investment for fixed, long-lived assets like LNG terminals.[209]

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204 Richard A. Posner, *Behavioral Finance Before Kahneman*, 44 LOY. U. CHI. L.J. 1341, 1345–1346 (2013); *see also* MONTIER, *supra* note 203, at 447 (reporting that experimental subjects who had experienced damage to the fear centers of the brain were more likely to invest when facing the risk of loss).

205 *See, e.g.*, Antoine Bechara et al., *Deciding Advantageously Before Knowing the Advantageous Strategy*, 275 SCIENCE 1293 (1997); Antoine Bechara et al., *Role of the Amygdala in Decision-Making*, 985 ANNALS N.Y. ACAD. SCI. 356 (2003).

206 The cost of an LNG liquefaction facility is in the hundreds of millions (or billions) of dollars. *See* BRIAN SONGHURST, OXFORD INST. FOR ENERGY STUDIES, LNG PLANT COST ESCALATION 2 (2014), http://www.oxfordenergy.org/wpcms/wp-content/uploads/2014/02/NG-83.pdf.

207 *See* Hackberry LNG Terminal, L.L.C., 101 F.E.R.C. ¶ 61,294 (2002); Cameron LNG, L.L.C., 104 F.E.R.C. ¶ 61,269 (2003) (concluding that the change in policy would be in the public interest).

208 Specifically, Congress amended the Natural Gas Act to prohibit the FERC from requiring applicants to operate terminals on an open-access basis, but that prohibition expired in 2015. *See* 15 U.S.C. § 717b(e)(3)(b)(2) (2012).

209 One might argue that investors' reluctance to invest is efficient. Natural gas prices in the United States and elsewhere fluctuate. They fell after import terminals were permitted in the early 2000s, upsetting the economic justification for those terminals. Prices in foreign markets fell in 2014, upsetting the economic justification for export terminals permitted in 2011–2014. However, as described *infra* at subsection III.B.2, the availability of

Some market regulators have seen fit to intervene in electricity markets in similar ways, where nuclear power plants, coal-fired power plants, and other large central station technologies trigger the same investment dynamic. These kinds of electric generating facilities resemble LNG terminals in that they are also fixed assets that require hundreds of millions (or billions) of dollars of investment capital.[210] In traditionally regulated states, state regulators guarantee a fair return on that investment, thereby providing ample incentive to invest. Critics of traditional regulation argue that such a guarantee creates unnecessarily high rates for ratepayers, windfalls to shareholders, and unnecessary capital investments.[211] In competitive electricity markets owners of plants have no such guarantee. They must make investment decisions based upon revenue projections in uncertain competitive markets over the life of the plant.[212] This is problematic because it is difficult to project how much electricity will be needed in the future, or whether any particular plant's electricity will be competitively priced in the future.[213] Nor can plant owners always solve this problem by signing long-term contracts with prospective buyers. In states like Texas, New York, and Pennsylvania, which are characterized by retail competition, retailers are the buyers on wholesale power markets. Because retailers typically sign contracts with their customers for no more than twelve months in duration,[214] it is difficult for retailers to commit

this capacity in the network has benefits that extend beyond the terminals' customer base, which exacerbates the undersupply problem.

210 The U.S. Energy Information Administration (EIA) estimates that the present value of all capital investment over the life of a nuclear power plant is more than $12 billion; the comparable number for a coal-fired plant is about $3 billion. U.S. ENERGY INFO. ADMIN., LEVELIZED COST AND LEVELIZED AVOIDED COST OF NEW GENERATION RESOURCES IN THE ANNUAL ENERGY OUTLOOK 2014, at 6 (2014), http://www.eia.gov/forecasts/aeo/pdf/electricity_generation.pdf.

211 *See* Harvey Averch & Leland L. Johnson, *Behavior of the Firm Under Regulatory Constraint*, 52 AM. ECON. REV. 1052, 1052 (1962) (arguing the cost-of-service approach leads to overinvestment in capital); *see also* Léon Courville, *Regulation and Efficiency in the Electric Utility Industry*, 5 BELL J. ECON. & MGMT. SCI. 53 (1974) (demonstrating this effect for power plants).

212 A recent study by the American Public Power Association found that almost all new capacity in 2013 was constructed under a long-term contract or ownership, and that only 2.4% was built for sale into competitive markets. AM. PUB. POWER ASS'N, POWER PLANTS ARE NOT BUILT ON SPEC: 2014 UPDATE 1 (2014), http://www.publicpower.org/files/PDFs/94_2014_Power_Plant_Study.pdf.

213 For discussions of the asset specificity problem and the problem of incentivizing investment in electricity markets, see Boyd, *supra* note 19, at 1689; Paul L. Joskow, *Asset Specificity and the Structure of Vertical Relationships: Empirical Evidence*, *in* THE NATURE OF THE FIRM: ORIGINS, EVOLUTION, AND DEVELOPMENT 117 (Oliver E. Williamson & Sidney G. Winter eds., 1991) (explaining the problem of asset specificity as an incentive to underinvest in plant); David B. Spence, *Can Law Manage Competitive Energy Markets?*, 93 CORNELL L. REV. 765, 806–09 (2008) (noting reduced incentives to invest in generation in competitive markets).

214 *See* DIRECT ENERGY, https://www.directenergy.com/ny/electricity-plans (last visited Oct. 31, 2016); FIRST CHOICE POWER, https://www.firstchoicepower.com/texas/electricity-plans (last visited Oct. 31, 2016).

to power purchases over decades—the length of time necessary to secure financing for large power plants.

Uncertainty (and the consequent disincentive to invest) is further exacerbated by the way electric power is dispatched on the grid. Because electricity cannot be stored in commercial quantities economically, the grid must be kept in balance—at any given point in time, the amount of electricity being dispatched to the grid by generators must equal the amount being taken off the grid by consumers[215]—in order to avoid outages. When the grid operator dispatches power from individual electric generating facilities to the grid, it does so from the available generating facility that is willing to provide the power at the lowest marginal cost, subject to the caveat that the security of the grid must be maintained. This is the so-called "security constrained economic dispatch" (SCED) rule.[216] This rule protects ratepayers from paying unnecessarily high (unjust and unreasonable) rates, and applies both in traditionally regulated systems and in competitive wholesale markets.[217] For buyers, this dispatch rule means that spot market prices face continuous downward price pressure, particularly in an era of inexpensive natural gas and as more zero-marginal cost power from wind and solar generators enters the system,[218] increasing the opportunity cost (or decreasing the option value) of locking into a fixed-price, long-term supply contract. For plant owners, this rule means that they cannot always or easily predict when their plants will actually be dispatching power to the grid.

This additional uncertainty has led overseers and regulators of competitive electricity markets to intervene in those markets in a variety of ways to try to promote reliability of supply.[219] Grid operators in every competitive market employ a variety of mandatory and contractual arrangements to ensure that specified plants are available to provide short-term power to the market in order to balance loads and avoid outages.[220] In most organized wholesale power markets, RTOs/ISOs operate capacity markets, which use auctions to

215 The North American power grid is maintained at a frequency of 60 hertz (Hz). If the grid strays too far from this frequency, the system fails. N. AM. ELEC. RELIABILITY CORP., BALANCING AND FREQUENCY CONTROL 5 (2011), http://www.nerc.com/docs/oc/rs/NERC%20Balancing%20and%20Frequency%20Control%20040520111.pdf.

216 For a basic description of SCED, see FED. ENERGY REGULATORY COMM'N, SECURITY CONSTRAINED ECONOMIC DISPATCH: DEFINITION, PRACTICES, ISSUES AND RECOMMENDATIONS (2006), http://www.ferc.gov/industries/electric/indus-act/joint-boards/final-cong-rpt.pdf.

217 *Id.*

218 Willingness to accept bids on electricity spot markets tends to track marginal costs.

219 In the absence of regulatory interventions designed to ensure an adequate supply, pivotal suppliers can acquire and abuse market power in competitive markets. For a full exploration of how this arises, and the regulatory regimes that attempt to police the exercise of market power in energy markets, see Spence & Prentice, *supra* note 18.

