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Future-Proofing Energy Transport Law

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FUTURE-PROOFING ENERGY TRANSPORT LAW

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ABSTRACT

The U.S. energy system is critical to every aspect of the nation's economy and daily life. That energy system, in turn, is completely dependent on U.S. energy transport infrastructure—the oil pipelines, natural gas pipelines, electric transmission lines, and import and export facilities that transport and distribute the energy resources that power the country. This Article explores how the law can influence the billions of dollars in private sector energy transport investments necessary to meet current energy needs as well as respond to the significant technological, market, and policy developments in the energy sector. In doing so, it develops criteria policymakers should consider in creating laws and regulations to govern energy transport infrastructure that focus on federalism principles, flexibility in the location and amount of energy resources, and clean energy goals. It then applies these criteria to two of the nation's most pressing energy transport debates: (1) whether to transfer more siting authority for interstate electric transmission lines from the states to a federal or regional authority and (2) whether to transport new sources of North American oil primarily by an upgraded rail system or by expanded pipeline infrastructure.

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INTRODUCTION

The U.S. energy system is critical to every aspect of the nation's economy and daily life. That energy system, in turn, is completely dependent on U.S. energy transport infrastructure—the oil pipelines, natural gas pipelines, electric transmission lines, and import and export facilities that allow for the transportation and distribution of the energy resources that power the country. This Article explores how the law can best influence the billions of dollars in private sector energy transport investments necessary to meet current energy needs, address the rapid technological and market shifts in the energy sector, and implement present and future clean energy goals. In other words, it considers how policymakers can attempt to "future-proof"[1] energy transport laws to deliver the growing array of present and future fossil fuel and renewable energy resources to markets and consumers in a sustainable manner.

In a time of major technological and economic change in the energy sector, it is difficult to decide what to build. Should electric utilities and other market actors pour billions of dollars into expanding the long-distance electric transmission grid to transport wind energy in the Midwest to population centers on the coasts if new industrial scale batteries or new wind turbine technology will ultimately make such long-distance infrastructure unnecessary?[2] Should the oil industry build new major interstate oil pipelines if expansion of existing interstate rail infrastructure can fill a short term need to transport increased oil production while avoiding the path-dependency that comes with new pipeline infrastructure devoted to transporting fossil fuels for another generation?[3] Should the private sector

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1. "Future-proofing is the process of anticipating the future and developing methods of minimizing the negative effects while taking advantage of the positive effects of shocks and stresses due to future events. Future-proofing is a term that is used across the globe in multiple cultures and multiple industries." *See Principles of Future-proofing: Research on Future-proofing the Built Environment*, http://principlesoffutureproofing.com. *See also Future Proof*, TECHOPEDIA, http://www.techopedia.com /definition/2204/future-proof ("Future proof is a buzzword that describes a product, service or technological system that will not need to be significantly updated as technology advances.").

2. *See* Diane Cardwell, *Tesla Ventures Into Solar Power Storage for Home and Business*, N.Y. TIMES (May 1, 2015), http://nyti.ms/1DGek0B; Diane Cardwell, *Wind Power is Poised to Spread to All States*, N.Y. TIMES (May 19, 2015), http://nyti.ms/1JxUPii (discussing a DOE report on the ability of taller wind turbines to bring increased wind capacity to all fifty states); Jeff McMahon, *Did Tesla Just Kill Nuclear Power?*, FORBES (May 1, 2015), http://onforb.es/1Iv7nWU.

3. *See* James Conca, *Pick Your Poison for Crude—Pipeline, Rail, Truck or Boat*, FORBES (Apr. 26, 2014), http://onforb.es/1lSYIQS; Charles Esser, *Rail vs. Pipelines: How to Move Oil*, INT'L ENERGY AGENCY, May 2, 2014; Elizabeth Douglass, *In Keystone Fight and Beyond, Infrastructure Is Energy Policy*, INSIDE CLIMATENEWS (Jan. 8, 2015), https://insideclimatenews.org/news/ 20150108/keystone-fight-and-beyond-infrastructure-energy-policy (reporting that major energy infrastructure projects, like interstate pipelines, have a lifespan of thirty years or more and thus "infrastructure is destiny.").

expand the natural gas pipelines network to allow electric utilities to more easily replace coal-fired electricity with cleaner-burning and now cheap natural gas? Or should it focus more heavily on investing in the infrastructure necessary to move directly to a greater reliance on utility-scale wind, solar, and hydropower energy and expand locally distributed energy in the form of increased rooftop solar coupled with battery storage?

Legal structures that help or hinder the development of energy transport infrastructure influence the answers to these questions. This is particularly true because this infrastructure spans multiple local, state, and federal jurisdictions and is regulated by a combination of local, state, and federal actors.[4] Moreover, it is almost exclusively the private sector that builds and owns the billions of dollars in infrastructure necessary to transport fuels and electric energy resources across the country from import and domestic production sites to nationwide markets and exports.[5] This stands in stark contrast to the U.S. road transportation infrastructure, which is planned, developed, and built almost exclusively by government actors.[6] Because energy transport infrastructure will last for many decades, decisions made now regarding what to build will profoundly influence the capital-intensive private investments in a wide range of fossil fuel and renewable energy resources long into the future.[7] In other words, "infrastructure is destiny."[8]

A holistic evaluation of current and developing energy transport systems and the laws that govern them is critical to a clean energy future. This is because energy transport infrastructure requires significant utilization of land-based and other physical resources to build millions of miles of pipelines and electric transmission lines, thousands or millions of charging or fueling stations, and the like. This infrastructure can become completely

4. QUADRENNIAL ENERGY REVIEW, TRANSFORMING U.S. ENERGY INFRASTRUCTURE IN A TIME OF RAPID CHANGE: THE FIRST INSTALLMENT OF THE QUADRENNIAL ENERGY REVIEW S-3 (2015) [hereinafter QER].

5. *See id.*

6. *See, e.g.*, *About*, U.S. DEPT. OF TRANSP., FED. HWY. ADMIN., www.fhwa.dot.gov/about.

7. *See, e.g.*, William Boyd, *Public Utility and the Low Carbon Future*, 61 UCLA L. REV. 1614, 1624 (2014) ("[T]he $1.1 trillion invested in the current electric power system in the United States, combined with the multi-decade lifetimes of many of these assets, and a constellation of deeply entrenched political and economic interests, makes the system very resistant to change.").

8. Douglass, *supra* note 3. *See also* N. Jonathan Peress, *How to Ensure New Natural Gas Infrastructure Doesn't Lock Out Renewables*, FORBES (June 5, 2015), http://onforb.es/1G08JqK (noting that the typical lifespan of a natural gas pipeline is fifty years or more, that they are financed over decades based on long-term contracts, and that "[b]y locking in that demand . . . these massive investments lock *out* competition from cleaner, more efficient alternatives."); Boyd, *supra* note 7, at 1624–25 (observing that the U.S. electric power system is "very resistant to change" and that "the investment decisions made today will strongly influence the industry's [greenhouse gas] emissions profile for decades to come.").

obsolete at best and a public health or environmental risk at worst if changing markets and technology leave it behind.[9] But it becomes very difficult to abandon such major investments in favor of new sources of energy even if technology and market development would otherwise support such a transition.[10] This raises the question of what types of laws can most effectively require or encourage the build-out of energy transport infrastructure that can meet the needs of the present but also incorporate the changing technologies, markets, and clean energy policies of the future. Policymakers, industry, and the public must make major efforts to future-proof energy transport laws to provide sufficient flexibility to accommodate changing energy development technologies and resources while attempting to achieve clean energy goals in a process that adequately weighs both national energy needs and local costs of energy infrastructure.

An assessment of existing energy transport laws also raises important federalism questions because federal law governs some forms of energy transport infrastructure—like interstate natural gas pipelines—and state law governs other forms of energy transport infrastructure—like interstate oil pipelines and interstate electric transmission lines.[11] Such distinctions profoundly impact private investment decisions not only in energy transport infrastructure, but also in the energy resources themselves, which are profitable only if they can be cost-effectively delivered to processing and distribution sites and markets.

These concerns about sunk costs, path dependency, federalism, future-proofing, and a clean energy future are coming to a head as the nation faces growing concerns regarding climate change at the same time as it has an unprecedented abundance of newly available sources of domestic oil, natural gas, wind, and solar energy. After decades of concern about growing U.S. oil imports and the high cost of natural gas, developments in hydraulic fracturing and directional drilling technologies have made massive new domestic sources of oil and gas available in Texas, Oklahoma,

9. The tension in energy law between sunk investments and new technology is longstanding. *See, e.g.*, Mkt. St. Ry. Co. v. R.R. Comm'n of Cal., 324 U.S. 548, 567 (1945) (The "due process clause never has been held by this Court to require a commission to fix rates on the present reproduction value of something no one would presently want to reproduce, or on the historical valuation of a property whose history and current financial statements showed the value no longer to exist, or on an investment after it has vanished, even if once prudently made, or to maintain the credit of a concern whose securities already are impaired.").

10. Douglass *supra* note 3. *See also* MINN. ENVTL. QUALITY BD., INTERAGENCY REPORT ON OIL PIPELINES 48–49 (Dec. 2015) ("Development of infrastructure to support the extraction, transportation, refinement, and combustion of oil has the potential to release additional carbon into the atmosphere and may perpetuate a carbon-based economic structure that contributes to climate change.").

11. *See infra* Parts I & II.

Pennsylvania, Ohio, and North Dakota.[12] This has resulted in a significant decline in oil imports that will continue for decades, and will result in the U.S. transitioning from a net importer of natural gas in 2013 to a net exporter as early as 2018.[13] This shift has also resulted in a precipitous drop in natural gas prices, allowing gas to displace coal as a major source of electric energy, as well as a significant drop in oil prices, which has a major effect on the vehicle and transportation sector.[14] With regard to renewable energy, the U.S. Energy Information Administration ("EIA")[15] predicts that electricity generation from renewable sources such as wind and solar energy will increase dramatically.[16] Indeed, the U.S. Department of Energy ("DOE") estimates that wind power alone could supply 20% of U.S. electricity needs by 2020 and 35% by 2050, and such percentages already exist in certain regions of the country.[17]

These new energy resources can either put the United States on a path to a greater dependence on fossil fuels, which are now available domestically at low prices, or can help the nation transition to a clean energy economy, with new sources of wind and solar energy on a scale very few would have anticipated less than a decade ago. Which path predominates depends in large part on what energy transport infrastructure the private sector invests in to deliver the growing array of fossil fuels and renewable energy

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12. Although hydraulic fracturing technology has been available for decades, it was not a technologically feasible or cost effective method to extract oil and gas from shale until the industry developed new directional drilling technologies (the ability to drill long, horizontal wells) and improved 3D seismic imaging techniques. *See* Mason Inman, *Natural Gas: The Fracking Fallacy*, 516 NATURE 28, 29 (2014). *See also* John M. Golden & Hannah J. Wiseman, *The Fracking Revolution: Shale Gas As a Case Study in Innovation Policy*, 64 EMORY L.J. 955, 964–74 (2015) (discussing developments in hydraulic fracturing and directional drilling technologies and the role of government policy and support in those developments).

13. *See* U.S. ENERGY INFO. ADMIN., ANNUAL ENERGY OUTLOOK 2017 WITH PROJECTIONS TO 2050 (2017) [hereinafter ENERGY OUTLOOK]; Jenny Mandel, *2017 Will Bring Fundamental Gas Market Shift, EIA Says*, ENERGYWIRE, July l3, 2016; *Liquefied Natural Gas Exports Expected to Drive Growth in U.S. Natural Gas Trade*, U.S. ENERGY INFO. ADMIN., Feb. 22, 2017.

14. *See infra* Parts I.A. and I.B.

15. The EIA is the statistical and analytical agency within the U.S. Department of Energy. According to its website:

> [The] EIA collects, analyzes, and disseminates independent and impartial energy information to promote sound policymaking, efficient markets, and public understanding of energy and its interaction with the economy and the environment. . . . [B]y law, its data, analyses, and forecasts are independent of approval by any other officer or employee of the U.S. government.

See About EIA: Mission and Overview, U.S. ENERGY INFO. ADMIN., http://www.eia.gov/about/mission_overview.cfm.

16. ENERGY OUTLOOK at 13, 69–80.

17. *See* U.S. DEPT. OF ENERGY, WIND VISION: A NEW ERA OF WIND POWER IN THE UNITED STATES 4 (2015) [hereinafter WIND VISION].

resources to processing facilities and consumers. And legal frameworks governing energy transport siting have a major influence on these investment decisions. This is particularly true because this new abundance of domestic energy resources comes at a time when there is increasing public resistance by landowners, environmental advocates, and others to the expansion of new energy transport infrastructure like the Keystone XL and Dakota Access oil pipelines as well as new natural gas pipelines and interstate electric transmission lines.[18] In the face of major public opposition to new energy transport infrastructure, the role of the law in facilitating or blocking the ability to obtain siting permits and exercise eminent domain authority to build such transport infrastructure cannot be overstated.

Part I evaluates the rapidly changing nature of the U.S. energy economy as well as the development, current status, and key challenges of the U.S. energy transportation network of oil pipelines, natural gas pipelines, electric transmission lines, and related energy import and export facilities. It describes these multi-billion dollar physical networks, their current shortcomings, and their future promises and challenges. These promises and challenges include the development of new utility-scale battery technology to store electric energy, the shift from building natural gas import terminals to building natural gas export terminals in a span of less than ten years, the growth of oil transport by rail, and the increasing human health and safety risks associated with oil transport in general. Part I also introduces the federalism tensions in the various siting and eminent domain laws governing the infrastructure necessary to transport oil, gas, and electric energy.

Part II analyzes in greater detail a select group of federal and state laws that regulate the planning, permitting, and construction of energy transport infrastructure. It considers the federal laws governing the siting and eminent domain for interstate natural gas pipelines and liquefied natural gas import and export terminals, as well as state laws governing the siting and eminent domain for interstate electric transmission lines. This analysis illustrates how federal siting authority is used to overcome state opposition to energy transport infrastructure when that infrastructure may meet national or regional energy needs but imposes costs on local economies, environmental values, and property rights. It also illustrates how states can create nearly insurmountable regulatory roadblocks to approving interstate energy transport projects that would facilitate the transition to a clean energy future

18. *See infra* Parts I.A., II.A.2, & II.B.1.

(such as interstate electric transmission lines) and other projects (like oil pipelines) that would do precisely the opposite.

Finally, Part III draws on the examples in Part II to set forth criteria policymakers should consider in creating laws and regulations to best encourage development of clean energy resources and the infrastructure necessary to transport them. Part III proposes that laws governing energy transport infrastructure can best adapt to changing technologies and markets when they: (1) give siting and eminent domain authority to federal or regional regulators when the energy transport infrastructure will physically cross state boundaries; (2) allow for flexibility regarding the location and amount of expected domestic energy resources to transport, import, or export; and (3) support state and federal clean energy goals. Part III also recognizes that these goals may be in conflict with each other in some cases and discusses some of the trade-offs between them.

Part III then uses two illustrations to apply these criteria. It first considers the benefits and costs associated with transferring primary siting and eminent domain authority for interstate electric transmission lines from the states to a federal or regional permitting authority. It concludes that for interstate electric transmission lines that physically cross state lines, a regional or national permitting authority is preferable to state permitting authority, at least until technology develops sufficiently to allow for alternatives to long-distance transmission lines for large-scale carbon-free electricity transport and use. This Part then evaluates whether to transport new sources of North American oil primarily by an upgraded rail system or by expanded pipeline infrastructure. It concludes, perhaps surprisingly, that the criteria developed in this Part would support relying more heavily on an upgraded rail system to transport new sources of oil instead of investing billions of dollars in new interstate oil pipelines that would lock in fossil fuel investments for decades.

I. ENERGY TRANSPORT INFRASTRUCTURE PAST AND FUTURE

In its inaugural Quadrennial Energy Review in 2015, the U.S. DOE focused on the massive scale and scope of U.S. energy transport infrastructure:

> It includes approximately 2.6 million miles of interstate and intrastate pipelines; 414 natural gas storage facilities; 330 ports handling crude petroleum and refined petroleum products; and more than 140,000 miles of railways that handle crude petroleum, refined petroleum products, liquefied natural gas (LNG), and coal. The electrical

> component of the Nation's TS&D [transmission, storage, and distribution] infrastructure links more than 19,000 individual generators with a capacity of 1 megawatt or more (sited at more than 7,000 operational power plants), with more than 642,000 miles of high-voltage transmission lines and 6.3 million miles of distribution lines.[19]

A major theme throughout the report is the need to build and improve energy transport infrastructure in a time of rapid technological and economic change in the energy sector. And this challenge is exacerbated by the following facts—much of this infrastructure is owned and operated by multiple, fragmented private sector actors with "natural monopoly" characteristics[20] that favor incumbent providers; it spans numerous local, state, and federal jurisdictions; and it is variously regulated by a combination of local, state, and federal actors.[21]

This Part first discusses changes in how the U.S. transports its growing domestic oil resources. It then turns to natural gas transport infrastructure, focusing on interstate natural gas pipelines and liquefied natural gas ("LNG") import and export terminals. Last, it explores the nation's electricity transport system and highlights recent efforts to expand the electric grid to integrate growing renewable electric energy resources as well as take advantage of newly available low-cost natural gas.

A. Transporting Oil: Pipelines and Rail

A combination of pipelines, water carriers, trucks, and railroads transport oil and other petroleum products throughout the United States. Traditionally, pipelines and oil tankers have carried approximately 90% of

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19. *See* QER, *supra* note 4, at 1-2. In his "Climate Action Plan" released in 2013, President Obama directed his Administration to begin an interagency Quadrennial Energy Review, with annual installments over four years, to match federal energy policy with the nation's economic and climate goals "in this dramatically changing energy landscape." *Id.* at S-2.

20. Electric utilities, natural gas utilities, and other companies that provide essential services to the public are often regulated as "natural monopolies." For these types of businesses, infrastructure investments (transmission lines, pipelines, etc.) are very costly and it is often economically inefficient for multiple companies to make these infrastructure investments to compete for customers. Instead, in these situations it is more efficient for only one company to build and operate the necessary infrastructure to provide the essential service rather than having numerous companies build redundant infrastructure. Under the "regulatory compact" that applies to these industries, companies acting as natural monopolies avoid having to compete for customers with other companies in exchange for state or local regulation of their prices, customer relationships, and investment decisions, in order promote the public interest. ALEXANDRA B. KLASS & HANNAH J. WISEMAN, ENERGY LAW (CONCEPTS AND INSIGHTS) 165–67 (Foundation Press 2017).

