DYNAMIC ENERGY FEDERALISM

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ABSTRACT

U.S. energy law and the scholarship analyzing it are deeply fragmented. Each source of energy has a distinct legal regime, and limited federal regulation in some areas has resulted in divergent state and local approaches to regulation. Much of the existing energy law literature reflects these substantive and structural divisions, and focuses on particular aspects of the energy system and associated federalism disputes. However, in order to meet modern energy challenges—such as reducing risks from deepwater drilling and hydraulic fracturing, maintaining the reliability of the electricity grid in this period of rapid technological change, and producing cleaner energy—we need a more dynamic, holistic understanding of energy law. Examining the energy system as a whole reveals patterns across substantive areas and allows them to learn from one another.

This Article provides the first systematic account of energy federalism, proposing a novel model for understanding the energy system and its federalism dynamics. It begins by describing the U.S. energy system as comprised of interacting physical, market, and regulatory dimensions. The Article next explains why this complex system requires a federalism model that moves beyond disputes over federal versus state authority; it describes the many vertical interactions (those across levels of government, from the local to the international) and horizontal interactions (those among actors within the same level of government) within different types of energy regulation. The Article then considers the governance challenges created by these interactions, with a focus on inadequate regulatory authority,

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simultaneous overlap and fragmentation of regulation and institutions, and the difficulties of including key public and private stakeholders while avoiding inappropriate regulatory capture, such as when powerful utilities or oil companies gain control of regulatory processes to protect their private interests at the expense of the public. The Article concludes by proposing dynamic federalism principles for designing institutions that are responsive to these governance challenges through (1) creating needed authority; (2) reducing fragmentation; and (3) allowing for high levels of involvement from key public and private stakeholders that allow for meaningful input without capture. It also introduces our companion article, *Hybrid Energy Governance*, which applies these principles through detailed case studies to assess institutional innovation in areas critical to energy transformation.

INTRODUCTION

In the hot and humid summer of 2012, more than three million residents in the District of Columbia and nearby states lost power, and more than twenty people died.[1] The effects spread nationwide as Netflix and

[1] *Taken By Trees: The Powerful without Power*, THE ECONOMIST, July 7, 2012, *available at* http://www.economist.com/node/21558302.

Amazon servers in the D.C. area went down;[2] for days, residents in the mid-Atlantic region suffered from continued high temperatures and a lack of air conditioning.[3] The immediate causes of this massive disruption were trees falling on power lines during severe storms.[4] But the broader factors underlying this incident illuminate the complexities of the U.S. energy system and the novel governance challenges that it faces. First, energy stands alone in its level of physical interconnectedness: Any one failure in the wires that transport electricity can cause extensive rolling blackouts, as seen in D.C., New Jersey, and Illinois in June 2012.[5] Second, we increasingly rely on energy for our every task—largely due to the computerization of our economy. Disruptions in the energy system can have widespread market impacts, as evidenced by this summer's brief but potentially widespread outage of services that millions of people use. And finally, these physical and market forces interact with a multi-level regulatory system, requiring the coordination of actors across city and state (and increasingly, international) lines and among various levels of government. Pepco, the utility that was largely blamed for the power outage, for example, is a regional entity that serves Maryland and D.C. customers.[6] Its regulators include both the North American Electric Reliability Corporation—a public-private federal institution with regional components—and the state-level Maryland Public Service Commission, which had earlier fined the utility for excessive outages due largely to poor communication with individual utility consumers.[7]

This example of power disruption in the Mid-Atlantic states is not unique. Weather extremes that affect the electricity grid have become more common,[8] and throughout energy law, seemingly straightforward and

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[2] Alon Harish, *Rare "Derecho" Storm Ravaged Washington Area*, ABC NEWS, July 2, 2012, *available at* http://abcnews.go.com/US/derecho-storm-ravaged-washington-area/story?id=16696593#.UBNhLfVRBM8 (last visited July 27, 2012).

[3] Michael Schwirtz, Many Still Without Electricity in Mid-Atlantic States, N.Y. TIMES, July 1, 2012, *available at* http://www.nytimes.com/2012/07/02/us/mid-atlantic-braces-for-more-storms-and-heat.html?_r=1&ref=washingtondc (last visited July 27, 2012).

[4] *Id*.

[5] *See Taken By Trees*, *supra* note 1 (describing the geographic breadth of the outage).

[6] Pepco, About, http://www.pepco.com/welcome/ (last visited July 27, 2012).

[7] *Taken By Trees*, *supra* note 1. *But see* Aaron C. Davis & Mary Pat Flaherty, *Pepco Defends Its Response to Derecho Storm, Saying it "Mobilized Quickly*, WASHINGTON POST, July 30, 2012, *available at* http://www.washingtonpost.com/local/pepco-defends-its-response-to-derecho-storm-saying-it-mobilized-quickly/2012/07/30/gJQAmxuVLX_story.html?wpisrc=emailtoafriend.

[8] Matthew L. Wald & John Schwartz, *Weather Extremes Leave Parts of U.S. Grid Buckling*, N.Y. TIMES, July 25, 2012, *available at* http://www.nytimes.com/2012/07/26/us/rise-in-weather-extremes-threatens-infrastructure.html?_r=1&emc=eta1 (last visited July 31, 2012).

distinct problems involve complex interactions among components of the physical electricity grid and its sources, the markets that drive fuel extraction and the generation and movement of electricity, and the relevant law and institutions at multiple levels of government. These interactions create an important federalism challenge: How can energy regulation and its institutions create more effective multi-level governance structures to meet our need for cheap, clean, and reliable electricity as technology changes and as customers demand more sustainable energy solutions?

Efforts in energy law scholarship and policy to address this question largely reflect the fragmented nature of the energy system; they address different sources and institutions within the self-contained categories that the energy law system has created for them. Numerous scholarly articles tackle particular issues, such as whether a federal renewable energy standard should supplant existing state law regimes or how to overcome state law barriers to interstate transmission lines.[9] But none of these analyses creates a holistic model for conceptualizing energy federalism approaches across the full system. U.S. energy policymakers similarly tend to suggest solutions that fail to address the full complexity of the system. Recent proposals from both sides of the political aisle, and the resulting debates, generally have addressed the appropriate roles of state and federal government on particular energy issues without nuanced discussion of how the parts fit together into an overall multi-level governance approach.[10] These silos, through which we address issues individually, limit our understanding of shared patterns and opportunities for synergistic learning.[11] They also contribute to continued failures in efforts toward a comprehensive, longer-term energy policy.

This Article begins to provide a needed, more holistic approach by proposing a novel model for understanding the energy system, its federalism dynamics, and resulting governance challenges. Through mapping interactions among different levels of government (from local to international) and key entities at each level of government, this dynamic

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[9] For examples of this narrowly-focused scholarship, see *infra* notes 124–125.

[10] *Compare* Mitt Romney for President, Energy, http://www.mittromney.com/issues/energy (proposing, generally, "streamlined regulation" of energy, a state-centric approach to energy, and support of fossil fuel production), *with* The White House, Energy, Climate Change, and Our Environment, http://www.whitehouse.gov/energy/securing-american-energy#energy-menu (promoting U.S. energy independence through domestic fossil fuel production and renewable energy and encouraging clean energy innovation). *See also* Jennifer A. Diouhy, *Drilling Down: 5 Major Differences in Obama, Romney Energy Plans*, CHRON.COM, Aug. 23, 2012, http://blog.chron.com/txpotomac/2012/08/drilling-down-5-major-differences-in-obama-romney-energy-plans/.

[11] For an in-depth discussion of the current state of energy law federalism scholarship and the need for a dynamic model, see *infra* Section II.A.

federalism model goes well beyond questions of the appropriateness of federal versus state regulatory authority. It categorizes these interactions both with respect to the common challenges that they create and the solutions needed to overcome them, thus providing a better understanding of patterns and offering solutions grounded in nuanced federalism principles.

This model reveals patterns of inadequate regulatory authority, simultaneous overlap and fragmentation, and entities in public regulatory roles enmeshed with, and at times partially made up of, the private actors that they ostensibly regulate across numerous types of energy law. These patterns provide the basis for the Article's recommendations of principles for developing energy law institutions that navigate federalism dynamics more effectively: (1) creation of needed authority; (2) reduction of fragmentation; and (3) and provision of mechanisms for high levels of involvement from key public and private stakeholders that allow for meaningful input without capture, such as when powerful utilities or oil companies gain control of regulatory processes to protect their private interests at the expense of the public. A companion article, *Hybrid Energy Governance*, assesses institutions that have begun to incorporate these strategies in multiple areas of energy law critical to addressing modern energy challenges.[12]

Through its ambitious, synthetic approach to energy law, the Article makes important theoretical and practical contributions. Theoretically, it argues against forcing energy law into existing, constrained understandings of federalism and creates a more dynamic, nuanced model for federalism analysis. Our federalism model also infuses governance issues into federalism, showing that questions about how different levels of government interact cannot be separated from the construction of institutions and their decisionmaking processes; these complex interactions both create challenges for such construction and opportunities for innovation. This model therefore provides a new way of conceptualizing the field that is grounded in the unique characteristics of the energy system.

Practically, this approach could help foster a needed rethinking of energy governance. It demonstrates how common characteristics of energy governance systems constrain effectiveness, and it models how to analyze these patterns, which allows for largely separated areas of energy law to learn from one another. It then proposes principles for more effective institutional construction grounded in the more dynamic understanding of federalism and governance that we have proposed. These principles are not

[12] Hari M. Osofsky & Hannah J. Wiseman, *Hybrid Energy Governance*, submitted to journals Aug. 2012.

simply theoretical ones. They provide the basis for the companion piece's assessment of regulatory innovation in the context of hybrid regional institutions[13] that have begun to make progress toward managing risky, unconventional fuel extraction technologies like hydraulic fracturing[14] and deepwater drilling appropriately; providing adequate pathways to update our aging electrical grid and implement smart grid approaches; and allowing us to integrate cleaner sources onto it effectively.

This Article begins in Part I by mapping the interacting physical, market, and regulatory dimensions of the energy system. Part II then considers the federalism implications of this complex system; it argues for the need for a more holistic, dynamic approach to energy federalism and maps the simultaneous vertical (multi-level) and horizontal (same level) interactions taking place across energy law. Part III explores the contours of the specific governance problems that these federalism interactions create, with a focus on the above-described patterns. The Article concludes by proposing principles that could help address these governance problems and introducing our application of them in a companion Article.

I. THE TRIPARTITE STRUCTURE OF THE U.S. ENERGY SYSTEM

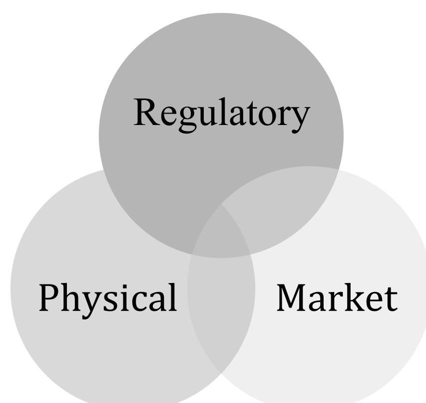
The production and movement of energy presents one of the greatest governance challenges of our time. The physical processes that underlie much of our modern energy system—including primary energy extraction and transportation, and the generation, transportation, and distribution of electricity (secondary energy)[15]—are necessary to sustain human life as we know it and yet are unusually complex and difficult to manage. Because energy is at the core of every human necessity, from enabling the provision of food, shelter, and clothing to driving economic growth and essential interpersonal communications, it is inextricably intertwined with fundamental societal values of fairness, justice, economic opportunity, and environmental protection. As humans demand energy transformation in the form of cleaner, more affordable, and more accessible energy, and as technology introduces new opportunities and challenges into an already complex system,[16] these developments run up against the boundaries of traditional governance structures and create the need for rapid regulatory

[13] For a definition of this term, see *infra* Conclusion: Dynamic Federalism Principles for More Effective Governance; *see also id*.
[14] Hydraulic fracturing is also at times called fracking, fracing, or hydrofracking.
[15] In addition to secondary energy (electricity), we rely—although decreasingly so—on primary energy, which is fuel burned to directly power something or produce heat, such as in a car or furnace.
[16] For a full discussion of energy transitions, *see* Osofsky & Wiseman, *Hybrid Energy Governance*, *supra* note 12.

innovation. This innovation, in turn, requires new theoretical approaches to governance, and particularly to federalism—the guiding force behind decisions about interactions among governmental and nongovernmental actors across levels of government.

This Part delineates the complex grid of physical, market, and regulatory interactions that form the current U.S. energy system and drive its governance challenges. As illustrated in figure 1, the energy system in the United States is a tripartite structure comprised of physical infrastructure and sources, market forces, and regulations that both shape and are shaped by these physical and market forces. This system simultaneously drives and constrains regulatory innovation at the domestic level,[17] which in turn forces unique interactions among regulatory peers as well as among different levels of government.

Figure 1. Core Components of the U.S. Energy System



[17] Indeed, due to the interconnected nature of energy, it is increasingly difficult to separate domestic from international regulation. The North American Electric Reliability Corporation, for example, writes and implements standards intended to guarantee the provision of a constant and adequate supply of electricity in the United States and several Canadian provinces. *See* North American Electric Reliability Corporation, Governance: Canada, http://www.nerc.com/page.php?cid=1|8|293 (last visited July 10, 2012) (showing memoranda of understanding between NERC and various Canadian utilities and provinces). *See also, e.g.*, Memorandum of Understanding between Saskatchewan Power Corporation (SPC) and Midwest Reliability Organization (MRO) and North American Electric Power Corporation, (identifying NERC and the Midwest Reliability Organization—a subentity of NERC called a regional entity—as "Saskatchewan's Electric Reliability Standard Setting Bodies").

A. Physical

The physical complexity of the energy system extends well beyond wires within the United States. Energy is a unique good because it relies on physical fuels located in limited global locations. The primary sources of energy, from fossil fuels to renewable sources such as sunlight and wind, are distributed unevenly within and among countries,[18] and they have very different physical attributes; there is no one fungible, interchangeable energy product. Moreover, because the demand for these energy sources does not match their spatial distribution, the resources must be moved from their points of production or generation to end users domestically and internationally.[19]

Coal is easily stored and moved by rail or ship,[20] while natural gas often is pressurized for efficient long-distance transport,[21] and gas storage is

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[18] For example, "79 percent of the world's recoverable reserves are located in five regions: the United States (27 percent), Russia (18 percent), China (13 percent), non-OECD Europe and Eurasia outside of Russia (11 percent), and Australia/New Zealand (9 percent)." Energy Information Admin., International Energy Outlook 2011 at 79, *available at* http://www.eia.gov/forecasts/ieo/pdf/0484%282011%29.pdf. Similarly, "just under 79 percent" of global proved oil reserves "are concentrated in eight countries," including Saudi Arabia (18% of total world proved reserves), Venezuela (14 %); Canada (12%), Iran (9%), Iraq (8%), Kuwait (7%), United Arab Emirates (7%), and Russia (4%). *Id*. at 38. Gas reserves are similarly skewed: "three-quarters of the world's natural gas reserves are located in the Middle East and Eurasia." *Id*. at 64. It is important to note that reserve estimates change frequently due to "reappraisals" of fields, changes in government reporting, and/or new technologies. *See, e.g.*, *id*. at 63-64 (explaining that "[i]n 2010 there were large increases in reported natural gas reserves" due to reappraisals of a field in Turkmenistan and a change in Australia's reporting system).

[19] The longer the transmission distance, the more electricity is lost in the process. Electricity losses are calculated based on total electricity generated times "distance from the source to the load [electricity demand]" times a phase calculation divided by kilovolt). *See* Benjamin I. Phillips & Richard S. Middleton, *SimWIND: A Geospatial Infrastructure Model for Optimizing Wind Generation and Transmission*, 43 ENERGY POLICY 291, 298 (2012). *See also id.* (explaining that transmission line type and length are a critical factor in transmission loss and explaining that for a 750 kilovolt line with an input of 4352 megawatts, losses are 5.42% over 500 kilometers and 10.83% over 1,000 kilometers).

[20] Transporters now primarily rely on rail, rather than barges, to transport coal within the United States. *See* Jeffrey K. Lazo & Katherine T. McClain, *Community Perceptions, Environmental Impacts, and Energy Policy: Rail Shipment of Coal*, 24 ENERGY POLICY 531, 532 (1996) (describing the transition from barges and explaining that most coal was moved by rail by the 1990s); Energy Information Admin., Coal Transportation Issues (2007), http://205.254.135.7/oiaf/aeo/otheranalysis/cti.html (last visited July 10, 2012) ("Most of the coal delivered to U.S. consumers is transported by railroads, which accounted for 64 percent of total domestic coal shipments in 2004."); Energy Information Admin., *Coal Stockpiles Above Five-Year Range in First Quarter of 2012*, Today in Energy, May 31, 2012, http://www.eia.gov/todayinenergy/detail.cfm?id=6490 (describing coal stockpiles at power plants).

available but more limited.[22] Oil and natural gas both require trucks or pipelines for transport.[23] Nuclear energy consumes comparatively little fuel and relies on existing highways for transport, but transport is a riskier process.[24] Renewable energy generators, in contrast, must move to the fuel; they must locate a spot on the globe with sunlight, wind, or other resources that are sufficiently abundant to support economically feasible electricity production and then transport their product through wires.[25]

The uneven global and domestic distribution of the various fuels, and particularly our increasing reliance upon secondary energy (electricity) within the United States, causes many of the complications in the physical domestic energy picture. The United States has abundant natural gas, coal, and renewable resources[26]—and indeed, more oil than previously thought.[27]

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[21] *See* Energy Information Admin., Natural Gas, About U.S. Natural Gas Pipelines, Transportation Process and Flow, http://205.254.135.7/pub/oil_gas/natural_gas/analysis_publications/ngpipeline/process.html (last visited July 10, 2012) (explaining that compressor stations "increase the pressure and rate of flow, and thus, maintain the movement of natural gas along the pipeline").

[22] *Id*. (describing "depleted reservoirs in oil and/or gas fields, aquifers, and salt cavern formations" that store natural gas in the United States); MASS. INST. OF TECHNOLOGY, THE FUTURE OF NATURAL GAS at 3 (2011), http://web.mit.edu/mitei/research/studies/documents/natural-gas-2011/NaturalGas_Report.pdf (noting that "because of its gaseous form and low energy density, natural gas is uniquely disadvantaged in terms of transmission and storage").

[23] *See* Mass. Institute of Technology, *supra* note 22, at 3 (explaining that "[a]s a liquid, oil can be readily transported over any distance by a variety of means"); *id*. (explaining that "the vast majority of natural gas supplies are delivered to market by pipeline"). *See also* Wendy N. Duong, *Partnerships with Monarchs – Two Case Studies*, 26 U. PA. J. INT'L ECON. L. 69, 70-71 ("Crude oil can be shipped all over the world. On the other hand, natural gas transportation by ship is only economically feasible if the natural gas is liquefied--the cooling and compression needed to "shrink" the gas from its original volume.").