220 Grid operators use so-called "reliability must run" or "RMR" contracts with plant owners under which plants are obligated to supply power when called upon to do so. For a discussion of how these types of contractual devices are used to ensure reliability, see Amy L. Stein, *Regulating Reliability*, 54 HOUS. L. REV. (forthcoming 2017).

pay owners of generating capacity in order to ensure that an adequate amount of generating resources will be available at some future date.[221] The Texas grid operator has eschewed capacity markets in favor of letting wholesale prices float freely as a way of rewarding investment in new capacity.[222] However, concerned that high prices alone might not be a sufficient incentive, Texas regulators have explored intervening in ancillary services[223] markets to increase payments to providers of short-term reserves (essentially, a reliability adder).[224] This same sense that wholesale markets are undercompensating providers of reliable electric service is behind a recent FERC initiative requiring RTOs/ISOs to change their settlement procedures in wholesale spot markets.[225] Some of these market interventions are intended to "get prices right,"[226] and represent rejections of the unfettered market allocation of costs, benefits, and risk.

Nor do these interventions necessarily address all of the reliability attributes voters and regulators might wish for from a diversified fuel mix, attrib-

221 One of the more persuasive cases for capacity markets comes from MIT economist Paul Joskow. *See* Paul L. Joskow, *Capacity Payments in Imperfect Electricity Markets: Need and Design*, 16 UTIL. POL'Y. 159 (2008) (arguing that even well designed electricity markets will undersupply generation capacity, and so require interventions like capacity markets); *see also* Adam James, *How a Capacity Market Works*, THE ENERGY COLLECTIVE (June 14, 2013), http://www.theenergycollective.com/adamjames/237496/energy-nerd-lunch-break-how-capacity-market-works-and-why-it-matters (explaining capacity markets). New England ISO, New York ISO, PJM, and (most recently) MISO all employ some form of capacity market to ensure an adequate future supply of generation.

222 ELEC. RELIABILITY COUNCIL OF TEX., SYSTEM-WIDE OFFER CAP AND SCARCITY PRICING MECHANISM METHODOLOGY 5 (2013) (on file with author).

223 The term "ancillary services" refers to reserve generating capacity that is currently unused but that is available to serve load on relatively short notice. If that capacity is already running, that operator may dispatch its electricity to the grid on very short notice. "Spinning reserves" are plants that are running but not yet dispatching their power to the grid. "Regulation" services are the grid management activities that maintain voltages at their proper level, to ensure grid reliability. *See* Willett Kempton & Jasna Tomic, *Vehicle-to-Grid Power Fundamentals: Calculating Capacity and Net Revenue*, 144 J. POWER SOURCES 268, 272–75 (2005).

224 *See Project 40000: Commission Proceeding to Ensure Resource Adequacy in Texas*, PUB. UTIL. COMMISSION OF TEX., http://www.puc.texas.gov/industry/projects/electric/40000/40000.aspx (last visited Nov. 15, 2016) [hereinafter *Project 40000*] (providing information and documents); *see also* Robert Walton, *Texas Grid Operator Continues Debate over Pricey Reliability Agreement*, UTIL. DIVE (Dec. 16, 2016), http://www.utilitydive.com/news/texas-grid-operator-continues-debate-over-pricey-reliability-agreement/432545/ (describing the debate in the Texas market about an expensive RMR contract). For more discussion of this idea, see Emily Hammond & David B. Spence, *The Regulatory Contract in the Marketplace*, 69 VAND. L. REV. 141, 199–213 (2016).

225 Settlement Intervals and Shortage Pricing in Markets Operated by Regional Transmission Organizations and Independent System Operators, 81 Fed. Reg. 42,882 (June 30, 2016) (to be codified at 18 C.F.R. pt. 35).

226 This is true of Order No. 825, which the FERC characterized as necessary to cure price formation problems in wholesale markets distorted by poorly conceived pricing practices. *Id.* at 42,883.

utes that may not be reflected in the way electricity is priced in spot markets.[227] For example, intermittent sources like wind and solar are less reliable than fossil-fueled plants, because the former can offer power to the grid only when the wind is blowing and the sun is shining, respectively. And coal-fired and nuclear power plants are more reliable than gas-fired plants because they do not depend on real-time (and, therefore interruptible) supply of fuel from a pipeline. Uniquely among electric generation sources, nuclear power combines very high fuel reliability with zero-emission generation, which may account for the efforts of states in competitive markets to ensure that existing nuclear plants do not exit the market.[228] On the other hand, gas-fired plants can ramp much more quickly and efficiently than coal-fired or nuclear generators,[229] and can be efficient providers of short-term reserves. For all of these reasons, policymakers may intervene to ensure fuel diversity in the electric generation mix in order to ensure reliability of supply.[230] Central planners can plan for a diverse fuel mix, whereas the free market has difficulty pricing these reliability attributes of the generation mix.[231] They simply do not appear through a bottom-up Hayekian process of spontaneous order; rather, they are provided from the top-down, by a combination of grid operator decisions and reliability planning mandates.

227 For a fuller discussion of this issue, see Hammond & Spence, *supra* note 224 (arguing that markets do not incentivize reliability well, at least not yet); Amy L. Stein, Distributed Reliability (Dec. 4, 2015) (unpublished manuscript) (on file with author) (discussing various aspects of the reliability challenge, specifically with respect to distributed generation and microgrids).

228 *See* Robert Walton, *NY Gov. Cuomo: State Will Fight Entergy Plans to Shutter FitzPatrick Nuclear Plant*, UTIL. DIVE (Nov. 5, 2015), http://www.utilitydive.com/news/ny-gov-cuomo-state-will-fight-entergy-plans-to-shutter-fitzpatrick-nuclea/408667/.

229 *See* BLACK & VEATCH, COST AND PERFORMANCE DATA FOR POWER GENERATION TECHNOLOGIES (2012), http://bv.com/docs/reports-studies/nrel-cost-report.pdf (listing ramp rates and "quick start" rates for various generation technologies); MIT ENERGY INITIATIVE, MANAGING LARGE-SCALE PENETRATION OF INTERMITTENT RENEWABLES 11, 27 (2011), http://mitei.mit.edu/system/files/intermittent-renewables-full.pdf (describing cycling and ramping rates).

230 *See* Jay Morrison, *Capacity Markets: A Path Back to Resource Adequacy*, 37 ENERGY L.J. 1 (2016) (arguing that centralized capacity markets do not allow individual retailers to procure the diverse generation (fuel) mix they need to ensure supply reliability).

231 The EPA's Clean Power Plan recognizes this fact by attempting to encourage states to extend the life of nuclear power facilities so as to ensure a reliable supply of emission-free electricity. *See* Carbon Pollution Emission Guidelines for Existing Stationary Sources: Electric Utility Generating Units, 79 Fed. Reg. 34,830, 34,858 (proposed June 18, 2014) (to be codified at 40 C.F.R. pt. 60). Recent efforts by the states of Illinois and New York to prolong the life of existing nuclear plants within their borders also reflect concern that the market is not providing fuel diversity (and, therefore, long-run reliability). *See* Aaron Larson, *Exelon Gets Its Christmas Wish—Illinois Legislation Will Save Nuclear Plants*, POWER (Dec. 2, 2016), http://www.powermag.com/exelon-gets-its-christmas-wish-illinois-legislation-will-save-nuclear-plants/; Brian Nearing, *Multi-Billion Dollar State Nuclear Payout Draws Environmental Challengers, Defenders*, ALBANY TIMES-UNION (Dec. 3, 2016), http://www.timesunion.com/tuplus-business/article/Multi-billion-dollar-state-nuclear-payout-draws-10688616.php.