21. QER, *supra* note 4, at S-3.

crude oil to refineries where it is converted to refined petroleum products and then shipped by pipeline, rail, truck, or barge to markets.[22] According to the DOE, "[t]here are more than 180,000 miles of liquid petroleum pipelines in the United States, delivering over 14 billion barrels annually of crude oil, petroleum products, and natural gas liquids [("NGLs")],[23] each through their own dedicated pipeline network."[24]

These pipelines are critical to the U.S. transportation sector because domestically and throughout the world, petroleum (gasoline, diesel, and jet fuel) makes up 90% of transportation fuels, with natural gas providing only 3%, biofuels 4%, and other sources (including electricity, liquid petroleum gas, and other fuels) 3%.[25] In light of the continuing dominant role of oil in the transportation sector, it is hard to overstate the importance of technological developments in hydraulic fracturing and directional drilling in the first decade of the 21st century for U.S. oil and gas production. After many decades of concern over the nation's growing dependence on foreign nations for oil and natural gas imports, in 2015 the U.S. became the world's largest combined producer of petroleum and natural gas.[26] As a result, the

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22. *See* Memorandum from Quadrennial Energy Review Task Force Secretariat & Energy Policy & Sys. Analysis Staff to Members of the Pub. 3, 3 n.4 (May 21, 2014) [hereinafter Memorandum]; *Natural Gas Pipelines*, PIPELINE 101, http://www.pipeline101.org/why-do-we-need-pipelines/other-means-of-transport (stating that pipelines carry 71% of crude oil and petroleum products on a ton-mile basis, oil tankers and barges carry 22%, trucks carry 4%, and rail carries 3%); STEVEN LEVINE, ET AL., THE BRATTLE GROUP, UNDERSTANDING CRUDE OIL AND PRODUCT MARKETS 10, fig. 11 (2014), http://www.api.org/~/media/files/oil-and-natural-gas/crude-oil-product-markets/crude-oil-primer/understanding-crude-oil-and-product-markets-primer-high.pdf.

23. "Natural gas liquids (NGLs) are hydrocarbons . . . composed exclusively of carbon and hydrogen," and include ethane, propane, butane, isobutane, and pentane. "NGLs are used as inputs for petrochemical plants, burned for space heat and cooking, and blended into vehicle fuel." *See* U.S. ENERGY INFO. ADMIN., *What are Natural Gas Liquids and How Are They Used?*, TODAY IN ENERGY (Apr. 20, 2012), http://www.eia.gov/todayinenergy/detail.cfm?id=5930. Pipelines that transport NGLs are sited and permitted like oil pipelines on a state-by-state level rather than like interstate natural gas pipelines, which are sited and permitted by the Federal Energy Regulatory Commission. *See, e.g.*, David L. Wochner, *FERC's Jurisdiction Now Reaches Ethane Pipelines Too*, LAW 360, Feb. 27, 2014 (explaining that federal jurisdiction over NGL pipelines is under the Interstate Commerce Act, not the Natural Gas Act, and extends to rates and conditions of service but not to the siting, construction, abandonment, or transfer of facilities); PIPELINE SAFETY TRUST, PIPELINE BRIEFING PAPER #14: JURISDICTIONAL ISSUES RELATING TO PIPELINES 3–4 (2015) (discussing pipeline siting issues); *infra* notes 36–37 and accompanying text (discussing state level disputes over oil and NGL pipeline siting and eminent domain).

24. Memorandum, *supra* note 22, at 3 (footnotes omitted). Refined petroleum products include multiple grades of gasoline, diesel, jet fuel, heating oil, propane and butane. *Id.* There are far fewer miles of oil and refined petroleum pipelines than there are natural gas transmission lines (approximately 300,000 miles) and natural gas distribution lines (approximately 2.1 million miles). *Id.* at 4.

25. *Energy Use for Transportation*, U.S. ENERGY INFO. ADMIN., http://www.eia.gov/EnergyExplained/?page=us_ energy_transportation.

26. U.S. ENERGY INFO. ADMIN., *United States Remains Largest Producer of Petroleum and*

U.S. is now less dependent on foreign oil than it has been in forty years, has increased its exports of refined petroleum products significantly, and is poised to become a net exporter of natural gas by 2018.[27]

This massive increase in oil and gas production as a result of directional drilling and hydraulic fracturing in the late 2000s was unexpected.[28] It created immediate challenges for the existing oil and gas transport infrastructure by greatly expanding U.S. production and by enabling production in parts of the country that had not been significant producing regions for decades, if ever. For instance, North Dakota's production of oil from the Bakken shale region increased from 81,000 barrels per day in 2003 to more than 1 million barrels per day by 2014, turning it into the number two oil-producing state in the nation behind Texas.[29]

With the rapid increase in shale oil development, pipeline companies are engaged in the largest U.S. oil pipeline build-out since World War II, with significant new oil pipelines under development to transport unconventional oil resources from Alberta, Canada; North Dakota; and Texas.[30] These pipelines include the controversial Keystone XL and Dakota Access pipelines, which, between the two of them, are designed to transport oil sands (also referred to as "tar sands") from Alberta, as well as shale oil from the Bakken region of North Dakota, to refineries in the Gulf Coast and elsewhere.[31] Although much of the controversy over both pipelines focused on federal approvals—a State Department Presidential Permit in the case of Keystone XL for the U.S.-Canada border crossing and a U.S. Army Corps

Natural Gas Hydrocarbons, TODAY IN ENERGY (May 23, 2016), http://www.eia.gov/todayinenergy/detail.cfm?id= 26352#.

27. *See Increasing Domestic Production of Crude Oil Reduces Net Petroleum Imports*, U.S. ENERGY INFO. ADMIN., Apr. 21, 2015 (discussing reductions in U.S. oil imports); *supra* note 13.

28. For background on hydraulic fracturing and directional drilling technologies, data on increased production of oil and natural gas from shale and tight oil formations, and the location of shale plays, see generally, AM. PETROLEUM INST., HYDRAULIC FRACTURING: UNLOCKING AMERICA'S NATURAL GAS RESOURCES (2015); James McBride & Mohammed Aly Sergie, *Hydraulic Fracturing (Fracking)*, COUNCIL ON FOREIGN RELATIONS (June 10, 2015), http://www.cfr.org/energy-and-environment/hydraulic-fracturing-fracking/p31559; MICHAEL RATNER & MARY TIEMANN, CONG. RESEARCH SERV., R43148, AN OVERVIEW OF UNCONVENTIONAL OIL AND NATURAL GAS: RESOURCES AND FEDERAL ACTIONS (2015).

29. *See Crude Oil Production*, U.S. ENERGY INFO. ADMIN. (July 31, 2015), http://www.eia.gov/dnav/pet/pet_ crd_crpdn_adc_mbbl_m.htm (showing crude oil production by state).

30. Alexandra B. Klass & Danielle Meinhardt, *Transporting Oil and Gas: U.S. Infrastructure Challenges*, 100 IOWA L. REV. 947, 969–71 (2015) (discussing scale and scope of recent oil pipeline expansions and highlighting the Keystone XL pipeline from Canada to the Gulf Coast and the Sandpiper Pipe from North Dakota to Minnesota).

31. Robinson Meyer, *Donald Trump and the Order of the Pipelines*, The Atlantic (Jan. 25, 2017); Darran Simon & Eliott C. McLaughlin, *Keystone and Dakota Access Pipelines: How Did We Get Here?*, CNN (Jan. 25, 2017).

of Engineers permit to cross under a federally controlled reservoir in the case of Dakota Access—the vast majority of interstate oil pipelines require only state approvals. This is because states, not the federal government, have primary jurisdiction over siting and eminent domain for interstate oil pipelines.[32] Many states require an oil pipeline to obtain a certificate of need (sometimes called a certificate of public convenience and necessity) to build the pipeline, and define such pipelines as a "public use," granting them the right to exercise eminent domain authority.[33] Thus, with regard to Keystone XL, even though it has now received a Presidential Permit from the Trump Administration, it must still obtain approval from Nebraska, where litigation is ongoing regarding state approval.[34]

The publicity over the Keystone XL and Dakota Access pipelines coupled with the fact that state law rather than federal law governs approvals of all oil pipelines not on federal lands have created a fairly effective groundswell of opposition to such pipelines. Throughout the country, landowners have joined forces with environmental and climate change advocates to mount effective, state-based opposition to such pipelines at a scale not seen in the past. In Minnesota, Kentucky, and Georgia, for example, residents and environmental groups have opposed oil and NGL pipelines,[35] arguing that the development of new pipeline infrastructure contributes directly to climate change and facilitates increased use of fossil fuels; that the pipeline's potential adverse impacts on water, wetlands, and other natural resources outweigh any benefits of the pipeline; that an out-of-state or foreign corporation should not be able to exercise eminent domain authority to take private property for a pipeline; and that there is no in-state benefit from the pipeline because all the oil producers and oil

32. Meyer, *supra* note 31; Simon & McLaughlin, *supra* note 31; Klass & Meinhardt, *supra* note 30, at 981–89; U.S. Army Corps of Engineers, *Corps Grants Easement to Dakota Access LLC* (Feb. 8, 2017), http://www.nwo.usace.army.mil/Media/News-Releases/Article/1077134/corps-grants-easement-to-dakota-access-llc/.

33. States generally define oil pipelines as a public use by statute, along with electric transmission lines, water lines, natural gas pipelines, and other similar infrastructure. *See* Klass & Meinhart, *supra* note 30, at 983, app. (detailing state statutes and different approaches states take with regard to defining oil pipelines as a public use for purposes of eminent domain authority).

34. *See* Brady Dennis & Steve Mufson, *As Trump Administration Grants Approval for Keystone XL Pipeline, An Old Fight is Reignited*, WASH. POST, Mar. 24, 2017; Klass & Meinhardt, *supra* note 30, at 975–79, 982–88. The state approval process for interstate oil pipelines stands in contrast with the federal approval process for interstate natural gas pipelines. *See infra* Part I.B.

35. As noted earlier, NGL pipelines are not within FERC's jurisdiction over interstate natural gas pipelines and are sited and approved at the state level like oil pipelines. For a description of NGLs, *see supra* note 23.

markets are in other states.[36] Even when these challenges do not succeed, they inevitably cause delay and increase costs associated with new oil pipeline infrastructure.[37]

As the controversies continue over building new oil pipelines to meet growing domestic production, oil transport by rail has increased dramatically. Oil transport by rail increased from 4,674 rail cars in 2006 to 493,000 rail cars in 2014.[38] This is true even though shipping crude oil by rail costs $5-$10 more per barrel than shipping it by pipeline.[39] At least while oil prices remained high, producers were more than willing to bear the additional costs on both a short-term and a long-term basis because: (1) constraints on existing pipeline infrastructure in the Bakken shale region in North Dakota left no other short-term alternatives; (2) rail is established infrastructure and using it to transport oil requires only the construction of easily built loading and unloading facilities; (3) rail infrastructure already serves every refinery in the country; and (4) rail facilities can be built more quickly than pipelines, allow greater flexibility for shippers, and require fewer capital risks.[40] Rail has transported as much as 75% of the oil

36. *See, e.g.*, Liz Sawyer, *Pipeline Protests Draw Marchers to St. Paul*, STAR TRIB., June 7, 2015 (discussing opposition to Sandpiper Pipeline based on the climate change impacts of Canadian oil sands development); David Shaffer, *Minnesota PUC Approves Enbridge's Sandpiper Pipeline but Didn't Settle Its Route*, STAR TRIB., June 6, 2015 (discussing the approval process for Sandpiper Pipeline in Minnesota and opposition based on environmental impacts to the headwaters of the Mississippi River); Pam Wright, *Kentucky Court of Appeals Upholds Eminent Domain Decision on Pipeline*, CENTRAL KENTUCKY NEWS, May 22, 2015 (reporting on the 2015 Kentucky Court of Appeals decision holding that Kinder Morgan may not exercise eminent domain authority to build the Bluegrass Pipeline to transport NGLs through Kentucky because it provides no benefit to Kentucky consumers); Greg Bluestein, *Palmetto Pipeline Likely Headed to Courts After Georgia Rejects Proposal*, AJC.COM (May 19, 2015) (reporting on decision by Georgia Department of Transportation to deny approval for Kinder Morgan's 360-mile Palmetto Pipeline to transport petroleum products from Florida to South Carolina through Georgia because fuel demand in the state did not require new pipeline capacity and thus the pipeline would not constitute a public convenience or necessity).

37. Some of the recent protests and lawsuits have been successful. The Minnesota Court of Appeals held in 2015 that the state agency did not do sufficient environmental review of the Sandpiper Pipeline and remanded the case for additional review. Enbridge later abandoned the project, at least until oil markets rebound. *See In re* N.D. Pipeline Co., LLC, 869 N.W.2d 693, 694 (Minn. Ct. App. 2015). *See also* Mike Hughlett, *Enbridge Energy Pulling Plug on Sandpiper Pipeline*, STAR TRIB., Sept. 2, 2016. In 2016, Georgia and South Carolina enacted moratoria on the use of eminent domain for oil pipelines as a result of growing opposition to the Palmetto Pipeline. Molly Samuel, *Gov. Nathan Deal Signs Pipeline Moratorium Bill*, WABE (May 4, 2016), http://news.wabe.org/post/gov-nathan-deal-signs-pipeline-moratorium-bill; Shelley Robbins, *What You Need to Know About Pipelines*, GREENVILLE J. (June 17, 2016), http://greenvillejournal.com/2016/ 06/17/need-know-pipelines/.

38. Memorandum, *supra* note 22, at 5; QER, *supra* note 4, at 5-4.

39. Shipping a barrel of oil by rail costs between $10 and $15 per barrel as compared to $5 per barrel by pipeline. Memorandum, *supra* note 22, at 3.

40. Memorandum, *supra* note 22, at 5. *See also* Klass & Meinhardt, *supra* note 30, at 973–94 (discussing benefits of oil transport by rail for producers despite the additional costs); Richard Allan & Zachary Kearns, *Federal Agencies and States Pursue New Regulations for Oil Trains, Face Court*

produced in the Bakken region, although that number may decrease as more new pipelines come on line.[41] While the drop in oil prices in the second half of 2014 caused some experts to question whether transporting oil by rail is a price-competitive substitute for pipelines over the longer term, the fact remains that rail will remain a dominant means of oil transport in regions of the country not well served by existing pipeline infrastructure.[42]

It is also significant that federal law rather than state law governs virtually all aspects of railroad routes, prices, construction, and safety, which means opponents to the transport of oil by rail have virtually no recourse at the state or local government level other than to encourage state and local governments to improve spill response procedures.[43] While this allows a more streamlined process for rail expansion efforts for oil transport as well as national uniformity in safety measures, it has also caused concern in many communities. This is particularly true after high-profile oil-by-rail disasters that have resulted in deaths and extensive property damage, like the explosions in Lac Megantic, Quebec; Casselton, North Dakota; and

Challenges, MARTEN LAW (Apr. 8, 2015) (discussing reasons for rise in transport of oil by rail, particularly from the Bakken shale region); *Crude by Rail Provides the West Coast with Supply as Regional Crude Oil Production Falls*, U.S. ENERGY INFO. ADMIN., June 9, 2015 (reporting on continued long-term decline in California-produced oil, the need to import oil to the region, the lack of major crude oil pipelines to the West Coast, and the consequential increased reliance on rail to transport oil to the region); JOHN FRITTELLI ET AL., CONG. RESEARCH SERV., R43390, U.S. RAIL TRANSPORTATION OF CRUDE OIL: BACKGROUND AND ISSUES FOR CONGRESS 5–6 (2014) (discussing flexibility of rail as compared to pipelines for transporting oil and why this flexibility can be particularly attractive for a market in flux).

41. Klass & Meinhardt, *supra* note 30, at 972–93; AP, *North Dakota Oil Shipments by Rail Drop Below 50 Percent*, FIN. & COM., Aug. 14, 2015 (stating that oil shipments by rail in North Dakota accounted for 47% of the 1.2 million barrels of oil produced in June 2015, down from a high of 75% in 2013, as a result of recently completed pipelines and new refining capacity in the state).

42. *See* FRITTELLI ET AL., *supra* note 40, at 4–5 (discussing changing economics of transporting Bakken crude oil by rail due to potential reduction in pipeline bottlenecks if new pipeline capacity is constructed and due to the drop in global oil prices in 2014). *But see* Mike Lee, *N.D. Hits Near-Record Oil Production as Prices Plummet*, ENERGYWIRE, Aug. 17, 2015 (reporting that North Dakota produced 1.21 million barrels of oil per day in June 2015, the second-highest monthly average on record, despite earlier predictions that low oil prices would prompt producers in the state to reduce production).

43. *See, e.g.*, FRITTELLI ET AL., *supra* note 40, at 14–24 (discussing federal regulation of railroad routes, safety, and tank cars); Elizabeth Douglass, *2 States Beef Up Oil-by-Rail and Pipeline Safety After String of Accidents*, INSIDE CLIMATE NEWS, June 16, 2014 (discussing increases in state funding for spill response efforts in Minnesota and New Hampshire and additional fees on railroads and pipeline companies to pay for them); Richard Allan & Zachary Kearns, *Federal Agencies and States Pursue New Regulations for Oil Trains, Face Court Challenges*, MARTEN LAW (Apr. 8, 2015) (discussing reasons for rise in transporting crude oil by rail, state efforts to regulate rail safety, and legal challenges to those efforts on federal preemption grounds); Hunton & Williams LLP, *North Dakota Crude "Oil Conditioning" Order: Vulnerable to Preemption Challenge?*, PIPELINELAW.COM (Jan. 13, 2015) (discussing whether North Dakota order requiring oil to be "conditioned" prior to shipment by rail to reduce volatility is preempted by federal law).

other areas of the United States and Canada.[44] The increase in shipping oil by rail has also caused significant delays in shipments of other commodities, such as grain, as well as delays on passenger rail routes, as a result of increased congestion on the nation's railways.[45]

B. Transporting Natural Gas: Pipelines and LNG Import/Export Facilities

With regard to U.S. natural gas infrastructure, as of 2014 there were over 480,000 producing wells, 516 processing plants, 210 pipeline systems consisting of over 300,000 miles of transmission pipelines, 414 underground storage facilities, eleven LNG import terminals (many of which are in the process of being converted to export terminals), three LNG export terminals, and several more LNG export terminals which have received federal approvals and are in the construction process.[46] These numbers do not include the 200,000 miles of gathering pipelines that collect gas from production areas and transport it to processing facilities for refining, where it is then delivered to transmission pipelines, and the over two million miles of distribution pipelines that deliver natural gas to industrial, commercial, and residential customers for heating and, increasingly, for electricity generation.[47]

Natural gas prices in the United States have always been volatile.[48] Starting in 2008, however, with the growing domestic production of shale gas, prices began to drop significantly.[49] According to the Congressional

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44. *See* FRITTELLI ET AL., *supra* note 40, at 10–12 (discussing pipeline spills and oil train derailments).

45. *See, e.g.*, QER, *supra* note 4, at 5-8 (discussing increased stress placed on rail transport system by increased shipments of oil and adverse effects on grain industry); ELAINE KUB, AM. FARM BUREAU FED'N, INSUFFICIENT FREIGHT: AN ASSESSMENT OF U.S. TRANSPORTATION INFRASTRUCTURE AND ITS EFFECTS ON THE GRAIN INDUSTRY (2015) (white paper commissioned by farm bureau concluding that new pipelines are best means to reduce current congestion impacts on grain industry); Angel Gonzales, *Oil Trains Crowd out Grain Shipments to NW Ports*, SEATTLE TIMES (July 26, 2014), http://www.seattletimes.com/business/oiltrainscrowdoutgrainshipmentstonwports/; Ron Nixon, *Grain Piles Up, Waiting for a Ride, As Trains Move North Dakota Oil*, N.Y. TIMES (Aug. 25, 2014), http://nyti.ms/1qHXSHh; Ron Nixon, *As Trains Move Oil Bonanza, Delays Mount for Other Goods and Passengers*, N.Y. TIMES (Oct. 8, 2014), http://nyti.ms/1y990Fw.