[24] *Cf.* Lucas W. Davis, *Prospects for Nuclear Power*, 26 J. ECON. PERSPECTIVES 49, 58-59 (2012) (explaining that "fuel expenditures represent a relatively small proportion of the total cost of nuclear power"); Marvin Baker Schaffer, *Toward a Viable Nuclear Waste Disposal Problem*, 39 ENERGY POLICY 1382, 1387 (2011) (in the nuclear waste disposal (not fuel) context, noting the risk of an "[a]ccident or terrorist attack while transporting casks," but concluding that "no explosion would occur internal to the casks" and that radioactive dispersal would be limited to "a few meters").

[25] *See* Energy Information Admin., Transmission Pricing Issues for Electricity Generation from Renewable Resources 3, *available at* ftp://ftp.eia.doe.gov/features/transprc.pdf (noting that nonrenewable fuels can be moved from the point of extraction to the power plant and that renewables lack this advantage). For an analysis of the technical and policy issues of integrating renewables into grids globally, see Hugh Outhred, Robert Howse, Petrus van Bork & Stan Bull, Scoping Paper: Integration of Renewable Energy into Electricity Grids (Nov. 20, 2006) (developed for IEA Experts Workshop).

[26] U.S. Energy Information Admin., Energy In Brief, What Is the Role of Coal in the United States?, http://205.254.135.7/energy_in_brief/role_coal_us.cfm ("The United States

But we still rely on fuel imports for about a quarter of our energy mix,[28] especially for transportation, and the resources within our borders—fuels that we rely on for the bulk of our energy—are concentrated within certain regions. The Midwest has extensive wind resources[29] and relatively few electricity users, for example, thus requiring massive new investments in transmission if its energy resources are to be effectively harnessed, whereas the Southeast has comparatively few renewable or fossil fuels.[30]

The environmental and social impacts of global and domestic fuels also differ substantially, which complicates decisions about whether and where to build new infrastructure to transport fuels and electricity. Wind farms disrupt habitat and the breeding routines of endangered birds, kill bats, and have non-negligible visual and noise impacts.[31] Extraction of oil and natural gas, which increasingly requires unconventional technologies,

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is home to the largest recoverable reserves of coal in the world. In fact, we have enough coal to last more than 200 years, based on current consumption levels."); U.S. Energy Information Admin., Energy In Brief, What Is Shale Gas and Why Is It Important?, http://205.254.135.7/energy_in_brief/about_shale_gas.cfm ("The availability of large quantities of shale gas should enable the United States to consume a predominantly domestic supply of gas for many years and produce more natural gas than it consumes."); U.S. Department of Energy, 20% Wind by 2030: Increasing Wind Energy's Contribution to U.S. Electricity Supply (2008) (explaining that we have the potential to produce 20% of electricity from wind by 2030).

[27] Energy Information Admin., Energy In Brief, http://www.eia.gov/energy_in_brief/foreign_oil_dependence.cfm (noting "strong gains in domestic production of crude oil" and decreasing oil imports since 2006).

[28] Net energy imports in 2007 accounted for 29 percent of all U.S. energy production and consumption. This dropped to 22 percent in 2009 due to the recession, and the EIA predicts that it will drop further to 13 percent by 2035, due primarily to onshore "tight oil" production (the production of oil from shales and tight sands using hydraulic fracturing and other technologies). U.S. Energy Information Admin., AEO 2012 Early Release Overview 8 (2012), *available at* www.eia.gov/forecasts/aeo/er/pdf/0383er(2012).pdf.

[29] U.S. Dep't of Energy, Wind Powering America, Utility-Scale Land-Based 80-Meter Wind Maps, http://www.windpoweringamerica.gov/wind_maps.asp (onshore, showing the highest average wind speed 80 meters above ground as occurring throughout the Midwest).

[30] *See* Jim Rossi, *The Shaky Political Economy Foundation of a National Renewable Electricity Requirement*, 2011 U. ILL. L. REV. 361, 367 (2011) (noting that "southeastern states have strong potential for biomass development, but in comparison to most western states, they have very limited opportunities for the development of wind, solar, and geothermal"); Energy Information Admin., State Energy Data System, 2011 Estimates, http://www.eia.gov/state/seds/seds-data-fuel.cfm (allowing a comparison of state fossil fuel production estimates at the "States" hyperlink).

[31] *See* U.S. Fish and Wildlife Service, Land-Based Wind Energy Guidelines 2012 at 1, *available at* http://www.fws.gov/windenergy/docs/WEG_final.pdf (summarizing studies that describe bird and bat fatalities caused by wind energy equipment); R.H. Bakker et al., Impact of Wind Turbine Sound on Annoyance, Self-Reported Sleep Disturbance and Psychological Distress, 425 SCI. OF THE TOTAL ENV'T 42, 48 (2012) (finding a significant positive correlation between noise from wind turbines and psychological distress).

has polluted valuable natural resources, and spills have had catastrophic social and economic effects.[32] Increasingly common surface coal extraction,[33] in turn, has created short-term jobs but has destroyed communities and polluted surface waters.[34] Further, all fossil fuels emit greenhouse gases,[35] causing an environmental crisis of global proportions. Expanding knowledge about the comparative carbon emissions of these fuels, and particularly the lower but still substantial climate impact of natural gas,[36] affects fuel choices and has begun to significantly change electricity generation in the United States. Most new power plants use natural gas[37] rather than coal,[38] for example, and some existing plants are

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[32] *See* Henry Fountain, *U.S. Says BP Well Is Finally 'Dead,'* N.Y. TIMES, Sept. 20, 2010, at A14 (showing that in total, the BP's oil well incident in the Gulf of Mexico released approximately 205 million gallons of oil).

[33] *See* Energy Information Admin., Coal Production and Number of Mines by State and Mine Type, 2010, 2009, *available at* http://205.254.135.7/coal/annual/pdf/table1.pdf (showing surface and underground mining numbers); EPA, Technology Transfer Network, Clearinghouse for Emissions Inventories and Factors, http://www.epa.gov/ttnchie1/ap42/ch11/final/c11s09.pdf (describing the western surface coal mining process, in which topsoil is scraped away and "the earth that is between the topsoil and coal seam . . . is leveled, drilled, and blasted").

[34] *See, e.g.*, ENVTL. PROTECTION AGENCY, IMPROVING EPA REVIEW OF APPALACHIAN COAL SURFACE MINING OPERATIONS UNDER THE CLEAN WATER ACT, July 11, 2011, *available at* http://water.epa.gov/lawsregs/guidance/wetlands/upload/Final_Appalachian_Mining_Guidance_072111.pdf. Coal also provides important jobs for communities—often the only jobs currently available within these communities. But this perpetuates boom and bust cycles that leaves communities stranded when the resource is no longer abundant.

[35] *See* U.S. Envtl. Protection Agency, Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2010, at 2-5 - 2-7.http://www.epa.gov/climatechange/Downloads/ghgemissions/US-GHG-Inventory-2012-Main-Text.pdf (showing emissions from fossil fuel combustion, non-energy use of fuels, natural gas systems, petroleum systems, and coal mining).

[36] Estimates of these emissions vary widely, but "on a per-joule basis, burning methane, the primary constituent of natural gas, produces less carbon dioxide than burning coal." Richard Lovett, *Natural Gas Greenhouse Emissions Study Draws* Fire, Nature, Apr. 15, 2011, http://www.nature.com/news/2011/110415/full/news.2011.242.html. Lifecycle emissions are of course higher due to methane leakage during the drilling and fracturing process and from pipelines. *See* Mark Fulton, Worldwatch Institute, Comparing Life-Cycle Greenhouse Gas Emissions from Natural Gas and Coal, Aug. 25, 2011, http://www.worldwatch.org/system/files/pdf/Natural_Gas_LCA_Update_082511.pdf.

[37] *See infra* note 79.

[38] *See* U.S. Energy Information Admin., U.S. Coal's Share of Total Net Generation Continues to Climb, http://www.eia.gov/todayinenergy/detail.cfm?id=6550; U.S. Energy Information Admin., Monthly Coal- and Natural Gas-Fired Generation Equal for the First Time in April 2012, http://205.254.135.7/todayinenergy/detail.cfm?id=6990 (noting that although coal has historically dominated U.S. electricity generation, "for the first time since EIA began collecting the data," natural gas and coal contributed equally to generation in April 2012, each contributing to "32% of total generation"); Clifford Krauss, *Breaking*

switching to natural gas. Plummeting natural gas prices and an abundant supply also have discouraged renewable generation despite its positive climate impacts.[39]

This Article focuses primarily on secondary energy (electricity) and the many complex fuel and transportation choices underlying electricity production, although it also considers the parallel risks and inequities of unconventional fuel development that cross-cut the primary and secondary energy systems. It chooses this focus because electricity occupies a large share of U.S. energy consumption[40] and contributes to a similarly large proportion of energy impacts: electricity generation produced 34% of U.S. carbon emissions in 2010.[41] Indeed, our trajectory seems to be moving even more rapidly toward secondary sources of energy as we begin to plug in cars[42] and continue to computerize a variety of systems.

Traditionally, electricity is generated at large power plants and then moved to utilities and ultimately to customers, but this same pattern can occur at much smaller scales through distributed generation and microgrids;

Away from Coal, N.Y. Times, Nov. 29, 2010, http://www.nytimes.com/2010/11/30/business/energy-environment/30utilities.html?pagewanted=all ("Over the last year and a half, at least 10 power companies have announced plans to close more than three dozen of their oldest, least efficient coal-burning generators by 2019. A few are being replaced by new, more efficient coal plants, but many more are being replaced by gas-fired plants.").

[39] *See infra* note 80.

[40] Industry long ago abandoned steam engines and other direct sources of power for more convenient electricity from large, centrally-located plants. *See, e.*g., Fred Bosselman et al., Energy, Economics, and the Environment (2d ed. 2006) (explaining the rise and fall of the steam engine); Woods Institute for the Environment, Large-Scale Solar Technology and Policy Forum, Apr. 8-9, 2010, Distributed vs. Centralized Power Generation, Energy Info. Admin., U.S. Dep't of Energy, Annual Energy Review 2009, at 8 fig.1.2 (2009), available at http://woods.stanford.edu/docs/solar-forum/stanford-solar-forum-generation-background-info.pdf; Peter C. Christensen, *Overview of Electricity Generation and the Industry*, 42B RMMLF-INST 1 (1996) (describing "current electrical power management model"); (describing the "the highly interconnected and integrated infrastructure of generation and transmission that is so ingrained in the electric utility industry today"). In other sectors, we have also steadily expanded our reliance on electricity to power communication devices, homes, and (gradually) cars. Of the various sectors that consume primary energy, the highest percentage (40% of primary energy consumption) is the electric power sector. U.S. Energy Information Administration, Total Energy, http://205.254.135.7/totalenergy/data/annual/pecss_diagram.cfm.

[41] U.S. ENVIRONMENTAL PROTECTION AGENCY, DRAFT INVENTORY OF U.S. GREENHOUSE GAS EMISSIONS AND SINKS: 1990 – 2010 (2012)

[42] *See* U.S. Dep't of Energy, Alternative Fuels Data Center, Availability of Hybrid and Plug-In Electric Vehicles, http://www.afdc.energy.gov/vehicles/electric_availability.html (last visited July 31, 2012) ("A number of light-, medium-, and heavy-duty hybrid electric vehicles (HEVs), plug-in hybrid electric vehicles (PHEVs), and all-electric vehicles (EVs) are available from a variety of automakers or are in development.").

production and distribution still generally occur in a more confined physical area than generation and transmission.[43] Within the most common domestic secondary energy system, a typical generator of electricity pipes in fuel or receives it by rail, burns it to produce electricity, and then sells its product wholesale to utilities or directly to industry users. In order to transport electricity to the relevant markets, generators connect to a large network of transmission lines,[44] which are typically built and owned by utilities. Historically, utilities that owned and controlled transmission lines also owned generation facilities and distribution lines and were thus "vertically-integrated"; in many states, this system has not changed.[45]

The utility that controls the transmission lines bargains with generators regarding the terms of connection and use of the line and ultimately enters into an interconnection agreement with them.[46] This agreement emerges only after the utility ensures that there is room in the lines for additional electricity and that the new generating source will not interfere with smooth grid operations.[47] In addition to accommodating individual interconnections, the transmission utility or a regional institution

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[43] *See* Sara Bronin, *Curbing Energy Sprawl With Microgrids*, 43 CONN. L. REV. 547 (2010).

[44] Traditionally, vertically integrated utilities owned and operated transmission and distribution lines as well as generation. Increasingly, however, independent, transmission-only utilities own and operate lines. *See, e.g.*, Electric Transmission Texas, About Electric Transmission Texas, http://www.ettexas.com/about/ (explaining a join venture between American Electric Power, which "owns the nation's largest electricity transmission system, a nearly 39,000-mile network that includes more 765 kilovolt extra-high voltage transmission lines than all other United States transmission systems combined" and MidAmerican to form an independent transmission-only utility).

[45] In 2010, electric utilities owned approximately 62 percent of "nameplate" generating capacity (the technical potential output of generation capacity). Energy Information Administration, Electric Power Annual 2010, Existing Capacity by Producer Type, 2010, *available at* http://205.254.135.7/electricity/annual/pdf/table1.3.pdf (comparing the capacity of "electric utilities" and "independent power producers"). The EIA definition of electric utilities appears to generally align with vertically-integrated utilities, as it defines the utility as "[a] corporation, person, agency, authority, or other legal entity or instrumentality aligned with distribution facilities for delivery of electric energy for use primarily by the public." *See* Energy Information Admin., Glossary, http://www.eia.gov/tools/glossary/index.cfm?id=E#el_utility. Those utilities that both distribute and generate electricity, as described in the EIA capacity information, are at least partially vertically integrated.

[46] Stephen M. Fisher, *Note: Reforming Interconnection Queue Management Under FERC Order No. 2003*, 26 YALE J. ON REG. 117, 129 (2009) (explaining that after conducting interconnection studies to determine whether the transmission line can accommodate generation, the "the transmission provider and interconnection customer then negotiate any remaining transaction-specific provisions" enter into an interconnection agreement).

[47] *See id*. (describing interconnection studies, including feasibility studies "to ensure the proposed interconnection is reasonable from engineering and economic perspectives").

manages the flow of electricity through the wires.[48] After identifying the "load" (electricity demanded by load serving entities—those that provide electricity to consumers) and the amount of electricity available from generators, the line operator balances these two factors and sets the quantity of electricity that flows through transmission lines.[49] The operator must maintain a relatively constant voltage in the lines, and thus carefully regulate flow, in order to avoid major outages,[50] which often spread instantaneously through an interconnected transmission system.[51] It also must provide electricity at the moment that it is demanded because large-scale electricity storage is not yet available.[52]

This dual mandate of accommodating fluctuating generation and demand while maintaining a relatively constant voltage in the lines and ensuring instantaneous availability[53] of the product to be consumed is a core challenge of grid management. Transmission line owners are wary of intermittent generation sources, such as solar and wind, which send unpredictable amounts of electricity through the wires, for example.[54] The

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[48] *See* MASON WILLRICH, INDUSTRIAL PERFORMANCE CENTER, MASS. INSTITUTE OF TECHNOLOGY, ELECTRICITY TRANSMISSION POLICY FOR AMERICA: ENABLING A SMART GRID, END-TO-END (July 2009) at 19, http://web.mit.edu/ipc/research/energy/pdf/EIP_09-003.pdf (describing RTOs and markets).

[49] The electricity market varies by regional transmission organization/grid operator and is far more complex than the brief description provided here. Some have capacity markets, for example, where generators bid in actual capacities to provide power in the future, while others do not.

[50] K. Ramar & M.S. Raviprakasha, *Design of Compensation Schemes for Long AC Transmission Lines for Maximum Power Transfer Limited by Voltage Stability*, 17 ELECTRICAL POWER & ENGINEERING SYSTEMS 83, 83 (1995) (explaining that instability in the transmission system "may be caused primarily by the loss of synchronism of one or more generating units . . . or by the uncontrollable decay of system voltage over a significant portion of the network (voltage instability") and that voltage stability is the need to "maintain stable load voltage magnitudes").

[51] SPENCER ABRAHAM, SEC. OF ENERGY, U.S. DEP'T OF ENERGY, NATIONAL TRANSMISSION GRID STUDY at 2 (2002), http://energy.gov/sites/prod/files/oeprod/DocumentsandMedia/TransmissionGrid.pdf ("Within each system, disturbances or reliability events are felt nearly instantaneously throughout the system.").

[52] *But see* Marc Beaudin et al., *Energy Storage for Mitigating the Variability of Renewable Electricity Source: An Updated Review*, 14 ENERGY FOR SUSTAINABLE DEVELOPMENT 302 (2010) (describing research efforts in storage).

[53] *See* David K. Detton, Contracting To Sell Or Buy Electricity, *The Electric Industry: Opportunities And Impacts For Resource Producers, Power Generators, Marketers, and Consumers* §5.08 (Rocky Mt. Min. L. Fdn. 1996) ("Unlike natural gas, . . . the physical characteristics of electricity not only make storage impractical, but impose unique "real time" supply, delivery, and damage mitigation requirements.").

[54] *See, e.g.*, Remarks of Pedro J. Pizarro, Executive Vice President of Power Operations for Southern Cal. Edison Co., FERC Technical Conference, Integrating Renewable Resources

smart grid, including improved technological ability to predict availability of renewable resources, has begun to alleviate this hurdle; computers incorporated within the grid can instantaneously draw in new generation sources when needed and better predict and balance supply and demand.[55] Much progress remains to be made, however, and computerization of the grid as part of a nationwide smart grid initiative has expanded reliability concerns.[56] In many cases, renewable generators also lack access to transmission even when interconnection is theoretically possible, as abundant renewable resources tend to be located in rural areas far from existing transmission lines.[57]

A utility that receives electricity from a transmission line ultimately distributes this electricity to retail customers through smaller, lower-voltage lines. The combination of large transmission lines and smaller distribution lines for electricity forms a massive physical system called the transmission grid.[58] Together, the physical movement of fuel to generators and of electricity to utilities and consumers frame the markets that are the subject of the following section.

B. Market

The demand for energy resources paired with their uneven distribution and resulting transportation challenges creates a market for energy that

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into the Wholesale Electric Grid (AD09-4), Mar. 2, 2009, at 4, *available at* http://www.ferc.gov/EventCalendar/Files/20090302090557-Pizarro,%20SoCal%20Edison-EEI.pdf (noting that higher levels of renewable generation "can result in significant amounts of surplus energy that cannot be used on the grid or sold to others," in which case power must be offloaded, and that the grid requires more "Planning Reserve Margins to back up the system when these intermittent resources are incapable of producing sufficient energy").