2. The Demand Side

Does economic theory do a better job of predicting demand behavior? If freely floating wholesale and retail energy prices do not always provide a sufficient incentive to invest in supply, might prices be used to influence demand decisions more efficiently? When prices are high in oil markets, we drive less, and convert home heating systems from heating oil to gas or electricity. Proponents of freer markets argue that electricity market price caps disrupt this dynamic: if wholesale and retail power prices floated freely in ways that reflected the full cost of delivering electricity to each location on the grid over time, price signals could cure the capacity assurance problem more efficiently than market interventions (such as capacity markets), in part by influencing (reducing) demand. At grid locations where prices are consistently high, not only will new capacity be built, at those same locations, consumers will reduce demand, obviating the need for peaking capacity in the first place.[232] Or, if consumers wish to avoid outages, they will pay more for electricity or find their own alternative sources of supply. If consumers are not willing to pay rates that sustain the amount of generating capacity necessary to prevent outages, we can infer, therefore, that consumers do not really want that higher level of reliability. Instead, they have revealed their true preferences for more frequent outages.[233] This sort of real-time, or dynamic, retail pricing would elicit from consumers their true willingness to pay to ensure a reliable supply (and avoid outages), in much the same way that Coasean bargaining ought to reveal the parties' true willingness to pay to resolve pollution problems. Dynamic pricing is technically possible in the era of smart meters,[234] and commonly used in organized wholesale markets;[235] yet it is largely absent from both competitive and regulated retail

232 Alfred Kahn is generally credited with first championing dynamic pricing of electricity, both as an academic and as chair of the New York State Public Service Commission. *See* ALFRED E. KAHN, THE ECONOMICS OF REGULATION: PRINCIPLES AND INSTITUTIONS (1970); *see also* KIESLING, *supra* note 81, at 64–70; Ahmad Faruqui & Jennifer Palmer, *Dynamic Pricing and Its Discontents*, 34 REG. 16 (2011); Paul L. Joskow & Catherine D. Wolfram, *Dynamic Pricing of Electricity*, 102 AM. ECON. REV. 381 (2012).

233 KIESLING, *supra* note 81, at 68.

234 The widespread availability of smart meters, which send real-time consumption data to the utility, makes dynamic pricing technically possible. According to the FERC, more than thirty-seven million smart meters have been installed in U.S. homes and businesses, representing about a twenty-five percent penetration of the market. FED. ENERGY REGULATORY COMM'N, ASSESSMENT OF DEMAND RESPONSE AND ADVANCED METERING 2 (2013), http://www.ferc.gov/legal/staff-reports/2013/oct-demand-response.pdf. It is not clear, however, that individual electricity consumers can purchase individual levels of reliability as an attribute of grid-supplied power, since supply cannot be allocated over the grid to individual customers (who would pay more for more reliability), but instead affects entire portions of the grid and all the customers served thereby.

235 *Wholesale Power Price Maps Reflect Real-Time Constraints on Transmission of Electricity*, U.S. ENERGY INFO. ADMIN.: TODAY IN ENERGY (Sept. 20, 2011), http://www.eia.gov/todayinenergy/detail.php?id=3150 (explaining the use of LMP in U.S. wholesale markets).

markets, where customers pay mostly fixed rates.[236] This is inefficient in that it leads the market to undervalue generating capacity,[237] a problem electricity economists call "the missing money problem."[238]

Pilot experiments indicate that consumers respond to dynamic pricing by altering their consumption patterns in response to price signals (saving money in the process).[239] If dynamic retail pricing is efficient and technically possible, why is it so rare? It may be that for most residential consumers the stakes (savings of a few dollars per month) may not be worth the bother of responding manually to price signals, or of purchasing and programming a device to do so. Or it may be that consumers, like investors, prefer to avoid downside price risk, and may be willing to pay a premium (in the form of higher-but-predictable rates) to avoid it.[240] Moreover, the subjects of dynamic pricing experiments may not be a representative sample of ratepayers: most were not selected randomly, and many were insulated against downside risk as a condition of their participation in the experimental program.[241] If consumers really do not want dynamic retail pricing, are they being irrational in forgoing the ultimate savings available from dynamic rates?[242] Perhaps, but this behavior seems perfectly consistent with the loss aversion heuristic in the behavioral literature.

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236 According to a 2011 FERC survey, less than one percent of households pay rates that vary according to time of use. FED. ENERGY REGULATORY COMM'N, ASSESSMENT OF DEMAND RESPONSE AND ADVANCED METERING, STAFF REPORT 27 (2011), http://www.ferc.gov/legal/staff-reports/2010-dr-report.pdf.

237 Proponents of unfettered electricity markets also point to price caps in most organized wholesale markets, ranging from $1000/MWh to $9000/MWh in Texas (as compared with average prices of less than $50/MWh). *See Project 40000*, *supra* note 224 (providing information and documents).

238 Peter Cramton & Steven Stoft, The Convergence of Market Designs for Adequate Generating Capacity with Special Attention to the CAISO's Resource Adequacy Problem: A White Paper for the Electricity Oversight Board 8–11 (Apr. 25, 2006) (unpublished manuscript), http://works.bepress.com/cramton/34/ (describing missing money problem); William W. Hogan, On an "Energy Only" Electricity Market Design for Resource Adequacy 7–9 (Sept. 23, 2005) (unpublished manuscript), https://www.hks.harvard.edu/fs/whogan/Hogan_Energy_Only_092305.pdf (explaining idealized energy-only model). *But cf.* Joskow, *supra* note 221 (arguing that the missing money problem can never be fully ameliorated, even with freely floating prices).

239 *See* KIESLING, *supra* note 81, at 73–77; Ahmad Faruqui & Sanem Sergici, Household Response to Dynamic Pricing of Electricity—A Survey of the Empirical Evidence 2 (2009) (unpublished manuscript) (on file with author) ("[There is] conclusive evidence that households . . . respond to higher prices by lowering usage.").

240 *See* Joskow & Wolfram, *supra* note 232, at 384 (citing "fear of large redistributions across customers [as] possibly the largest impediment to further adoption of dynamic pricing").

241 *See* Faruqui & Sergici, *supra* note 239, at 3 (noting that in some dynamic pricing experiments "treatment groups suffer from self-selection bias").

242 Joskow & Wolfram, *supra* note 232, at 384 (citing studies showing that customers would benefit from dynamic pricing and that low-income households would not be hurt by it). However, customers may not fear "redistribution" per se; rather, they may fear their

Retailers may yet coax consumers into acceptance of dynamic rates, since retailers face dynamic prices on wholesale markets. A few retailers, many of them traditionally regulated utilities in competitive wholesale markets, are trying to entice their customers to embrace dynamic pricing by offering risk-free trial periods during which the utility guarantees that the customer's rate will not increase regardless of consumption patterns.[243] After the price ceiling guarantee expires, risk-averse retail customers could conceivably purchase financial hedges, thereby reducing their exposure to price risk.[244] However, financial hedges make more sense for high-volume market participants (like retailers or generators) than for individual residential consumers for whom the stakes are small and the transaction costs relatively high. Alternatively, there has arisen a niche market of demand-side "aggregators," who sign up retail customers to contracts in which the customer pledges to reduce demand (or to allow the aggregator to do so) during peak demand periods; the aggregator and the customer share the resulting savings.[245] Even in the absence of dynamic retail pricing, aggregated demand response (DR) could theoretically bid into wholesale markets just as generators do, offering to provide *X* MW of DR at specified times, for a price. Indeed, the FERC encourages DR participation in wholesale markets.[246]

Additional alternatives to dynamic pricing include behavioral "nudges," policies that might reduce demand peaks with fewer transaction costs for consumers. Nudges usually take the form of informational appeals to users to reduce consumption during peak periods, for varied reasons. The appeal can be to assist in the achievement of a policy goal, such as environmental protection or avoiding health-based costs of power generation,[247] or to the individual's sense of peer or community norms.[248] These sorts of appeals

own potential losses in the form of higher prices if they cannot shift demand away from peak periods.

243 *See* MINA BADTKE-BERKOW, ENVTL. DEF. FUND, A PRIMER ON TIME-VARIANT ELECTRICITY PRICING 16 (2015), https://www.edf.org/sites/default/files/a_primer_on_time-variant_pricing.pdf.

244 Buyers or sellers of energy can purchase contractual price guarantees on financial markets to hedge their price risk. For a fuller description of these contracts and their regulation, see Spence & Prentice, *supra* note 18, at 150–54.

245 For a description of the aggregator market, see Katherine Tweed, *The Top 5 Players in Demand Response*, GREENTECH MEDIA (July 19, 2010), http://www.greentechmedia.com/articles/read/top-5-demand-response.

246 The Supreme Court recently endorsed the legality of this effort in *Federal Energy Regulatory Commission v. Electric Power Supply Ass'n*, 136 S. Ct. 760 (2016), which overturned a lower court decision finding DR participation in wholesale markets inconsistent with the Federal Power Act.