46. *See* QER, *supra* note 4, app. B, at NG-13, tbl. B-2, NG-22–NG-23, NG-26, tbl. B-6, fig. B-16.

47. *See* U.S. GOV'T. ACCOUNTABILITY OFFICE, GAO-13-221, PIPELINE PERMITTING: INTERSTATE AND INTRASTATE NATURAL GAS PERMITTING PROCESSES INCLUDE MULTIPLE STEPS, AND TIME FRAMES VARY 4 (2013); PIPELINE 101, *supra* note 22.

48. From 1995 to 1999, the spot price of natural gas averaged $2.23 per million British thermal units ("MMBtu") but increased to an average price of $4.68 per MMBtu during the 2000–2004 period, hitting a peak in December 2005 at $15.38 per MMBtu. RATNER & TIEMANN, *supra* note 28, at 2–3.

49. Natural gas prices remained between $2 and $5 per MMBtu between 2009 and 2015 and hovered between $2 and $3 per MMBtu in 2015. *Id*. *See also* MICHAEL RATNER ET AL., CONG.

Budget Office, by 2040, in the absence of shale gas, U.S. natural gas prices would be 70% higher than today's projected prices for that year.[50] Not surprisingly, before the widespread implementation of hydraulic fracturing technologies, natural gas was used more sparingly in the electricity sector because of this historic price volatility. This resulted in greater reliance on coal for electricity generation in many parts of the nation despite the increased greenhouse gas ("GHG") emissions and other air pollutants associated with its use. For example, in 1990, coal provided 55% of net electricity generation and natural gas provided only 12%.[51] But by 2013, net electricity generation from coal had dropped to 39% and natural gas had increased to 27%, with natural gas plants making up over 50% of new utility-scale generating capacity.[52] In April 2015, natural gas surpassed coal as the dominant energy source of electricity in the U.S., providing 31% of U.S. electric power generation as compared to 30% for coal, and that trend continued into 2016.[53]

In addition to lower prices, the EPA's "Carbon Pollution Emission Guidelines for Existing Stationary Sources: Electric Utility Generating Units" (known as the Clean Power Plan) coupled with existing EPA regulations limiting mercury and other emissions from electric power plants will likely continue to shift electric energy generation away from coal in favor of natural gas.[54] Regardless of the fate of the Clean Power Plan, which

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RESEARCH SERV., R42074, U.S. NATURAL GAS EXPORTS: NEW OPPORTUNITIES, UNCERTAIN OUTCOMES 3–5 (2015) (showing changes in U.S. natural gas production and price over time); *Henry Hub Natural Gas Spot Prices*, U.S. ENERGY INFO. ADMIN. (June 3, 2015), http://www.eia.gov/dnav/ng/hist/rngwhhdm.htm.

50. *See* QER, *supra* note 4, at 1-6.

51. *See* Alexandra B. Klass, *The Electric Grid at a Crossroads: A Regional Approach to Siting Transmission Lines*, 48 U.C. DAVIS L. REV. 1895, 1932–33 (2015) (discussing historical trends in energy sources for U.S. electricity generation).

52. *Id.*; ASS'N OF AM. R.RS., RAILROADS AND COAL 4 (2016) (discussing increases in natural gas use for electricity in the 2010s and decreases in coal use for electricity and providing historical charts); QER, *supra* note 4, app. B, at NG-9.

53. *See Gas Surges Beyond Coal in U.S. Electricity Generation in Historic April Shift*, CLIMATEWIRE, July 15, 2015; U.S. ENERGY INFO. ADMIN., *Natural Gas Expected to Surpass Coal in Mix of Fuel Used for U.S. Power Generation in 2016*, TODAY IN ENERGY (Mar. 16, 2016), http://www.eia.gov/ todayinenergy/detail.cfm?id=25392; AP, *Coal Production Falls to Lowest Volume in 3 Decades*, N.Y. TIMES: BUS. BRIEFING (Jan. 8, 2016), http://nyti.ms/1UDphKS; Seth Feaster, *IEEFA Data Bite: Wind on the Rise, Coal on the Wane*, INST. FOR ENERGY ECON. & FIN. ANALYSIS (May 12, 2016), http://ieefa.org/ieefa-data-bite-wind-rise-coal-wane/; Tom Murphy, AP, *Fuel of Choice: Natural Gas Surpasses Coal as Top Source of Electrical Power*, July 13, 2015.

54. Clean Air Act § 111(d), 42 U.S.C. § 7411(d) (2012); *Q&A: EPA Regulation of Greenhouse Gas Emissions from Existing Power Plants*, CTR. FOR CLIMATE & ENERGY SOLUTIONS, http://www.c2es.org/federal/executive/epa/q-a-regulation-greenhouse-gases-existing-power. Section 111 provides that the standards must limit emissions to the extent "achievable through the application of the best system

the U.S. Supreme Court stayed in February 2016,[55] the full suite of new EPA pollution control regulations governing the electric power sector coupled with the economic factors described above favoring natural gas over coal will continue to shift additional electricity generation away from coal and toward natural gas-fired electricity.

This significant increase in both natural gas supply and demand has resulted in a corresponding expansion in the natural gas pipeline network since the late 2000s. Indeed, a technical report the DOE prepared in connection with the Quadrennial Energy Review in 2015 concluded that increased demand for natural gas for electricity use in connection with new clean energy policies would not require significant additional expansion of the U.S. natural gas pipeline network except perhaps in New England, where pipeline constraints can create shortages in winter months as well as price spikes.[56] The DOE based this conclusion on the diverse geography of current natural gas production and consumption, available capacity on the existing pipeline network, and the fact that the industry has already made significant expansions in the pipeline network to accommodate increased shale gas production since the late 2000s.[57] EIA estimates that between 2004 and 2013, the industry spent over $50 billion expanding the network.[58] The natural gas industry also benefits from the fact that the pre-existing pipeline network is widespread, the pipelines were designed to be long-lived assets sized to accommodate additional capacity, and many pipelines were built in

of emission reduction." 42 U.S.C. § 7411(a)(1).

55. North Dakota v. E.P.A, 136 S. Ct. 999 (Feb. 9, 2016) (mem.). In March 2017, President Trump issued an Executive Order directing the EPA to take steps to review, suspend, revise, or repeal the Clean Power Plan. *See* PRESIDENTIAL EXECUTIVE ORDER ON PROMOTING ENERGY INDEPENDENCE AND ECONOMIC GROWTH (Mar. 28, 2017).

56. *See* U.S. DEPT. OF ENERGY, NATURAL GAS INFRASTRUCTURE IMPLICATIONS OF INCREASED DEMAND FROM THE ELECTRIC POWER SECTOR vi–vii (2015) [hereinafter NATURAL GAS INFRASTRUCTURE IMPLICATIONS]; QER, *supra* note 4, app. B, at NG-29–NG-32 (discussing existing pipeline capacity in regions of the country and highlighting constraints in New England); Bruce Gellerman, *Old System, New Solution?: Liquefied Natural Gas Could Be Pipeline Alternative*, WBUR NEWS, Mar. 11, 2015 (suggesting that importing LNG is a better solution for New England's heating and electricity needs than an expanded pipeline system because constraints exist only on the coldest days thus there is no need to build a billion dollar solution "for a 365-day problem when there's only a 30- to 40-day problem."); Cassandra Sweet, *In New England, Shale Gas is Hard to Get*, WALL ST. J., Sept. 30, 2015 (discussing how pipeline constraints are causing generation facilities to rely on more expensive LNG imports from Trinidad and Tobago and the Middle East to generate gas-fired electricity in New England). *But see* Mike Lee et al., *The Shale-Bust Recovery May Be Coming This Time—Slowly*, ENERGYWIRE, Apr. 23, 2015 (reporting that "the gas is in the wrong place" in that the Marcellus and Utica shales in the northeast are producing so much gas that producers are having to sell it for $1 less than producers get in Texas and Louisiana because of regional transport constraints).

57. NATURAL GAS INFRASTRUCTURE IMPLICATIONS, *supra* note 56, at vi–vii; QER, *supra* note 4, app. B, at NG-29–NG-32.

58. QER, *supra* note 4, app. B, at NG-28–NG-29.

cold weather regions to meet winter heating demand, not electricity needs, and thus have additional capacity during off-peak seasons.[59]

Moreover, the report highlights the fact that the Federal Energy Regulatory Commission ("FERC") has primary jurisdiction over the approval of interstate natural gas pipelines, which makes such pipelines easier to build than if they were subject to multiple state approvals.[60] Specifically, FERC authorizes such pipelines by issuing a certificate of public convenience and necessity if the pipeline meets statutory requirements.[61] If FERC issues a certificate, the pipeline can exercise eminent domain authority to obtain the land necessary to build the pipeline if it is unable to negotiate voluntary easements with all landowners.[62] Since 2005, FERC also has primary authority over the approval and siting of LNG import and export facilities, generally preempting state law, although states may exercise federal rights under other applicable environmental laws such as the Coastal Zone Management Act, the Clean Air Act, and the Clean Water Act.[63] Responding to producer requests to expand the U.S. natural gas export market, FERC has approved several LNG terminals for natural gas export since 2012.[64]

This federal regulatory authority—coupled with the creation of expedited permitting processes and Congressional authorization for LNG terminals to sign long-term contracts with users[65]—means that interstate natural gas pipelines and LNG facilities can often be built more easily than other forms of energy transport infrastructure, such as interstate oil pipelines

59. *Id*.

60. *Id. See also* NATURAL GAS INFRASTRUCTURE IMPLICATIONS, *supra* note 56, at vi–vii, 4.

61. Under Section 7 of the Natural Gas Act, FERC determines whether a proposed pipeline meets the "public convenience and necessity" and, although it coordinates with state and federal environmental agencies in pipeline review, it possesses the ultimate power of approval, which is accompanied by the right of the certificate holder to exercise eminent domain. *See* 15 U.S.C. §717f (2012).

62. *Id*.

63. *See infra* Part II.

64. OilOnline Press, *EIA: LNG Export Terminals Under Construction, More Planned*, OILONLINE PRESS (Apr. 17, 2015), https://www.oilonline.com/news/midstream/eia-lng-export-terminals-under-construction-more-planned; *North American LNG Import/Export Terminals Approved*, FERC, OFFICE OF ENERGY PROJECTS (last visited June 7, 2017) [hereinafter Office of Energy Projects], http://www.ferc.gov/industries/gas/indus-act/lng/lng-approved.pdf [perma.cc/ Y7EA-TXPV]. Although applicants must obtain approval from FERC to obtain a siting permit to construct the facility, they must also obtain approval from DOE to export the natural gas. *See, e.g.*, RATNER, ET AL., *supra* note 49, at 7–10 (discussing federal approvals required for LNG export and the status of LNG export applications and approvals); *Liquefaction Project Details*, CAMERON LNG, http://cameronlng.com/pdf/11337%20CameronFctShts_ LiquefactionProject.pdf (discussing FERC and DOE approvals).

65. 15 U.S.C. § 717b(e)(3)(B)(ii) (2012).

or interstate electric transmission lines.[66] Between 2000 and 2011, pipeline companies applied for and received FERC approval for more than 16,000 miles of interstate gas pipelines and nearly 15,000 miles of those pipelines were constructed and put in service by 2011.[67] Moreover, the transmission capacity that was added to the U.S. natural gas pipeline network more than doubled from 2007 to 2008.[68]

C. Transporting Electricity: The Future of the Grid

The North American electric transmission and distribution grid consists of 7,000 power plants connected to nearly 450,000 miles of high-voltage transmission lines, substations, and approximately 6 million low-voltage distribution lines.[69] The grid is an $876 billion asset managed by over 3,000 electric utilities serving nearly 300 million residential, commercial, and industrial customers.[70] In many parts of the nation, non-profit Regional Transmission Organizations ("RTOs") and Independent System Operators ("ISOs")[71] manage the grid and wholesale electricity markets, even though investor-owned utilities, municipal utilities, electric cooperatives, and other transmission line owners continue to develop, build, and own the transmission assets themselves.[72]

After a decline in investment in the transmission system investments for decades, investor-owned utilities and other electricity infrastructure owners began to invest in the grid in earnest in the early 2000s, and spent $16.9 billion on transmission in 2013 and $20.1 billion in 2015, up from $5.8 billion in 2001.[73] Construction of new lines accounts for slightly more than half of total investments.[74] Experts contend that despite these short-term increases, greater long-term investment in the transmission grid is necessary

66. *See infra* Parts I.C and II.B for a discussion of the siting and eminent domain process for interstate electric transmission lines.

67. U.S. GOV'T. ACCOUNTABILITY OFFICE, *supra* note 47, at 12.

68. PAUL W. PARFOMAK, CONG. RESEARCH SERV., R43138, INTERSTATE NATURAL GAS PIPELINES: PROCESS AND TIMING OF FERC PERMIT APPLICATION REVIEW 8 & fig. 2 (2015).

69. *See, e.g.*, HARRIS WILLIAMS & CO., TRANSMISSION & DISTRIBUTION INFRASTRUCTURE 1–2 (2014).

70. *Id.*; QER, *supra* note 4, at 3-4.

71. RTOs and ISOs are FERC-approved non-governmental entities formed by member utilities and entities that produce and transmit electricity. RTOs and ISOs play a significant role in electric transmission planning and reliability. They exist in approximately two-thirds of the United States in terms of both geography and electricity demand. *See* Klass, *supra* note 51, at 1936–38.

72. QER, *supra* note 4, at 3-23; Klass, *supra* note 51, at 1936–40 (discussing RTOs and ISOs).

73. EDISON ELEC. INST., TRANSMISSION PROJECTS: AT A GLANCE v (Dec. 2016); QER, *supra* note 4, at 3-6. For a discussion of the investor-owned utilities, municipal cooperatives, and private merchant transmission line companies that build and own electric transmission assets, see *id.* at 3-20–3-21.

74. QER, *supra* note 4, at 3-6.

to increase system reliability in light of increasingly severe weather events; to decrease congestion-related outages; and to interconnect new generation sources, particularly new utility-scale wind and solar energy and natural gas plants.[75]

The increase in the use of renewable energy for electricity has been rapid. Non-hydropower renewable energy resources for electricity increased from approximately 1% in 2000 (excluding biomass which constituted 1.4%) to nearly 7% by 2013.[76] From 2008 through the end of 2013, the amount of electricity generated from wind energy more than tripled and the amount from solar has increased more than tenfold.[77] With regard to wind, according to the National Renewable Energy Laboratory, there are over 10 million megawatts ("MWs") of onshore wind resources, which are sufficient to power ten times the nation's electricity needs.[78] As of 2016, wind generated more than 20% of electricity needs in several states, most notably in the Midwest.[79] On a nationwide basis, that percentage is more modest but increasing; in 2016 wind power alone surpassed hydropower as the single largest source of renewable electricity in the

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75. *Id. See also* AMERICAN SOC'Y OF CIVIL ENG'RS, FAILURE TO ACT: THE ECONOMIC IMPACT OF CURRENT INVESTMENT TRENDS IN ELECTRICITY INFRASTRUCTURE (2011); BIPARTISAN POLICY CTR., CAPITALIZING ON THE EVOLVING POWER SECTOR: POLICIES FOR A MODERN AND RELIABLE U.S. ELECTRIC GRID 28–33 (2013); RICHARD J. CAMPBELL, CONG. RESEARCH SERV., R42923, ELECTRICAL POWER: OVERVIEW OF CONGRESSIONAL ISSUES 7–8 (2013); JUDY W. CHANG & JOHANNES P. PFEIFENBERGER, THE BRATTLE GROUP, WELL-PLANNED ELECTRIC TRANSMISSION SAVES CUSTOMER COSTS: IMPROVED TRANSMISSION PLANNING IS KEY TO THE TRANSITION TO A CARBON-CONSTRAINED FUTURE (2016); THE NAT'L ACAD. OF SCI., ENG'G, AND MED., THE POWER OF CHANGE: INNOVATION FOR DEVELOPMENT AND DEPLOYMENT OF INCREASINGLY CLEAN ELECTRIC POWER TECHNOLOGIES 153–59 (Nat'l Acad. Press 2016); U.S. GOV'T. ACCOUNTABILITY OFFICE, CLIMATE CHANGE: ENERGY INFRASTRUCTURE RISKS AND ADAPTATION EFFORTS (2014) (discussing risks climate change poses to aging electric grid infrastructure); Klass, *supra* note 51, at 1922–24; John Fialka, *Modernizing the Grid: A Tugboat "Trying to Turn a Big Ocean Liner*," CLIMATEWIRE, July 6, 2016.

76. *See* U.S. DEPT. OF ENERGY, 2013 RENEWABLE ENERGY DATA BOOK (2015); U.S. ENERGY INFO. ADMIN., *Renewable Share of U.S. Energy Consumption Highest Since 1930s*, TODAY IN ENERGY (May 28, 2015), http://www.eia.gov/todayinenergy/detail.cfm?id=21412; Pete Danko, *6 New Charts That Show U.S. Renewable Energy Progress*, BREAKING ENERGY (Feb. 5, 2015), http://breakingenergy .com/2015/02/05 /6-new-charts-that-show-us-renewable-energy-progress/.

77. *See* QER, *supra* note 4, at 1-17.

78. *See* Press Release, Am. Wind Energy Ass'n, American Wind Power Reaches Major Power Generation Milestones in 2013 (Mar. 5, 2013), http://www.awea.org/MediaCenter/pressrelease.aspx? ItemNumber=6184.

79. *See, e.g.,* Daniel Cusick, *Midwestern States Now Get a Fifth of Their Power from Wind*, CLIMATEWIRE (Mar. 7, 2017), http://perma.cc/9MUT-EHFY (discussing surge in investment in U.S. wind power and the fact that several Midwestern states now produce over 20% of their electricity from wind energy).

United States.[80] State renewable portfolio standards ("RPSs")[81] that exist in over half the states have driven this growth along with rapidly falling costs of wind farm construction, increased transmission capacity, and federal and state tax incentives.[82] A 2015 DOE report predicted that wind could generate 20% of U.S. electricity needs by 2030 and 35% by 2050.[83] Moreover, research shows that building taller wind turbines could substantially expand the reach of wind energy where it has not yet been developed.[84]

The use of solar energy has also increased dramatically in the last decade. Although solar energy still generates less than 2% of U.S. electricity needs, its use nationwide has grown significantly in recent years. As of 2016, the U.S. had over 40,000 MW of installed capacity, enough to power over 8 million homes.[85] While solar resources are most intense in the desert southwest, growth in solar has occurred throughout the country, with California dominating the market but with rapid expansion in Massachusetts, Arizona, North Carolina, Texas, New Jersey, and Nevada, among others.[86] State RPSs, tax incentives, and other state policies encouraging solar generation have combined with significantly falling costs of photovoltaic ("PV") rooftop solar and utility scale solar over the past five years to bring about this transformation in the solar industry.[87] Experts

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80. U.S. Energy Info. Admin, *What is U.S. Electricity Generation by Energy Source?* (Apr. 1, 2016), http://perma.cc/NT7N-CKWN. U.S. Energy Info. Admin., *Electricity* (Mar. 7, 2017) https://perma.cc/33S2-9KLN (forecasting non-hydropower renewable energy will grow to 9% of total electricity generation in 2017 and 10% in 2018). At the end of 2016, wind energy alone surpassed hydropower for the first time as the largest source of renewable electricity. Diane Cardwell, *Wind Surpasses Hydropower in a Critical Measure*, N.Y. TIMES (Feb. 9, 2017), https://perma.cc/FKQ5-UY5G.