[55] *See, e.g.*, Pacific Northwest Natl. Laboratory, Asia-Pacific Economic Corporation, Using Smart Grids to Enhance Use of Energy-Efficiency and Renewable-Energy Technologies at 3.4 (2011), *available at* http://www.pnl.gov/main/publications/external/technical_reports/PNNL-20389.pdf ("Smart grid technologies, such as transmission and distribution automation and active distributed energy resources, allow a diverse and changing mix of renewable-energy resources to be accommodated on the grid.").

[56] *See* at NERC, Reliability Considerations from the Integration of Smart Grid, at 70, http://www.nerc.com/files/SGTF_Report_Final_posted.pdf.

[57] *See* Energy Information Admin., *supra* note 25, at 3 (describing the remote location of certain renewable resources, noting, for example, that viable solar thermal generation is limited to the southwestern United States).

[58] Not all wires are connected, though; the United States has three major grids—the Eastern, Western, and Texas Interconnections—which are physically separated. If one distribution or transmission line within any one of these grids fails, the effects can spiral through large portions of each interconnection, as shown by historical blackouts and rolling brownouts.

interacts with each stage of the energy production process. This Section traces the ways in which the energy market, in its interaction with the underlying physical resources introduced above, forms a complex, difficult-to-regulate structure. It first describes the evolving economic structure of the market and then considers the market forces at each stage of the energy production process: generation and its accompanying fuels, transmission, and distribution.

U.S. energy markets must navigate both the increasing transnational interconnections within historically regional and national markets and the partial evolution away from treating our domestic energy markets as natural monopolies (markets in which it would be economically inefficient to have more than one provider, often because of high infrastructure investments). Oil is the most international of the fuel markets in terms of its global price and its transnational network of pipelines, while natural gas and electricity have traditionally been regional in nature.[59] This difference is largely due to particular physical limitations of each type of energy noted above in our tripartite structure. For example, natural gas typically must be liquefied before being shipped long distances, which requires expensive facilities; these facilities are not yet common but likely will expand as natural gas supplies worldwide increase.[60] Indeed, several applications for LNG export terminals are currently pending before the Federal Energy Regulatory Commission.[61] Electricity, too, has remained largely regional because of the expense of constructing transmission lines across oceans and other natural and artificial barriers that divide countries.[62] Governance of energy is slowly becoming "formally" international, however, as more electricity flows within transnational regions and neighboring countries begin to enlist common governing entities, such as the North American Electric Reliability Corporation, with jurisdiction both within the United States and parts of Canada. The influence of international factors on U.S. energy markets, governance, and even its physical infrastructure will likely continue to expand along with this slow transition; indeed, a desire to avoid importing

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[59] *See An Unconventional Bonanza* 3, 3, THE ECONOMIST, July 14, 2012 ("Only one-third of all gas is traded across borders, compared with two-thirds of oil. Other commodities fetch roughly the same price the world over, but gas has no global price.").

[60] *See id*. (predicting a gradual internationalization of the natural gas market).

[61] *See* Federal Energy Reg. Comm'n., Office of Energy Projects, North American LNG Import/Export Terminals, Proposed/Potential, *available at* http://ferc.gov/industries/gas/indus-act/lng/LNG-proposed-potential.pdf.

[62] The transmission grid in the United States, for example, is highly interconnected with Canada, but the lines are artificially separated at the border by a transformer, and Canada maintains jurisdiction over its lines.

oil from countries viewed as enemies has driven and will continue to drive much of our fuel extraction policy.[63]

Just as international forces increasingly affect U.S. energy markets (and vice versa), our internal economic treatment of energy systems also has changed substantially in the past two decades. Traditionally, in the United States, almost all pieces of the physical energy system were regarded as natural monopolies,[64] with significant consequences for the regulatory system discussed in Section II.C. Over time, that view has evolved. Restructuring of electricity regulation and other energy markets to allow for more competition, also known as "deregulation," was popular in the 1990s but has slowed somewhat since the Enron crisis.[65] Even prior to the heavy restructuring trend in the 1990s, the federal government recognized that fuel extraction is a classically competitive enterprise and thus deregulated prices of natural gas at the wellhead—meaning the price of natural gas sold from a producer (the entity that extracts the gas) to a buyer.[66] Both the federal government and some states also began to view components of the electricity system—particularly generation—as competitive and began to separate generation from transmission and distribution.[67] Following this separation, small, independent entities began

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[63] *See, e.g.*, Energy Independence and Security Act of 2007 (increasing alternative fuel use and implementing energy reduction goals in federal buildings, among other measures).

[64] Robert L. Bradley, Jr., THE ORIGINS AND DEVELOPMENT OF ELECTRIC POWER REGULATION, IN THE END OF A NATURAL MONOPOLY 43 (Peter Z. Grossman & Daniel H. Cole eds., 2003) (describing Samuel Insull's successful campaign for state electricity regulation of utilities as natural monopolies and how most states had established public utility commissions and natural monopoly treatment by the 1930s and 40s).

[65] *See* WILLIAM W. HOGAN, ELECTRICITY MARKET RESTRUCTURING, 20TH ANNUAL CONFERENCE, CENTER FOR RESEARCH IN REGULATED INDUSTRIES, May 25, 2001, at 3-9, *available at* http://belfercenter.ksg.harvard.edu/files/rut052501.pdf (describing U.S. restructuring and its motivations); Richard D. Cudahy, *Whither Deregulation: A Look at the Portents*, 58 N.Y.U. ANN. SURV. AM. L. 155, 172-175, 186 (2001) (describing the rise of deregulation, including in California, and concluding that the "California experience may significantly slow the onward march of electricity deregulation in other parts of the country"); Alexia Brunet & Meredith Shafe, *Beyond Enron: Regulation in Energy Derivatives Trading*, 27 NW. J. INT'L L. & BUS. 665 (2007) (describing post-Enron changes in energy markets and regulation); Energy Info. Admin., Electricity Restructuring by States, http://205.254.135.7/cneaf/electricity/page/restructuring/restructure_elect.html (last visited July 11, 2012) (in yellow, showing several states that have suspended restructuring).

[66] *See* Suedeen G. Kelly, Natural Gas, *in* ENERGY LAW AND POLICY FOR THE 21ST CENTURY 8-23 (Energy Law Group eds., 2000).

[67] *See* Sandeep Vaheesan, *Preempting Parochialism and Protectionism in Power*, 49 HARV. J. ON LEGIS. 87, 94 (2012) (explaining that "in a significant fraction of states, only transmission and distribution are treated as natural monopolies; generation and retailing are open to competition").

to compete to generate electricity.[68] Some components of the system that involve major infrastructure investment, like transmission lines or pipelines, remain as classic natural monopolies, however; it is not generally profitable for more than one company to make that investment,[69] and the infrastructure could become a problematic bottleneck if not regulated.[70]

These overall dynamics play out in varying ways at each stage of the energy production process. Although historical and current energy subsidies and regulatory intervention make separating market forces from governance difficult,[71] the core economic drivers in electricity include the type of fuel used by generators,[72] the quantity and timing of electricity production,[73] and the ultimate destination of generated electricity. These forces, which have recently been shaped by demands for an updated grid,[74] cleaner fuels,[75] and

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[68] *See* Joseph T. Kelliher, *The Changing Landscape of Federal Energy Law*, 61 ADMIN. L. REV. 611, 642 (2009)

[69] *See* David Spence, *Can Law Manage Competitive Energy Markets?*, 93 CORNELL L. REV. 765, 772 (2005) ("Delivery--transmission and distribution service--is a natural monopoly because the construction of duplicate delivery networks between two points is often inefficient.").

[70] *See* Jacqueline Lang Weaver, *Can Energy Markets Be Trusted?: The Effect of the Rise and Fall of Enron on Energy Markets*, 4 HOUS. BUS. & TAX L. J. 1, 13 (2004) (explaining that transmission "wires are the equivalent of a gas pipeline--an essential network industry that is often a natural monopoly. Unless rate-regulated, a bottleneck industry can extract monopoly rents from generators and end users who must use the transmission service to move electricity to market.").

[71] *See, e.g.*, Congressional Quarterly Inc., Energy Policy 66-67 (2d ed. 1981) (showing, in the 1970s and early 80s, Congressional requirements that power plants use coal instead of natural gas).

[72] Stan Kaplan, CRS Report for Congress, Power Plants: Characteristics and Costs, Nov. 13, 2008, at CRS-1, http://www.fas.org/sgp/crs/misc/RL34746.pdf (identifying "construction costs, fuel expense, environmental regulations, and financing costs" as the "factors that determine the cost of electricity from new power plants"). *See also, cf.*, Davis, *supra* note 24 (explaining that unlike in fossil fuel-generated power plants, the price of fuel does not drive the cost of nuclear power significantly but that the price of fossil fuels—which still are required for a nuclear plant—affects cost).

[73] *See, e.g.*, Felix Mormann, *Requirements for a Renewables Revolution*, 38 ECOLOGY L.Q. 903, 958 (2011) (describing "peaker" power plants, which are "older plants that can be dispatched at relatively short notice but have such high operational costs that they are not profitable other than at peak demand, when wholesale prices are highest").

[74] *See, e.g.*, Democratic Policy Committee, The Case for a 21st Century Electricity Transmission System, http://dpc.senate.gov/dpcdoc.cfm?doc_name=fs-111-1-34 (last visited July 11, 2012) (arguing that "[t]he electricity transmission grid in the United States is regionally fragmented, inadequate, and does not offer the state-of-the-art transmission system that is needed to access the country's best renewable energy resources"); Charles Cate, Southwest Power Pool, Integrated Transmission Planning Process, FERC Technical Conference, March 19-21, 2012, http://www.ferc.gov/EventCalendar/Files/20120410112557-spp.pdf (explaining that more transmission is needed to improve grid reliability, add renewables to the grid, allow for

consumer control of electricity consumption and price,[76] strongly influences the pace of energy transformation.

At the electricity generation stage, the fuel chosen by generators is a choice with powerful environmental and social effects[77] that drives decisions about the location and capacity of transmission or fuel transportation infrastructure, and it is largely a function of available extraction technologies. A booming natural gas supply enabled by recently-expanded horizontal drilling and hydraulic fracturing technologies, for example, has caused gas prices to drop[78] and has led many existing power generators to switch to gas. Indeed, most new generating capacity built in

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diverse fuel usage for reliability, create more efficient electricity delivery, and reduce the need for new generation, among other factors).

[75] *See* Database of State Incentives for Renewable Energy, RPS Policies, June 2012, http://dsireusa.org/documents/summarymaps/RPS_map.pdf (showing 29 states, the District of Columbia, and two territories as having renewable portfolio standards, which require a certain portion of electricity to come from renewable sources).

[76] *See, e.g.*, Electricity Consumers Resource Council, An Introduction to ELCON, http://www.elcon.org/ (last visited July 11, 2012) (explaining that the council represents the views of industrial electricity consumers before FERC and within NERC); Charles H. Koch, Jr., *Collaborative Governance in the Restructured Electricity Industry*, 40 WAKE FOREST L. REV. 589, 601-02 (2005) (observing that "[l]arge consumers have enough economic power to create alternatives, even when their local utility has some degree of market power," and that they often align with utilities to influence political decisions, but arguing that small industrial and residential consumers have lost political power with electricity restructuring). In the many states that remain regulated, however, the mandate that public service and public utility commission only approve "reasonable" rates can give consumers a powerful voice in major decisions about power plant construction, fuel choice, and other electricity-based issues. Megan J. Hertzler & Mara N. Koeller, *Who Pays for Carbon Costs? Uncertainty and Risk in Response to the Current Patchwork of Carbon Regulation for Public Utilities*, 36 WM. MITCHELL L. REV. 904, 931 (2010) (explaining that "rates for service are set through a quasi-legislative process involving review by state regulatory commissions acting under broad powers conferred by the state legislature to determine just and reasonable rates through an examination of the public utility's costs"),

[77] *See, e.g.*, Alice Kaswan, *Climate Change, the Clean Air Act, and Industrial Pollution*, 30 UCLA J. ENVTL. L. & POL'Y 51, 63-64, 75-76 (2012) (describing acid rain caused by coal-fired power plants and the contribution of these same plants to greenhouse gas emissions and co-pollutants, explaining that power plants "emit half of the nation's mercury emissions," noting the health and economic impacts of pollution, with respect to co-pollutants from coal, noting that the level of emissions depends in part on the type of coal burned, and noting that "choices among renewable energy technologies will impact net co-pollutant levels").

[78] *See* Energy Information Admin., Average Price of Natural Gas Sold to Electric Power Consumers, by State, 2010-2012, *available at* http://205.254.135.7/naturalgas/monthly/pdf/table_23.pdf. In January 2010, the average price of natural gas sold to power plants was $6.98 per thousand cubic feet of gas. By January 2011, this had dropped to $5.63/mcf and to $3.81 by January 2012.

the United States is natural gas-fired.[79] This trend, in turn, creates incentives against constructing more expensive renewable generating capacity—thus partially slowing what appeared to be a rapid yet small energy transition toward renewables.[80]

Several forces impede any type of generator commitment to a new fuel, whether natural gas, renewables, or other sources. In the case of natural gas, for example, generators often enter into long-term contracts for fuel supply with an energy marketer—largely for price-hedging purposes.[81] The energy marketer, in turn, works with individual gas producers and contracts with pipelines to transport the gas to utility clients.[82] These long-term contracts often disincentivize switches to new fuels or generating plants, and particularly more expensive ones. Similar entrenchment within the energy system extends beyond fuel supply to the utility that buys wholesale power and sells this power retail to customers. Utilities typically sign power purchase agreements with generators,[83] ensuring that generators

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[79] Energy Information Admin., Today in Energy, July 5, 2011, http://205.254.135.7/todayinenergy/detail.cfm?id=2070 (explaining that new natural gas-fired plants represented "81% of total generation capacity additions" from 2000-2010).

[80] So far, evidence of of gas outcompeting potential renewable projects tend is anecdotal, but an MIT source predicts massive displacement of new renewables by gas plants. *See* S. Paltsev et al., The Future of U.S. Natural Gas Production, Use, and Trade, MIT Report No. 186 (June 2010), *available at* http://globalchange.mit.edu/files/document/MITJPSPGC_Rpt186.pdf. Several concerns also have prevented a broader transition from coal to gas in the electricity world. Power plants have historically experienced broad price volatility in natural gas and are concerned about continued price fluctuations. Cheap, abundant coal, in contrast, has offered a more steady and predictable fuel option. Even if natural gas prices remained consistently low and encouraged generators to switch to gas, this trend could disincentivize expanded gas extraction; hydraulic fracturing is an expensive extraction technology, and energy companies may avoid drilling and fracturing new wells if they believe that the break-even price is elusive.

[81] Judith M. Matlock, *Impact of Restructuring of the Electric Power Industry on Oil, Gas, Coal, and Other Mineral Producers*, 43 RMMLF-INST 1, § 1.16 (1997) (describing the stranded costs that can result from long-term fuel contracts). *But see id*. (noting that "[a]s utilities face competition in the generation segment of their business, this is expected to reduce the demand for long-term fuel contracts").

[82] *See, e.g.*, Southwest Energy (noting that the midstream marketer specializes in "supply aggregation, sales, and logistical delivery"); JAMES HICKEY, JR., ET AL., ENERGY LAW AND POLICY FOR THE 21ST CENTURY (2000) (describing gas marketing).

[83] Detton, *supra* note 53 (explaining that "some physical contracts charge a price for the seller's commitment to reserve capacity, regardless of whether the buyer actually takes the electricity, as well as a separate price for the electricity actually received," that some are "firm," meaning that "meaning that only certain forces outside a party's control may justify interruption of receipt or delivery," and that "The price may be fixed to lock in current market prices to reduce price risk in the future," although "[t]ransaction agreements for longer terms . . . may use a wider variety of pricing terms"). Long-term contracts in some cases may benefits renewable producers in the future, as renewable generators typically

have a reliable outlet for their product and that utilities have a steady supply of electricity at a predictable price. If utility customers demand new generators with access to more alternative fuel sources, long-term agreements may constrain the utility's ability to switch. So, too, do state-based ratemaking regimes for retail electricity, which have reasonable rate requirements[84] that limit utilities' use of expensive, alternative fuels.

Market forces in the transmission sector have similarly powerful effects within the energy system as a whole. As noted above, transmission lines are a classic natural monopoly, and many utilities that own transmission lines also own generation capacity.[85] Rather than raising prices, they could simply block all other generators from using the lines or charge exorbitant fees. While a number of regulations have emerged to temper these effects, the entrenched transmission regime remains as a powerful bottleneck and potential blockade to desired changes in the energy system.[86] Utilities can still deny generators access to the grid if generation will be too intermittent and will interfere with effective grid operation.[87] Utilities also can prioritize certain generators over others within the long queue of generators awaiting interconnection.[88]

"lock-in" deals through these contracts. David A. Domansky, *The Indefatigable Power of Wind: A Practical Treatment of Development of Wind Projects*, 55 RMMLF-INST 5-1 (2009) (noting "in a typical wind project" the existence of the "the power purchaser (Power Purchaser), which purchases the Project's output pursuant to a long-term Power Purchase Agreement (Power Purchase Agreement)." *See also* Marc B. Mihaly, *Recovery of a Lost Decade (Or is it There?): Developing the Capacity in Government Necessary to Reduce Carbon Emissions and Administer Energy Markets*, 88 Or. L. Rev. 405, 476-77 (2009) (noting that large industrial consumers sometimes bypass utilities and directly entered into power purchase agreements with generators)

[84] *See, e.g.*, Virginia State Corporation Comm'n, Electric Rates in Virginia, *available at* http://www.scc.virginia.gov/comm/howerates.pdf (explaining the "reasonable and prudent" rate requirement).

[85] *See* Sandeep Vaheesan, *Preempting Parochialism and Protectionism in Power*, 49 HARV. J. ON LEGIS. 87, 94 (2012) (noting that "[i]n much of the West and Southeast, most utilities remain vertically integrated and regulated as natural monopolies," although recognizing that new generating firms can enter the market and sell to these utilities).

[86] *Cf. id*. at 115 (noting that "incumbent utilities with significant political clout in state government can use siting processes to block new transmission lines as a means to protect their existing market power").

[87] *See, e.g.*, NATL. RENEWABLE ENERGY LABORATORY, MAKING CONNECTIONS: CASE STUDIES OF INTERCONNECTION BARRIERS AND THEIR IMPACT ON DISTRIBUTED POWER PROJECTS at 37 (2000), *available at* http://www.nrel.gov/docs/fy00osti/28053.pdf (noting that "[t]here were several case-study examples of distributed power proponents being denied interconnection and parallel operation by either investor owned or publicly owned utilities").