247 *See* Omar I. Asensio & Magali A. Delmas, *Nonprice Incentives and Energy Conservation*, 112 PROC. NAT'L ACAD. SCI. 510 (2015) (finding appeals to the health benefits of avoided generation produced an eight-percent reduction in peak usage).

248 Hunt Allcott, *Social Norms and Energy Conservation*, 95 J. PUB. ECON. 1082 (2011) (finding appeals to social norms reduced power consumption by an average of two percent, but by more than six percent among the highest energy users); Ian Ayres et al., *Evi-*

aim to activate individuals' sense of social responsibility or desire to conform to social norms.[249] Companies like Opower manage these sorts of nudge programs for an increasing number of retailers.[250]

Economists tend to see behavioral nudges as inferior to dynamic pricing because they induce consumers to bear a cost (forgoing consumption at a convenient time) and provide uncompensated benefits (shaving system peaks) to others; dynamic retail pricing, on the other hand, allows consumers to sell that benefit to the retailer. Thus, dynamic pricing represents a Pareto improvement: each party gains from the trade, or they would not make the trade. Nudges may not represent a Pareto improvement, because consumers forgo benefits of uncertain value. However, one can argue that nudges represent Pareto improvements. The consumer is not compensated monetarily for her inconvenience; but it may be that the consumer derives utility from contributing to the achievement of a social goal or from conforming to social norms.[251] After all, nudges induce behavior; they do not compel it. In any case, nudges are a form of regulatory intervention in the market, one whose relative success (compared to dynamic retail pricing) seems to be a function of its embrace of the behavioral (rather than the rational actor) model.

B. Managing (Negative and Positive) Externalities in Energy Markets

Nor has the economics prescription for externalities—namely, to "get prices right" through taxes, subsidies or assigning property rights to public goods—prevailed in the law. Part of the reason is that getting prices right in this context is very difficult; and for reasons suggested by the behavioral literature, voters may not consider pricing externalities a sufficient solution to the problem. The economics literature on negative (environmental) externalities is rich, well-developed, and tends to favor pollution taxes over command-and-control permitting regimes. It tends to view permitting regimes as

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dence from Two Large Field Experiments That Peer Comparison Feedback Can Reduce Residential Energy Usage, 29 J.L. ECON. & ORG. 992 (2012) (reaching similar results); Sébastien Houde et al., *Real-Time Feedback and Electricity Consumption: A Field Experiment Assessing the Potential for Savings and Persistence*, 34 ENERGY J. 87, 94, 97 (2013) (finding five-percent reductions in electricity consumption, but noting that the reductions were only partially durable after the initial effect).

249 For a seminal early study demonstrating the power of activating "help" norms, see Leonard Berkowitz & Louise R. Daniels, *Affecting the Salience of the Social Responsibility Norm: Effects of Past Help on the Response to Dependency Relationships*, 68 J. ABNORMAL & SOC. PSYCHOL. 275 (1964).

250 As of this writing, Opower claims to be working with twenty-eight of the fifty largest American utilities in this way, and to be reaching "more than 50 million households and businesses across nine countries." *Company: Overview*, OPOWER, http://viget.opower.com/company (last visited Nov. 2, 2016).

251 On the other hand, the nudge may induce disutility by alerting the customer that she is conflicting with social norms; her change in behavior represents a desire to remove that disutility. It is not clear whether that is a welfare-enhancing outcome.

unnecessarily costly barriers to entry in energy markets.[252] Some dedicated Coaseans prefer private law solutions even to environmental taxes,[253] but most conservative scholars agree that permitting regimes impede efficiency.[254] Nonetheless, permitting and licensing continue to dominate American environmental regulation, despite decades-long challenges from economic theory and the ideological right. Their abolition seems unlikely primarily because they enjoy public support, support we might infer is rooted in the sense of security that comes from the existence of a regulator preventing firms from shifting too many environmental costs to the rest of us.[255]

Economics also struggles with how to "get prices right" in the supply of network infrastructure—oil and gas pipelines, and electricity transmission and distribution lines; these networks produce their own kind of missing money problem, one that is also in need of a regulatory fix. This problem is one of *positive* externalities, in that many of the beneficiaries of the network

252 For a good discussion of entry barriers in energy markets, see Richard J. Pierce Jr., *Environmental Regulation, Energy, and Market Entry*, 15 DUKE ENVTL. L. & POL'Y F. 167 (2005) (discussing three specific contexts—gasoline production, importation of liquefied natural gas, and electricity transmission—where environmental regulation methods conflict with energy policy goals). Professor Pierce suggests that these regimes tend to be Kaldor-Hicks efficient because regulators must perform cost-benefit analyses before implementing them. *See id.* Presumably, public choice scholars would be skeptical about the ability of regulators to undertake or employ such analyses.

253 As noted previously, Coase recognized that his zero-transaction-cost world almost never exists, a fact that has led some scholars to object to describing that world as "Coasean." *See, e.g.*, Robert C. Ellickson, *The Case for Coase and Against "Coaseanism"*, 99 YALE L.J. 611, 612–13 (1989). Nonetheless, there remain advocates of Coasean solutions to environmental problems. *See, e.g.*, TERRY L. ANDERSON & GARY D. LIBECAP, *Environmental Markets: A Property Rights Approach* xiii (2014); Geoffrey Black et al., *The Coasean Framework of the New York City Watershed Agreement*, 34 CATO J. 1, 2 (2014) ("[W]e argue that the New York City Watershed Memorandum of Agreement (MOA) proves the usefulness of the Coasean framework—even when there are a large number of affected parties from nonpoint source pollution."); Demsetz, *supra* note 120.

254 *See* NICOLAS D. LORIS, HERITAGE FOUND., BACKGROUNDER NO. 2966, FREE MARKETS SUPPLY AFFORDABLE ENERGY AND A CLEAN ENVIRONMENT (2014), http://www.heritage.org/research/reports/2014/10/free-markets-supply-affordable-energy-and-a-clean-environment (arguing that "[government should] get . . . out of the way," and that "[a] free energy market would drive innovation and provide the affordable, reliable energy that American families and businesses need").

255 Rather, regulatory licensing regimes tend to be the product of groundswells of public concern, and so tend to reflect the public's perception of the risk of harm at the time the regulatory statute was passed. The history of American regulation has been one of "republican moments"—instances in which the broad interest in a problem has overcome powerful, organized interests to produce national legislative victories. This terminology 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); *see also* Daniel A. Farber, *Politics and Procedure in Environmental Law*, 8 J.L. ECON. & ORG. 59, 66–67 (1992) (applying this idea to environmental law); Robert A. Prentice & David B. Spence, *Sarbanes-Oxley as Quack Corporate Governance: How Wise Is the Received Wisdom?*, 95 GEO. L.J. 1843 (2007) (applying this notion to securities law).

are not customers of the network.[256] Absent some system for spreading the costs of the system to those noncustomer beneficiaries, prospective investors do not anticipate being fully compensated for the benefits their investment creates, suggesting a role for government in this market.

Economists struggle to fit energy delivery networks neatly into the public or private goods category. Access to the network is excludable (like a private good) but for the common carriage obligation; consumption of space on the network is non-rivalrous (like a public good), but only up to the point of congestion.[257] However, the benefits of a robust network extend beyond paying users, both geographically and temporally. For example, all of the New Englanders who use natural gas to heat their homes (or natural-gas-fired electricity) would benefit immediately from investment in additional pipeline capacity into New England, in the form of lower gas and electric prices, and fewer gas or electric supply interruptions. Likewise, all electricity users benefit from regional investment in high voltage transmission lines because the investment brings improved system reliability (fewer outages and less congestion on the system). Furthermore, if transmission is built to serve renewable generation, which is typically located far from load, then the beneficiaries are even farther flung, and include those who would otherwise have been the downwind receptors of pollution from fossil fuel plants displaced by the renewable generation made possible and/or economic by the transmission line.