81. RPSs generally require utilities and other power providers to generate a certain percentage of the electric energy they sell to customers (e.g., 15%, 20%, 30%) from renewable sources by a certain date (e.g., 2020, 2030) or purchase Renewable Energy Credits ("RECs") from other power providers, thus creating a market for renewable energy. *See* NAT'L CONF. OF STATE LEGISLATURES, STATE RENEWABLE PORTFOLIO STANDARDS AND GOALS (2016).

82. *See* QER, *supra* note 4, at 1-7 (discussing drivers for renewable energy growth).

83. WIND VISION, *supra* note 17.

84. *Energy Department Announces $2 Million to Support Manufacturing of Taller Wind Turbine Towers*, U.S. DEPT. OF ENERGY (Sept. 18, 2014), https://energy.gov/eere/articles/energy-department-announces-2-million-support-manufacturing-taller-wind-turbine-towers [hereinafter Taller Wind Turbine Towers]; Diane Cardwell, *Wind Power Is Poised to Spread to All States*, N.Y. TIMES (May 19, 2015), http://nyti.ms/1JxUPii (discussing DOE report on ability of taller wind turbines to bring increased wind capacity to all 50 states).

85. Solar Energy Industries Ass'n, U.S. Solar Market Insight, http://www.seia.org/research-resources/us-solar-market-insight.

86. *See generally* Solar Energy Industries Ass'n, Solar Market Insight Report 2016 Year in Review, http://www.seia.org/research-resources/solar-market-insight-report-2016-year-review; Solar Energy Industries Ass'n, Top 10 Solar States, http://www.seia.org/research-resources/top-10-solar-states.

87. The cost of PV solar modules is about 1% of what it was thirty-five years ago, and the average

anticipate that solar development will continue to rise as component costs continue to fall and generation efficiencies increase.[88] Moreover, major utilities have already begun to enter the solar market, procuring utility-scale solar, building solar gardens, and selling rooftop PV solar to retail customers,[89] all of which will significantly increase the amount of solar energy on the grid.[90]

New, long-distance electric transmission lines are critical to expand the use of renewable energy for electricity and to reduce reliance on fossil fuels.[91] Unlike traditional sources of electric energy such as oil, natural gas, uranium, and coal, which can be transported to power plants near population centers by truck, train, or pipeline, utility scale wind and solar energy can only be transported via transmission lines.[92] Moreover, these resources are often concentrated in less populated parts of the country—wind in the Midwest and Plains states and solar in the Southwest.[93] This means that

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cost for a utility-scale PV project dropped from approximately 21¢ per KWh in 2010 to 11¢ per KWh at the end of 2013. *See* QER, *supra* note 4, at 1-7. Prices have fallen even further since that time. *See* Solar Energy Industries Ass'n, Solar Industry Data, http://www.seia.org/research-resources/solar-industry-data.

88. *See* MIT, THE FUTURE OF SOLAR ENERGY (2015). *See also* Naureen S. Malik, *Solar Shines as Sellers Sometimes Pay Buyers to Use Power*, BLOOMBERG BUSINESS, May 26, 2015 (noting that solar capacity in the United States has increased 20 times since 2008 through significant increases in utility scale and rooftop solar and quoting a business analyst as stating that "[s]olar is the new shale.").

89. "Wholesale sales" are sales to a person or company for purposes of resale. "Retail sales" are sales to the ultimate user or consumer of the product, whether that product is electricity, groceries, or other goods. *See, e.g.*, 16 U.S.C. § 824(d) (2012) (defining "sale of electric energy at wholesale" as "a sale of electric energy to any person for resale."). In the realm of electricity, wholesale sales include sales of electricity from electricity producers to investor-owned utilities, municipal utilities, and other entities that sell electricity to end users. By contrast, retail sales of electricity are sales of electricity to residential, commercial, and industrial end users.

90. *See* Mark Chediak *Southern Co. Will Sell Rooftop Solar in Georgia, Mulls Residential Batteries*, 111 BNA DAILY ENVTL. REPORT, June 9, 2015, at A-8; *SunShare and Mortenson Announce Strategic Agreement to Develop and Build Community Solar Gardens in Minnesota*, M.A. MORTENSON (Jan. 13, 2015), http://www.mortenson.com/company/news-and-insights/2014/sunshare-and-mortenson-community-solar (discussing partnerships with Xcel Energy to build solar gardens to meet Minnesota's solar mandate for utilities); Cory Honeyman, *Utility-Scale Solar is Back from the Dead*, GREENTECH MEDIA (Aug. 5, 2014), https://www.greentechmedia.com/articles/read/utility-scale-solar-is-back-from-the-dead.

91. *See, e.g.*, CHANG & PFEIFENBERGER, *supra* note 75; U.S. DEPT. OF ENERGY, REDUCING WIND CURTAILMENT THROUGH TRANSMISSION EXPANSION IN A WIND VISION FUTURE iv–v (Jan. 2017), http://www.nrel.gov/docs/fy17osti/67240.pdf [hereinafter REDUCING WIND CURTAILMENT] (finding that long distance transmission line expansion in the western United States is "likely to be critical" to achieving wind penetration of 35% by 2050 and that such grid expansion will provide "substantial health, environmental, and economic benefits.").

92. *See* REGULATORY ASSISTANCE PROJECT, ELECTRICITY REGULATION IN THE US: A GUIDE 93–99 (2d ed. 2016) (describing the electric transmission grid); Klass, *supra* note 51, at 1915–16 (discussing challenges of integrating more renewable energy into the transmission grid).

93. *See United States—Average Annual Wind Speed at 80 m*, NAT'L RENEWABLE ENERGY LAB.,

capitalizing on these renewable energy resources requires expansion and development of the U.S. transmission grid.[94]

Both public utilities and private transmission companies, known as "merchant" transmission companies,[95] are seeking to build new transmission lines to expand the use of renewable energy and increase the reliability of the grid.[96] A growing number of these proposed new, long-distance transmission lines are direct current ("DC") lines which, unlike more commonly used alternating current ("AC") lines, do not allow power to move in both direction and do not contain frequent "on-ramps" and "off-ramps." Because of these differences, over longer distances, DC lines are more efficient and lose less power over the length of the line, making them desirable for long distance transmission of electric energy from generation sites to population centers.[97]

In addition to recent efforts to expand the transmission grid to integrate new sources of renewable energy, the technology and market developments taking place with regard to electricity generation and the electric grid are staggering. For instance, one of the limitations of wind and solar energy is

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http://www.nrel.gov/gis/images/80m_wind/USwind300dpe4-11.jpg (map showing high potential wind areas of the United States); *Solar Energy Potential*, U.S. DEPT. OF ENERGY, http://energy.gov/maps/solar-energy-potential (map showing high areas of potential solar energy).

94. *See* John Fialka, *China Has a "Grand Vision" for the Grid. Does Trump?*, CLIMATEWIRE (Dec. 21, 2016), http://www.eenews.net/climatewire/2016/12/21/stories/1060047497 (discussing the need for more long-distance, high voltage electric transmission lines in the United States to meet "deep decarbonization" goals for the electric grid in addition to development and integration of enhanced battery storage technologies). *See also* REDUCING WIND CURTAILMENT, *supra* note 91, at iv–v (discussing the need for expansion of the grid to integrate greater percentages of renewable energy resources).

95. Merchant transmission line companies generate revenue solely from contracts with electricity generators to transmit electricity over the transmission lines they build for ultimate delivery of electricity to the retail electricity market by other companies. Thus, unlike state-regulated public utilities, merchant transmission companies do not receive a regulated, cost-based rate of return from electricity users. *See* Heidi Werntz, *Let's Make a Deal: Negotiated Rates for Merchant Transmission*, 28 PACE ENVTL. L. REV. 421, 424 n.13 (2011); JOSEPH H. ETO, LAWRENCE BERKELEY NAT'L LAB., BUILDING ELECTRIC TRANSMISSION LINES: A REVIEW OF RECENT TRANSMISSION PROJECTS 1 (2016) ("Merchant transmission project developers rely on buyers of bulk transmission services to establish a project's financial viability" and do not rely on "cost-based tariffs approved through related Federal Energy Regulatory Commission (FERC) and state ratemaking processes.").

96. Klass, *supra* note 51, at 1925–28 (discussing proposed long-distance transmission lines designed to bring renewable energy to population centers); Alexandra B. Klass, *Takings and Transmission*, 91 N.C. L. REV. 1079, 1116–23 (2013) (discussing rise of merchant transmission companies, expansion of the electric grid, and ongoing transmission line projects).

97. *See How HVDC Works*, CLEAN LINE ENERGY PARTNERS, http://www.cleanlineenergy.com/technology/hvdc/how (explaining benefits of DC transmission lines); *About Direct Current Technology*, CLEAN LINE ENERGY PARTNERS, http://www.cleanlineenergy.com/technology/hvdc (also describing advantages of DC transmission lines); John Fialka, *The Birth and Troubled Childhood of an American Supergrid*, CLIMATEWIRE (Sept. 7, 2016) (discussing benefits of high-voltage DC transmission lines); John Fialka, *Can the U.S. Develop a Supergrid Before China?*, CLIMATEWIRE, Sept. 9, 2016.

its variability—wind farms, utility-scale solar plants, and rooftop solar PV panels only produce electricity when the wind blows or the sun shines. This means that back up generation in some form is needed so supply and demand in the grid are in constant balance.[98] In response to this challenge, states, utilities, and industry experts are exploring a number of existing technologies to integrate higher percentages of renewable energy into the grid, including an increased ability to manage short-term mismatches in demand and supply, improved forecasts for wind production, and more flexibility with power plants that use fossil fuels.[99] A 2015 report prepared by the Brattle Group for the Advanced Energy Economics Institute explored how Texas and Colorado were regularly able to achieve 10-20% renewable energy penetration levels (and much higher rates for shorter periods of time) using existing technologies and modest operational changes.[100] As noted earlier, research is underway to expand the potential use of large amounts of wind energy outside of Texas and the Midwest by building taller turbines that can capture stronger, more consistent winds available at elevated heights throughout the country and with decreased land-use impacts.[101]

Moreover, utilities and other market actors are attempting to develop cost-effective large-scale batteries to complement ongoing developments in a variety of energy storage technologies. Energy storage consists of a suite of technologies including batteries, pumped-storage hydropower, compressed air storage, flywheels, and thermal energy that retain energy from electricity generated at times of low demand, strong winds, or peak sun until demand increases.[102] In 2014, Oncor, Texas's largest transmission line network operator, sought regulatory approval to invest billions of dollars in utility-scale batteries beginning in 2018, which would allow it to store electricity at night, when demand—and cost—is lowest and also when

98. *See* Boyd, *supra* note 7, at 1626–28 (discussing mechanics of the electric grid).

99. *See* JURGEN WEISS & BRUCE TSUCHIDA, THE BRATTLE GROUP, INTEGRATING RENEWABLE ENERGY INTO THE ELECTRICITY GRID: CASE STUDIES SHOWING HOW SYSTEM OPERATORS ARE MAINTAINING RELIABILITY (2015); Edward Klump, *Texas, Colo., Show How to Integrate Renewables as Carbon Plan Looms—Report*, ENERGYWIRE, June 10, 2015 (reporting on findings of Brattle Group Study for Advanced Energy Economics Institute).

100. WEISS & TSUCHIDA, *supra* note 99, at 4–5. *See also* Umair Irfan, *New Study Outlines Path to 100% Renewables in All 50 States*, CLIMATEWIRE, June 10, 2015 (discussing report by researchers showing how all fifty states can achieve 80% renewable energy use by 2020 and 100% renewable energy use by 2050 for all energy needs, not just electricity, using regional resources and gradual developments in technologies at reasonable cost).

101. Taller Wind Turbine Towers, *supra* note 84; Cardwell, *supra* note 84.

102. *See* Amy L. Stein, *Reconsidering Regulatory Uncertainty: Making a Case for Energy Storage*, 41 FLA. ST. U. L. REV. 697, 705–09 (2014) (discussing types of energy storage technologies).

wind energy is at its peak.[103] Oncor also began micro-grid pilot projects using battery technology, solar energy, and back-up generators.[104] Although Texas law currently makes it difficult, if not impossible, for Oncor to seek ratepayer cost recovery for these projects because they are considered electricity "generation" projects rather than "transmission" projects,[105] in other parts of the country, states are actively encouraging utilities to invest in storage projects. For instance, California has placed mandates on utilities to produce 1.3 gigawatts of energy storage by 2022, along with additional regional procurements.[106] Hawaii and New York also have multiple storage pilots and projects underway.[107]

Moreover, FERC has recognized that energy storage can, depending on the project, constitute a transmission, generation, or distribution asset.[108] In

103. James Osborne, *Oncor Proposes Giant Leap for Grid, Batteries*, THE DALLAS MORNING NEWS (Nov. 8, 2014), http://www.dallasnews.com/business/energy/2014/11/08/oncor-proposes-giant-leap-for-grid-batteries; Robert Fares, *Three Reasons Oncor's Energy Storage Proposal Is a Game Changer*, SCIENTIFIC AM.: PLUGGED IN (Nov. 18, 2014), https://blogs.scientificamerican.com/plugged-in/three-reasons-oncor-s-energy-storage-proposal-is-a-game-changer/ (explaining why the scope and scale of Oncor's proposal is significant, particularly because Oncor is a regulated transmission and distribution company and can obtain rate recovery from consumers if the state approves the project, and thus can procure billions of dollars in capital); JUDY CHANG ET AL., THE BRATTLE GROUP, THE VALUE OF DISTRIBUTED ELECTRICITY STORAGE IN TEXAS (2014) (expert analysis conducted for Oncor to determine feasibility of large-scale battery proposal for its transmission and distribution business).

104. Andrew Burger, *Oncor Launches Paradigm-Breaking Microgrid in Texas*, RENEWABLE ENERGY WORLD (Apr. 13, 2015), http://www.renewableenergyworld.com/articles/2015/04/oncor-launches-paradigm-breaking-microgrid-in-texas.html.

105. See Gavin Bade, *Whatever Happened to Oncor's Big Energy Storage Plans?*, UTILITY DIVE (Sept. 1, 2015), http://www.utilitydive.com/news/whatever-happened-to-oncors-big-energy-storage-plans/404949/ (reporting that Oncor, as a regulated transmission and distribution utility, cannot participate in energy generation markets under Texas law, and that Oncor's proposal to use the battery technology to enhance renewable energy storage is considered to be on the generation side of the line rather than the transmission and distribution side of the line); R.A. Dyer, *Commentary: Why the $5 Billion Battery Plan Went Nowhere*, FUELFIX (Oct. 8, 2015), http://fuelfix.com/blog/2015/10/08/commentary-why-the-5-billion-battery-plan-went-nowhere/ (reporting that Oncor failed to obtain changes in Texas statutory law to allow it to implement its battery proposal).

106. Cal. Energy Comm'n, *California's Energy Storage Roadmap*, CA.GOV, http://www.energy.ca.gov/research/energystorage/tour/roadmap/ (last visited June 7, 2017); Jeff St. John, *Texas Utility Oncor Wants to Invest $5.2 Billion in Storage: Can it Get Approval?*, GREENTECH MEDIA (Nov. 10, 2014), https://www.greentechmedia.com/articles/read/Texas-Utility-Oncor-Faces-Opposition-on-Its-5.2B-Bet-on-Distributed-Energy; Ken Kulak et al., *Renewable Energy and Storage*, MORGAN LEWIS (March 17, 2016) (PowerPoint presentation), https://www.morganlewis.com/events/~/media/4d8e599ba3a24d9b816b9530ff1ea4cc.ashx; Robert Mullin, *FERC OKs CAISO Energy Storage Rules*, RTO INSIDER (Aug. 22, 2016). *See also In re* Western Grid Development, LLC, 130 FERC ¶ 61,056 (2010) (finding that Western Grid's proposed energy storage device projects are wholesale transmission facilities).

107. St. John, *supra* note 106.

108. *In re Western Grid Development, LLC*, 130 FERC ¶ 61,056, at 14–15 (FERC finding that certain energy storage projects can constitute "transmission" assets and noting that "electricity storage devices, such as those that will be used in the Projects, do not readily fit into only one of the traditional asset functions of generation, transmission or distribution. Under certain circumstances, storage devices can resemble any of these functions or even load. For this reason, the Commission has addressed the

April 2016, FERC opened a proceeding to consider regulatory issues related to energy storage and to determine whether barriers exist at the RTO/ISO and/or state levels that are hindering the development of this important electricity resource.[109] Several months later, in November 2016, FERC issued a notice of proposed rulemaking that would require each RTO/ISO to revise its tariff to create new market rules to accommodate the participation of electric storage resources in wholesale electricity markets, including participation by distributed energy resource aggregators.[110] To the extent these efforts continue at the federal level, it may significantly accelerate and enhance the integration of energy storage resources into electric grid management.

Finally, since 2015, Tesla Motors has been selling two new forms of electric battery storage. The first, called the Powerwall, was designed for homeowners with PV rooftop solar panels.[111] The batteries were priced between $3,000 and $7,000 and use lithium-ion technology. Tesla also offered a larger Powerpack 100-kWh battery tower, designed for commercial and utility customers. The Powerpack gives utilities the option of not using grid power when it is most expensive, such as when air conditioning use is high in the summer or at other peak demand times during the day.[112] In 2016, Tesla unveiled its second-generation Powerwall 2, with greater energy density and a built-in power inverter.[113] The development of commercial products that can store electric energy on a widespread basis has the potential to reduce many of the grid reliability and variability issues associated with integrating greater percentages of renewable energy into the grid. Tesla's entry into the battery storage market has caused the public and

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classification of energy storage devices on a case-by-case basis.").

109. *See, e.g.*, William H. Holmes & Molly Suda, *FERC Staff Seeks Comments on Participation of Electric Storage Resources in Wholesale Electricity Markets*, K&L GATES: LEGAL INSIGHTS (Apr. 22, 2016), http://www.klgates.com/ferc-staff-seeks-comments-on-participation-of-electric-storage-resources-in-wholesale-electricity-markets-04-22-2016/.

110. *See* News Release, Fed. Energy Regulatory Comm'n, FERC Proposes to Integrate Electricity Storage into Organized Markets (Nov. 17, 2016), https://www.ferc.gov/media/news-releases/2016/2016-4/11-17-16-E-1.asp#.WC8lrbROKhA; Federal Energy Regulatory Comm'n, Notice of Proposed Rulemaking, Electric Storage Participation in Markets Operated by Regional Transmission Organizations and Independent System Operators, 157 FERC ¶ 61,121 (2016).

111. *See* David Ferris, *Tesla Makes Itself the Center of the Energy-Storage Universe*, ENERGYWIRE (May 6, 2015); Anne C. Mulkern, *Tesla Says it Will Double Capacity of Home Battery*, ENERGYWIRE (June 10, 2015).