[88] *See* Stephen M. Fisher, Note, Reforming Interconnection Queue Management Under FERC Order No. 2003, 26 Yale J. on Reg. 117, 119 (2009) (observing that many regional interconnection queues "are backlogged with hundreds of power projects, representing tens

New generators—particularly renewable installations located far from load centers—also need new lines, and they often rely on utilities to build them. Yet beyond controlling access to existing lines, utilities can refuse to construct new ones.[89] Although "merchant" transmission lines constructed by non-vertically integrated utilities are slowly emerging, large utilities still hold the bulk of the capital and expertise necessary to construct new transmission.[90] Existing regulations, too, favor utility construction.[91] Yet vertically integrated utilities with their own generation capacity have few incentives to build new transmission that will accommodate new, competitive generation.[92] Finally, even utilities willing to build new lines face a dilemma: They want an up-front assurance that generators will in fact construct new capacity and connect it to the line, yet generators are unwilling to build until they have a reasonable guarantee of grid access. Texas has solved this problem by designating "competitive renewable energy zones" where construction of new wind generation is anticipated and by requiring rapid construction of transmission to these zones;[93] California has implemented a similar system.[94] The western states, in turn, have joined in an attempt to designate regional renewable zones and encourage construction of transmission to them,[95] but the Association's lack of regional authority over transmission siting may stifle serious investment in generation or transmission.

Finally, at the distribution level, where a utility provides electricity to individual consumers or a marketer connects consumers directly to generators, a number of market forces affect the types of energy generated and consumer access to it. Historically, vertically-integrated utilities have

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of thousands of megawatts of generating capacity" and that projects are sometimes backlogged "several months" due to the wait.

[89] *See* Steven J. Eagle, *Securing a Reliable Electricity Grid: A New Era in Transmission Siting Regulation?,* 73 TENN. L. REV. 1, 12 (2005) ("After the FERC issued Order 888, which mandated open access to transmission lines, investment in new bulk transmission facilities dropped by nearly 50%.").

[90] *See id*. (noting "entry-deterring practices" by utilities against merchant transmission).

[91] *See also* Brown and Rossi, *infra* note 115, at 720 (explaining that "in Colorado, it is not clear that anyone other than a public utility may apply to site a transmission line, although a public utility is defined broadly so that any party operating transmission lines may be a public utility").

[92] *See* Vaheesan, *supra* note 67, at 115 (noting that "incumbent utilities with significant political clout in state government can use siting processes to block new transmission lines as a means to protect their existing market power").

[93] Texas Publ. Utility Comm'n. Order 33672 (2008); Public Utility Comm'n. of Tex., PUCT - CREZ Home Page, http://www.texascrezprojects.com/.

[94] California Energy Comm'n., Renewable Energy Transmission Initiative, http://www.energy.ca.gov/reti/index.html.

[95] *See* Western Governors' Association, Western Renewable Energy Zones - Phase 1 Report (June 2009), *available at* http://www.westgov.org/wga/publicat/WREZ09.pdf.

charged customers fixed, regulated rates for electricity. In exchange for offering rates controlled by the state's public utility or public service commission, utilities enjoyed a natural monopoly in a given service area—consumers had no choice but to buy electricity from them.[96] Consumers also had few means of reducing costs by using electricity at efficient times.[97] Fixed rates, the utility's natural monopoly in an area, and the inability to easily move consumption away from peak periods gave consumers few incentives to change consumption habits or locate alternative generators.

Technological change, the demand for cleaner sources, and the increasing economic viability of renewables have slowly changed utility and consumer behavior and have enabled some movement toward the type of energy system that would meet a variety of public values, such as affordable and clean energy. Some consumers have demanded options for purchasing electricity generated from wind or solar sources, for example, or for real time pricing,[98] in which electricity prices change depending on how many people are demanding it at a given time. State legislatures and public utility and service commissions, in turn, have begun to enable these types of options.[99] Old traditions remain, however, and long-term contracts, the powerful incentives for utilities to block transmission access, and consumers' lack of familiarity with more flexible usage and pricing schemes for electricity largely perpetuate an antiquated and entrenched system. These long-standing, hard-to-change aspects of markets provide significant barriers to efforts at framing regulation and institutions to support needed evolution.

C. Regulatory

The combination of physical and market challenges highlighted in Sections I.A and I.B combine to create daunting regulatory challenges in an energy system which needs more flexibility in generation and access to

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[96] *See* Spence, *Can Law Manage Competitive Energy Markets?*, *supra* note 69, at 770, 772 (explaining that distribution is a natural monopoly and historically was provided by vertically integrated utilities and regulated as a natural monopoly).

[97] *See, e.g.*, *c.f.* Elias L. Quinn & Adam L. Reed, *Envisioning the Smart Grid: Network Architecture, Information Control, and the Public Policy Balancing Act*, 81 U. COLO. L. REV. 833, 871 (2010) (describing real-time prices and other measures that reduce customer use of electricity and utilities' disincentive to implement these types of schemes).

[98] *See, e.g.*, PG&E Proposes Option for Customers to Choose 100% Renewable Energy, Apr. 25, 2012, http://www.nawindpower.com/e107_plugins/content/content.php?content.9747.

[99] *See, e.g.*, *id.*; U.S. Dep't of Energy, Renewable Portfolio Standard Policies, June 2012, *available at* http://www.dsireusa.org/documents/summarymaps/RPS_map.pdf.

transmission, more consumer options, and, as always, a continuous and adequate supply of electricity. These challenges largely fall to federal and local entities, which often are not fully equipped with the jurisdictional reach or the governance capacity to fully address them: Although energy resources are distributed unequally around the world, and markets for them are increasingly transnational, these resources are primarily regulated at a national or subnational level due to the international law principle of state sovereignty over natural resources. This principle both gives the United States property rights to and control over its land-based and off-shore energy resources and makes it dependent on the other countries with energy resources that it needs.[100]

Within the United States, a number of local, regional, federal, and state regulations, standards, and quasi-formal governance schemes shape both the physical structure of America's energy system and intervene in the market forces described above. These public controls also provide unique market opportunities, such as the construction of new transmission lines and the addition of smart grid technologies, which can enable new generation sources to connect to the grid and empower consumers to influence the type, quantity, and price of electricity they consume.[101]

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[100] *See* Robert Dufresne, *The Opacity of Oil: Oil Corporations, Internal Violence, and International Law*, 36 N.Y.U. J. INT'L & POL. 331 (2004); Melaku Geboye Desta, *OPEC Production Management Practices Under WTO Law and the Antitrust Law of Non-OPEC Countries*, 28 J. ENERGY & NAT. RESOURCES L. 439 (2010); *cf.* GEORGE ELIAN, THE PRINCIPLE OF SOVEREIGNTY OVER NATURAL RESOURCES (1979); NICO SCHRIJVER, SOVEREIGNTY OVER NATURAL RESOURCES: BALANCING RIGHTS AND DUTIES (1997); Hari M. Osofsky, *Learning from Environmental Justice: A New Model for International Environmental Rights*, 24 STAN. ENVTL. L.J. 71 (2005); Annecoos Wiersema, *A Train Without Tracks: Rethinking the Place of Law and Goals in Environmental and Natural Resources Law*, 38 ENVTL. L. 1239, 1283 n.261 (2008).

[101] Multi-level public-private collaborations, such as those in the new greenhouse gas emissions standards for motor vehicles, similarly shape the evolving transportation side of the energy sector. Hari Osofsky, *Diagonal Federalism and Climate Change: Implications for the Obama Administration*, 62 ALA. L. REV. 237 (2011); Jody Freeman, *The Obama Administration's National Auto Policy: Lessons from the "Car Deal"*, 35 HARV. ENVTL. L. REV. 343 (2011). The government also subsidizes desired transformative developments at times, such as providing royalties concessions to oil companies engaged in offshore drilling; these incentives impact the type, rate, and location of primary fuel extraction for transportation and heating, for example, as well as for electricity generation. 1995 Outer Continental Shelf Deep Water Royalty Relief Act (DWRRA), 43 U.S.C. § 1337(a)(1) & (a)(3)(C) (2006). This scheme has been upheld by the Fifth Circuit. Kerr-McGee Oil & Gas Corp. v. U.S. Dep't of Interior, 554 F.3d 1082, 1086–87 (5th Cir. 2009); *see also* Keith Hall, *Mineral Law: Outer Continental Shelf Deep Water Royalty Relief Act*, 57 LA. B.J. 53 (2009). For criticism and limited reform of the royalty scheme, see U.S. GOV'T ACCOUNTABILITY OFFICE, GAO-07-682T, ROYALTIES COLLECTION: ONGOING PROBLEMS WITH INTERIOR'S EFFORTS TO ENSURE A FAIR RETURN FOR TAXPAYERS REQUIRE ATTENTION 7–8 (2007), *available at* http://www.gao.gov/new.items/d07682t.pdf; U.S.

Local and state governments have broad control over the choice of fuel used to produce electricity and the type of generation facilities constructed. Increasingly, cities[102] and states write renewable portfolio standards[103] that require a certain percentage of electricity to come from renewable sources, for example. These force utilities, over time, to switch generation sources even if they have to abandon beneficial long-term contracts with fossil fuel-based generators.[104] Local and state governments also affect the type of generation chosen through their regulation of utility rates or through direct mandates for generation. City councils sometimes direct municipally-owned utilities, for example, to build new renewable generation, whereas states that regulate utility rates tend to only approve affordable construction projects that keep rates down.[105] Through renewable portfolio standards and other decisions about the energy generation mix, state and local governments directly or indirectly require the construction of new transmission to connect renewable generation to the utilities that must purchase it. Texas has gone the furthest in this regard, requiring its Public Utility Commission to select utilities to build high-priority transmission lines to wind generation built under the state's renewable portfolio standard.[106]

DEP'T OF INTERIOR, REFORMING MMS: JANUARY 2009 – PRESENT (2010), *available at* http://www.doi.gov/deepwaterhorizon/upload/05-07-10-reform-fact-sheet.pdf. Given this Article's emphasis on the electricity sector and the above described previous scholarly analysis of multi-scalar dynamics in regulating the transportation sector, however, this Section focuses primarily on the electricity context.

[102] For a description of the many city initiatives in the most populous areas, see Garrick Pursley & Hannah Wiseman, *Local Energy*, 60 EMORY L.J. 877, 959, Table 1 (2011).

[103] *See* Lincoln L. Davies, *Renewable Portfolio Standards: Is There A "Race" and Is It "To the Top"*?, 3 SAN DIEGO J. CLIMATE & ENERGY L. 3, 13-24 (2011-12) (describing the content and design of state RPS programs).

[104] Governments often mitigate the impacts of abandoning long-term contracts by allowing utilities to recover their stranded costs, or at least a portion of these costs, through the rates that they charge. *See, e.g.*, William J. Baumol & J. Gregory Sidak, *Stranded Costs*, 18 HARV. J.L. & PUB. POL'Y 835, 848 (1995) (arguing in favor of allowing recovery and describing FERC's allowing recovery of stranded costs but requiring utilities to mitigate).

[105] *See, e.g.*, Matthew L. Wald & Tom Zeller, Jr., *Cost of Green Power Makes Projects Tougher Sell*, N.Y. TIMES, Nov. 7, 2010, at A1, *available at* http://www.nytimes.com/2010/11/08/science/earth/08fossil.html (describing how state regulators rejected a Virginia utility's contract to purchase power from a wind farm, "citing the recession and the lower prices of natural gas and other fossil fuels").

[106] S.B. 20 § 3(g)(1), 79th Leg., 1st Spec. Sess. (Tex. 2005), available at http://www.capitol.state.tx.us/tlodocs/791/billtext/pdf/SB00020F.pdf. On the transportation side which is not the focus of this Article, cities make decisions regarding their own vehicle fleet and land use planning that shape both the choice of and overall usage patterns of transportation fuels. *See* Katherine A. Trisolini, *All Hands on Deck: Local Governments and the Potential for Bidirectional Climate Change Regulation*, 62 STANFORD L. REV. 669 (2010); Hari M. Osofsky, *Suburban Climate Change Efforts: Possibilities for Small and*

Federal entities also influence generation choice by governing core elements of the transportation of fuels and electricity. The Federal Energy Regulatory Commission approves the location of interstate gas pipelines and sets wholesale gas prices (typically now tied to market rates) and the price charged by pipelines for transporting natural gas, for example.[107] This affects power plants' access to an increasingly sought-after fuel source. FERC also influences the ability of renewable generators to sell their product due to its control over transmission services, including the rate that operators may charge for these services, the means of allocating rates, and the conditions that they may impose on generators waiting to connect to the grid.

In 1996, FERC ordered that vertically-integrated utilities functionally separate their transmission services from distribution and generation and offer open access to their transmission lines on a first-come first-served basis.[108] When this failed to solve the transmission bottleneck, FERC attempted to require the regionalization of transmission. To do this, it strongly encouraged the formation of organizations with regional control of the transmission grid—originally called independent system operators and later "regional transmission organizations,"[109] entities that our companion piece *Hybrid Energy Governance* discusses in more depth.[110] These organizations, where they have been formed, apply to FERC for a unified transmission "tariff"—a document that sets the rate that the organization may charge for transmission service and prescribes the conditions of that service. RTOs then operate the transmission grid and plan for necessary upgrades. And in one of their most contentious roles, they plan for new transmission capacity and decide how to allocate transmission rates among utilities to cover this new capacity—leading the Seventh Circuit to strike down one scheme[111] and FERC to update its standards for RTO cost recovery.[112]

Nimble Cities Participating in State, Regional, National, and International Networks, __ CORNELL J. L. & PUB. POLICY __ (forthcoming 2012).

107 *See* Federal Energy Regulatory Commission, Natural Gas, Commission's Responsibilities, http://www.ferc.gov/industries/gas.asp. This power originally comes from 15 U.S.C. § 717 (granting federal authority over "transportation of natural gas in interstate commerce" and "the sale in interstate commerce of natural gas for resale").

108 FERC Order 888 (1996), *available at* www.ferc.gov/legal/maj-ord-reg/land-docs/rm95-8-00w.txt.

109 *See id*. (encouraging ISOs); FERC Order 2,000 (1999), *available at* http://www.ferc.gov/industries/electric/indus-act/trans-plan.asp (encouraging RTOs).

110 *See* Osofsky & Wiseman, *Hybrid Energy Governance*, *supra* note 12.

111 Illinois Commerce Comm'n v. Federal Energy Regulatory Comm'n, 576 F.3d 470 (7th Cir. 2009).

112 *See* FERC Order 1,000 (2012), *available at* http://www.ferc.gov/industries/electric/indus-act/trans-plan.asp.

Beyond setting rates and service standards for RTOs and other transmission operators, FERC also determines interconnection requirements, including how operators must prioritize and review generators' requests to connect to the lines and the conditions that they may impose on newly-interconnected sources.[113] FERC has written specific interconnection standards for large wind generators[114] in an effort to open up transmission access for this growing source yet also ensure reliable grid operation.

Although FERC affects generation choices through its control over pipelines and transmission services, states and local governments have an equally strong role in electricity transportation decisions. Municipal or state governments generally control transmission siting processes and can block projects by refusing all proposed locations.[115] A small number of regional organizations have emerged to facilitate transmission siting and planning for future expansions, but local entities have been hesitant to cede meaningful authority to them.[116]

States also have unique authority over the electricity sold by a utility directly to consumers. Historically, states have granted utilities exclusive access to service territories in exchange for comprehensive regulation.[117] States set the rates that utilities could charge customers, limited utilities' ability to immediately disconnect service for customers who could not pay, and regulated a variety of other aspects of service, such as billing disclosure.[118] States also controlled the types of generation built by utilities and the types of electricity purchased from generators. This system remains in place in a number of areas, but restructuring in a handful of states has substantially changed it.

In Texas, for example, in regions where sufficient competition among generators has developed, the state has separated the generation, transmission, and distribution functions. Power generation companies now compete for customers, and retail electric providers or "REPs" offer an

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[113] *See* FERC Order No. 2003-C (2012), *available at* http://www.ferc.gov/legal/maj-ord-reg/land-docs/order2003.asp (providing interconnection standards for large generators).

[114] FERC Order No. 661-A (2005), *available at* http://www.ferc.gov/EventCalendar/Files/20051212171744-RM05-4-001.pdf.

[115] For a description of siting regimes in some of the western states, see Ashley Brown & Jim Rossi, *Siting Transmission Lines in a Changed Milieu*, 81 U. COLO. L. REV. 677 (2010).

[116] *See id*. at 740, 748 (describing how many state transmission siting regimes remain antiquated and focus on local issues such as local environmental impacts, and describing the cost allocation issue as a major impediment to regional transmission governance and planning).

[117] *See* Bradley, *supra* note 64.

[118] *See* Spence, *Can Law Manage Competitive Energy Markets?*, supra note 69, at 769.

interface between customers and generators.[119] REPs approach customers with a variety of generation packages and arrange for a transmission and distribution service provider to connect the generator to the retail customer. The state continues to at least minimally regulate each of these entities: power generation companies must apply for a license, for example, and retail electric providers must provide certain notice to customers and, like historic vertically integrated utilities, must follow certain procedures in connecting and disconnecting customers from power services.[120] Transmission and distribution service providers, which still have a natural monopoly, continue to operate under state-approved rates.[121]

Together, the physical, market, and regulatory elements of the U.S. secondary energy system form a complex system. Any efforts to change the system or improve its governance must navigate the nuances of this tripartite structure. As discussed in the Part that follows, the nature of this system creates complicated federalism dynamics among and within levels of governance as multiple entities are granted partial authority over critical decisions.

II. THE NEED FOR A DYNAMIC CONCEPTION OF ENERGY FEDERALISM

As the analysis in Part I illustrates, the regulatory apparatus applicable to the U.S. energy system is tremendously complex, with many different types of law, institutions, and actors operating at multiple levels of government. The problem of multi-level governance is not new, and has long been addressed in the United States under the rubric of "federalism." From before the founding of this country through the present, both scholars and policymakers have debated the best way to organize regulatory authority across multiple levels of government. The vast majority of this scholarship focuses on "scale matching": people argue over which level of government, usually state or federal, is best suited to address a particular issue. Energy law scholarship has followed this tradition for the most part, with many articles devoted to which level of government is most appropriate for a particular sub-part of energy law, such as transmission siting[122] or renewable portfolio standards.[123]

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[119] *See* Texas Electric Choice Education Program, Retail Electric Providers, http://powertochoose.org/_content/_compare/companylist.aspx (last visited July 11, 2012) (describing REP functions).

[120] *See* Public Utility Comm'n of Tex., Certification and Licensing, http://www.puc.state.tx.us/industry/electric/business/rep/Rep.aspx (last visited July 11, 2012).