Traditionally, jurisprudence under the Natural Gas Act and the Federal Power Act follows the cost-causation principle, which historically has limited cost-allocation to customers of the pipeline or transmission line. This is an artifact of the requirement in both statutes that rates be just, reasonable, and nondiscriminatory.[258] Thus, owners of gas pipelines recover costs only from customers,[259] which means that risk-averse investors build pipelines only after securing a sufficient volume of firm, long-term transmission contracts to justify construction.[260] However, natural-gas-fired power plants selling into competitive wholesale markets are reluctant to sign long-term contracts for natural gas, because they cannot guarantee that they will have customers for their electricity over the term of the contract.[261] The lack of pipeline capac-

256 Some, but not all, of the positive externalities generated by the energy delivery network are what economists call "network externalities."

257 For a fuller discussion of these issues, see BRETT M. FRISCHMANN, INFRASTRUCTURE: THE SOCIAL VALUE OF SHARED RESOURCES (2012); KIESLING, *supra* note 81, at 98–99; Stein, *supra* note 227.

258 *See supra* notes 40–41.

259 Nw. Pipeline Corp., 71 F.E.R.C. ¶ 61,253, 61,984–85 (1995) (explaining that pipeline cost allocation follows the cost-causation principle).

260 *Pipeline Operators Ask FERC to Protect Financing of New Construction*, PIPELINE & GAS J. (Feb. 2013), http://www.pipelineandgasjournal.com/pipeline-operators-ask-ferc-protect-financing-new-construction ("Financing new pipeline construction depends upon a guaranteed stream of revenue based on rates charged for using the pipeline.").

261 As described previously, retailers who buy power from the plant sell power to their customers on contracts of much shorter duration.

ity and/or disincentive for power plants to reserve firm capacity has resulted in significant electric power outages on at least two occasions recently, in the North during the recent polar vortex, and during a cold snap in Texas. On both occasions, cold snaps increased demand for natural gas beyond system capacity and/or led pipelines to curtail shipments of gas to power plants whose interruptible contracts with the pipeline left them without service as only firm supply contracts were honored during a time of gas shortages.[262]

The problem of incentivizing investment in electricity transmission infrastructure is more acute, because the need for new investment is widely perceived to be urgent,[263] and because the Federal Power Act (unlike the Natural Gas Act) does not grant the FERC the power to site lines, or line owners the power of eminent domain,[264] creating additional (state and local) barriers to entry.[265] Moreover, applying the cost-causation principle is even more difficult in the electricity context because electricity follows its own path (of least resistance) across the interstate grid,[266] spreading the

262 FED. ENERGY REGULATORY COMM'N & N. AM. ELEC. RELIABILITY CORP., REPORT ON OUTAGES AND CURTAILMENTS DURING THE SOUTHWEST COLD WEATHER EVENT OF FEBRUARY 1–5, 2011 (2011), http://www.ferc.gov/legal/staff-reports/08-16-11-report.pdf; Rod Kuckro, *Northeast Blizzard Evokes Polar Vortex—and Region's Gas Pipeline Shortages*, ENERGYWIRE (Jan. 27, 2015), http://www.eenews.net/stories/1060012323.

263 The grid was built for the older, balkanized bulk power market, not for the modern, geographically broader, and much more robust bulk power market. *See* PETER FOX-PENNER, SMART POWER: CLIMATE CHANGE, THE SMART GRID, AND THE FUTURE OF ELECTRIC UTILITIES 89–92 (anniversary ed. 2014) (describing plans for a transmission "superhighway"); Matthew L. Wald, *Giving the Grid Some Backbone*, SCI. AM. EARTH 3.0, Mar. 2009, at 52, 56 (describing the possibility for a new system of high-voltage lines controlled by state-of-the-art transmission centers); Richard W. Caperton & Matt Kasper, *Re-Energize Regional Economies with New Electric Transmission Lines*, CTR. FOR AM. PROGRESS (Dec. 15, 2011), https://cdn.americanprogress.org/wp-content/uploads/issues/2011/12/pdf/transmission_lines.pdf ("The Brattle Group has found that we need to spend at least $298 billion on upgrading the investment grid by 2030."); *see also* U.S. DEP'T OF ENERGY, OFFICE OF ELEC. TRANSMISSION & DISTRIBUTION, "GRID 2030": A NATIONAL VISION FOR ELECTRICITY'S SECOND 100 YEARS iv (2003), http://www.ferc.gov/eventcalendar/files/20050608125055-grid-2030.pdf.

264 *See* Natural Gas Act, 15 U.S.C. § 717f(c)–(h) (2012). The FERC issues certificates of convenience and necessity to owners of new interstate natural gas pipelines. That certificate grants the holder the power of eminent domain. *Id.* The Federal Power Act, 16 U.S.C. § 824 (2012), contains no analogous provision. A 2005 amendment to the statute attempted to give the FERC "backstop authority over siting transmission lines," but courts have weakened that provision. *See* Freeman & Spence, *supra* note 5, at 54–55 (discussing this amendment and the litigation weakening it).

265 For an analysis of the legal barriers to siting transmission lines, see Ashley C. Brown & Jim Rossi, *Siting Transmission Lines in a Changed Milieu: Evolving Notions of the "Public Interest" in Balancing State and Regional Considerations*, 81 U. COLO. L. REV. 705 (2010) (discussing how recent developments have challenged the definition of "public interest"); Cassandra Burke Robertson, *Bringing the Camel into the Tent: State and Federal Power over Electricity Transmission*, 49 CLEV. ST. L. REV. 71, 73 (2001) (arguing that proper transmission policy "requires greater federal power"—namely, Congress rather than the courts).

266 MATTHEW H. BROWN & RICHARD P. SEDANO, NAT'L COUNCIL ON ENERGY POL'Y, ELECTRICITY TRANSMISSION: A PRIMER 30 (2004), http://energy.gov/sites/prod/files/oeprod/DocumentsandMedia/primer.pdf.

impacts of transmission investment more widely throughout the network. In the first of three transmission-cost-allocation opinions involving challenges to FERC orders by the Illinois Commerce Commission (ICC), the Seventh Circuit overturned a FERC order authorizing a transmission tariff that would spread the cost of a new high-voltage transmission line among all of the utilities (and their customers) within the PJM region on a pro rata basis.[267] The court found the order to be inconsistent with the cost-causation principle, because the FERC had not met the burden of demonstrating that costs were being allocated in a way that was at least "roughly commensurate" with benefits, though it acknowledged in principle that costs could be spread more widely than the transmission customer base.[268]

The FERC has since tried to encourage transmission tariffs allocating costs to noncustomer beneficiaries who reap the reliability or clean energy benefits of new transmission lines.[269] The Seventh Circuit has approved a MISO[270] transmission tariff that spreads costs of new lines broadly across the MISO region,[271] but rejected a second attempt by PJM to spread the costs of a new high-voltage line across its region in 2014.[272] This cost-allocation problem prompted a debate between Judge Posner and the late Judge Cudahy over the leeway that market regulators ought to be afforded in managing the market for transmission. Judge Posner's majority opinions in these cases reflect his belief that it ought to be possible to identify the distribution of the benefits of new transmission among existing customers, and to apportion the costs accordingly. Judge Cudahy disagreed:

> However theoretically attractive may be the principle of "beneficiary pays," an unbending devotion to this rule in every instance can only . . . discourage construction while the nation suffers from inadequate and unreliable transmission. Unsurprisingly, it is not possible to realistically determine for each

267 PJM is an RTO whose territory extends from the mid-Atlantic states through much of the Midwest to parts of the Chicago area. Ill. Commerce Comm'n v. FERC (*ICC I*), 576 F.3d 470, 473 (7th Cir. 2009).

268 *Id.* at 477 ("No doubt there will be *some* benefit [to nonusers] just because the network *is* a network.").

269 Transmission Planning and Cost Allocation by Transmission Owning and Operating Public Utilities, 76 Fed. Reg. 49,842, 49,857, 49,918–61 (Aug. 11, 2011) (authorizing transmission utilities to allocate costs to users who reap reliability benefits, and to consider public policies such as renewable portfolio standards in determining the distribution of benefits).

270 MISO is an RTO whose territory extends from Minnesota south through the central portion of the country and includes parts of the upper Midwest.