112. Mulkern, *supra* note 111.

113. *See* Julian Spector, *Here's Everything New About Tesla's Updated Powerwall 2.0*, GREENTECH MEDIA (Nov. 7, 2016), https://www.greentechmedia.com/articles/read/what-really-matters-from-tesla-battery-powerwall-powerpack (reporting on second generation Powerwall and Powerpack batteries); Powerwall 2, TESLA, https://www.tesla.com/powerwall.

investors to pay closer attention to battery storage technology, which means the technology and markets are likely to grow at a much more rapid pace, particularly if the costs of the technology, which are currently extremely high, can be reduced.[114]

Advanced battery technology has significant implications for utility scale generation and distributed energy resources that power individual homes, businesses, and smaller communities apart from the larger transmission grid.[115] Indeed, these developments in battery technology provide the potential to retain power in localized areas during major storms and hurricanes, to help utilities even out power flow on a daily basis, and to allow consumers in parts of the country with extremely high electricity prices, like Hawaii, to partially or fully leave the grid.[116] Researchers are also exploring the use of natural gas turbines to act as a regular backup for renewable energy, thus using cost-effective, existing technologies to allow integration of large percentages of renewable energy into the grid.[117] And Commonwealth Edison, the dominant utility in Chicago and throughout the northern part of Illinois, has proposed ambitious microgrid projects that would bring together distributed energy, microgrids, smart meters, and energy efficiency programs to avoid power outages in times of severe weather, reduce electricity costs, and increase the use of renewable energy through solar PV, fuel cells, and energy storage.[118] However, questions remain over how long it will take these technologies to become an integral part of the electricity system, based on economics, technology scale-up, and

114. *See* Ferris, *supra* note 111; David Labrador, *How Much Does Storage Really Cost? Lazard Weighs In*, RMI OUTLET (Jan. 21, 2016), http://blog.rmi.org/blog_2016_01_21_how_much_does_storage_really_cost_lazard_weighs_in (discussing costs of battery storage).

115. Rebecca Kern, *Integrating New Distributed Energy Resources into Grid Continues to Challenge Regulators*, 88 DAILY ENVTL. REPORT, May 7, 2015, at A-1 (discussing need for utilities and state regulators to develop technologies and programs to modernize the grid as well as facilitate and integrate distributed energy models).

116. Anne C. Mulkern, *SolarCity Plans to Sell Hawaii on Off-Grid Solar Package Using Tesla Battery*, CLIMATEWIRE (May 6, 2015), http://www.eenews.net/climatewire/stories/1060018058 (reporting on potential uses of commercial-scale batteries).

117. *See* Irfan, *supra* note 100.

118. Daniel Cusick, *Historic Chicago Neighborhood Points Way to Energy's Future*, CLIMATEWIRE (June 6, 2016), http://www.eenews.net/climatewire/2016/06/06/stories/1060038298. *See also* LINCOLN L. DAVIES ET AL., ENERGY LAW AND POLICY 705–20 (2015) (describing U.S. smart grid developments); U.S. DEPT. OF ENERGY, TRANSFORMING THE NATION'S ELECTRICITY SYSTEM: THE SECOND INSTALLMENT OF THE QUADRENNIAL ENERGY REVIEW, SUMMARY FOR POLICYMAKERS S-4, S-6 (Jan. 2017), https://energy.gov/sites/prod/files/2017/01/f34/Transforming%20the%20Nation%E2%80%99s%20Electricity%20System--Summary%20for%20Policymakers.pdf (defining the "smart grid" and explaining its importance for increasing grid reliability, lowering electricity costs, and increasing energy efficiency).

state and federal energy storage policies.[119] These advances—from incremental improvements in renewable energy to breakthrough technologies—will allow wind and solar to penetrate electricity markets at higher rates and demand energy transport infrastructure to accommodate this growth.

Despite this potential for significant change, as discussed in more detail in Part II, state laws often limit the ability of both utilities and merchant transmission companies to make necessary expansions to the grid to address reliability and to increase the ability to use renewable energy to generate electricity.[120] Unlike interstate natural gas pipelines that apply for and receive approval and eminent domain authority from a single federal agency—FERC—transmission line operators must obtain siting approval and eminent domain authority from each state in the path of the line. Many states do not even allow merchant transmission companies to seek a certificate of need to build a transmission line, instead limiting that right to incumbent, in-state public utilities.[121] Moreover, transmission lines are controversial for their perceived land use and aesthetic impacts, and many state public utility commissions question the local "need" for the line, particularly if the line only passes through the state and does not deliver electricity from or to the state.[122] Part II explores these regulatory challenges in more detail as well as their implications for developing sustainable and adaptive infrastructure for future energy needs.

II. EVALUATING EXISTING ENERGY TRANSPORT SITING LAWS

This Part analyzes a select group of federal and state laws that regulate the siting of energy transport infrastructure in order to evaluate the aspects of these laws that most facilitate or impede the development of energy transport infrastructure that can meet present energy needs as well as remain

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119. *See, e.g.*, John Fialka, *Will the World's Largest Storage Battery Be America's Energy Cure?*, CLIMATEWIRE (July 7, 2016), http://www.eenews.net/stories/1060039876.

120. *See, e.g.*, BIPARTISAN POLICY CTR., CAPITALIZING ON THE EVOLVING POWER SECTOR: POLICIES FOR A MODERN AND RELIABLE U.S. ELECTRIC GRID 28–33 (2013); MIT, THE FUTURE OF THE ELECTRIC GRID (2011).

121. For a survey of states that do and do not allow merchant transmission lines companies to seeking siting certificates and exercise eminent domain for electric transmission lines see Klass, *supra* note 96, at 1079, 1123–26, app. A.

122. *See* Alexandra B. Klass & Jim Rossi, *Revitalizing Dormant Commerce Clause Review for Interstate Coordination*, 100 MINN. L. REV. 129, 181–84 (2015) (discussing examples in Arizona and Missouri where state regulators refused to issue a siting certificate for an interstate transmission line because of lack of in-state "need" for the line and a perception that the benefits of the line would go solely to neighboring states).

relevant in an uncertain future. As stated at the outset, this Article assumes that part of this future should include a goal of transitioning to a cleaner and more sustainable energy future.

As mentioned earlier, there are significant differences in the regulatory approval regimes for interstate oil pipelines, interstate natural gas pipelines, and interstate electric transmission lines.[123] Interstate oil pipelines and interstate electric transmission lines require siting approval and eminent domain authority from each affected state.[124] By contrast, interstate natural gas pipelines need not obtain state siting approval or eminent domain authority from affected states but instead can obtain a single approval from FERC.[125] Since 2005, the same federal process applies to liquefied natural gas import and export terminals.[126] This Part considers the federal laws governing the siting and eminent domain for interstate natural gas pipelines and LNG terminals and state laws governing siting and eminent domain for interstate electric transmission lines. In its evaluation of these laws, this Part is able to consider the benefits and drawbacks of federal regulation versus state regulation of energy transport infrastructure as well as laws that govern different types of energy resources.

An evaluation of these laws allows at least three conclusions. First, it is easier to mount successful opposition to interstate energy transport infrastructure projects when local and state laws govern than when federal law governs. Second, laws that focus on state and local energy needs and benefits as opposed to regional or national needs and benefits are not well suited to building interstate energy transport networks. Third, creating laws that do not lock in assumptions regarding the location, amount, and type of energy resources for transport allow needed flexibility in the energy transport system.

A. *Federal Siting Authority for Interstate Natural Gas Pipelines and LNG Import/Export Terminal*

Unlike the siting process for interstate oil pipelines and interstate electric transmission lines, one federal agency—FERC—controls the siting and approval process for both interstate natural gas pipelines and LNG terminals required to import or export LNG across oceans. Federal control over the siting of interstate natural gas pipelines dates back to the Natural Gas Act

123. *See supra* notes 32–34, 60–62, 121–122 and accompanying text.
124. *See supra* notes 32–34, 121–122 and accompanying text.
125. *See supra* notes 60–62 and accompanying text.
126. *See infra* Part II.A.2.

of 1938, when Congress first gave the Federal Power Commission (now FERC) authority to regulate sales and transportation of natural gas in interstate commerce, and the facilities used for such sales and transportation.[127] Amendments to the Natural Gas Act in 1947 authorized FERC to grant nationwide eminent domain authority to pipelines receiving a certificate of public convenience and necessity, which allowed pipelines to overcome state opposition to natural gas transport infrastructure that had led to gas shortages on the East Coast and consequential industry shutdowns in the 1940s.[128] Today, Section 7 of the Natural Gas Act provides a process whereby the pipeline operator can seek a certificate of public convenience and necessity from FERC to build an interstate natural gas pipeline after a review of the economic and environmental impacts of the pipeline.[129]

In contrast to the established federal process for siting and approving interstate natural gas pipelines that has existed since the 1940s, the division of authority between the federal government and the states over the siting of LNG terminals remained ambiguous until Congress created express federal authority and preempted state authority in the Energy Policy Act of 2005.[130] As shown below, this transfer of siting authority to FERC allowed industry to change course quite rapidly on the infrastructure needed to respond to market forces in the natural gas sector both when shortages were anticipated in the late 2000s and, more recently, in response to industry demands to export newly available shale gas resources. The remainder of this Section discusses the LNG import and export process, the conflicts between the states and the federal government over authority to site LNG terminals, the amendments to the Natural Gas Act created by the Energy Policy Act of 2005 granting FERC exclusive federal authority over siting LNG terminals, and the implications of that change for U.S. natural gas transportation.

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127. *See, e.g.*, 15 U.S.C. § 717c (2012) (providing federal authority over natural gas rates and charges); 15 U.S.C. §§ 717f(c)–(h) (providing federal authority over natural gas facilities); Minisink Residents for Envtl. Pres. & Safety v. F.E.R.C., 762 F.3d 97, 101–02 (D.C. Cir. 2014) (describing federal process for siting and approving interstate natural gas pipelines under the Natural Gas Act); Klass, *supra* note 51, at 1906–07 (describing federal siting process for interstate natural gas pipelines and events contributing to Congress's decision to transfer authority over interstate natural gas pipeline siting from the states to the federal government).

128. *See* Klass, *supra* note 51, at 1906–07 (describing landowner and state opposition to interstate natural gas pipelines in the 1940s and subsequent amendments to the Natural Gas Act in 1947 to create federal eminent domain authority for such pipelines).

129. 15 U.S.C. §§ 717f(c)–(h) (providing federal authority over natural gas facilities); *Minisink*, 762 F.3d at 101–02 (describing federal process for siting and approving interstate natural gas pipelines under the Natural Gas Act).

130. *See* 15 U.S.C. § 717b.

1. The LNG Import and Export Process

LNG is natural gas that has been cooled to at or below -260º F.[131] At this temperature, LNG changes from a gas to a clear, colorless, odorless liquid, and its volume is reduced by a factor of 600 to 1.[132] Because its liquid state occupies a substantially smaller volume of space than its gaseous form, it can be stored and transported more efficiently than natural gas. When it is warmed, LNG "regasifies" and is suitable for transportation in pipelines and is usable in the same manner as conventional natural gas.[133] There are two types of LNG terminals. The first type, which converts natural gas into LNG, is an export facility, typically called a "liquefaction terminal." The second type, which handles imports and converts LNG back into natural gas, is called a "regasification terminal."[134] At the LNG export facility, natural gas is liquefied, processed, and pumped into tankers designed specifically to store and transport LNG over long distances.[135] Once an LNG tanker arrives at an import facility, the LNG within it is pumped into an insulated storage tank and, ultimately, regasified for shipment via pipelines or tanker trucks for delivery to customers.[136]

In January 1959, the world's first LNG tanker, The Methane Pioneer, a converted World War II liberty freighter, carried an LNG cargo from Lake Charles, Louisiana to Canvey Island, United Kingdom.[137] Between 1971 and 1980, four import terminals and one export terminal (in Alaska) were built in the United States.[138] When the four import terminals opened in the 1970s, they began importing new quantities of LNG, but imports quickly declined by the early 1980s, when market conditions caused LNG prices to greatly exceed lower priced domestic natural gas.[139] However, the rapid

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131. FED. ENERGY REGULATORY COMM'N, A GUIDE TO LNG: WHAT ALL CITIZENS SHOULD KNOW 1 (2005); *see also* Rachel Clingman & Audrey Cumming, *The 2005 Energy Policy Act: Analysis of the Jurisdictional Basis for Federal Siting of LNG Facilities,* 2 TEX. J. OIL, GAS, & ENERGY L. 57, 60 (2006).

132. *See* FED. ENERGY REGULATORY COMM'N, *supra* note 131.

133. PAUL W. PARFOMAK & AARON M. FLYNN, CONG. RESEARCH SERV., RL32205, LIQUEFIED NATURAL GAS (LNG) IMPORT TERMINALS: SITING, SAFETY AND REGULATION 2 (2004).

134. Hobart King, *What is LNG—Liquefied Natural Gas?*, GEOLOGY.COM, http://geology.com/articles/lng-liquefied-natural-gas/ (last visited June 7, 2017).

135. MICHELLE MICHOT FOSS, CTR. FOR ENERGY ECON., INTRODUCTION TO LNG 17–20 (2012); *see also* Clingman & Cumming, *supra* note 131, at 61.

136. FOSS, *supra* note 135, at 20–21.

137. *Id*. at 11.

138. KEVIN LANDFRIED ET AL., LNG INDUSTRY, BRIDGING THE GAP, 1 (2005).

139. *See* Monica Berry, *Liquefied Natural Gas Import Terminals: Jurisdiction Over Siting, Construction, and Operation in the Context of Commerce Clause Jurisprudence*, 26 ENERGY L.J. 135, 137 (2005); Phillip R. Weems & Harry W. Sullivan, Jr., *LNG at 50—History and Projected Future for Liquefied Natural Gas Exports in an Unconventional Era*, 60 ROCKY MTN. L. INST. 6-1, 6-17–6-18 (2014) (discussing history of United States' failed attempt at meaningful LNG imports in the 1970s as a

increase in domestic natural gas prices between 2000 and 2005, and heightened demand based on natural gas's environmental benefits over coal created a second and more powerful push for LNG imports by 2005.[140]

2. *Federalism Conflicts and the LNG Siting Provisions of the Energy Policy Act of 2005*

As noted above, the Natural Gas Act governs the regulation, transportation, import, and export of natural gas. DOE approves the import and export of natural gas through its Office of Fossil Energy, and the Natural Gas Act grants FERC authority to approve any LNG terminal used to import or export natural gas.[141] If the United States has a Free Trade Agreement ("FTA") with a foreign nation for natural gas, the application for import or export is automatically deemed consistent with the "public interest," and DOE must grant it without delay.[142] Exports to non-FTA nations are presumed to be in the public interest unless, after opportunity for a hearing, the DOE finds that the authorization would not be consistent with the public interest.[143]

Under Section 3(e) of the Natural Gas Act, FERC has "exclusive authority to approve or deny an application for the siting, construction, expansion, or operation of an LNG terminal."[144] This section of the Natural Gas Act was added as part of the Energy Policy Act of 2005, as Congress attempted to clarify disputes between FERC and the states over the authority for LNG terminal siting.[145] FERC regulations implementing Section 3(e)

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result of pricing policies).

140. *See supra* notes 48–50 (discussing increase in U.S. natural gas prices in the early 2000s); Jacob Dweck et al., *Liquefied Natural Gas (LNG) Litigation After the Energy Policy Act of 2005: State Powers in LNG Terminal Siting*, 27 ENERGY L.J. 473, 473 (2006).

141. *See, e.g., In re* Sabine Pass Liquefaction, DOE/FE Order 3669 (June 26, 2015), http://op.bna.com/der.nsf/id/rken-9xunpc/$File/Sabine_Pass.pdf (order granting approval of LNG exports and explaining in detail the DOE and FERC approval processes).

142. 15 U.S.C. § 717b(c) (2012). DOE regulations implementing the natural gas import and export provisions of the Natural Gas Act are at 10 C.F.R. § 590 (2012). Free Trade Agreement countries for natural gas are Australia, Bahrain, Canada, Chile, Dominican Republic, El Salvador, Guatemala, Honduras, Jordan, Mexico, Morocco, Nicaragua, Oman, Peru, Singapore, and South Korea. *See How to Obtain Authorization to Import and/or Export Natural Gas and LNG*, U.S. DEPT. OF ENERGY, http://energy.gov/fe/services/natural-gas-regulation/how-obtain-authorization-import-andor-export-natural-gas-and-lng#LNG. Not all of these countries have LNG import terminals or import significant amounts of natural gas. *See* INT'L GAS UNION, WORLD LNG REPORT – 2014 EDITION (2014).

143. 15 U.S.C. § 717b(a).

144. 15 U.S.C. § 717b(e)(1).

145. *See infra* notes 148–158 and accompanying text. *See also* 15 U.S.C. § 717a(11) (defining LNG terminal and limiting Natural Gas Act siting authority for LNG terminals to facilities located "onshore

require the applicant to include in its application a statement demonstrating that the proposal "is not inconsistent with the public interest" and, if possible, demonstrate that the proposal will "improve access to supplies of natural gas, serve new market demand, enhance the reliability, security, and/or flexibility of the applicant's pipeline system, improve the dependability of international energy trade, or enhance competition within the United States for natural gas transportation or supply."[146] The applicant should also demonstrate that the new terminal will not impair the applicant's ability to render transportation service in the U.S. to existing customers or that the facility will not restrict or prevent other U.S. companies from extending their activities in the same general area.[147]

Prior to the Energy Policy Act of 2005, however, neither the Natural Gas Act nor any other federal law provided express authority for FERC to approve LNG terminals.[148] But during the 1970s, when U.S. construction of LNG terminals began, FERC, with approval of the courts began to rely on Sections 3 and 7 of the NGA to assert authority over such terminals.[149] No one challenged FERC's jurisdiction over LNG terminals until over three decades later.[150] In October 2003, Sound Energy Solutions ("SES") was preparing to file an application with FERC under Section 3 of the Natural Gas Act for the construction of an LNG import terminal in Long Beach, California, when the California Public Utilities Commission ("CPUC") informed SES of its intent to exercise jurisdiction over the project.[151] The CPUC argued that since the gas to be imported would only be distributed intrastate, FERC did not have authority to regulate the terminal's construction.[152] In January 2004, SES ignored the CPUC's demand for an

or in State waters."). LNG facilities located beyond state waters are licensed under the Deepwater Port Act, which requires the applicant to obtain a license from the United States Maritime Administration ("MARAD") within the U.S. Department of Transportation, in conjunction with the U.S. Coast Guard, and also obtain approval from the governor or governors of the adjacent states. *See* 33 U.S.C. §§ 1501, *et seq*. (2012); Memorandum from Michael Ratner, Specialist in Energy Policy et al., to Senate Energy and Natural Res. Comm. 3–5 (June 30, 2013), http://www.energy.senate.gov/public/index.cfm/files/serve?File_id=fb60c4c3-bff2-4fd5-b669-bf0049c4689b (explaining onshore and offshore LNG permitting processes); Hannah Northey, *Cuomo Rejects Offshore LNG Terminal*, E&E NEWS PM (Nov. 12, 2015), http://www.eenews.net/pm/2015/11/12 (reporting that Governor Cuomo of New York vetoed Liberty Natural Gas LLC's proposal to build and operate a $300 million offshore LNG import facility and that Governor Christie of New Jersey planned to veto the project as well).

146. 18 C.F.R. § 153.7(c)(1) (2012).

147. *Id.*

148. *See* Natural Gas Act, 15 U.S.C. §§ 717-17w (2000).

149. *See* Dweck et al., *supra* note 140, at 477.

150. Notice of Intervention and Protest of the Public Utilities Commission of the State of California, *Sound Energy Solutions*, 106 FERC ¶ 61,279 (2004) (No. CP04-58-000) [hereinafter CPUC Protest].

151. *Id.* at 3.