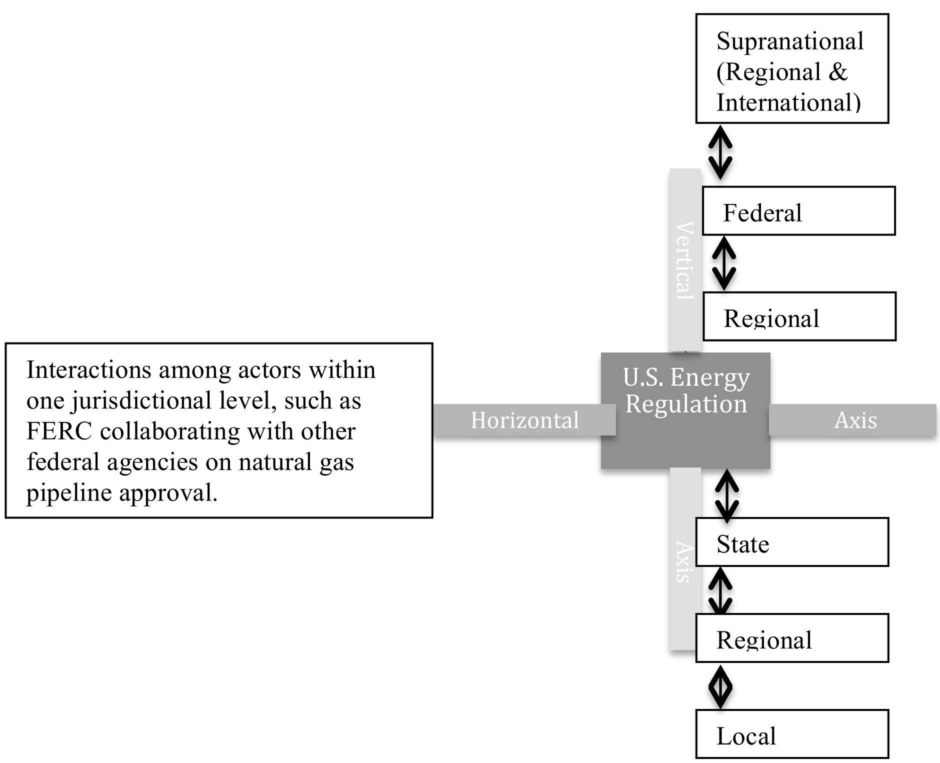
[121] ERCOT, Transmission and Distribution Providers, http://www.ercot.com/services/rq/tdsp/ (last visited July 31, 2012).

[122] *See infra* note 125.

While respecting the contribution that the current energy law scholarship makes to particular federalism questions, this Part argues that a more dynamic and holistic model is needed. In numerous substantive areas, especially environmental law, there has been increasing scholarly analysis of federalism in dynamic terms, which helps connect federalism to broader governance concerns. However, very little of this dynamic federalism literature has infused analyses of energy federalism. This Part proposes a model for doing so.

It begins in Section II.A by describing the current status of energy federalism scholarship and the ways in which a dynamic federalism approach could ground a more systematic analysis. It next operationalizes such an approach; Section II.B explores how energy law and institutions interact on a spatial grid, with a consideration of both vertical (local through international) and horizontal (same level) dynamics. Figure 2 illustrates this spatial grid.

Figure 2. Spatializing U.S. Energy Regulation



[123] *See infra* note 124.

A. Limits of Current Approaches to Energy Federalism

An extensive legal literature has thoroughly explored many variations of federalism, including a rapidly growing cluster of scholarship in recent years focused on dynamic models. Most energy federalism scholarship, however, analyzes questions of multi-level governance in traditional terms and specific contexts. Because so much of U.S. energy law is locused at the state level, for example, much of the energy federalism literature focuses on the appropriateness of expanding federal authority. Numerous pieces explore the benefits, limitations, and viability of the United States adopting a national renewable portfolio standard as opposed to the current model, under which states set individual, and highly varied, standards and goals.[124] Other scholarship similarly discusses how effective and appropriate an expansion of federal transmission siting authority would be.[125]

With these rather narrow applications of federalism to energy, and a tendency to rely on traditional federalism principles within these applications, energy law has largely failed to incorporate a more dynamic version of federalism emerging in other substantive areas.[126] Traditional federalism scholarship focuses on spatial relationships among levels of governance in a limited way: it concentrates on interactions along a vertical axis (the local to the federal), asking which level of government is most appropriate and how concurrent authority at more than one level of government should be shared. However, a rapidly developing stream of federalism scholarship has moved beyond these static views of multi-level relationships and has begun to recognize the complex interactions among governmental and nongovernmental actors. As Hari Osofsky has analyzed in previous work, a rich scholarly literature in federalism and other areas explores multiple iterations of regulatory structures that cut across traditional governance divisions.[127]

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[124] For example, a 2010 volume of the *Connecticut Law Review* contained several articles analyzing the benefits, limitations, and political viability of a National Renewable Portfolio Standard. *See* Lincoln L. Davis, *Power Forward: The Argument for a National RPS*, 42 CONN. L. REV. 1339 (2010); Joshua P. Fershee, *Moving* Power Forward*: Creating a Forward Looking Energy Policy Based on a National RPS*, 42 CONN. L. REV. 1405 (2010); Jim Rossi, *The Limits of a Renewable Portfolio Standard*, 42 CONN. L. REV. 1425 (2010); David B. Spence, *The Political Barriers to a National RPS*, 42 CONN. L. REV. 1451 (2010); Jim M. Foundation, *Johnny-Come-Lately: Practical Considerations of a National RPS*, 42 CONN. L. REV. 1475 (2010).

[125] *See* Jim Rossi, *The Trojan Horse of Electric Power Line Transmission Siting Authority*, 39 ENVTL. L. 1015 (2009).

[126] We discuss the limited set of scholarship bringing dynamic federalism into energy law *supra* notes 135–142 and accompanying text.

[127] *See id.*; Osofsky, *Diagonal Federalism and Climate Change*, *supra* note 101. As Osofsky has discussed in prior work, dynamic federalism intersects with many other streams of scholarship in multiple disciplines, such as network theory, scale theory,

Specifically, the dynamic federalism literature's treatment of the vertical axis has moved beyond traditional state-federal questions to multi-layered models that integrate actors from the smallest individual level to the largest international one.[128] "Federalism" for these scholars has come to encompass not simply federal-state-local interactions,[129] but also simultaneous interactions among multiple governance levels along the

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complexity theory, and adaptive management. Hari M. Osofsky, *Multidimensional Governance and the BP Deepwater Horizon Oil Spill*, 63 FLORIDA L. REV 1077 (2011). This Article acknowledges those synergies but focuses specifically on dynamic federalism because it wants to highlight the ways in which those spatial dynamics intersect with governance challenges.

[128] For examples looking at the very small individual and local scales, see Sarah Krakoff, *Environmental Law, Tragedy and Community* (draft manuscript on file with author); Michael P. Vandenbergh, Jack Barkenbus & Jonathan Gilligan, *Individual Carbon Emissions: The Low-Hanging Fruit*, 55 UCLA L. Rev. 1701 (2008). For examples of discussions that integrate domestic federalism questions with international law, Robert B. Ahdieh, *Foreign Affairs, International Law, and the New Federalism: Lessons from Coordination*, 73 MO. L. REV. 1185 (2008); Robert B. Ahdieh, *Dialectical Regulation*, 38 CONN. L. REV. 863 (2006); Robert B. Ahdieh, *From Federalism to Intersystemic Governance: The Changing Nature of Modern Jurisdiction*, 57 EMORY L.J. 1 (2007); Douglas A. Kysar & Bernadette A. Meyler, *Like a Nation State*, 55 UCLA L. REV. 1621 (2008); Judith Resnik, *Law's Migration: American Exceptionalism, Silent Dialogues, and Federalism's Multiple Ports of Entry*, 115 YALE L.J. 1564 (2006); Richard B. Stewart, *States and Cities as Actors in Global Climate Regulation: Unitary vs. Plural Architectures*, 50 ARIZ. L. REV. 681 (2008); Tseming Yang & Robert V. Percival, *The Emergence of Global Environmental Law*, 36 ECOLOGY L.Q. 615 (2009); *When Subnational Meets International: The Politics and Place of City, State, and Province in the World*, 102 AM. SOC'Y INT'L L. PROC. 339 (2008).

[129] Robert Percival has traced the emergence of environmental federalism in the United States, and some of the traditional debates that took place. *See* Robert V. Percival, *Environmental Federalism: Historical Roots and Contemporary Models*, 54 MD. L. REV. 1141 (1995). For an example of more traditional debates over top-down versus bottom-up models based on ideas of "race to the top" versus "race to the bottom theories of regulation, *compare* Kristen H. Engel, *State Environmental Standard-Setting: Is There a "Race" and Is It "to the Bottom"?*, 48 HASTINGS L.J. 271 (1997) (top down), Daniel C. Esty, *Revitalizing Environmental Federalism*, 95 MICH. L. REV. 570 (1996) (same), Joshua D. Sarnoff, *The Continuing Imperative (but Only from a National Perspective) for Federal Environmental Protection*, 7 DUKE ENVTL. L. & POL'Y F. 225 (1997) (same), and Peter P. Swire, *The Race to Laxity and the Race to Undesirability: Explaining Failures in Competition Among Jurisdictions in Environmental Law*, 14 YALE J. ON REG. 67 (1996) (same), *with* Henry N. Butler & Jonathan R. Macey, *Externalities and the Matching Principle: The Case for Reallocating Environmental Regulatory Authority*, 14 YALE L. & POL'Y REV & YALE J. ON REG. 23 (1996) (bottom up); Richard L. Revesz, *Rehabilitating Interstate Competition: Rethinking the "Race-to-the-Bottom" Rationale for Federal Environmental Regulation*, 7 N.Y.U. L. REV. 1210 (1992) (same); Richard L. Revesz, *The Race to the Bottom and Federal Environmental Regulation: A Response to Critics*, 82 MINN. L. REV. 535 (1997) (same); Richard B. Stewart, *Environmental Regulation and International Competitiveness*, 102 YALE L.J. 2039 (1993) (same).

vertical axis.[130] Moreover, as discussed in more depth in Part III, dynamic conceptions of shared governance often extend well beyond questions of concurrent authority to include evolving patterns of complicated relationships. Federal-state, local-state, and regional-local relationships often all occur simultaneously within one institution and change over time.

Dynamic federalism also at times moves beyond the primary focus on the vertical axis that dominates traditional accounts. Some of these scholars include interactions among key actors at a single level of governance as part of federalism. This horizontal dynamic federalism literature brings the role of intra-level regulatory relationships into clearer focus. For example, Noah Hall has argued that the Great Lakes–St. Lawrence River Basin Compact, which includes eight Great Lakes states, uses a cooperative horizontal federalism approach that promotes flexibility while minimizing incentives to underregulate.[131] In a broader substantive context, Allan Erbsen and others have provided models for analyzing the way in which horizontal and vertical federalism dynamics interact.[132]

In addition to analyzing vertical and horizontal relationships among government entities in a more nuanced way, the dynamic federalism literature unpacks existing characterizations of regulatory levels; even when

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[130] Kirsten Engel has given a helpful exposition of this evolution in an environmental context. *See* Kirsten H. Engel, *Harnessing the Benefits of Dynamic Federalism in Environmental Law*, 56 EMORY L.J. 159, 176 (2006). For an earlier exploration of dynamic federalism in a corporate law context, *see* Renee M. Jones, *Dynamic Federalism: Competition, Cooperation and Securities Enforcement*, 11 CONN INS. L.J. 107 (2004). For additional conceptualization of dynamic approaches, see ERIN RYAN, FEDERALISM AND THE TUG OF WAR WITHIN (2012); ROBERT A. SCHAPIRO, POLYPHONIC FEDERALISM: TOWARD THE PROTECTION OF FUNDAMENTAL RIGHTS (2009); Robert B. Ahdieh, *Dialectical Regulation*, 38 CONN. L. REV. 863, 879-83 (2006); Craig Anthony (Tony) Arnold, *The Structure of the Land Use Regulatory System in the United States*, 22 J. LAND USE & ENVTL. L. 441 (2007); William W. Buzbee, *Asymmetrical Regulation: Risk, Preemption, and the Floor/Ceiling Distinction*, 82 N.Y.U. L. REV. 1547, 1549-50 (2007); William W. Buzbee, *Recognizing the Regulatory Commons: A Theory of Regulatory Gaps*, 89 IOWA L. REV. 1, 49-51 (2003); Ann E. Carlson, *Iterative Federalism and Climate Change*, 103 NW. U. L. REV. 1097 (2009); Erwin Chemerinsky, *Empowering States When It Matters: A Different Approach to Preemption*, 69 BROOK. L. REV. 1313, 1328-32 (2004); Daniel A. Farber, *Climate Change, Federalism, and the Constitution*, 50 ARIZ. L. REV. 879 (2008); J.B. Ruhl & James Salzman, *Climate Change, Dead Zones, and Massive Problems in the Administrative State: A Guide for Whittling Away*, 98 CAL. L. REV. 59 (2010); Erin Ryan, *Negotiating Federalism*, 52 B.C. L. REV. 1 (2011). For examples of symposia dedicated to exploring these federalism models, see Symposium, *Interactive Federalism: Filling the Gaps?*, 56 EMORY L.J. 1 (2006); Symposium, *The New Federalism: Plural Governance in a Decentered World*, 57 EMORY L.J. 1 (2007).

[131] Noah D. Hall, *Toward a New Horizontal Federalism: Interstate Water Management in the Great Lakes Region*, 77 U. COLO. L. REV. 405 (2006).

[132] Allan Erbsen, *Horizontal Federalism*, 93 MINN. L. REV. 493 (2008); *see also* Osofsky, *Diagonal Federalism and Climate Change*, *supra* note 101.

an approach is defined as existing at a particular level, such as within the jurisdiction of the federal government, the literature recognizes that that characterization may be incomplete, and that relationships often shift over time. For example, Ann Carlson has explored the iterative dynamics that move policy forward as the state and federal government cooperate and clash over time.[133] Erin Ryan has considered the role of negotiation in creating these interactions, noting that state and federal officials at times negotiate schemes that are "federal" in name only—rejecting a system that would lodge all power at one level or another.[134] This nuanced treatment of cross-cutting relationships—those that bridge levels of governance, substantive areas of the law, public/private, or other institutional divisions—has implications for governance, which Part III explores in more depth.

A few scholars have begun discussing energy law issues in these types of dynamic terms, but that scholarship, like the above-described more traditional energy federalism work, is all in relatively narrow contexts. Most critically for this Article's analysis, none of it develops an overarching conceptual model for energy federalism. For example, as part of a broader analysis of agency coordination questions in administrative law, Jody Freeman and Jim Rossi provide examples of interagency coordination tools from energy law.[135] Ashira Ostrow has developed a dynamic federalism model she terms "process preemption" in the context of renewable energy siting.[136] In their analysis of transmission, Alexandra Klass and Elizabeth Wilson also reference the dynamic federalism literature and draw some models from it, including Ostrow's.[137] Ann Carlson has argued for a cross-cutting federalism approach to energy efficiency standards for appliances modeled on the hybrid approach used in the automobile emissions context.[138] Robin Kundis Craig, in turn, has taken a dynamic federalism approach to exploring the nexus of water, climate change, and energy

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[133] Carlson, *Iterative Federalism*, *supra* note 130.

[134] Erin Ryan, *Negotiating Federalism*, 52 B.C. L. REV. 1 (2011) (noting that some "forms of federalism"… "partner different federal, state, and local actors from across the different branches on both sides of the line in an elaborate process with multiple stages of iterative exchange—such as negotiated federal lawmaking over policy").

[135] Jody Freeman & Jim Rossi, *Agency Coordination in Shared Regulatory Space*, 125 HARV. L. REV. 1131 (2012).

[136] Ashira Pelman Ostrow, *Process Preemption in Federal Siting Regimes*, 48 Harv. J. on Legis. 289 (2011).

[137] Alexandra B. Klass & Elizabeth Wilson, *Interstate Transmission Challenges for Renewable Energy: A Federalism Mismatch*, __ VANDERBILT L. REV. __ (forthcoming 2012) (draft manuscript on file with authors).

[138] Ann E. Carlson, *Energy Efficiency and Federalism*, 1 SAN DIEGO J. CLIMATE & ENERGY L. 11 (2009).

law,[139] and Hannah Wiseman has argued for the expansion of regional renewable energy governance to address commons and anti-commons problems in siting. With Garrick Pursley, Wiseman also has examined the possibilities for expanding municipal powers in that context.[140] In the fuel extraction context, David Spence has explored the need for flexible considerations of federalism in the governance of hydraulic fracturing, describing demands for rapid response to new risks and assessing the ideal governance levels for this response.[141] Finally, Hari Osofsky has proposed a dynamic federalism model for understanding the complex regulatory interactions around offshore drilling regulation and spill clean-up that occurred in the context of the BP *Deepwater Horizon* oil spill.[142]

This Article argues that the complex and evolutionary understanding of governance explored in the dynamic federalism scholarship could contribute to a more systematic approach to regulating energy than current energy federalism scholarship provides.[143] A dynamic federalism approach is particularly well-suited to energy law because of the complex tripartite structure described in Part I. While detailed analyses of particular areas of energy law are important to understanding the nuances of those areas, traditional federalism approaches focused on solely choosing between the state and federal government may not adequately capture crucial dynamics among the system's physical, market, and regulatory aspects.

Dynamic federalism, with its more complete spatialization of critical relationships, helps to ensure that this fuller understanding is incorporated into regulatory proposals. It also fosters regulatory proposals that consider key stakeholders beyond just the state and federal governments and that employ innovative governance methods. Specifically, the vertical and horizontal axes of our dynamic federalism model for energy—discussed in depth in Section II.B—considers how entities are interacting across levels of government, within levels of government, and simultaneously across and within levels of government. Understanding these relationships more systematically across many areas of energy law helps to illuminate shared

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[139] Robin Kundis Craig, *Adapting Water Federalism to Climate Change Impacts: Energy Policy, Food Security, and the Allocation of Water Resources*, 5 ENVT'L & ENERGY L. & POL'Y J. 183 (2010).

[140] Garrick B. Pursley & Hannah J. Wiseman, *Local Energy*, 60 EMORY L.J. 877 (2011); Hannah Wiseman, *Expanding Regional Renewable Governance*, 35 HARV. ENVTL. L. REV. 477 (2011).

[141] David B. Spence, *Federalism, Regulatory Lags, and the Political Economy of Energy Production*, __ U. PA. L. REV. __ (forthcoming 2012), *available at* http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2017280.

[142] Osofsky, *Multidimensional Governance and the BP Deepwater Horizon Oil Spill*, *supra* note 127.

governance challenges and possibilities for institutional innovation discussed in Section III and the Conclusion.