271 Ill. Commerce Comm'n v. FERC (*ICC II*), 721 F.3d 764, 775 (7th Cir. 2013) ("[MISO] has an articulable and plausible reason to believe that the benefits are at least roughly commensurate with those utilities' share of total electricity sales in [the] region." (quoting *ICC I*, 576 F.3d at 477)); *see also* Midwest ISO Transmission Owners v. FERC, 373 F.3d 1361, 1368 (D.C. Cir. 2004) (adopting a relatively expansive view of the FERC's authority under the Federal Power Act to spread the costs of new transmission investment).

272 Ill. Commerce Comm'n v. FERC (*ICC III*), 756 F.3d 556, 564 (7th Cir. 2014) ("We conclude, with regret given the age of this case, that the Commission failed to comply with our order remanding the case to it. It must try again.").

> utility . . . the precise value of not having to cover the costs of power failures and of not paying costs associated with congestions, and all this *over the next forty to fifty years.*[273]

Judge Cudahy noted that the positive externalities are partly temporal, making the kind of accounting sought by Judge Posner impossible in his view,[274] in part because many of the beneficiaries of improvements to this network cannot be identified. We can be almost certain that sometime in the next four or five decades people on the network (who do not directly use the new line) will benefit from its presence in predictable ways, but we cannot come close to identifying who those people are right now. To Judge Cudahy, the problem was one of "incommensurable forces and conditions," and therefore required deference to agency discretion.[275]

When network infrastructure produces positive externalities not easily compensated by the market, there is a role for regulators to assist in spreading the costs more broadly to ensure the provision of sufficient supply.[276] Positive externalities lead markets to undersupply network infrastructure, as do ill-designed rules (like the beneficiary pays rule) that attempt to mimic that same flawed market. Furthermore, for delivery networks, the cost-causation rule poses an equity problem if access to the network is essential in order to participate in economic life. If we build networks only to locations where the users have the ability to pay, the rich will have access to the network and the poor will not.[277] In the post-ordinal revolution framework of neoclassical economics, that fact does not necessarily imply a problem, because we cannot assume that those who are unable to pay would derive as much utility from access to the network as those who are able to pay; to many others, however, the problems associated with relying on willingness-to-pay measures as the best measure of utility in that instance are obvious.

Local governments are currently grappling with this kind of positive externality pricing problem in connection with the build out of high-speed fiber optic networks;[278] it is the same problem that provoked a government

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273 *ICC I*, 576 F.3d at 479 (Cudahy, J., concurring in part and dissenting in part) (emphasis added).

274 *See ICC III*, 756 F.3d at 565 (Cudahy, J., dissenting) ("I will say preliminarily that I think the majority is under the impression that somehow there is a mathematical solution to this problem, and I think that this is a complete illusion.").

275 *Id.* at 566.

276 In the words of Brett Frischmann, "The societal need for nondiscriminatory community access to infrastructure and the generation of substantial spillovers each appears to independently constitute grounds for identifying a potential market failure and for supporting some role for government." FRISCHMANN, *supra* note 257, at 6.

277 The cost-causation principle produces a level of network investment that maximizes net benefits only if one subscribes to the fiction that willingness-to-pay is the best available measure of utility, and that we cannot make inferences about the relative amounts of utility different individuals derive from a good or service. As discussed above in subsection II.A.1, these are debatable assumptions.

278 *See* Frank Morris, *As Cities Push for Their Own Broadband, Cable Firms Say Not So Fast*, NPR (Jan. 17, 2015), http://www.npr.org/sections/alltechconsidered/2015/01/17/3777

solution in the form of the Rural Electrification Act in the 1930s.[279] In the 1950s, neither President Eisenhower nor the Congress justified government funding of interstate highways by identifying and taxing only those people likely to use each segment of the interstate highways system. Nor could they have done so, which may be partly why American taxpayers shared that burden. Interestingly, electric transmission lines are being approved and built in Texas with relative speed and ease,[280] where much of the grid lies beyond the jurisdiction of the Federal Power Act's cost-causation rule.[281] This may be because the state has chosen to emulate the financing of the federal highway system by spreading the cost of the new lines to all ratepayers.[282] In other words, these governments have seen fit to address market failure in the market for network investment, and they do so by spreading the costs more widely than rigid adherence to a (simulated) willingness-to-pay regime would.

IV. The New (Old) Political Economy of Regulation

There is a contradiction at the heart of capitalist democracy, one that government regulation attempts to manage. We want an economy that incentivizes innovation and offers the social benefits of efficiency, *and* a polity that protects us from the various harms associated with market failure. In

57372/as-cities-push-for-their-own-broadband-cable-firms-say-not-so-fast (describing local communities that provide high-speed internet as a government service); Frank Morris, *In Kansas City, Superfast Internet and a Digital Divide*, NPR (Mar. 9, 2015), http://www.npr.org/sections/alltechconsidered/2015/03/09/390392782/in-kansas-city-superfast-internet-and-a-digital-divide (describing the differences in access in Kansas City).

279 Rural Electrification Act of 1936, Pub. L. No. 74-605, 49 Stat. 1363. For a detailed and poignant explanation of how the Act funded electrification of poor, rural communities, and specifically the Texas hill country, see Caro, *supra* note 39, at 502–28.

280 Investors have sunk $6.8 billion into new transmission lines in Texas, which has prompted development of more wind capacity than any other state. *See Texas to Double Wind Capacity, Deliver to Major Cities*, SustainableBusiness.com (Apr. 1, 2013), http://www.sustainablebusiness.com/index.cfm/go/news.display/id/24725. In 2005 the state created "competitive renewable energy zones" ("CREZ zones"), areas suitable for development of wind resources. *Competitive Renewable Energy Zones*, Oncor, http://www.oncor.com/EN/Pages/CREZ.aspx (last visited Nov. 15, 2016).

281 The Electric Reliability Council of Texas (ERCOT) is an RTO that manages a grid that is functionally separate from the remainder of the American power grid, and comprises most of the grid within the state of Texas. Hence the requirement that transmission rates be just, reasonable, and nondiscriminatory does not apply to the ERCOT grid. *See* Jared M. Fleisher, *ERCOT's Jurisdictional Status: A Legal History and Contemporary Appraisal*, 3 Tex. J. Oil, Gas & Energy L. 4, 4–5 (2008) (explaining the history of ERCOT's separation from the rest of the U.S. grid).

282 The state offered financial incentives for investment in renewable power within the CREZ zones, and decided to "socialize" the costs of building transmission generators in the CREZ zones eastward to those in San Antonio, Houston, and the remainder of central and east Texas. The presence of this new transmission, in turn, has sparked the development of more generation in Texas than any other state. *See* S.B. 20, 79th Leg. § 3(g)(3) (Tex. 2005).

energy markets those harms include sudden price spikes, harmful pollution, and the undersupply of energy infrastructure. Americans seem willing to support policies that reduce our exposure to these harms, and to ensure that energy prices and competition in energy markets are "fair." Since its inception more than a century ago, modern American energy law—public utility law and environmental law—has sought to reconcile these conflicting impulses. Certainly, regulation sometimes produces distributions that economists suspect are suboptimal. When voters and policymakers choose these policies anyway, it is tempting to ascribe to them a misunderstanding of markets, or of what is best for society. But it may be that voters and policymakers believe they are choosing between two imperfect systems, and reject the pure forms of both; it may very well be that regulation is an informed choice.

Right now American energy markets are more competitive and greener than they have been since before the industrial age. They are shaped by bottom-up innovation that responds to market incentives, and by top-down regulation that aims to minimize the dangers of market failure. It seems extremely unlikely that American energy policy will veer sharply toward central planning, or toward eliminating regulation of energy markets altogether, and for good reason. This Article has documented some (but not all) of the dangers of the latter route, and of basing regulatory policy on the naive pursuit of Pareto efficiency, or the naive assumption that market participants will necessarily behave like *homo economicus*. Because the Pareto criterion is both practically and politically an unrealistic goal, and because we often fail to behave like *homo economicus*, regulators intervene in energy markets to incentivize investment, and to manage the distribution of the externalities of energy production. Economic models of politics may conceive of these interventions as rent-seeking likely to distort markets, but this explanation is convenient and unpersuasive, because it is the product of the *a priori* assumptions economists employ.[283] Rather, regulatory interventions are better explained as the product of Americans' revealed preferences for *some* regulation of energy markets.