152. *Id.*

application for construction of the facility, and filed its application solely with FERC.[153] CPUC protested the application with FERC, and FERC issued a declaratory order claiming exclusive jurisdiction over the project and encouraged state and local agencies to cooperate with it.[154]

After FERC denied the CPUC's request for a hearing, CPUC petitioned the U.S. Court of Appeals for the Ninth Circuit to settle the jurisdictional dispute between itself and FERC.[155] At the same time the case was pending, other local and state opposition threatened to delay LNG projects across the country, raising concerns over potential gas shortages and high prices.[156] FERC thus sought action from Congress to confirm FERC's exclusive authority over the siting of LNG terminals in order to prevent delays in the siting process.[157] Before the Ninth Circuit issued a ruling in the case, and despite opposition from the states, President Bush signed the Energy Policy Act of 2005, which included provisions granting FERC exclusive jurisdiction over LNG terminal siting and preempting state and local authority, into law on August 8, 2005.[158]

The Congressional hearings reveal that there were many reasons for the strong state opposition to vesting exclusive siting authority over LNG

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153. Declaratory Order Asserting Exclusive Jurisdiction, *Sound Energy Solutions,* 106 FERC ¶ 61,279 (2004) (No. CP04-58-000); *see also* CPUC Protest, *supra* note 150, at 3.

154. 106 FERC ¶ 61,279; Order Denying Reh'g, Denying Stay, and Clarifying Prior Order, 107 FERC ¶ 61,263 (2004); Order on Clarification, 108 FERC ¶ 61,155 (2004); *In re* Sound Energy Solutions, 2005 WL 4052298 (Cal. P.U.C. Nov. 18, 2005) (finding the Energy Policy Act of 2005 mooted the Commission's appeal).

155. *See In re Sound Energy Solutions*, 2005 WL 4052298 (discussing litigation).

156. *Natural Gas: Symposium Before the S. Comm. on Energy and Natural Resources*, 109th Cong. 2 (2005) [hereinafter Senate Symposium] (statement of Sen. Domenici) (discussing decreasing natural gas supplies, increasing demand, and increased costs to consumers); Eben Kaplan, *Liquefied Natural Gas: A Potential Terrorist Target?*, COUNCIL ON FOREIGN RELATIONS (Feb. 27, 2006), www.cfr.org/natural-gas/liquefied-natural-gas-potential-terrorist-target/p9810 (discussing local opposition to LNG terminals); Eileen Gauna, *LNG Facility Siting and Environmental (In)Justice: Is It Time for a National Siting Scheme?*, 2 ENVTL. & ENERGY L. & POL'Y J. 85, 101–06 (2007) (discussing local opposition to LNG terminals in the mid-2000s on grounds ranging from environmental harm, terrorist attacks, and explosions, resulting in "a NIMBY phenomenon on a national scale"); James B. Lebeck, Note, *Liquefied Natural Gas Terminals, Community Decisionmaking, and the 2005 Energy Policy Act*, 85 TEX. L. REV. 243, 243–44 (2006) (discussing local concerns over environmental and other risks associated with LNG terminals and the fact that the benefits of such terminals, other than local jobs, are more diffuse).

157. *See* Energy Policy Act of 2005, Pub. L. No. 109-58, 119 Stat. 594; *Ensuring Jobs for Our Future with Secure and Reliable Energy: Hearing Before the Subcomm. on Energy and Air Quality of the H. Comm. on Energy and Commerce*, 109th Cong. (2005) (summary of testimony of Cynthia A. Marlette, General Counsel, Federal Energy Regulatory Commission) (requesting provisions in the Energy Policy Act of 2005 to confirm exclusive FERC authority).

158. Energy Policy Act of 2005 §§ 311, 313. *See also* Dweck, et al., *supra* note 140, at 479–81 (discussing litigation and enactment of LNG terminal siting provisions of the Energy Policy Act of 2005).

terminals with FERC. California officials were concerned that exclusive federal jurisdiction over LNG terminals would take away the "meaningful role" that the state should be able to play "in determining the appropriate location of any gas terminal within the state's boundaries."[159] The Chair of the California Coastal Commission contended that the provisions were "directly contrary to California's strong interest in safeguarding its precious coastal resources from offshore oil and gas drilling-related activities."[160] Other members of Congress raised the fact that the bill "directly undermines the ability of State and local officials to ensure that any new LNG facility is not sited in an area where it could pose a danger to the surrounding community."[161]

However, there were also strong supporters for granting FERC exclusive jurisdiction over LNG terminals. David Garman representing the DOE testified before a House of Representatives Committee regarding the increasing need for LNG and the need for timely siting of terminals:

> Given the situation we face, we need more LNG both in the Northeast and around the Nation. And, it is critical that necessary LNG import facilities receive appropriate permits and approvals in a timely and orderly manner. We believe a uniform national policy and Federal regulation of LNG import and related facilities best serves this goal.[162]

The Senate Committee on Energy and Natural Resources heard testimony regarding imminent shortages of natural gas in the United States. The EIA had reported that natural gas imports were expected to rise from 6 million cubic feet of LNG to 6.4 trillion cubic feet by 2025 due to expected domestic natural gas shortages, and that natural gas imports would rise from 15% of total consumption in 2005 to 25% by 2025.[163] But the bulk of the hearing focused on the difficulty of constructing LNG infrastructure to meet

159. 151 CONG. REC. H2188 (daily ed. Apr. 20, 2005) (statement of Cruz M. Bustamante, Lieutenant Governor, California). Members of the House Committee on Energy and Commerce and the House Committee on Resources also expressed concern that states would have to seek FERC permission before conducting safety inspections and would be barred from taking independent enforcement actions against LNG terminal operators if safety violations occurred. *Id.* at H2186 (statements of Reps. Eshoo, Waxman, Capps, Napolitano, Miller, and Solis).

160. *Id.* at H2188 (statement of Meg Caldwell, Chair, California Coastal Commission).

161. *Id.* at H2181 (statement of Rep. Jim McGovern).

162. *LNG Import Terminal and Deepwater Port Siting: Federal and State Roles: Hearing before the Subcomm. on Energy Policy of the H. Comm. on Gov't Reform*, 108th Cong. 26–27 (2004) (statement of David Garman, Acting Under Secretary, U.S. Department of Energy).

163. Senate Symposium, *supra* note 156, at 2.

expected natural gas import needs. Mark Robinson, Director of the Office of Energy Projects for FERC, testified:

> There is the potential for the public to get to a point on infrastructure where they want you to be able to answer . . . that there is no risk associated with whatever infrastructure it is that you may have to have to accommodate our economy. I cannot do that and I do not think anyone can.[164]

With regard to the siting of natural gas facilities, an industry representative testified that "[w]e do not have the luxury of choosing to just say no to new pipelines or to new natural gas development or to LNG terminals" and thus Congress should create "adult supervision" by affirming FERC's exclusive siting authority for LNG terminals.[165] Mr. Robinson from FERC also testified that "we need help with siting basically because it is not good enough to site infrastructure where people want it, where people can accept it."[166] He urged that Congress create, among other things, "clear jurisdiction for a lead agency" and development of a single federal record.[167]

Ultimately, Congress sided with supporters of the federal LNG siting provisions and included federal siting provisions in the Energy Policy Act of 2005.[168] Although Congress granted FERC exclusive authority over the siting of LNG terminals, it placed that authority in Section 3, not Section 7 (governing approvals of natural gas pipelines), which meant that it did not convey federal eminent domain authority in connection with constructing LNG terminals, even though FERC has requested such authority.[169] In addition to granting FERC exclusive federal jurisdiction over LNG terminals, the Energy Policy Act of 2005 clarified the state's role in FERC's safety and environmental review of onshore LNG terminal applications and reserved certain rights to states.[170] Section 3(d) of the Natural Gas Act

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164. *Id.* at 28.

165. *Id.* at 39–40 (statement of Keith Rattie, Chairman, CEO, and President, Questar Corporation).

166. *Id.* at 40.

167. *Id.*

168. 15 U.S.C. § 717b (2012).

169. *See* Order Granting Authority Under Section 3 of the Natural Gas Act and Issuing Certificates, *In re* Broadwater Energy LLC, 122 FERC ¶ 61,255, at 10 (2008), *vacated*, 140 FERC ¶ 61,009 (2012) (discussing differences between FERC authority under Sections 3 and 7 of the Natural Gas Act). Arguably, eminent domain authority is less necessary for LNG facilities than for interstate natural gas pipelines because there are far fewer "assembly problems" with an LNG facility than for an interstate natural gas pipeline that must cross hundreds of parcels of land and multiple states.

170. 15 U.S.C. § 717b(d); *see also* Christopher M. Crane, *State Authority in Siting of Liquefied Natural Gas Import Terminals,* 14 BUFF. ENVTL. L.J. 1, 31–33 (2006).

expressly reserves for states those powers Congress has delegated to them under other statutes to review and regulate certain projects, such the Clean Air Act ("CAA"), the Clean Water Act ("CWA"), and the Coastal Zone Management Act ("CZMA").[171] Additionally, the new LNG siting provisions require FERC to implement a "pre-filing" procedure for LNG terminal applications under the National Environmental Policy Act to encourage applicant cooperation with state and local officials.[172] The Governor of a State in which an LNG terminal is proposed must designate an agency to consult with FERC on state and local safety considerations during application review.[173] The state agency may provide an advisory report to FERC on safety issues, to which FERC must respond.[174] Finally, states may conduct safety inspections of operating LNG terminals to evaluate facility conformance with federal regulations.[175]

With the pressure to build new interstate natural gas pipelines and LNG export terminals since the hydraulic fracturing boom in the late 2000s, states have begun to be more active in using their federally delegated authority under the CZMA and the CWA to block infrastructure projects. For instance, in 2009, in *AES Sparrows Point LNG, LLC v. Wilson*, the U.S. Court of Appeals for the Fourth Circuit upheld Maryland's denial of CWA Section 401 water quality certification for a proposed LNG export facility adjacent to Baltimore Harbor based on adverse impacts on the state's water quality.[176] Environmental groups have also challenged the approval or expansion of LNG terminals in recent years but none of those challenges have succeeded to date. For instance, the Sierra Club has challenged multiple LNG terminals including the Dominion Cove Point LNG terminal in Maryland, the Freeport LNG terminal in Texas, and the Sabine Pass and Cameron LNG terminals in Louisiana.[177] The Sierra Club has argued that

171. 15 U.S.C. § 717b(d) ("nothing in this chapter affects the rights of States" under the CWA, CAA, or CZMA). *See also* Dweck et al., *supra* note 140, at 481. The first major U.S. law to address water pollution was the Federal Water Pollution Control Act of 1948. Congress enacted significant amendments to the law in 1972 and, as amended, the law is commonly known as the "Clean Water Act." *See History of the Clean Water Act*, U.S. EPA, https://www.epa.gov/laws-regulations/history-clean-water-act.

172. *See* 15 U.S.C. § 717b-1(a); Pre-filing Procedures and Review Process for LNG Terminal Facilities and Other Natural Gas Facilities Prior to Filing of Applications, 18 C.F.R. § 157.21.

173. 15 U.S.C. § 717b-1(b).

174. 15 U.S.C. § 717b-1(c).

175. 15 U.S.C. § 717b-1(d).

176. 589 F.3d 721, 723, 730–31 (4th Cir. 2009).

177. *See, e.g.*, *In re* Sabine Pass Liquefaction, LLC, 139 FERC ¶ 61,039 (2012) (FERC order granting authorization to construct LNG export facility); *In re* Sabine Pass Liquefaction Expansion, LLC, 151 FERC ¶ 61,253 (2015) (order denying Sierra Club's request for rehearing on order approving LNG export facility expansion); *Stop LNG Exports*, SIERRA CLUB, http://content.sierraclub.org/

expansion of LNG exports will increase hydraulic fracturing of U.S. shale formations and cause adverse environmental impacts, including air pollution, water pollution, and climate change impacts.[178]

3. *The Shift from U.S. Natural Gas Imports to U.S. Natural Gas Exports*

After 2005, FERC approved multiple new LNG import terminals—five new terminals in the latter half of the 2000s and others that were re-commissioned or expanded during that time period, bringing the total number to eleven.[179] But after the late 2000s, the development of hydraulic fracturing and directional drilling technologies completely changed the U.S. natural gas landscape. Thus, many of these import terminals have since applied to convert to export facilities to align with the new influx of domestic natural gas.[180] Additionally, between the end of 2012 and early 2014 FERC approved five new LNG export terminals in response to producer requests and issued additional approvals in 2014 and 2015.[181] As of January 2016, FERC had received forty-eight applications for permits either to construct export facilities at existing LNG import terminals or for new LNG export terminals.[182] Eight of these liquefaction projects would

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naturalgas/stop-lng-exports (discussing Sierra Club's continued opposition to every proposed new LNG facility in the United States because of the adverse environmental effects of natural gas development on air, water, and climate); *Sierra Club Continues Fight Against LNG Exports: Files Protest Against Golden Pass LNG Export Project*, SUTHERLAND LNG (Aug. 12, 2014), http://www.lnglawblog.com/2014/08/sierra-club-continues-fight-against-lng-exports-files-protest-against-golden-pass-lng-export-project (same).

178. Mark Westlund, *Groups Appeal Federal Approval of Cove Point LNG Export Facility*, SIERRA CLUB (May 7, 2015), http://content.sierraclub.org/press-releases/2015/05/groups-appeal-federal-approval-cove-point-lng-export-facility; *In re Sabine Pass Liquefaction Expansion LLC*, 151 FERC ¶ 61,253.

179. QER, *supra* note 4, app. B, at 23 & tbl. B-6; RATNER ET AL., *supra* note 49, at 7–10.

180. RATNER ET AL., *supra* note 49, at 3, 7.

181. *Energy Department Conditionally Authorizes Cameron LNG to Export Liquefied Natural Gas*, U.S. DEPT. OF ENERGY (Feb. 11, 2014), http://energy.gov/articles/energy-department-conditionally-authorizes-cameron-lng-export-liquefied-natural-gas. *See also* Klass & Meinhardt, *supra* note 30, at 1001–02 (discussing LNG projects); RATNER ET AL., *supra* note 49, at 7; Office of Energy Projects, *supra* note 64; *EIA: LNG Export Terminals Under Construction, More Planned*, OILONLINE PRESS (Apr. 17, 2015), https://www.oilonline.com/news/midstream/eia-lng-export-terminals-under-construction-more-planned; EIA, NATURAL GAS IMPORTS & EXPORTS 2014 (May 11, 2015), http://www.eia.gov/naturalgas/importsexports/annual (discussing status of FERC approvals of LNG export terminals); Jonathan N. Crawford, *Lake Charles LNG Export Facility Gets Approval of Federal Regulator*, 243 BNA DAILY ENVTL. REPORT, Dec. 18, 2015, at A-12 (reporting on FERC approval of Energy Transfer Equity LP's Lake Charles LNG Export Facility).

182. *See* RATNER ET AL., *supra* note 49, at 3. *See also* North American LNG Export Terminals Proposed, FERC (Jan. 6, 2016), https://www.ferc.gov/industries/gas/indus-act/lng/lng-proposed-export.pdf.

adapt an existing LNG import terminal to be used for export at a cost of $6-10 billion per terminal while the remaining applications were to construct new export terminals at a cost of $20 billion each.[183]

4. *Implications of federal siting authority for natural gas transport expansion*

The availability of a streamlined, federal siting process for interstate natural gas pipelines and LNG terminals has significant implications for the ability to expand natural gas transport infrastructure. As noted earlier, in response to electric utilities' increased reliance on natural gas in the electricity sector since the late 2000s, the industry has been able to make major expansions to the natural gas pipeline system in a relatively short period of time.[184] Reports show that after the widespread adoption of hydraulic fracturing technologies in the late 2000s, FERC-regulated gas transmission capacity increased quickly.[185] In testimony before Congress in 2013, a FERC commissioner testified that the nation's system for expanding pipeline capacity has "worked well" and that over the past decade "FERC has issued permits for construction of nearly 10,000 miles of new pipeline."[186] Although members of Congress have introduced bills to further expedite the siting process for natural gas pipelines,[187] industry has been able to expand interstate natural gas infrastructure quite rapidly to respond to increased production under existing law. Since the amendments to the Natural Gas Act in the Energy Policy Act of 2005, the same federal process now exists for LNG terminals. This process, coupled with an improved investment climate created by Congress and FERC authorizing LNG terminals to enter into long-term contracts with users,[188] has allowed

183. *See* RATNER ET AL., *supra* note 49, at 7.

184. *See* PARFOMAK, *supra* note 68, at 8 & fig. 2.

185. INTERSTATE NATURAL GAS ASS'N OF AM. FOUND., NORTH AMERICAN NATURAL GAS MIDSTREAM INFRASTRUCTURE THROUGH 2035: A SECURE ENERGY FUTURE 8–9 (2011); PARFOMAK, *supra* note 68, at 8–9.

186. *See* PARFOMAK, *supra* note 68, at 9.

187. *See Id.* at 7–12 (discussing legislative proposals).

188. A provision of Energy Policy Act of 2005 prohibited FERC from requiring LNG terminal applicants to operate on an open-access basis, thus allowing long-term contracts with users. *See* 15 U.S.C. § 171b(e)(3)(B)(ii) (2012). Although this legislative prohibition expired in 2015, FERC had already begun to exempt LNG terminals from common carrier obligations on a case-by-case basis as early as 2002 on grounds that it would be in the public interest. *See* Hackberry LNG Terminal LLC, 101 FERC ¶ 61,294 (2002); Cameron LNG, formerly d/b/a/ Hackberry Terminal LNG, 104 FERC ¶ 61,269 (2003); *See also* David B. Spence, *Naïve Energy Markets*, 92 NOTRE DAME L. REV. 973 (2017) (discussing improved investment climate for LNG terminals as a result of this policy change).

industry to change course quite rapidly on the infrastructure needed to respond to new market forces in the natural gas sector.

This is not to say that the industry is completely satisfied with the current process. There have been calls for DOE and FERC to streamline their processes and particularly for DOE to expedite approval of LNG exports to non-FTA nations.[189] And increasing opposition to all forms of energy transport infrastructure for fossil fuels by environmental groups, local residents, and some states has led to increasing scrutiny of natural gas pipelines and LNG terminals and calls for increased environmental review by FERC.[190] Likewise, environmental groups and landowners are not satisfied with the existing process because it allows fossil fuel infrastructure to expand much more quickly than if a state siting and eminent domain process were available to more fully take into account local environmental and land use concerns. However, this latter critique simply highlights the fact that because a single, federal regulator—FERC—has authority to approve projects, it is less likely that a groundswell of sentiment focused on the local costs of a project can easily derail it. This is why many state and environmental interests opposed FERC's exclusive siting authority over LNG terminals in the 2005 Energy Policy Act,[191] and have since had only limited success opposing projects even if they may be able to slow them down in some circumstances.[192]

For both natural gas pipelines and LNG terminals, it is unlikely the industry could have expanded the interstate natural gas transport infrastructure so quickly and so extensively if it required state approvals for every state through which a proposed pipeline passed or additional state approvals for LNG terminals. For pipelines, that would require multiple approvals using multiple standards for "need" and review of economic and environmental impacts. For both pipelines and LNG terminals, a state forum

189. *See* RATNER ET AL., *supra* note 49, at 22–25 (discussing positions of various interest groups on expediting export decisions); Brenna Lee Wolcott, Note & Comment, *Out With the Old and In With the New: Modernizing Liquefied Gas Regulations*, 26 COLO. NAT. RESOURCES, ENERGY & ENVTL. L. REV. 139, 142 (2015) (arguing that DOE approval of exports to non-FTA nations has been "devastatingly slow" and that the process needs to be reformed).