B. Mapping Dynamic Federalism Interactions in the Energy System

This Section applies the dynamic federalism theory of the previous Section—a theory that exists largely outside of energy law—by mapping the spatial dynamics of energy regulation. At times, as discussed in more depth in *Hybrid Energy Governance*, innovative institutions navigate multiple governance levels, and employ unique interactions among key stakeholders within a given level, to address the complexities that arise in the physical, market, and regulatory components of the energy system.[144] However, in much of energy law, these interactions across and within levels of government occur through multiple institutions interacting in varying ways. The Section describes the patterns of relationships that these institutions have across different areas of energy law.

To do so, the Section employs the vertical and horizontal axes discussed in Section II.A to trace complex interactions among governmental and nongovernmental actors. First, it examines vertical relationships among actors at more than one level of government, including both the traditional state-federal interactions and additional ones. Like other dynamic federalism accounts, it seeks to capture the complicated interplay among stakeholders rather than just focusing on state, federal, and concurrent authority. Second, it explores the horizontal dimensions of these relationships, with a discussion of the ways in which a variety of actors at each level of government interact in the energy system.

In reality, interactions are rarely solely vertical or horizontal. Many of this Section's examples include simultaneous interactions across both axes. For example, when a group of states form a regional collaboration, their interaction is horizontal, but they have added a new vertical layer in the regional entity. However, breaking out the vertical and horizontal elements of the relationships across energy law helps to illuminate the complicated nature of energy federalism and reveal important patterns, including lessons for the future formation of energy institutions and improvement of existings ones. Together, these two sets of interacting spatial dynamics frame governance challenges for the energy system, which are the subject of Part III.

1. Vertical

In energy governance, most vertical interactions occur among federal-regional, regional-state, and federal-state actors, with a variety of

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[144] *See* Osofsky & Wiseman, *Hybrid Energy Governance*, *supra* note 12.

actors at each of these levels interacting with many actors at levels below or above them. At the national level these actors include Congress, FERC, and national associations that report to FERC; at the regional level, Regional Transmission Organizations/Independent System Operators and entities created by groups of states or their public utility commissions (such as state organizations that comment on RTO decisions), and federal and state actors operating within compacts; at the state level legislatures and public utility commissions; and at the local level entities that make land use planning decisions and individual regulated entities, which at times are city or state-based but often have multi-state operations occurring under larger parent company. We consider activities by utilities and their sub-units to be part of "governance" because utilities, including privately-owned businesses, are key actors within several formal governing institutions, such as the North American Electric Reliability Corporation (NERC) and RTOs/ISOs, and they implement a number of requirements imposed by FERC, RTOs/ISOs, and NERC. A dynamic approach is helpful to exploring these relationships because they change based on substantive context and over time.

Although major federal statutes address different aspects of the energy system, they vary significantly in how they balance larger and smaller scale authority. In the context of electricity, state public utility commissions and state and local land use bodies largely control most important aspects of generation, transmission, and distribution, with the exception of FERC authority over the terms and rates of wholesale transmission service.[145] This dominant small-scale control can create difficult vertical dynamics. Ashira Ostrow, for example, has explored the ways in which state and local jurisdiction makes renewable energy siting harder because of communities' unwillingness to bear the burdens of generation, and has drawn from telecommunications law to argue for a process preemption approach.[146] Ashley Brown and Jim Rossi, and Alexandra Klass and Elizabeth Wilson, have explored similar concerns in the context of new transmission lines—many of which would help bring renewable energy onto the grid—where FERC and regional transmission organizations have tried to address the need for interstate lines that state-by-state public utility commission approval often stalls.[147] Despite the Energy Policy Act of 2005 establishing national interest electric transmission corridors, the Department of Energy has not yet been able to successfully

[145] 16 U.S.C. § 824(a).
[146] Ostrow, *Process Preemption in Federal Siting Regimes*, *supra* note 136.
[147] 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); Klass & Wilson, *Interstate Transmission Challenges for Renewable Energy*, *supra* note 137.

complete such designations due to Ninth and Fourth Circuit rulings,[148] and most key transmission decisions still occur at a state level through public utility commissions—and to some extent, at a regional level.[149]

In other areas of energy law, however, opposite vertical dynamics dominate. For example, the federal government controls the siting and construction of interstate pipelines and all liquefied natural gas terminals in the natural gas context,[150] wielding substantial authority over their size, location, and environmental effects.[151] Similarly, deepwater drilling and oil spill clean-up are largely governed by federal statutes and federal inter-agency collaboration, even though they involve multiple scales of government. The Outer Continental Shelf Lands Act (OCSLA) and Coastal Zone Management Act (CZMA), building out of the federalism arrangement created in the Submerged Lands Act, designate the federal government as the regulator for drilling far off the coast in deep water.[152] The Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) and its amendments likewise create the basis for the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), which governs responses to deepwater spills like the 2010 *Deepwater Horizon* one.[153]

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[148] *Piedmont Envtl. Council v. Fed. Energy Regulatory Comm'n*, 558 F.3d 304, 313 (4th Cir. 2009); *California Wilderness Coalition v. DOE*, 631 F.3d 1072 (9th Cir. 2011).

[149] FERC has at times tried to create institutional mechanisms for addressing these issues, such as encouraging the creation of regional transmission organizations in Order 2000 or mandating that public utilities participate in open and transparent planning processes in Order 890.

[150] 15 U.S.C. § 717f (prohibiting the "the construction or extension of any [pipeline] facilities" without a FERC certificate); 15 U.S.C. § 717b ("The Commission shall have the exclusive authority to approve or deny an application for the siting, construction, expansion, or operation of an LNG terminal.").

[151] FERC, Guidance for Applicant-Prepared Draft Environmental Assessments for Certain Proposed Natural Gas Projects, http://www.ferc.gov/industries/gas/enviro/draft-ea-guidance.pdf (explaining that FERC prepares environmental assessments under the National Environmental Policy Act for "all proposed natural gas projects).

[152] *See* Coastal Zone Management Act, 16 U.S.C. §§ 1451–66 (2006); Outer Continental Shelf Lands Act, 43 U.S.C. §§ 1331–56a (2006); Submerged Lands Act, ch. 65, 67 Stat. 29 (1953) (codified as amended at 43 U.S.C. §§ 1301–15); *see also* Rachel E. Salcido, *Offshore Federalism and Ocean Industrialization*, 82 TUL. L. REV. 1355, 1375–96 (2008).

[153] 40 C.F.R. § 300.2 ("The NCP is required by section 105 of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, 42 U.S.C. § 9605, as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA), Pub. L. 99–499, (hereinafter CERCLA), and by section 311(d) of the Clean Water Act (CWA), 33 U.S.C. § 1321(d), as amended by the Oil Pollution Act of 1990 (OPA), Pub. L. 101–380. In Executive Order (E.O.) 12777 (56 FR 54757, October 22, 1991), the President delegated to the Environmental Protection Agency (EPA) the responsibility for the amendment of the NCP. Amendments to the NCP are coordinated with members of the National Response Team (NRT) prior to publication for notice and comment. This includes coordination with the Federal Emergency Management Agency (FEMA) and the Nuclear Regulatory Commission in order to avoid inconsistent or duplicative requirements in the emergency

Finally, some energy law establishes hybrid structures in which neither federal nor state and local governance dominates. We analyze these structures in depth in *Hybrid Energy Governance* to assess their effectiveness in navigating federalism complexity and its resulting governance challenges. For example, although FERC has federal control over interstate transmission rates and service, much of the operation of transmission lines occurs at the regional level, through regional transmission organizations. Any transmission utility that joins an approved RTO does not have to receive an individual transmission tariff from FERC, which would establish the rate that the utility could charge and the service conditions that it must follow.[154] Instead, by becoming a member of the RTO, the utility is immediately subject to a complex regional regime and tariff, in which members independent of transmission owners and generators set the rules for daily grid operations and the electricity market enabled by the grid. Although the RTO operates under its own tariff issued by FERC, it has a great deal of latitude in choosing the mechanisms for daily grid operation and long-term transmission planning.[155]

The North American Electric Reliability Corporation—a quasi-public association that writes grid reliability standards—also intermixes federal, regional, state, and local lines in its institutional construction. Despite the recent addition of FERC review authority, NERC largely relies on regional sub-institutions (regional entities) to write and enforce standards for electric reliability, which require, for example, that utilities follow procedures to prevent sabotage of transmission lines and to avoid generation failures that could cause voltage swings.[156] NERC members, consisting of investor-owned utilities, municipalities that own and operate utilities, power marketers, state public utility commissions, and industrial and individual electricity end-users, all vote on proposed reliability standards before passing them on to FERC for final approval.[157]

A dynamic energy federalism model therefore must recognize multiple, simultaneous interactions among numerous players along a

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planning responsibilities of those agencies. The NCP is applicable to response actions taken pursuant to the authorities under CERCLA and section 311 of the CWA, as amended.”).

[154] *See* FERC Order 2000, Final Rule, at 190-92, Dec. 20, 1999, *available at* http://www.ferc.gov/legal/maj-ord-reg/land-docs/RM99-2A.pdf (describing the importance of RTO independence from individual utilities that join the RTO and the attendant need for the RTO to have the sole authority to file a transmission tariff).

[155] *See* Osofsky & Wiseman, *Hybrid Energy Governance*, *supra* note 12.

[156] *See* NERC Stds. CIP-002-2 through CIP-009-3, *available at* http://www.nerc.com/page.php?cid=2|20 (follow “Critical Infrastructure Protection” hyperlink).

[157] For a more in-depth discussion of these processes, see Osofsky & Wiseman, *Hybrid Energy Governance*, *supra* note 12.

vertical axis, and, as discussed in Part III, complex relationships among these actors: NERC—a regional institution, for example—proposes reliability standards to FERC in a bottom-up process, and FERC ultimately approves them;[158] NERC and its sub-units also enforce many of the standards themselves, with FERC holding review authority.[159] The power within these vertical interactions does not always flow first from the top down, and, as also described in more detail in Part III, it often involves both conflict and cooperation; state members of an RTO sometimes support the RTO's proposals to FERC for transmission service changes or expanded transmission, for example, and at other times oppose it.[160] A dynamic energy federalism model captures these many nuances of vertical institutional relationships.

2. Horizontal

Intergovernmental interactions do not simply occur across different jurisdictional levels. Often, more than one governmental entity at a particular level plays an important role in energy decisionmaking, which makes the dynamic federalism literature with a horizontal focus salient to energy. Horizontal federalism issues arise in the energy system in numerous contexts and at many levels of governance. For example, at a federal level, FERC works with a number of other federal agencies in the gas pipeline siting and construction context by coordinating the various approvals that are required for pipelines, such as biological opinions from the Fish and Wildlife Service if endangered or threatened species may be affected by construction.[161] To perform this coordinating function, FERC issues a schedule with deadlines for completion of the various federal authorizations, requires agency heads to notify FERC of their anticipated

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[158] *See* 18 C.F.R. Part 39 (Feb. 3, 2006), Rules Concerning Certification of the Electric Reliability Organization; and Procedures for the Establishment, Approval, and Enforcement of Electric Reliability Stds., *available at* http://www.ferc.gov/whats-new/comm-meet/020206/E-1.pdf.

[159] *See id*. (describing NERC's and regional entities' roles).

[160] *See infra* text accompanying note 216.

[161] Order No. 687 at 2-3, http://www.ferc.gov/whats-new/comm-meet/101906/C-2.pdf. In footnote 4 of the order, FERC makes clear that it believes that any "recommendations and opinions . . . necessary for a federal agency to reach a decision on a request for a federal authorization that is needed for a proposed [pipeline or LNG project] to go forward" will be coordinated by FERC. If an endangered or threatened species would potentially be jeopardized by the pipeline, it appears that an FWS biological opinion would be "necessary" and that FERC therefore could set a deadline for the completion of this opinion under its new authority.

decision dates, and maintains a consolidated record of all authorizations required for the pipeline.[162]

Many horizontal relationships among key state-level stakeholders also take place at a regional level. While the creation of a regional level entity of state actors creates a state-regional vertical dynamic, this Section focuses on the way in which horizontal interactions take place within these entities. For instance, public utility commissions frequently interact with each other to compare approaches to obtaining cheaper fuels for electricity generation and ways to implement smart grid technologies, including those that allow more grid accommodation of renewables.[163] State officials that have to implement rules issued by FERC, RTOs, and state public utility commissions also have created regional state committees, such as the Organization of MISO States, to coordinate these regulating entities' recommendations and requirements, to influence new standards of the Midwest Independent System Operator (MISO) or FERC, and to provide better regulatory oversight of the MISO grid.[164]

Similarly, members of the Western Governors' Association and state public utility commissioners within the Western Interconnection (the western third of the national grid) joined in a horizontal effort to develop "Western Renewable Energy Zones"—areas amenable to the construction of large-scale renewable installations.[165] After gathering state and provincial officials and stakeholders to identify areas with open land surfaces, land use laws that would allow for renewable development, and abundant renewable resources, the Association is now trying to encourage the construction of transmission to these areas. It is "working through the Regional Transmission Expansion Project (RTEP) to analyze transmission requirements under a broad range of alternative energy futures and to develop long-term, interconnection-wide transmission expansion plans,"[166]

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[162] *Id*. at 8, 16, 24-25. FERC avoids unduly impinging on other federal agencies' authority by providing that its schedule will comply with those agencies' federally-mandated timelines. *Id*. at 8.

[163] *See, e.g.*, New England Conference of Public Utilities Commissioners, 65th Annual NECPUC Symposium, Preliminary Agenda, 2012, *available at* http://www.necpuc.org/Meetings/NecpucAgenda2012.pdf (including topics such as methods of getting shale gas to New England for generation and residential and commercial use and system "regulatory adjustments" that may be necessary for this change; "current opportunities and the challenges in modernizing the grid," including "access to cheaper, more efficient and clean energy technologies"; and addressing grid challenges associated with interconnecting wind and variable natural gas resources).

[164] Organization of MISO States, OMS Purpose, http://www.misostates.org/.

[165] Western Governors' Association, *supra* note 95.

[166] Western Governors' Association, Regional Transmission Expansion Planning, http://www.westgov.org/initiatives/rtep.

which will, if successful, harness renewable energy from these ideal construction areas and transmit it to load centers.

Within states and localities, different types of regional institutions allow power plant developers to participate in a centralized process that coordinates local and state agency approvals. In Oregon, for example, all large utility developers must apply to the Energy Facility Siting Council for a siting certificate.[167] The state's Council must extensively consult with other state and local agencies in making the siting determination, which involves nearly fifty environmental, social and economic criteria.[168] Municipal zoning laws also apply, but the utility developer may opt to have the Council determine whether the project complies with these laws, thus avoiding time-consuming developer negotiations with each individual municipality.[169]

Washington State offers a similar process with strong horizontal elements, in which the state's Energy Facility Site Evaluation Council is to "serve as an interagency coordinating body for energy-related issues,"[170] including the siting of generation facilities. The Council's first step toward cooperation comes through its membership, which includes representatives from the state's environmental, natural resources, and wildlife agencies; Department of Commerce; and Utilities and Transportation Commission.[171] It also involves these and other state agencies in the siting review process. Before submitting a formal application for certification of a site, a power generator seeking siting approval may apply to the Council for a preliminary site study, which the Council conducts in coordination with cities and counties where the site is proposed, as well as other state agencies "that might be requested to comment upon the potential site."[172] The Council also conducts some vertical coordination, as it includes federal agencies in the site study and environmental review process.[173]

Together, these vertical and horizontal relationships reveal ways in which federalism dynamics interact with energy law's tripartite structure and the complexities that a dynamic energy federalism model captures. Regulatory structures involve many public and private actors functioning at multiple levels of government because they must respond to the physical

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[167] OREGON REV. STAT. 469.350, 469.370 (West 2010).

[168] Oregon.gov, The Siting Process for Energy Facilities, http://www.oregon.gov/ENERGY/SITING/process.shtml; http://psc.wi.gov/thelibrary/publications/electric/electric05.pdf.

[169] *Id*.

[170] REV. CODE WASH. ANN. § 80.50.040(13) (West 2010).

[171] *Id*.

[172] Energy Facility Site Evaluation Council, Siting/Review Process, http://www.efsec.wa.gov/cert.shtml#Certification.

[173] *Id*.

characteristics of sources and the structures that move them through generation, transmission, and distribution; those physical interactions involve numerous governing entities, such as local or regional utilities that deliver retail electricity, multi-state transmission line operators, and a federal agency (FERC) that oversees interstate flows. The market forces further reinforce these complex spatial dynamics. The above-described regulatory frameworks and institutions have expanded and changed in order to to help energy supplies meet growing energy demand, while protecting the public against potential market distortions—such as utilities resisting the expansion of transmission that would increase competition (a problem partially addressed by RTOs)—and externalities, such as the environmental effects of siting generation its associated wires.

An understanding of these vertical and horizontal dynamics will not by itself, however, create an effective response to this complexity or the need for energy transitions. Rather, these dynamics lay the groundwork for the next step in this Article's dynamic federalism analysis: assessing governance challenges and developing a systematic, principled response to them. Part III draws from dynamic federalism to explore the relationship between this spatial complexity and effective governance.

III. GOVERNANCE CHALLENGES ARISING FROM THE COMPLEXITY OF ENERGY FEDERALISM

Complex spatial interactions among energy actors along both vertical and horizontal axes create difficult governance issues, which traditional federalism models that focus on governance *levels*, rather than governance itself, often ignore. First, do individual key decisionmakers have adequate authority to allow the energy system to function and evolve in response to modern challenges? Second, when simultaneous overlap and fragmentation occurs, how should the decisionmaking hierarchy be structured (whether along a horizontal or a vertical axis) and who makes that decision? To what extent do and should governance structures encourage cooperation among key actors, and when does (and should) conflict play a role in driving regulation? Third, how should governance systems navigate the diversity of public, private, and hybrid actors that play a role in the energy system? This Section explores each of these questions in turn.[174]

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[174] Hari Osofsky has explored variations on these governance issues her federalism analysis of of the BP Deepwater Horizon oil spill, Osofsky, *Multidimensional Governance and the BP Deepwater Horizon Oil Spill*, *supra* note 127, which builds upon the model of diagonal federalism she introduced in the context of climate change in Osofsky, *Diagonal Federalism and Climate Change*, *supra* note 101. We draw upon it here because it applies

In its analysis, this Part takes a dynamic federalist approach to exploring the relationship between federalism and governance. Beyond its more nuanced spatialization of federalism questions, the dynamic federalism literature interweaves broader governance questions, such as power structures within decisionmaking processes, with traditional federalism concerns. With respect to the first question of individual decisionmaker authority, outside of the energy context dynamic federalism scholars such as William Buzbee have considered the ways in which governance gaps rather than overregulation sometimes result from regulatory complexity;[175] these gaps exist throughout the energy system where key regulators often have inadequate authority to achieve important goals.