Ironically, while Smith and Hayek condemned governments' failure to understand the motives of market participants and the sometimes harmful consequences of regulation,[284] neither man sought to vindicate the kind of elegant, mathematical expression of human behavior found in modern economic theory. Rather, Smith and Hayek each wrote in response to the specific, problematic forms of government interference in the economy they observed during their lifetimes. Smith wrote at a time when guilds controlled access to most professions under the guise of protecting the public; Hayek wrote in the shadow of Nazi and Soviet totalitarianism. Their writings

283 Oliver Williamson chastised this kind of slavish adherence to economic theory in the wake of the California electricity crisis, arguing that designers of the California market applied theory "naively" without regard to "the realities of the political and regulatory process." Oliver E. Williamson, *Why Law, Economics, and Organization?*, 1 ANN. REV. L. & SOC. SCI. 369, 384 (2005).

284 *See* HAYEK, *supra* note 71, ch. 6.

should be understood in those contexts. It is a sizeable leap from their criticism of the misguided regulation they witnessed to the kind of idealized free energy markets being advocated by some conservatives today,[285] markets that Judge Cudahy long ago accurately described as "folklore."[286] To the contrary, one could argue that Smith and Hayek would endorse the kind of energy markets we see now: markets into which regulators have introduced competition and market pricing cautiously and iteratively, coupled with regulatory experimentation to ensure an adequate supply of infrastructure and to internalize the externalities of energy production.[287]

Both Smith and Hayek recognized a role for government in addressing public goods and externality problems, and in incentivizing investment where markets fail to supply enough of any good that society needs. Here is Hayek (quoting Smith) on the importance of "intelligently designed and continuously adjusted" legal institutions in an efficient market:

> To create conditions in which competition will be as effective as possible, to supplement it where it cannot be made effective, to provide the services which, in the words of Adam Smith, "though they may be in the highest degree advantageous to a great society, are, however, of such a nature, that the profit could never repay the expense to any individual or small number of individuals", these tasks provide indeed a *wide and unquestioned field for state activity*. In no system that could be rationally defended would the state just do nothing. An effective competitive system needs an intelligently designed and continuously adjusted legal framework as much as any other. Even the most essential prerequisite of its proper functioning, the prevention of fraud and deception (including exploitation of ignorance) provides a great and by no means yet fully accomplished object of legislative activity.[288]

Hayek also endorsed health and safety regulation,[289] and regulation that mandates the provision of information that "can never be adequately provided by private enterprise."[290] For his part, Adam Smith envisioned for government "the duty of protecting . . . every member of the society from the injustice or oppression of every other member . . . [and] of erecting and

285 *See supra* notes 71–82 and accompanying text.

286 Richard D. Cudahy, *The Folklore of Deregulation (with Apologies to Thurman Arnold)*, 15 YALE J. ON REG. 427 (1998).

287 Hayek argued that monopoly power was not coercive unless the monopolist provided "services . . . crucial to my existence or the preservation of what I most value." In that instance, Hayek recommended that government require that the monopolist be treated as a common carrier. FRIEDRICH A. HAYEK, THE CONSTITUTION OF LIBERTY 136 (1960).

288 *See* HAYEK, *supra* note 71, at 29 (emphasis added) (quoting 3 ADAM SMITH, AN INQUIRY INTO THE NATURE AND CAUSES OF THE WEALTH OF NATIONS 92–93 (London, A. Strahan & T. Cadell 5th ed. 1789)).

289 In Hayek's words, "To prohibit the use of certain poisonous substances, or to require special precautions in their use, to limit working hours or to require certain sanitary arrangements, is fully compatible with the preservation of competition." *Id.* at 28.

290 *Id.*

maintaining certain public works and certain public institutions" that the market will not provide.[291]

Nor would Smith or Hayek be comfortable with the mathematical version of modern neoclassical economics that was cause and consequence of the ordinal revolution: Smith because he would reject its narrow view of *homo economicus*, and Hayek because he was skeptical of the ability of mathematical economists to capture the dynamics at work inside markets.[292] According to economist Alan Krueger, "Smith was a Rawlsian before . . . Rawls," implying that Smith cared so much about distributional justice that he would have rejected Pareto optimality as a goal.[293] Rather, Adam Smith's was the behavioral view of human nature, one that embraced social preferences: "How[ever] selfish soever man may be supposed, there are evidently some principles in his nature, which interest him in the fortune of others, and render their happiness necessary to him, though he derives nothing from it, except the pleasure of seeing it."[294] Unfortunately, too many modern economists have jettisoned classical economists' broader understanding of human nature and of the interdependence of politics and markets in their attempts to make the discipline more scientific (and hence more rigorously logical and mathematical). Hayek's contemporary and rival John Maynard Keynes wrote that "the master-economist" is not only a logician or mathematician,

291 SMITH, *supra* note 288, at 42–43.

292 *See* Henry E. Kilpatrick, Jr., *Complexity, Spontaneous Order, and Friedrich Hayek: Are Spontaneous Order and Complexity Essentially the Same Thing?*, 6 COMPLEXITY 16, 18 (2001) ("Unlike complexity theorists [Hayek] thought little of the use of statistics for analysis of complex . . . phenomena."). In his 2014 best-selling book on wealth and income inequality, Thomas Piketty put it this way:

> To put it bluntly, the discipline of economics has yet to get over its childish passion for mathematics and for purely theoretical and often highly ideological speculation, at the expense of historical research and collaboration with the other social sciences. . . . This obsession with mathematics is an easy way of acquiring the appearance of scientificity without having to answer the far more complex questions posed by the world we live in.

THOMAS PIKETTY, CAPITAL IN THE TWENTY-FIRST CENTURY 32 (Arthur Goldhammer trans., 2014).

293 Alan B. Krueger, *Economic Scene; the Many Faces of Adam Smith: Rediscovering 'The Wealth of Nations'*, N.Y. TIMES (Aug. 16, 2001), http://www.nytimes.com/2001/08/16/business/economic-scene-the-many-faces-of-adam-smith-rediscovering-the-wealth-of-nations.html. Of course, this is a reference to John Rawls's theory of distributive justice, described in JOHN RAWLS, A THEORY OF JUSTICE (1971).

294 ADAM SMITH, THE THEORY OF MORAL SENTIMENTS 1 (Philadelphia, A. Finley 1817). Hayek's rejoinder is that our inability to understand the complexity of the economic system limits the beneficial effects of our altruistic impulses. HAYEK, *supra* note 125, at 14.

but also a "historian, statesman, [and] philosopher."[295] Hayek disagreed with Keynes on most things, but not on this point.[296]

Some scholars trace the ancestry of the ordinal revolution back to Smith's contemporary David Hume, and his admonition that an "ought" cannot be derived from an "is."[297] But Hume did not believe human nature was fully captured by *homo economicus* any more than Smith did; nor would Hume endorse the modern public choice view of the policy process. When Hume famously described reason as a "slave to" passion, he was making a descriptive statement about human nature that echoes modern behavioralists,[298] one central to his (and James Madison's) theory of government.[299] To be sure, the American Founders were students of mathematical theories of collective

295 J.M. Keynes, *Alfred Marshall, 1842–1924*, 34 ECON. J. 311, 322 (1924). Even John von Neumann, one of the architects of game-theoretic economic models, stressed the need for mathematical models to retain their ties to real-world problems:

> As a mathematical discipline travels far from its empirical source, or still more, if it is a second and third generation only indirectly inspired by ideas coming from "reality," it is beset with very grave dangers. It becomes more and more purely aestheticizing, more and more purely *l'art pour l'art*. This need not be bad, if the field is surrounded by correlated subjects, which still have closer empirical connections, or if the discipline is under the influence of men with an exceptionally well-developed taste. But there is a grave danger that the subject will develop along the line of least resistance, that the stream, so far from its source, will separate into a multitude of insignificant branches, and that the discipline will become a disorganized mass of details and complexities. In other words, at a great distance from its empirical source, or after much "abstract" inbreeding, a mathematical subject is in danger of degeneration. At the inception the style is usually classical; when it shows signs of becoming baroque, then the danger signal is up.

John von Neumann, *The Mathematician*, *in* THE WORKS OF THE MIND 180, 196 (Robert B. Heywood ed., 1947).