190. *See, e.g.*, Hannah Northey, *Developers Face "New Reality" of Protests, Longer Reviews*, GREENWIRE (June 3, 2016), http://www.eenews.net/stories/1060038277 (discussing reports by the pipeline industry that "[t]he amount of time it takes companies to get a new gas project approved and operational—from the proposal phase to steel in the ground—has grown from three years to four" and that the delays are the result of both more projects being proposed and increased opposition to fossil fuel infrastructure).

191. *See supra* notes 159–161 and accompanying text.

192. *See supra* notes 177–178 and accompanying text.

for approval would allow affected landowners, nonprofit groups, and others much easier access to decision-makers to oppose these projects, many of which have potential adverse environmental, land use, and aesthetic impacts. Moreover, in state proceedings, the focus as a result of politics as well as state jurisdictional concerns would be on the local need for natural gas and natural gas infrastructure rather than the federal focus on national and regional need. As the U.S. Court of Appeals for the D.C. Circuit stated in a 2014 decision involving the siting provisions of the Natural Gas Act:

> Given the choice, almost no one would want natural gas infrastructure built on their block. "Build it elsewhere," most would say. The sentiment is understandable. But given our nation's increasing demand for natural gas (and other alternative energy sources), it is an inescapable fact that such facilities must be built somewhere. . . . Congress decided to vest the Federal Energy Regulatory Commission with responsibility for overseeing the construction and expansion of interstate natural gas facilities. And in carrying out that charge, sometimes the Commission is faced with tough judgment calls as to where those facilities can and should be sited.[193]

One can certainly debate whether such rapid build-out of infrastructure for a fossil fuel resource is advisable, even if it has some significant benefits over other fossil fuel resources like coal. But it is clear that the federal process for siting and approving interstate natural gas pipelines and LNG terminals is a major reason, together with the economics driving private party investment in infrastructure, why that build-out has occurred so quickly.

B. State Electric Transmission Line Siting and Eminent Domain Laws

The siting, approval, and eminent domain processes for interstate electric transmission lines could not be more different from the process for interstate natural gas pipelines and LNG terminals (particularly post-2005) discussed in Part II.A. As stated earlier, electric transmission line companies must obtain approval to build new interstate electric transmission lines from regulators in all the states through which the line will pass.[194] The Federal Power Act of 1935 grants FERC jurisdiction over "transmission of electric energy in interstate commerce" and "the sale of electric energy at wholesale

193. Minisink Residents for Envtl. Pres. v. FERC, 762 F.3d 97, 100 (D.C. Cir. 2014).
194. *See supra* Parts I.C. and II.B.

in interstate commerce,"[195] but states retain authority over the location and construction of both intrastate and interstate electric transmission lines.

In most states the legislature has granted authority to its public utility commission ("PUC") or equivalent state agency to review and approve intrastate and interstate electric transmission lines based on a variety of factors associated with showing a "need" for the line and the economics and environmental impacts associated with the line.[196] If successful, the PUC grants a certificate of need or a certificate of public convenience and necessity that allows the transmission line operator to construct the line and exercise eminent domain to acquire the property necessary to build the line if the operator is unable to enter into voluntary easements with all landowners in the line's path.[197] For lines that cross several states, the operator must seek certificates in multiple states using multiple standards.[198]

1. *State Consideration of Regional Benefits and Local Costs of Transmission Lines*

The law differs from state to state as to whether state PUCs should approve interstate transmission lines that have significant regional benefits, such as moving wind or solar power from resource rich parts of the country to "load centers" (i.e. cities) several states away, or whether PUCs should only find a "need" for the line when there are also significant in-state benefits.[199] Despite the uncertainties in state law, there have been several major projects in recent years that highlight the growing role of interstate transmission lines to provide regional reliability and renewable energy benefits. For instance, within the Midcontinent Independent System Operator ("MISO") RTO,[200] an area covering most or part of over ten states, public utilities and other industry stakeholders have worked with state regulators and regional planners to build a series of Multi-Value Project

195. Federal Power Act § 201(b); 16 U.S.C. § 824(b)(1); FERC v. Elec. Power Supply Ass'n, 136 S. Ct. 760, 767 (2016).

196. *See* Klass & Rossi, *supra* note 122, at 149–50 (discussing state electric transmission line siting process).

197. *Id.*

198. *Id.*

199. *See infra* notes 214–228 and accompanying text; Klass & Rossi, *supra* note 122, at 151–55.

200. *See supra* note 71–72 and accompanying text for a discussion of RTOs and ISOs and their role in the U.S. electric grid. *See also Electric Power Markets: Midcontinent (MISO)*, FERC, www.ferc.gov/market-oversight/mkt-electric/midwest.asp#geo; MISO, *2014 Value Proposition: South Region* (Feb. 2015), https://www.misoenergy.org/Library/Repository/Meeting%20Material/Stakeholder/Workshops%20and%20Special%20Meetings/2015/Value%20Proposition/20150226%20Value%20Proposition%20Presentation.pdf.

("MVP") lines designed to improve grid reliability and transport wind energy throughout the region.[201] These lines have taken over a decade to plan and construct, and have required approval by multiple state PUCs within the MISO region.[202] In Texas, the state has worked with merchant transmission line companies and public utilities to build its $6.8 billion Texas Competitive Renewable Energy Zone ("CREZ") project over a decade. This project has constructed 3,600 miles of high-voltage transmission lines across Texas to integrate 16,000 MW of wind energy into the Texas grid.[203] And a merchant transmission line company, Clean Line Energy Partners, is attempting to build five separate high-voltage DC transmission lines across multiple states in the Midwest and southeast to bring wind energy to population centers.[204]

Unlike interstate natural gas pipelines and LNG terminals which can often be planned, permitted, and constructed within two or three years,[205] multi-state transmission lines can take well over a decade to plan, permit, and construct, if they can even receive approval at all.[206] Texas is unique in

201. *See* Ill. Commerce Comm'n v. FERC, 721 F.3d 764, 771–75 (7th Cir. 2013) (describing MISO's MVP projects and upholding FERC's approval of MISO's regional cost allocation to pay for those lines); MISO, MULTI VALUE PROJECT PORTFOLIO RESULTS AND ANALYSIS 11 (2012), https://www.misoenergy.org/Library/Repository/Study/Candidate%20MVP%20Analysis/MVP%20Portfolio%20Analysis%20Full%20Report.pdf (discussing MVP planning process beginning in 2002); *Multi Value Project Portfolio Analysis*, MISO, https://www.misoenergy.org/Planning/TransmissionExpansionPlanning/Pages/MVPAnalysis.aspx [hereinafter MISO Project Portfolio Analysis] (describing projects); *MISO Confirms Benefits of MVP Projects*, MISO (Oct. 1, 2014), http://www.misoenergy.org/AboutUs/MediaCenter/PressReleases/Pages/MISOConfirmsBenefitsofMVPProjects.aspx (discussing projects and how they benefit the MISO region).

202. *See Minnesota-Iowa Transmission Line*, CTR. FOR RURAL AFFAIRS, http://www.cfra.org/clean-energy-transmission-map/line/minnesota-iowa (discussing the siting and permitting process for one of several MISO MVP transmission lines); MISO Project Portfolio Analysis, *supra* note 201 (describing projects and eight-year planning process prior to permitting and construction).

203. *See* Daniel Cusick, *New Power Lines Will Make Texas the World's 5th-Largest Wind Power Producer*, CLIMATEWIRE (Feb. 25, 2014), http://www.eenews.net/stories/1059995041; Matthew L. Wald, *Wired for Wind*, N.Y. TIMES, July 24, 2014 (reporting on completion of Texas CREZ projects); R. Ryan Stain, Note, *CREZ II, Coming Soon to a Windy Texas Plain Near You?: Encouraging the Texas Renewable Energy Industry Through Transmission Investment*, 93 TEX. L. REV. 521 (2014) (discussing the CREZ process).

204. *See* Klass, *supra* note 51, at 1927 (discussing Clean Line Energy Partners projects); *Projects*, CLEAN LINE ENERGY PARTNERS, http://www.cleanlineenergy.com.

205. *See* PARFOMAK, *supra* note 68, at 7–8 (discussing average timeline for FERC approval of interstate natural gas pipelines). *See also supra* note 190 and accompanying text (discussing how opposition to fossil fuel infrastructure projects has increased project timelines from three years to four years).

206. BIPARTISAN POLICY CTR., *supra* note 120, at 28–29 (discussing flaws in state siting process for interstate transmission lines); CHANG & PFEIFENBERGER, *supra* note 75, at 4 (discussing timeline for building transmission projects); James J. Hoecker & Douglas W. Smith, *Regulatory Federalism and Development of Electric Transmission: A Brewing Storm?*, 35 ENERGY L.J. 71, 86–88 (2014) (discussing state barriers to interstate electric transmission lines); Richard J. Pierce, Jr., *Completing the Process of*

that it has its own transmission grid,[207] large cities, and ample wind resources all within a single state.[208] As a result, a single planner and regulatory body can approve all aspects of the transmission line, and all the benefits and burdens of the line are borne within the state.[209]

This is not the case for electric transmission lines in the rest of the country that must cross multiple state boundaries to bring renewable energy resources, particularly wind, to load centers. In that situation, the state that is exporting the wind sustains the benefits of selling its wind resources to the electric grid, creating economic gains for wind generators and related businesses in the state.[210] Likewise, the state that is importing the wind is receiving a valuable energy resource that allows utilities in that state to provide carbon-free power to its customers, meet any state-imposed RPS, and in some cases lower electricity prices by increasing the electric energy resources in the state.[211] But for a "pass-through" state that is in the path of the line but is not exporting or importing energy, its residents sustain the adverse impacts to property rights and environmental values associated with a large, high-voltage power line crossing the state with few of the benefits.[212] Even for the importing or exporting states, residents impacted directly by the line and regulators in those states often argue that the costs

Restructuring the Electricity Market, 40 WAKE FOREST L. REV. 451, 483–85 (2005) (discussing the growing shortage of transmission capacity and role of state law and NIMBY-based challenges in creating obstacles to modernizing and expanding the electric grid); Jim Snyder & Mark Drajem, *Long Slog to Build Electric Power May Imperil Obama's Carbon Cuts*, 102 BNA DAILY ENVTL. REPORT, May 27, 2015, at A-13; Alison Silverstein, *Presentation at the NCEP Transmission Technology Workshop: Transmissions* 101, at 51 (Apr. 20–21, 2011), http://www.naruc.org/grants/Documents/Silverstein%20 NCEP%20T-101%200420111.pdf.

207. The Electric Reliability Council of Texas ("ERCOT") manages the flow of electric power for 75% of the land area in Texas and approximately 90% of the state's electricity load. *See Company Profile*, ERCOT, http://www.ercot.com/about/profile. Texas is the only state with its own transmission grid. The rest of the continental United States is divided into two transmission grids—The Eastern Interconnection and the Western Interconnection. *See Learn More About Interconnections*, OFFICE OF ELEC. DELIVERY & ENERGY RELIABILITY, http://energy.gov/oe/services/electricity-policy-coordination-and-implementation/ transmission-planning/recovery-act-0.

208. *See* Alexandra B. Klass & Elizabeth J. Wilson, *Interstate Transmission Challenges for Renewable Energy: A Federalism Mismatch*, 65 VAND. L. REV. 1801, 1843–47 (2012) (discussing CREZ projects and uniqueness of Texas).

209. *See id*.

210. *See* Klass & Rossi, *supra* note 122.

211. *Id.*

212. *Id. See also* ETO, *supra* note 95, at 24 ("The state-centric public-interest issue that arises most vividly for multi-state transmission projects involves the so-called 'fly-over' states. These states are situated between the states that are the starting and ending point for a long-distance transmission project. . . . The public-interest issue raised by states in the middle is that, at bottom, they are being asked to bear significant portions of the cost or adverse impact of a project, yet they do not believe they are being provided with sufficient opportunity to share in the benefits of the project.").

associated with the line outweigh any benefits to the state associated with importing or exporting energy.[213]

Thus, in every state other than Texas, which is unique for the reasons noted above, issues arise over whether the "need" for the transmission line should include multi-state, regional electric grid needs and whether such regional lines are a "public use" for purposes of exercising eminent domain. State regulators and state courts that have addressed this issue have often reached different conclusions. In each case, the question is how to weigh the costs and benefits of the line when the physical impacts fall on in-state residents and the benefits are diffusely felt throughout a multi-state region through increased grid reliability, renewable energy benefits, and, in some areas, lower electricity prices.

Many state regulators have opposed new transmission lines that would serve regional electricity needs. For instance, in 2006, Southern California Edison sought to build a 230-mile high-voltage transmission line from California to a generating station in Arizona.[214] California regulators approved the line but Arizona regulators rejected it, even though California ratepayers would have paid for the project.[215] One regulator explained his vote by stating, "I don't want Arizona to become an energy farm for California. This project, if we approved it, would use our land, our air and our water to provide electricity to California."[216] Likewise, in *Mississippi Power & Light Co. v. Conerly*,[217] the Mississippi Supreme Court in 1984 refused to allow a utility to exercise eminent domain for a high-voltage power line between Mississippi and Louisiana because Mississippi customers would not directly benefit from the line and thus the line was not a "public use" for purposes of exercising eminent domain.[218] A Florida court similarly held in 1967 in *Clark v. Gulf Power Co.*,[219] that the state's power of eminent domain could not be used to build a "one way transmission line" from Florida to Georgia for which Florida citizens "will not derive one iota

213. *See infra* notes 214–228 (discussing examples).

214. Press Release, Ariz. Corp. Comm'n, Regulators Reject "Extension Cord for California" (May 30, 2007), http://www.azcc.gov/divisions/administration/news/Devers_II_Vote.pdf; Order Granting a Certificate of Public Convenience and Necessity, So. Cal. Edison Co., Decision No. 07-01-040 (Cal. Pub. Utils. Comm'n, Jan. 25, 2007), http://docs.cpuc.ca.gov/published/FINAL_DECISION/ 64017.pdf.

215. Order Denying Certificate of Environmental Compatibility, So. Cal. Edison Co., Case No. 130, Decision No. 69638 (Ariz. Corp. Comm'n, June 6, 2007), http://images.edocket.azcc.gov/docketpdf/ 0000073735.pdf.

216. Ariz. Corp. Comm'n Press Release, *supra* note 214.

217. 460 So. 2d 107 (Miss. 1984).

218. *Id.* at 113.

219. 198 So. 2d 368 (Fla. Dist. Ct. App. 1967).

of benefit" despite "[c]onjecture" that the line would benefit residents of both states.[220]

More recently, in 2014, Wisconsin regulators held hearings to determine the need for one of the MISO MVP lines discussed above. Among other things, the 345-kV line would provide transmission upgrades to western Wisconsin and provide local utilities with increased access to wholesale energy markets and increased renewable energy resources from the Dakotas.[221] During the hearings, Wisconsin residents questioned "why Wisconsonites should have to give up their land and views so generators in the Dakotas can ship surplus energy to the East Coast."[222] Likewise, during the hearings in Missouri on the Clean Line Energy Partners "Grain Belt Express," which would travel through four states, one resident stated "[i]f the East Coast wants wind power, let them produce it locally."[223] In July 2015, Missouri regulators denied Clean Line's request for a certificate of convenience and necessity for the Grain Belt Express project even while regulators in neighboring states had granted approval.[224] In advance of the final decision, the Missouri commissioners opposed to the project stated, "the project wasn't needed in the state and may not have an immediate benefit to Missouri ratepayers."[225] According to one commissioner, "[m]y first thought was that I need to look after Missourians first and go from there."[226] However, since rejecting the project, Missouri regulators indicated that they are willing to reconsider, particularly after the Missouri

220. *Id.* at 371.

221. News Release, Am. Transmission Co., PSC Deems Badger Coulee Transmission Line Project Application Complete (Apr. 30, 2014), http://www.atcllc.com/whats-current/psc-deems-badger-coulee-transmission-line-project-application-complete/.

222. Danielle Endvick, *Farmers, Rural Landowners Opposing Transmission Project Say It Puts Their Lifestyle … On the Line*, THE COUNTRY TODAY, June 18, 2014, at 3A.

223. Jeffrey Tomich, *Clean Line Transmission Project Gets Chilly Reception in Mo.*, ENERGYWIRE (Aug. 14, 2014), http://www.eenews.net/energywire/2014/08/13/stories/1060004417.

224. Jeffrey Tomich *Clean Line Transmission Project in Limbo After Mo. Rejection*, ENERGYWIRE (July 2, 2015), http://www.eenews.net/stories/1060021203/ (reporting on Missouri PUC denial of certificate of convenience and necessity for Grain Belt Express); Order Denying Certificate of Convenience and Necessity for Grain Belt Express, *In re* Application for Grain Belt Express Clean Line LLC, File No. EA-2014-0207 (Mo. PUC, July 1, 2015), http://www.eenews.net/assets/2015/07/02/document_ew_03.pdf; Jacob Barker, *Missouri Faces Hard Choice: Renewable Energy Highways, or Property Rights?*, ST. LOUIS POST-DISPATCH, June 14, 2015 (discussing positions of various Missouri PUC commissioners and status of Grain Belt Express in other states).

225. *See* Barker, *supra* note 224. *See also* AP, *Missouri Farmers Continue to Fight Power Line Project Despite Illinois Approval*, ST. LOUIS POST-DISPATCH, Dec. 12, 2015 (reporting that even though the Grain Belt Express had obtained approved in three of the four necessary states, Missouri regulators rejected the project, finding that it "wasn't needed," and noting "farmers' concerns about crops, pastures and difficulties in maneuvering large equipment around towers.").

226. *See* Barker, *supra* note 224.

Governor endorsed the project (citing evidence of benefits for Missouri residents) and several municipal utilities agreed to purchase long-term transmission services from the project if it is built.[227] Nevertheless, the Grain Belt Express proceeding, along with the others described in this section, raise significant concerns that federal and state clean energy policies may be at risk as a result of the inability of interstate electric transmission lines to obtain state approvals for many years, if at all.[228]

2. *Implication of State Siting Authority for Interstate Electric Transmission Lines*

If a federal regulator, like FERC, issued approvals for interstate transmission lines, the local concerns over adverse impacts on property rights or environmental values could be evaluated against existing or future regional or national policies to promote an expanded electric grid to increase reliability and meet present and future federal and state clean energy goals. But state regulators are bound by state laws that may either expressly or impliedly direct them to consider predominantly in-state needs and in-state costs and benefits when issuing transmission line siting certificates. Many government and private sector experts warn that the nation's aging electric grid must be expanded and modernized to avoid more frequent power outages, maintain adequate levels of grid reliability, and integrate the levels of renewable energy necessary to meet present and future state and federal clean energy mandates.[229] These risks are exacerbated by the threats of climate change, which have already caused a rapid increase in weather-related electric grid disruptions in the United States since 2000.[230] Experts estimate that the industry must make investments in transmission and

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227. *See* Jeffrey Tomich, *Missouri Gov. Nixon Backs $2B Grain Belt Express Project*, ENERGYWIRE (June 30, 2016), http://www.eenews.net/stories/1060039651.