Regarding the second question, the dynamic federalism literature—again typically without consideration of energy governance questions—has analyzed issues of hierarchy and cooperativeness that emerge from overlapping jurisdictional authority of actors at multiple levels, where no actor has full authority to address a particular externality. With respect to hierarchy, scholars such as William Buzbee, Ann Carlson, Daniel Esty, and Robert Schapiro have, for example, considered how vertical relationships might vary based on context[176] and how they might evolve over time through regulatory interaction.[177] The dynamic federalism literature on cooperativeness has both provided a range of models for cooperative federalism in which states or local entities implement regulations above a federal floor[178]—at times in combination with other theoretical approaches[179]—and explored how uncooperative interactions can form part

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particularly well to energy federalism, and none of the federalism analyses in the energy literature have performed this kind of mapping.

[175] Buzbee, *Recognizing the Regulatory Commons*, *supra* note 130.

[176] *See* William W. Buzbee, *Contextual Environmental Federalism*, 14 N.Y.U. ENVTL. L.J. 108 (2005); Buzbee, *Recognizing the Regulatory Commons*, *supra* note 130; Daniel C. Esty, *Revitalizing Environmental Federalism*, 95 MICH. L. REV. 570 (1996).

[177] SCHAPIRO, POLYPHONIC FEDERALISM, *supra* note **Error! Bookmark not defined.**; Carlson, *Iterative Federalism and Climate Change*, *supra* note 130.

[178] William Andreen et al., *Cooperative Federalism and Climate Change: Why Federal, State, and Local Governments Must Continue to Partner*, CENTER FOR PROGRESSIVE REFORM (May 29, 2008), http:// progressive regulation.org/ articles/ Cooperative_ Federalism_ and_ Climate_ Change.pdf; Alice Kaswan, *A Cooperative Federalism Proposal for Climate Legislation: The Value of State Autonomy in the Federalism System*, 85 DENV. U. L. REV. 791 (2008); Holly Doremus & W. Michael Hanemann, *Of Babies and Bathwater: Why the Clean Air Act's Cooperative Federalism Framework is Useful for Addressing Global Warming*, 50 ARIZ. L. REV. 799 (2008).

[179] Brad Karkkainen, *Information-Forcing Environmental Regulation*, 33 FLA. ST. U. L. REV. 861, 888 (2006) ("[p]roperly structured, penalty default rules might be used to induce meaningful participation in locally devolved, place-based, collaborative, public-private hybrid, new governance institutions, aimed at integrated, adaptive, experimentalist management of watersheds and other institutions.").

of a multi-level regulatory system,[180] which sometimes inspires constructive regulatory change. Efforts at energy regulation struggle with all of these hierarchy and cooperativeness concerns, as discussed in this Part.

Finally, regarding the third question of private entities' participation in governance, a literature analyzing how public-private dynamics interact with regulatory approaches can help to illuminate the particular variations of these relationships in the energy context.[181] The intertwining of public and private in energy regulation both poses challenges of institutional design and of preventing capture, and provides the basis for innovative strategies for meeting all three of these energy governance challenges.

A. Inadequacy of Authority

In part due to the complex federalism map described in Section II.B, key regulatory entities often lack authority to move critical energy governance decisions forward. This problem is particularly acute in the context of transmission. As discussed above, the federal government has only limited authority to site needed interstate transmission lines, and has had trouble exercising it. Regional organizations also have had trouble exercising authority, with the Seventh Circuit striking down a regional cost-sharing scheme,[182] and this creates uncertainty for new approaches, like the MISO's approach to sharing the costs of transmission expansion across its

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[180] *See* Kirk W. Junker, *Conventional Wisdom, De-emption and Uncooperative Federalism in International Environmental Agreements*, 2 LOY. U. CHI. INT'L L. REV. 93 (2004–05); Jessica Bulman-Pozen & Heather K. Gerken, *Uncooperative Federalism*, 118 YALE L.J. 1256 (2009); Karen Bridges, Note, *Uncooperative Federalism: The Struggle over Subsistence and Sovereignty in Alaska Continues*, 19 PUB. LAND & RESOURCES L. REV. 131 (1998). Beyond this literature directly focused on uncooperativeness, some scholarship includes conflict as one strand in its model. SCHAPIRO, POLYPHONIC FEDERALISM, *supra* note 130; Carlson, *Iterative Federalism and Climate Change*, *supra* note 130. An extensive literature that addresses cooperation-conflict has arisen in the specific context of preemption. *See* Buzbee, *Asymmetrical Regulation: Risk, Preemption, and the Floor/Ceiling Distinction*, *supra* note 130; Buzbee, *Recognizing the Regulatory Commons: A Theory of Regulatory Gaps*, *supra* note 130; Ann E. Carlson, *Federalism, Preemption, and Greenhouse Gas Emissions*, 37 U.C. DAVIS L. REV. 281, 290-92 (2003); Robert L. Glicksman & Richard E. Levy, *A Collection Action Perspective on Ceiling Preemption by Federal Regulation: The Case of Global Climate Change*, 102 NW. U. L. REV. 579 (2008); Alexandra B. Klass, *Common Law and Federalism in the Age of the Regulatory State*, 9 IOWA L. REV. 545 (2007); Benjamin K. Sovacool, *The Best of Both Worlds: Environmental Federalism and the Need for Federal Action on Renewable Energy and Climate Change*, 27 STAN. ENVTL. L.J. 397 (2008).

[181] For an example of a broader analysis of public-private, international-domestic regulatory interactions, see Alfred C. Aman, Jr., *The Globalizing State: A Future-Oriented Perspective on the Public/Private Distinction, Federalism, and Democracy*, 31 VAND. J. TRANSNAT'L L. 769 (1998).

[182] Ill. Commerce Comm'n v. FERC, 576 F.3d 470, 476 (7th Cir. 2009).

territory. Through this "multi-value" approach, regions that demand more electricity from the new lines pay a larger share of the costs.[183] MISO does not have full authority to expand the law, however. Public utility commissions are bound by state law regarding rates that they can approve and allow transmission utilities to pass on to customers—including that rates be "reasonable and prudent"[184] and that the rates support projects implemented to respond to public need—and interstate projects like those proposed by MISO will not always fit within this law. It is hard, for example, to demonstrate public need in a state for a line that simply passes through it.[185]

These types of issues run through many other areas of energy law and at times involve situations where one regulatory entity ostensibly has authority but other regulatory entities make decisions that impair implementation of that authority. For example, in the aftermath of the BP *Deepwater Horizon* oil spill, the Coast Guard tried to create a systematic approach to the placement of boom—physical barriers to the oil—was used. However, states resisted those decisions, and used their own regulatory authority and funds given to them from BP to place boom in ways that at times thwarted the Coast Guard's efforts to match barriers to the greatest risks based on tidal currents.[186]

Similar blockades emerge in onshore and offshore renewable siting. After Texas identified certain regions of the state as amenable to wind development and began considering transmission that would connect to these areas, for example, at least one county in a windy zone passed a resolution opposing windfarms.[187] A number of municipalities in states with abundant wind have similarly enacted moratoria on renewable development with mixed success.[188] In the offshore context, after the Department of Interior initiated a process to approve the Cape Wind project, a host of opponents enlisted a variety of state and federal laws in an effort to block Interior's support. In a case that held up the project for several years, citizens unsuccessfully argued that Massachusetts's state authority over certain aspects of fisheries management under the federal Magnuson-

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[183] Klass & Wilson, *supra* note 137.

[184] *See* Jim Rossi, *Clean Energy and the Price Preemption Ceiling*, 3 SAN DIEGO J. CLIMATE & ENERGY L. 243, 257 (2012) At the state level, regulators apply similar "just and reasonable" rate language under their own statutes in setting retail rates [similar to FERC's just and reasonable wholesale requirement).

[185] *See* Osofsky & Wiseman, *Hybrid Energy Governance*, *supra* note 12.

[186] *See Decision-Making Within the Unified Command*, *supra* note 196, at 17–20.

[187] Wiseman, *supra* note 140, at 510 (describing a Gillespie County, Texas resolution).

[188] *Id*. at 510-11 (describing moratoria); Outka, *supra* note 198, at 279 (describing a successful Kansas municipal ban and an invalidated Wisconsin one).

Stevens Act should extend to approval of a wind farm in federal waters.[189] Several parties also invoked the National Historic Preservation Act.[190] Although they were unsuccessful in blocking the project altogether, the DOI ultimately consulted with the Advisory Council on Historic Preservation (ACHP), reduced the number of allowed turbines, and required changes to their color to accommodate some of these concerns.[191] While conflict over the existence and extent of authority, as well as gaps in authority, in some cases led to needed deliberations and productive consideration of impacts—as shown by the DOI-ACHP compromise—it often causes unnecessary and ineffective delay and could ultimately halt important projects, such as regional transmission plans.

A dynamic energy federalism model, while recognizing complex vertical and horizontal interactions, also pinpoints the lack of authority that sometimes is disguised by these interactions. When multiple actors have a limited amount of jurisdiction over a particular issue, such as RTO control over certain types of transmission planning and state and local authority over transmission siting, any one entity often fails to cover the holes that remain. The model proposed here requires systematic attention to these problem areas, whether they exist in oil spill response or transmission siting.

B. Simultaneous Legal Overlap and Fragmentation

In a challenge closely related to inadequate authority in some areas, two primary types of regulatory overlap and fragmentation take place within the tripartite and multi-level energy system. First, significant substantive overlap and fragmentation exists within energy law and between energy and environmental law. For example, when renewable energy siting takes place on public land, developers often must navigate both state-level and federal-level environmental review for different aspects of the project.[192] Until siting some transmission lines through the national-level

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[189] *Ten Taxpayers v. Cape Wind*, 373 F.3d 183 (1st Cir. 2004).

[190] *See* Danielle E. Horgan, *Note, Reconciling the Past with the Future: the Cape Wind Project and the National Historic Preservation Act*, 46 VT. L. REV. 409 (2011).

[191] U.S. Dep't of the Interior, Secretary Salazar Announces Approval of Cape Wind Energy Project on Outer Continental Shelf of Massachusetts, Apr. 28, 2010, http://www.doi.gov/news/doinews/Secretary-Salazar-Announces-Approval-of-Cape-Wind-Energy-Project-on-Outer-Continental-Shelf-off-Massachusetts.cfm (describing mitigation measures to address cultural concerns, such as reductions in the number of turbines and changing their color to make them less visible).

[192] *See, e.g.*, Wiseman, *Expanding Regional Renewable Governance*, *supra* note 140. 501, 504-505 (2011) (providing examples of complex local-state-federal interactions in the siting process).

transmission corridor approach succeeds, new inter-state transmission lines must gain approval through state-level public utility commission processes in each state or locality, which vary from state to state. Similarly, for deepwater drilling projects, the Coast Guard regulates the platform level, but the Department of Interior regulates the subplatform level even though activities at the two physical levels are interrelated.[193] In addition, the subcontracting relationships of most major oil companies drilling offshore are governed by the state contract law of the nearest state, operating as federal law.[194] In some cases, jurisdiction overlaps or is simply too complicated to navigate—potentially causing an anticommons with inadequate levels of energy development.[195]

Second, even though at times the law tries to foster cooperation or coordination among the many entities with partial control over an energy issue, structural fragmentation among multiple entities at each level of governance makes those arrangements complex. For example, in the context of the BP *Deepwater Horizon* oil spill, the National Contingency Plan (NCP) governing the response included numerous federal agencies, in addition to state and local government representatives. The Department of Energy was not included within the group, however, even though it was very involved in the spill response, and at times, key clusters of agencies took actions outside the NCP process; the EPA made the key decisions around dispersants, with sign-off from the Coast Guard, and an ad hoc subgroup of the NCP team that included the Interagency Solutions group, National Oceanic and Atmospheric Administration, and the Department of Agriculture controlled fisheries closures.[196]

Similar fragmentation occurs in the power plant siting process, and particularly for large renewable installations. In some states, municipalities

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[193] CURRY L. HAGERTY & JONATHAN L. RAMSEUR, CONG. RESEARCH SERV., R41262, *DEEPWATER HORIZON* OIL SPILL: SELECTED ISSUES FOR CONGRESS 13–18 (2010), *available at* http://www.fas.org/sgp/crs/misc/R41262.pdf.

[194] *See* 43 U.S.C. § 1333 (2006); Fruge *ex rel.* Fruge v. Parker Drilling Co., 337 F.3d 558, 560 (5th Cir. 2003) ("Federal jurisdiction is predicated on the Outer Continental Shelf Lands Act (OSCLA) . . . [and] OCSLA adopts the law of the adjacent state (Louisiana) as surrogate federal law, to the extent that it is not inconsistent with other federal laws and regulations." (citations omitted)).

[195] *See* Wiseman, *Regional Renewable Energy Governance* (describing underdevelopment of renewable energy as a result of multiple layers of authority over the development process).

[196] *See Decision-Making Within the Unified Command* (Nat'l Comm'n on the BP *Deepwater Horizon* Oil Spill and Offshore Drilling, Staff Working Paper No. 2, 2010), at 8-9, *available at* http://www.oilspillcommission.gov/sites/default/files/documents/Updated%20Unified%20Command%20Working%20Paper.pdf; Osofsky, *Multidimensional Governance and the BP Deepwater Horizon Oil Spill*, *supra* note 127.

must modify their zoning to accommodate renewable technologies, the state must conduct an environmental review or ensure compliance with a range of other siting criteria to issue a certificate of need, and the developer also must apply to federal agencies for assurances, for example, that wind turbines will not interfere with aviation or illegally take endangered species.[197] The number of approvals required can be deceptive; while these processes, combined, may appear comprehensive, they can leave gaps due to jurisdictional and substantive fragmentation. As Uma Outka has observed, both local and federal processes, even when a review under the National Environmental Policy Act occurs, often ignore the cumulative environmental impacts of renewable installations.[198]

This Section focuses in particular on two governance concerns that emerge from these two types of overlap and fragmentation. Section III.B.1 explores the challenges created by competing conceptions of how the regulatory hierarchy should be structured. Section III.B.2 analyzes the related issue of how cooperative dynamics can and should be addressed in the energy governance context.

1. Competing Conceptions of Hierarchy

Like the underlying spatial arrangements of governance (along vertical and horizontal axes), the hierarchy of decisionmaking within these arrangements—the entity who decides and the entity who decides who decides[199]—varies across different areas of energy law. In some instances, a top-down structure dominates. For example, within federal-regional-utility-based interactions along a vertical axis, FERC often issues generalized orders or individual directives that regional transmission organizations must follow, such as tariffs that allow RTOs to operate the grid but specify a number of detailed conditions for grid operation, including the assurance of resource adequacy (sufficient generation capacity to avoid system interruption), conditions for open access for generators, and the factors that RTOs may consider in analyzing generator interconnection requests.[200] The new EPA rules on greenhouse gas emissions from stationary sources also at times create specific requirements for states and major utilities, which, although generally creating a floor—not a ceiling—

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[197] *See* Wiseman, *Regional Renewable Governance*.

[198] Uma Outka, *The Renewable Energy Footprint*, 30 STAN. ENVTL. L.J. 241, 283 (2011) (noting that regulatory structures are "reactive" and that this "leads to consistent and pervasive neglect of cumulative impacts").

[199] Erin Ryan, in her work on negotiating federalism, has grappled with the question of who decides who decides. *See* Ryan, *Negotiating Federalism*, *supra* note 134.

[200] *See* Order No. 2003-C, Standard Interconnection Agreements with Large Generators.

provide a clear, top-down directive as to the minimum emissions controls that must be achieved.[201]

In other instances, bottom-up efforts dominate. For example, states have banded together cooperatively to try to meet shared transmission needs and have then proposed that RTOs—and ultimately FERC—approve cost-sharing schemes necessary for transmission expansion.[202] And within NERC (the reliability organization described in Part II), any interested member, including an electricity end-user, can propose that a regional entity of NERC—or NERC itself—write a new reliability standard or modify or terminate one.[203]

Finally, dynamic interactions often take place within a mix of top-down and bottom-up decisionmaking authority. For example, a comparison of Clean Air Act approaches to mobile versus stationary sources of greenhouse gas emissions illuminates two different federalism structures. Automobile emissions regulation is an area in which the Clean Air Act has a particularly strong preemption regime, but California and states following it can obtain a waiver of preemption and exceed federal standards.[204] This structure has resulted in an iterative series of conflictual and then ultimately cooperative interactions among the federal government, California and other leader states, and the automobile industry, which has led to rapid development and convergence of greenhouse gas emissions standards under the Obama administration.[205] The Clean Air Act takes a much more cooperative federalist approach to stationary sources of greenhouse gas emissions (such as power plants), and as a result, in some aspects of its new greenhouse gas regulations applicable to power plants, the EPA gives the states significant implementation flexibility (which varies based on levels of state compliance with minimum standards). States can determine which technologies or other control measures must be implemented to achieve federal emissions caps and which sources will be subject to the most

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[201] The Tailoring Rule is a floor-based approach, unlike proposed federal cap and trade and other national greenhouse gas strategies advocated by certain industry actors, which would have created a ceiling. *See* William W. Buzbee, *Asymmetrical Regulation: Risk, Preemption, and the Floor/Ceiling Distinction*, 82 N.Y.U. L. REV. 1547, 1569-71 (2007). The rule relies on a cooperative federalist regime for implementation, with the exception of those states that have opted to have the EPA implement the rule.

[202] *See supra* text accompanying note 183.

[203] Although NERC is a private institution, we treat it primarily as a public governmental entity, as described in more detail in Part IV.B.

[204] See Clean Air Act Section 209(b).

[205] For an in-depth discussion of this evolution, see Osofsky, *Diagonal Federalism and Climate Change*, *supra* note 101; Freeman, *The Obama Administration's National Auto Policy: Lessons from the "Car Deal"*, *supra* note 101; *see also* Carlson, *Iterative Federalism*, *supra* note 130.

stringent measures. Operating under a federal emissions control floor, they also can require further reductions in greenhouse gas emissions.[206]

These types of back-and-forth top-down/bottom-up interactions do not just occur within familiar cooperative federalist schemes. This is best exemplified, perhaps, by public utility commissions' governance of retail rates. Utilities in "nonrestructured states" that retain a natural monopoly within a service area must charge one retail rate per kilowatt hour for the retail electricity that they provide to residential customers. (Often, there is a separate, uniform rate for industrial users.)[207] This rate is based on the cost of the utility's providing the service to customers,[208] including the construction of generation and distribution lines, the maintenance of a truck fleet for service and repairs, and the hiring of various employees, for example. The rate also incorporates a reasonable rate of return—money in addition to the cost of service—that the utility is allowed to make based on calculations of other, similar businesses' returns.[209]

Within this process, the utility typically can initiate a ratemaking proceeding from the bottom up.[210] To initiate a rate case, the utility files with the state public utility commission and brings boxes full of evidence on costs and returns to the commission. After the commission confirms that the filing is complete, it often makes initial determinations about facts that do not require administrative review and then lists the many remaining factors in dispute. It then conducts (or has an administrative court conduct) a formal ratemaking proceeding,[211] in which electricity customers and other

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[206] Holly L. Pearson & Kevin Poloncarz, *With Legislation Stalled, EPA Presses Forward with Greenhouse Gas Regulatory Program Under the Clean Air Act as January 2, 2011 Trigger Date Approaches*, 587 PLI/REAL 105, 107–11 (2011).