296 In an address at the London School of Economics, Hayek lamented narrow specialization within economics, noting that "if you know economics and nothing else, you will be a bane to mankind, good, perhaps, for writing articles for other economists to read, but for nothing else." Gerald R. Steele, *Friedrich Hayek: The Complete Economist*, 28 ECON. AFF. 67 (2008) (quoting Hayek). As described in this Article, behavioral economics is finally rediscovering a broader view of human nature and of political economy, but it remains to be seen how widely and deeply the insights of the behavioralists will penetrate mainstream economics.

297 *See* Hands, *supra* note 148, at 219–20 (discussing Hume's ought/is distinction, and crediting G.E. Moore with first describing it as the "naturalistic fallacy," early in the twentieth century).

298 2 DAVID HUME, A TREATISE OF HUMAN NATURE (1739), *reprinted in* 2 DAVID HUME: THE PHILOSOPHICAL WORKS 195 (Thomas Hill Green & Thomas Hodge Grose eds., 1964).

299 Specifically, Madison echoes Hume when he argues 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." THE FEDERALIST NO. 10, at 48 (James Madison) (Ian Shapiro ed., 2009).

choice that predated Arrow's Theorem;[300] however, the Madisonian theory of government was (and is) about more than mere preference aggregation, in the Arrovian sense. Rather, it is about structuring the *delegation* of decision authority by voters to a *deliberative* government. Despite their clear-eyed view of human ambition and selfishness, the Founders aimed to create a decision process that minimizes rent-seeking and favors deliberation, and that pushes policy toward "the permanent . . . interests of the community."[301] In that sense, Madison's goal for government resembled that of his contemporary Edmund Burke: government should decide as the people would decide if the people could devote the resources and time necessary to understand the problem.[302]

The problem we face in today's polarized American polity is that the meaning of the permanent interests of the community is particularly hotly contested. But that does not negate the worthiness of pursuing that goal. In American energy policy that contest seems to be between two visions of the good: a top-down vision of ever-greener energy markets, on the one hand, and a bottom-up vision of ever-freer energy markets, on the other. Both visions can be naive, at times.[303] Proponents of both visions lament the lack of "an energy policy" in line with their vision, and the fact that American energy policy falls somewhere in between.

However, American energy policy is forever destined to lie in between, because it appears that that is what the well-informed median voter wants. Voters want a reliable, affordable, and clean energy supply. Energy and environmental regulators, working within constraints imposed by statutes and courts, have proven quite adept at the kind of cautious experimentation by which the permanent interests of the community can be identified and realized. Defying the caricature of the power-hungry central planner, American regulators have long balanced the benefits of markets against their dangers in ways that reflect the goal of serving the well-informed median voter.[304]

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300 Apparently, some of the Founders corresponded with the Marquis de Condorcet, who published formal (mathematical) explanations of the phenomenon of cycling in legislatures, a simpler preference aggregation problem in the same family as Arrow's Theorem.

301 THE FEDERALIST NO. 10, at 48 (James Madison) (Ian Shapiro ed., 2009).

302 *See generally* EDMUND BURKE, REFLECTIONS ON THE REVOLUTION IN FRANCE (Frank M. Turner ed., Yale Univ. Press 2003) (1790); DANIEL A. FARBER & PHILIP P. FRICKEY, LAW AND PUBLIC CHOICE: A CRITICAL INTRODUCTION 143 (1991).

303 For a discussion of the naiveté of the latter vision, see Spence, *supra* note 28.

304 Throughout the history of Federal Power Act and Natural Gas Act jurisprudence, the FERC has shown an appreciation for market pricing. Long before restructuring, the so-called "*Mobile-Sierra* doctrine" stood (and stands) for the proposition that freely negotiated rates are presumed to be just and reasonable under both the FPA and NGA. *See* United Gas Pipe Line Co. v. Mobile Gas Serv. Corp., 350 U.S. 332 (1956); FPC v. Sierra Pac. Power Co., 350 U.S. 348 (1956). And it was the FERC rather than Congress that initiated the restructuring of wholesale markets in natural gas and electricity. *See supra* notes 90–96 and accompanying text.

This has been particularly true in the modern era of congressional gridlock.[305]

By contrast, it has been elected legislators, and sometimes even courts,[306] who have been much more prone to clumsy interventions in markets. State *legislators* have tried to "correct" energy prices they perceive to be discriminatory against their citizens, from the earliest days of public utility regulation[307] to the present day.[308] While today's legislators must curry votes by paying verbal lip service to one or the other ideal visions of our energy future, public utility commissions and environmental agencies are free to do the hard work of reconciling markets with community needs in an industry that produces what is often described as "the lifeblood of the economy."[309] Thus, in solidly Republican Texas, policymakers pursue a vision of free energy markets, but are willing to compromise that vision in order to ensure the security of energy supply, or to promote wind development.[310] In solidly Democratic California, policymakers pursue a vision of green energy markets, but are willing to compromise that vision in order to ensure that prices do not get too high.[311]

This is the reality not only of American energy policy, but of American policy toward financial markets, telecommunications markets, and most markets. Despite a policy debate fought using the language of ideological archetypes, regulation is "a collective project" involving continual interaction between policy and markets.[312] As human beings, we participate in this pro-

305 *See* Freeman & Spence, *supra* note 5 (documenting the iterative and cautious way the EPA and the FERC have grappled with twenty-first century energy policy problems in the absence of Congress).

306 Prior to the 1950s the FERC's predecessor, the Federal Power Commission, had declined to regulate wellhead pricing of natural gas, recognizing that it was a competitive industry. It was the Supreme Court's interpretation of the Natural Gas Act that forced the disastrous regulation of wellhead pricing that ultimately led to shortages in the 1970s. *See* Phillips Petroleum Co. v. Wisconsin, 347 U.S. 672, 681–85 (1954).

307 In the seminal case of *Smyth v. Ames*, the Supreme Court overturned a Nebraska statute limiting intrastate railroad rates. 169 U.S. 466 (1898). The statute was motivated in part by the fact that Iowa shippers were paying lower rates for the same service in Iowa; the Court recognized that this price difference was due to the fact that the railroad's unit costs of service were higher in Iowa. *Id.* at 540.

308 In the early 2000s, New Jersey and Maryland grew dissatisfied with wholesale electricity prices in eastern PJM. Policymakers in both states concluded that the PJM capacity market was not inducing sufficient investment in new generation facilities in eastern PJM, and undertook to subsidize construction of new natural-gas-fired generation within their state borders. Reasoning that these subsidies would distort prices in the PJM market, the Supreme Court struck them down in *Hughes v. Talen Energy Mktg., LLC*, 136 S. Ct. 1288 (2016).

309 A Google search of this phrase reveals more than 400,000 results (last searched Nov. 8, 2016).

310 *See supra* notes 224 (discussing resource adequacy proceedings in Texas), 280 (discussing the financing of CREZ transmission lines), and accompanying text.

311 *See* CAL. CLIMATE LEADERSHIP: POWERING THE NEW ECON., http://focus.senate.ca.gov/climate (last visited Nov. 8, 2016).

312 Boyd, *supra* note 19, at 1619 (describing the concept of "public utility" in this way).

ject in two ways: *homo politicus* participates in the policy process in order to place limits on *homo economicus* in the market. We bring different concerns and motives to each role, and it is little wonder that the best tools we have to analyze markets provide such an incomplete picture of the policy process. We recognize the virtues of the market, but we do not entirely trust it to maximize social net benefit, and so we retain the option to regulate.[313] In this way American policy—including energy policy—is an ongoing, contested effort to define which costs and benefits will be allocated by the market, and which will be allocated by law and policy. We are as uncomfortable with Schumpeter's "creative destruction" as we were with Rockefeller's "destructive competition," not because we do not understand it, but because we choose a middle path that embraces both markets and regulation.

313 In the words of experimental economist Daniel Friedman, we "hate the market system" despite its great achievements, because it "turn[s] embedded social relations into commodities" and "disrupts lives and clashes with established moral codes." DANIEL FRIEDMAN, MORALS AND MARKETS: AN EVOLUTIONARY ACCOUNT OF THE MODERN WORLD 60–61 (2008).