[207] MUCHOW & MOGEL, ENERGY LAW & TRANSACTIONS 52-24 (1990) (describing different rates for different classes and states' tendency to shift more of the rate burden to industrial classes).

[208] *Id.*; Mick Long, Texas Public Utility Comm'n., Electric Regulation in Texas (2009) (packet prepared by Mr. Long for Hannah Wiseman's "Law of Electricity" class at the University of Texas; on file with author) (showing the line items that went into the cost of service calculation for SOAH Docket No. 473-08-3436).

[209] Muchow & Mogel, *supra* note 207, at 52-24.

[210] Stefan H. Krieger, *The Ghost of Regulation Past: Current Applications of the Rule Against Retroactive Ratemaking in Public Utility Proceedings*, 1991 U. Ill. L. Rev. 983, n. 39 (1991) (noting that "usually the utility initiates proceedings to change rates")

[211] In Texas, for example, the Public Utility Commission makes the initial determinations regarding the completeness of the file and the facts that do not require consideration and then sends the ratemaking case to the State Office of Administrative Hearings (SOAH) for a formal hearing. Author notes from presentation by Mick Long, Texas Public Utility Commission, to Author's "Law of Electricity" class at the University of Texas, Oct. 16, 2009 (on file with author). *See also* Muchow & Mogel, *supra* note 207, at 52-24 ("Generally, the initial [rate] decision is made by an administrative law judge who presides at the hearings and issues a recommended decision to the utility commission itself.").

affected parties participate. The parties haggle over the utility's necessary costs and the rate of return—typically paring down the costs that are counted within the rate base and the requested rate of return[212]—and the public utility commission ultimately sets the acceptable rate. This top-down decision can once again be turned on its head, however, when the utility later requests another rate case, thus restarting the entire process.

Utilities that operate transmission lines or RTOs go through this same top-to-bottom, bottom-to-top dynamic with FERC. The operator—either an individual utility or the RTO—initially applies to FERC for a transmission tariff, which sets in motion a federal ratemaking proceeding with calculations similar to those described for state retail electricity.[213] (The calculations often are far more complicated due to FERC rules on cost sharing and the need to ensure that those customers receiving the benefits of transmission pay for the costs of the transmission service creating the benefit.) Once FERC approves a tariff with a rate and conditions of service, the individual transmission operator or an RTO often applies to FERC requesting tariff amendments. The amendments either are requested due to bottom-up demands (demands for expanded transmission, for example—thus necessitating a higher rate) or new, top-down FERC orders that require transmission operators to follow new rules, such as providing more assurance of adequate back-up generation capacity to avoid grid outages.[214]

Recognizing that various hierarchical dynamics occur within a horizontal or vertical relationship—with both top-down and bottom-up approaches to governance, for example—enables a more nuanced understanding of possibilities for structuring energy law institutions. It allows for consideration of how energy institutions pull in the many entities affected by energy decisions and grant these entities different levels of power depending on the particular energy issue at hand.

2. Cooperation and Conflict

Energy governance approaches also vary in the extent to which they encourage or rely upon cooperativeness. There are many examples of cooperative federalism along both the vertical and horizontal axes. For instance, states are trying to work together in the electricity context through

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Florida's Public Service Commission, on the other hand, conducts ratemaking hearings itself and makes the final rate determination. *See* http://www.floridapsc.com/publications/consumer/brochure/Ratemaking.pdf.

[212] *See* Author notes from presentation by Mick Long, *supra* note 211.

[213] *See* Danielle Changala & Paul Foley, *The Legal Regime of Widespread Plug-in Hybrid Vehicle Adoption: A Vermont Case Study*, 32 ENERGY L.J. 99, 113 (2011) (summarizing the requirements for Open Access Transmission Tariffs)

[214] *See, e.g.*, *infra* note 216 (describing the Midwest ISO's filing to amend its tariff in order to comply with new FERC resource adequacy requirements).

MISO's Multi-Value Project (MVP) introduced above, which will provide expanded transmission to allow more generation to connect to the grid while also connecting regional benefits to costs in order to ensure fair cost sharing.[215] The states governed by MISO, through their Organization of MISO States described above, also cooperate regularly to intervene in FERC proceedings—often shifting among positions that support a Midwest ISO policy or filing, oppose it, or follow a middle ground.[216]

Focusing on only cooperative federalism, however, would miss the many critical uncooperative dynamics that help to structure interactions along both axes and resulting governance approaches. On the vertical axis, for example, lawsuits filed by states opposing FERC's federal imposition of transmission siting authority made FERC restart its national interest electric transmission corridor designation process. In a case brought by the Minnesota Public Utilities Commission and environmental groups,[217] for example, the Fourth Circuit held that if a state commission denies a transmission siting application, this does not give FERC federal authority to select an appropriate site.[218]

As with directional hierarchy, interactions among entities often vary in how cooperative and conflictual they are over time. Ann Carlson has explained in the environmental context that these iterative interactions can help to foster needed regulation over time.[219] These types of interactions also occur throughout energy law. The Delaware River Basin Commission's governance of natural gas well development, discussed in depth in *Hybrid Energy Governance*, exemplifies these shifting relationships within a regional institution. The state members and single federal representative on this Commission initially cooperated to draft a comprehensive set of regulations governing the location of well sites, controlling erosion from sites, requiring extensive surface and subsurface water testing prior to drilling and fracturing, and imposing a number of

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[215] MISO, MISO Board Approves 215 New Transmission Projects, Dec. 8, 2011.

[216] *See, e.g.*, Notice of Intervention and Protest of the Organization of Miso States, Inc., Docket No. ER11-4081-000, at background, p. 2 (undated, but in protest of July 20, 2011 filing), *available at* http://www.misostates.org/images/stories/Filings/OMSProtestandCommentsonMISORAR ER11-4081.pdf (in opposing Midwest ISO's proposed modification of its FERC tariff to address resource adequacy requirements for generation capacity, arguing that the action "negatively impacts state jurisdictional responsibilities, lacks clear net benefits, and should not be found just and reasonable" and that in following an allegedly "extensive" stakeholder process, MISO in fact ignored repeated stakeholder votes against the proposed changes).

[217] *Piedmont Envtl. Council v. Fed. Energy Regulatory Comm'n*, 558 F.3d 304, 313 (4th Cir. 2009).

[218] *Piedmont Environmental Council*, 558 at 319-20.

[219] Carlson, *Iterative Federalism and Climate Change*, *supra* note 130.

other constraints on the gas extraction process.[220] The process temporarily broke down, however, when individual state members began to question the adequacy of the process (with New York demanding an environmental impact statement under the National Environmental Policy Act in federal court[221]) and the substance of the regulations (with Delaware's governor asserting that he would not vote for the regulations, which he viewed as insufficiently protective of the environment[222]). Based on these state concerns, the DRBC has delayed finalizing its rules and has continued to hold hearings and respond to public comments in an attempt to reach a constructive compromise.[223]

C. Inclusion of Private Actors within "Public" Processes

In addition to grappling with questions of authority and overlap and fragmentation among key governmental entities, the energy system involves a peculiar fusing of public and private interests, which results in its governance structures varying in the extent to which they are fully public. This involvement of private entities in multi-level, ostensibly public processes poses the challenge of establishing appropriate and effective inclusion without allowing private interests to inefficiently capture public processes. The vertical and horizontal dynamics described in Part II make this task substantially more complex.

Often, the entities that form relationships along both axes are an odd combination of private authorities vested with quasi-formal regulatory authority and public entities that adopt privately-drafted rules. RTOs, for example, which impose detailed rules on their private utility members, are governed by an independent board of managers or board of directors comprised of both public and private experts. These boards, in turn, respond to an advisory committee typically comprised of private generators, transmission owners, power marketers, and electricity end users, among others.[224] The rules written and implemented by this public-private RTO

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[220] Delaware River Basin Comm'n., Revised Draft Natural Gas Development Regulations, Nov. 8, 2011, *available at* http://www.nj.gov/drbc/library/documents/naturalgas-REVISEDdraftregs110811.pdf.
[221] Complaint, New York v. Army Corps of Engineers, May 31, 2011.
[222] Susan Phillips, State Impact, As Delaware Announces No Vote on DRBC Regulations, Monday's Meeting in Doubt, http://stateimpact.npr.org/pennsylvania/2011/11/17/as-delaware-sets-to-vote-no-on-drbc-regulations-mondays-meeting-in-doubt/.
[223] For an in-depth discussion of the DRBC, see Osofsky & Wiseman, *Hybrid Energy Governance*, *supra* note 12.
[224] *See* Stephen Bird, Harvard Electricity Policy Group, Appendix A—RTO Governance (April 2002), *available at* http://www.hks.harvard.edu/hepg/Papers/Bird%20ISO%20gov%20comparison%20matrix%20App%20A.pdf.

are largely influenced, and in some cases must be directly approved by, FERC—both through its general orders directed at all RTOs and the specific transmission tariff that FERC issues to the RTO.[225]

NERC has even stronger private elements, as it operated as a self-governing, industry-led institution for nearly four decades.[226] When Congress infused more public elements into the process for ensuring grid reliability in 2005, it left much of the responsibility for grid reliability with NERC, which continued to be a private organization. Specifically, Congress directed FERC to approve an "electric reliability organization" (ERO) that would govern grid reliability and only gave FERC review authority over this it.[227] After FERC approved NERC as the ERO in 2006, NERC continued writing and enforcing standards, which were now mandatory and federally enforceable but still private in nature.[228]

But these issues are not limited to the innovative hybrid entities that are the focus of our companion piece on hybrid energy governance; complex public-private dynamics abound throughout the fundamental structures of the energy systems. State public utility commissions and their ratemaking processes retain many private elements. Private utilities powerfully influence the process because they can initiate a ratemaking case. While the PUC can reduce the costs claimed by contesting their validity in a formal hearing—as can citizen groups—the utility is a key and influential player that substantively defines the initial boundaries of the regulation—the rate that ultimately will be set.[229]

These dynamics between utilities and their regulators are particularly complex in the context of transmission. As discussed in Part II, although many states no longer consider electricity generation to be a natural monopoly, transmission still is largely regarded as one.[230] Indeed, it does not make sense to create redundant transmission architecture. But infrastructure investments by the gatekeeper entity can lead to unproductive market power that stifles innovation and competition. This market structure around transmission creates a public-private regulatory dynamic that is

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225 *See* FERC Orders 888, 1000. For all FERC orders governing ISOs and RTOs, *see* FERC, Major Orders, http://www.ferc.gov/industries/electric/indus-act/rto/maj-ord.asp.

226 North American Electric Reliability Corporation, History, http://www.nerc.com/page.php?cid=1|7|11 (describing industry's formation of the National Electric Reliability Council, the Corporation's predecessor, in 1968).

227 Energy Policy Act of 2005, § 215(c).

228 For an in-depth discussion of NERC, see Osofsky & Wiseman, *Hybrid Energy Governance*, *supra* note 12.

229 *See, e.g.*, State of Arizona, Residential Utility Consumer Office, *The Rate Making Process*, http://www.azruco.gov/rate_making.htm (last visited Aug. 30, 2012).

230 Vaheesan, *supra* note 67, at 110.

unlikely to change any time soon, as the government tries to regulate the monopoly to make it act more in the public interest than it naturally would.

These issues also arise in the context of the fuels used in the energy system. For example, the response to the BP *Deepwater Horizon* oil spill was ostensibly led by the government, but was highly dependent on BP as the legally responsible party. The National Contingency Plan is structured around high levels involvement by the designated responsible party, but the public-private dynamics were made even more complicated by the interface with the physical realities and technological complexity of the spill response. BP, due to its access to the site and initially superior technical knowledge, played a major role in shaping available information and steps taken.[231]

This combining of public and private within the energy system provides both a challenge and an opportunity. On the one hand, the strong interaction of public and private power and preferences can undermine efforts to achieve needed change, such as when transmission utilities try to block new connections or retail utilities want higher rates from customers. The private influence on public decisionmaking carries risks of regulatory capture. On the other hand, these intersections create the opportunity for regulatory innovation that may help spur needed transformation, and they allow those with the technical information necessary for effective regulation to participate in the regulatory process.

Together, these three challenges suggest the need for new approaches to governance tailored to address them. These approaches need to acknowledge the complexity of the current system, and to be able to work with it. Realistically, the United States is unlikely to completely overhaul energy regulation or the overall energy system in the coming years. For energy governance approaches to functionally respond to modern challenges, therefore, they must effectively navigate the dynamism of the current system and build upon established structures. The Conclusion that follows provides principles for doing so and introduces our companion piece, which will apply these principles of dynamic energy federalism to assess regulatory innovations we describe as "hybrid energy governance."

CONCLUSION: DYNAMIC FEDERALISM PRINCIPLES FOR MORE EFFECTIVE ENERGY GOVERNANCE

Addressing the challenges outlined in Part III is daunting but critical. The United States is in the midst of a massive energy transition

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[231] For an in-depth discussion of governance issues in the context of the BP *Deepwater Horizon* oil spill, see Osofsky, *Multidimensional Governance and the BP Deepwater Horizon Oil Spill*, *supra* note 127.

toward new unconventional domestic fuel development (such as deep water drilling and hydrofracturing), an updated grid, and greater integration of renewables; these shifts demand fresh governance strategies. The emerging energy federalism scholarship provides important initial suggestions for effective steps forward, but it lacks a cohesive vision and dynamism that will be necessary for successful energy policy moving forward.

Having proposed a dynamic federalism model for energy, which recognizes the nuanced vertical and horizontal relationships among actors and the complexities of energy governance across the many subfields of energy laws, this Article concludes by proposing three core dynamic federalism principles drawn from its analysis in order to guide energy governance strategies moving forward. These principles each seek to address one of the governance challenges outlined in Part III. The companion article *Hybrid Energy Federalism* then builds on this Article's model through an in-depth analysis of institutions that embody these principles through their hybrid, regional approaches and that, by using these approaches, support needed energy transition. In particular, the companion piece examines efforts by Regional Citizens Advisory Councils and the Delaware River Basin Commission to address the risks of oil spills and hydraulic fracturing; by NERC to maintain grid reliability in the face of technological change; and by Regional Transmission Organizations to create transmission lines and market integration for renewables, particularly wind. That Article complements this one by assessing both the mechanisms and the benefits and limitations of operationalizing these three dynamic energy federalism principles through hybrid regional institutions.

Principle 1: We need institutions or multi-institutional structures with capacity for multi-level, cross-cutting regulatory authority.

As described in Section III.A, the inadequacy of authority occurring across numerous substantive areas of energy law results from no single institution at any particular level of governance having enough authority and from insufficient coordination among the institutions that have partial authority. Addressing this governance challenge therefore requires approaches that constitute authority, which, combined, can comprehensively address an energy issue.

One strategy for creating this authority that is currently being employed in multiple areas of energy law is the establishment of what we term "hybrid" institutions. "Hybrid" has been used in many different ways in legal scholarship; we define it here as referring to institutions that combine authority from more than one source, whether as a formal or informal part of their structure or governance process. By virtue of this combining, these institutions draw from the regulatory authority of key stakeholders and foster or force collaborations. The examples we use in *Hybrid Energy Governance* represent different variations of such institutional hybridity.

Principle Two: We need institutions that reduce simultaneous overlap and fragmentation by creating structures through which hierarchy can be defined, cooperation can take place, and conflicts can be resolved.

As described in Section III.B, the simultaneous overlap and fragmentation in the energy regulatory system—caused by both substantive and structural divisions—results in complexities over both how to order hierarchy and how to foster productive opportunities for cooperation and conflict. Addressing this governance challenge requires institutions or processes that can bring together substantive and structural silos and create a more efficient and effective approach.

Such institutions or processes may have synergies with the ones created in response to the first principle. However, the focus is different. Even if institutions within the fragmented system have enough authority, the principle aims to address divided governance structures in order to create a more functional overall system.

As with the first principle, hybridity will be needed here. Hybrid institutions, by including important but separated entities in a shared process, can help to resolve some of the complexities. We focus in particular on hybrid entities with significant regional components because operating on a scale between two governance levels might encourage cooperation, or even cooperative conflict, among actors from both levels. In each instance of hybrid entities that we examine in the companion piece, smaller-scale actors interact through that regional structure, which is also able to interact with larger scale regulatory institutions.

Principle Three: We need institutions that can integrate key public and private stakeholders with structural and procedural protection against capture.

As described in Section III.C, many energy regulatory institutions involve private actors in a variety of ways. Although integrating governmental and nongovernmental stakeholders is a crucial part of effective energy governance, these institutions need ways of protecting themselves against capture by private market participants whose interests may not align with those of the public.

As with the previous two principles, hybrid structures may be able to accomplish these aims more effectively than ones structured through one authority at a single level. The hybrid entities we examine in the companion piece all include private actors, but with substantial public oversight and involvement—particularly through expanded stakeholder involvement in decisionmaking processes. Our examination of these entities in the companion piece both showcases different models for private entity inclusion and assesses the extent to which they effectively limit possibilities for capture.

The dynamic energy federalism model that we have presented in this Article is not a panacea. It identifies the nuances of federalism that should be recognized when analyzing energy institutions and their effectiveness and suggesting change, including complex vertical and horizontal interactions that occur simultaneously—with local, state, regional, and federal actors engaging in novel relationships. It also explores the complicated governance schemes within these interactions, including, in some cases, inadequate authority of various actors along either axis, overlapping or fragmented authority, iterative conflict and cooperation among these actors, and high levels of private entity involvement in governance. The model then briefly suggests three core principles of energy governance to make these governance schemes more effective.

In illuminating the complexities of energy federalism and governance and suggesting principles that can be systematically applied across many energy areas, the model neither eliminates the system's underlying structural challenges nor the massive transitions that it faces. However, this Article argues that this type of analysis has value because it provides for a holistic, nuanced understanding of how regulation fits into the energy system, and the federalism and governance challenges that result. This understanding can help to create systematic solutions to our governance challenges that can complement current discussions of particular components of the energy system. In embracing the complexity of energy and its governance, we must recognize energy for what it is: the enabler of our daily activities and international economy; the multi-stranded system of infrastructure, markets, and regulation; and the driving force behind unusual governance forms. With this recognition comes greater opportunity for a future buttressed by cleaner, fairer, and more efficient energy.