228. *See* Snyder & Drajem, *supra* note 206; Krysti Shallenberger, *Transmission Shortfall Tests Mont.'s Ability To Use and Sell More Wind*, ENERGYWIRE (Mar. 18, 2015), http://www.eenews.net/energywire/2015/03/18/stories/1060015223 (discussing inability of Montana to capitalize on its significant wind resources because of opposition to transmission lines by Montana and other state residents because of the impact of such lines on local property values); Krysti Shallenberger, *Wind-and-Gas Hybrid Power – Wyoming's Idea of California Dreamin',* ENERGYWIRE (Feb. 23, 2015), http://www.eenews.net/stories/1060013829 (discussing benefits of exporting wind power from Wyoming to California and other states to meet California RPS but that transmission constraints are a limiting factor).

229. Klass, *supra* note 51, at 1922–24 (citing and discussing reports).

230. *See, e.g.*, U.S. GOV'T ACCOUNTABILITY OFFICE, GAO-14-74, CLIMATE CHANGE: ENERGY INFRASTRUCTURE RISKS AND ADAPTATION EFFORTS 24–27 (2014); U.S. DEP'T. OF ENERGY, CLIMATE CHANGE AND THE U.S. ENERGY SECTOR: REGIONAL VULNERABILITIES AND RESILIENCE SOLUTIONS (2015) (discussing risks by geographic region).

distribution of nearly $900 billion and total investments in the system of $1.5 to $2 trillion dollars just to maintain current levels of grid reliability.[231]

While FERC, other federal agencies, and regional entities, such as RTOs, have done their best to encourage greater consideration of regional benefits in transmission line siting, their statutory authority is very limited. Congress attempted to convey some siting authority to FERC in the Energy Policy Act of 2005, the same legislation that brought LNG siting authority under FERC's jurisdiction. In reaction to the 2003 Northeast blackouts, Congress granted FERC "backstop" siting authority that would allow FERC to approve interstate transmission lines in areas of the country the DOE determined were subject to significant congestion.[232] But court decisions limited that authority significantly, to the extent that any authority Congress may have attempted to convey has been rendered a nullity.[233] Another provision of the Energy Policy Act of 2005, Section 1222, grants the Western Area Power Administration (WAPA) and the Southwestern Power Administration (SWPA)—two federal power administrations that sell and transmit hydroelectric power from federal facilities at wholesale to utilities within designated parts of central, southern, and western states—the authority to "design, develop, construct, operate, maintain, or own . . . an electric power transmission facility and related facilities . . . needed to upgrade existing transmission facilities" on their own or in conjunction with private transmission line operators.[234] Although this provision may grant the federal government the authority to override state denials of siting permits and to exercise eminent domain authority, DOE, acting through SWPA, exercised this authority for the first time in 2016 when it granted an

231. MARC W. CHUPKA ET AL., EDISON FOUND., TRANSFORMING AMERICA'S POWER INDUSTRY: THE INVESTMENT CHALLENGE 2010–2030, at iv–xi (2008); *cf.* U.S. GOV'T ACCOUNTABILITY OFFICE, *supra* note 230 (discussing the necessity of large financial investments); U.S. DEP'T. OF ENERGY, *supra* note 230 (same); EXEC. OFFICE OF THE PRESIDENT, ECONOMIC BENEFITS OF INCREASING ELECTRIC GRID RESILIENCE TO WEATHER OUTAGES 4 (2013) (same).

232. *See* DAVIES ET AL., *supra* note 118, at 461–64 (discussing Section 1221 of the Energy Policy Act of 2005); Klass, *supra* note 51, at 1918–19 (same).

233. *See* Cal. Wilderness Coal. v. U.S. Dep't of Energy, 631 F.3d 1072, 1107 (9th Cir. 2011) (invalidating DOE's efforts to create a National Interest Electric Transmission Corridor ("NIETC") for failure to adequately consult with affected states); Piedmont Envtl. Council v. FERC, 558 F.3d 304, 313 (4th Cir. 2009), *cert. denied*, 558 U.S. 1147 (2010) (holding FERC's authority to exercise backstop siting authority not triggered when a state denies a siting permit but only when the state does not have authority to act in the first place or includes "project-killing" conditions on the permit); Klass, *supra* note 51, at 1918–20 (discussing court decisions and implications for federal electric transmission line siting authority).

234. Energy Policy Act of 2005, 42 U.S.C. § 16421(a). *See also About WAPA*, WESTERN AREA POWER ADMINISTRATION, https://www.wapa.gov/About/Pages/About.aspx; *About the Agency*, SOUTHWESTERN POWER ADMINISTRATION, http://www.swpa.gov/agency.aspx.

application by Clean Line Energy Partners—the merchant transmission line company discussed earlier—to partner with SWPA to build the Plains & Eastern Clean Line, a DC transmission line designed to bring wind energy from Texas and Oklahoma to Missouri, Arkansas, and other southern states.[235]

In the absence of plenary federal authority over the siting of interstate transmission lines, state legislators, regulators, and courts routinely limit consideration of the costs and benefits of interstate electric transmission lines to those costs and benefits that fall on local residents.[236] This is not surprising. State legislators and regulators must be responsive to their constituents, all of who are state residents and none of who are out-of-state residents. State legislators and regulators are also more likely to act in the interests of incumbent, in-state public utilities and not in the interests of out-of-state merchant transmission line companies that may wish to compete with the utilities in transmission markets within the state.[237]

State courts must also follow statutory directives, many of which make reference to "need" in the case of siting certificates and "public use" or "public purpose" in the case of eminent domain.[238] Regulators and courts are likely to interpret those terms as referring to the need, public use, and public purpose of the state and its citizens, rather than a multi-state region.[239] In light of these impediments, in the case of a multi-state transmission line that may have limited benefits to residents of certain states through which it passes, it is not surprising that the planning and approval of an interstate electric transmission line is a process that routinely takes more than a decade to complete, if the line is approved at all. The patchwork system of state laws governing multi-state electric transmission lines makes it difficult to assess regional and national need and creates significant investment uncertainty for electricity transport infrastructure.

235. *Plains & Eastern Clean Line Transmission Line*, OFFICE OF ELEC. DELIVERY & ENERGY RELIABILITY, U.S. DEP'T. OF ENERGY, http://energy.gov/oe/services/electricity-policy-coordination-and-implementation/transmission-planning/section-1222-0. Arkansas had denied a siting permit for the line on grounds that only public utilities that sold electricity at retail, and not merchant transmission lines, could seek siting permits. Affected states and landowners have challenged the legality of DOE's approval.

236. *See supra* notes 210–228 and accompanying text.

237. *See* Klass & Rossi, *supra* note 122, at 211–17.

238. *See* Klass, *supra* note 51, at 1916–17; Klass & Rossi, *supra* note 122, at 149–50 (discussing state decisions).

239. Klass, *supra* note 51, at 1916–17.

III. FUTURE-PROOFING ENERGY TRANSPORT POLICIES TO PROMOTE ADAPTIVE INFRASTRUCTURE

In order to meet current energy needs while also transitioning to a cleaner energy future, the nation needs laws that can facilitate the development of energy transport infrastructure to support both objectives. Even many CEOs of U.S. investor-owned utilities recognize the transition to a clean energy future is inevitable.[240] Part III takes this transition as a given even if there remains significant debate over what that future will look like and how long it will take to get there. This Part first considers the energy transport laws discussed in Part II to distill three criteria that are important to consider in any evaluation of new energy transport laws or energy transport infrastructure. These criteria are then applied to two contemporary energy transport debates: (1) whether to shift some regulatory authority over siting interstate electric transmission lines from the states to the federal government or a regional entity and (2) whether to transport new sources of domestic oil by an expanded rail system or by new pipeline infrastructure.

A. *Criteria for Evaluating and Future-Proofing Energy Transport Laws and Infrastructure*

The analysis conducted in Part II provides support for the idea that laws that best serve both present and future energy transport needs are ones that: (1) match siting and permitting authority to the intrastate or interstate nature of the energy transport project; (2) allow for flexibility in the location and amount of expected energy resources to transport, import, or export; and (3) promote state and federal clean energy goals. To further evaluate these principles, this Section considers each in turn, drawing on the examples in Part II, and highlights situations where these criteria may be in conflict.

1. *Siting and Eminent Domain Authority that Matches the Physical Scope of Project*

The first criterion to consider in efforts to future-proof energy transport law is *who* should regulate the approval of energy transport infrastructure

240. *See* Rod Kuckro, *Clean Power Plan is Obama's 'Legacy,' Utility Leader Says*, ENERGYWIRE (June 10, 2015), http://www.eenews.net/stories/1060019969 (discussing public statements from leaders of the major utilities companies and the Edison Electric Institute that "it may be time to 'call it a day' and finalize a 'rational' rule" on GHG emission reductions from the power sector).

that spans multiple states and is designed to meet national or regional energy needs. As shown in Part II, states have a limited ability to prevent energy transport projects like interstate natural gas pipelines and LNG terminals where authority rests with FERC. Once Congress created federal siting authority for interstate natural gas pipelines in the 1930s, and for LNG import and export facilities in 2005, FERC was able to approve projects much more rapidly as the agency could consider national and regional energy needs and states could not easily veto such projects based on local concerns.

This stands in stark contrast to energy transport projects like interstate electric transmission lines and oil pipelines where authority rests with the states. Part II shows that environmental advocates, landowners, and local politicians have been quite successful in delaying or completely halting interstate electric transmission lines, and, more recently, interstate oil pipelines,[241] because regulators can more easily elevate state and local harms over national energy needs. In some cases, state statutes require regulators to consider solely in-state need or in-state public use for making permitting or eminent domain decisions. In other cases, state statutes are vague but provide regulators with the discretion to weigh local issues more heavily. While this may have the effect of preventing certain energy transport infrastructure projects that risk locking-in future fossil fuel use in the case of oil pipelines, it also prevents other projects like interstate electric transmission lines that can integrate more renewable energy in the grid.

In sum, at a very basic level (and despite the many different ways to structure a siting process), federal regulation makes it easier to build multi-state infrastructure projects. This is because it creates a single regulatory regime and decision-maker, as well as a standard for approval that considers national needs in addition to local needs, and makes local opposition more expensive and difficult. Such federal authority would seem to be optimal when the goal is to promote energy transport infrastructure that must cross several states and is needed to meet regional and national energy transport needs. Such federal authority would also appear to be unnecessary and in some cases suboptimal for in-state energy projects such as single-state wind farms, solar plants, or other generation facilities.[242]

241. *See supra* notes 36–37 and accompanying text (discussing increasing opposition to oil and NGL pipelines and growing refusal of some state regulators to issue siting permits or authorize eminent domain for such pipelines).

242. Notably, focusing the need for federal siting authority on whether the energy transport infrastructure is built within a single state or must cross multiple states would not support federal siting authority for LNG terminals, since those terminals are built only in a single state. Of course, Congress may always find other reasons, such as national energy needs, to justify federal siting authority for such

Importantly, creating federal regulatory authority over interstate energy transport projects does not necessarily ensure that the most optimal or sustainable projects will be built. A federal process may facilitate an overexpansion of fossil fuel transport infrastructure by making it easier to build these projects. By contrast, a lengthier and less-efficient state process can delay or impose roadblocks to fossil fuel infrastructure projects, potentially facilitating a greater use of clean energy as a substitute or limiting new investments to smaller, less controversial projects.[243] This is why the Sierra Club and other environmental groups have filed numerous lawsuits opposing every new LNG export terminal, arguing that the new terminals will lead to increased domestic natural gas production and increased GHG emissions associated with its use worldwide, at least as compared to renewable energy.[244] But this effort's lack of success, to date, merely highlights the fact that a federal process generally expedites the approval process for locally-controversial projects like LNG terminals designed to serve national energy needs, while a state process, like the one in place for interstate electric transmission lines, has the opposite effect.

2. Flexibility Regarding Location and Amount of Energy Resources

With regard to the second criterion—flexibility regarding the location and availability of domestic energy resources—the federal siting provisions governing LNG facilities and interstate natural gas pipelines are instructive. In 2005, the nation was concerned about diminishing supplies of domestic natural gas and the need to increase natural gas imports, which would require new and expanded LNG import terminals.[245] In response to industry and FERC requests to create exclusive siting authority in FERC and to preempt most aspects of state regulatory authority, Congress created a streamlined federal siting process that applied to all LNG facilities, both import and export, and that severely minimized the ability of states to delay

projects. *See supra* notes 162–167 and accompanying text.

243. *See, e.g.*, Steve Huntoon, *The Rise and Fall of Big Transmission*, PUBLIC UTIL. FORTNIGHTLY, Sept. 2015, at 32 (arguing that incremental transmission line expansion is generally preferable to many of the proposed "big" transmission projects [transmission lines greater than 500kV and at least 250 miles long] and that state laws and open stakeholder processes are a potentially good correction to slow down, modify, or kill many such projects).

244. *See supra* notes 177–178 and accompanying text (discussing Sierra Club campaign opposing LNG terminals to prevent increased global use of natural gas and associated adverse climate change and environmental effects from hydraulic fracturing activities and increased fossil fuel use).

245. *See supra* Part II.A.

or stop projects.[246] In the late 2000s the industry used the LNG siting provisions to construct a number of LNG import terminals fairly quickly.[247]

But once the industry began to implement hydraulic fracturing and directional drilling technologies on a widespread basis during those same years, all prior assumptions regarding the amount and location of U.S. natural gas production shifted dramatically. The industry and FERC were able to utilize those same federal LNG siting provisions to approve many new LNG export terminals and convert existing import terminals to export terminals.[248] FERC was also able to approve major expansions of the U.S. interstate natural gas pipeline network to connect new natural gas resources in Pennsylvania, Texas, and other states to markets in less than ten years.[249] If Congress had created more limited siting authority that focused solely on LNG import terminals instead of covering both import and export terminals, it would have been much more difficult to respond so quickly to such major shifts in domestic natural gas production. Thus, the broad scope of the law created the flexibility to build energy transport infrastructure very rapidly to respond to significant changes in the amount and location of domestic natural gas resources.

3. *Promoting Clean Energy Policies*

The third criterion that should influence energy transport laws and infrastructure is whether they complement existing and emerging federal and state clean energy goals. EPA air pollution regulations, state RPSs, and numerous other federal and state laws discussed earlier attempt to decrease the use of fossil fuels, increase the use of renewable energy, and transition the nation to a cleaner and more sustainable energy future without significant energy price spikes or disruption. Such laws and policies should serve as a backdrop to any new policies, directives, and decisions that govern energy transport infrastructure. In other words, energy transport infrastructure should accommodate and facilitate future clean energy and sustainability goals.

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246. *See supra* Part II.A.
247. *See supra* Part II.A.
248. *See supra* Part II.A.
249. *See supra* notes 56–58, 67–68 and accompanying text (discussing interstate natural gas pipeline expansions).

B. Applications: Future-Proofing Energy Transport Law and Energy Transport Infrastructure

The previous section discussed various criteria for evaluating energy transport laws to meet current energy needs while also aiding the transition to a cleaner energy future. These criteria focused on placing regulatory authority at a level of government that can balance regional and national energy needs with state and local concerns based on the physical scope of the project, flexibility with regard to amount and location of energy resources, and promoting federal and state clean energy policies.

This section first applies the evaluation criteria to the regulatory regime governing siting and eminent domain for interstate electric transmission lines. It concludes that these principles favor, on balance, a shift away from states possessing primary regulatory authority over siting interstate electric transmission lines and toward greater federal or regional authority. This section then focuses on one of the major energy transport debates of the current decade—whether to rely more heavily on expanding rail infrastructure to transport the massive new sources of domestic oil from production sites to refineries or expand the existing oil pipeline network. It concludes that using an expanded rail system instead of investing heavily in new oil pipelines is consistent with the criteria outlined above, utilizes the benefits of existing federal regulatory authority over railroads to quickly build such infrastructure, and avoids new, long-term investments devoted to continued reliance on fossil fuel resources.

1. A New Regulatory Regime for Interstate Electric Transmission Lines?

As discussed in Part II.C, states have primary jurisdiction over siting and eminent domain for interstate electric transmission lines on non-federal lands. At issue is whether this regulatory regime matches the appropriate level of regulator to the scale of the infrastructure, provides sufficient flexibility regarding the amount and location of energy resources, and promotes developing state and federal clean energy goals.

With regard to which level of government can best balance national energy needs with local costs of infrastructure in evaluating interstate electric transmission lines that span multiple states, the criteria outlined above support federal or regional authority instead of state authority. As shown in Part II.B, local opponents to electric transmission lines are able to use state laws that focus narrowly on state need and state public use to defeat or delay transmission line projects that would serve national and regional energy needs, including grid reliability and integration of more renewable energy resources.[250] Federal and state mandates and goals to transition to low carbon electricity highlight the barriers state siting policies pose to a national clean energy policy. For instance, experts have concluded that one of the lowest-cost and most effective ways to reduce CO_2 emissions from the electric power sector is to rely more heavily on an expanded footprint of renewable resources.[251] But this is not possible without an expanded and enhanced regional transmission grid, which cannot be done in a cost-effective and timely process without major changes to U.S. transmission line siting policy.[252]

This stands in contrast to the federal system in place for interstate natural gas pipelines and LNG terminals that grants FERC authority to fully take into account national energy goals and needs in making permitting decisions.[253] Indeed, the case for federal siting authority over interstate electric transmission lines is far stronger than it is for LNG import and export terminals, since such terminals are physically located in a single state and thus do not need approval from multiple state regulators. While there may be reasons to federalize the siting process for some intrastate energy facilities—and many were raised in the Congressional hearings in 2005 with regard to LNG terminals—the need is more acute in the case of interstate electric transmission lines where the physical infrastructure itself is interstate and serves national energy needs.

The need for federal or regional authority for interstate electric transmission line siting is highlighted by the fact that states appear to do a fairly good job of weighing the costs and benefits of intrastate electric transmission line projects and approving many of them despite a variety of objections.[254] For instance, in 2015, the New York PUC approved the construction of $1.2 billion in new, intrastate electric transmission lines

250. *See supra* notes 210–228 and accompanying text.

251. *See, e.g.*, PATRICK LUCKOW ET AL., SYNAPSE ENERGY ECON., INC., A SOLVED PROBLEM: EXISTING MEASURES PROVIDE LOW-COST WIND AND SOLAR INTEGRATION 6–9 (2015); Patrick Luckow & Tommy Vitolo, *Renewables Integration and the Clean Power Plan* (Aug. 26, 2015), http://synapse-energy.com/sites/default/files/Renewables-Integration-Webinar.pdf (webinar).

252. *See* Emily Hammond & Richard J. Pierce Jr., *The Clean Power Plan: Testing the Limits of Administrative Law and the Electric Grid*, 7 GEO. WASH. J. ENERGY & ENVTL. L. 1 (2016).

253. *See supra* Part II.A.

254. As noted earlier, when considering interstate electric transmission line projects, states often weigh the in-state benefits of the project far more heavily than the regional or national benefits, and deny projects that are not perceived as providing in-state benefits. *See supra* notes 210–228 and accompanying text. *See also* ETO, *supra* note 95, at 23 ("When a project is wholly contained within a single state, the range and coordination of issues that must be considered is comparatively straighforward.").

aimed at easing electricity prices and cutting GHG emissions in the state by allowing for the transport of more wind energy in the northern part of the state to the southern part of the state.[255] The proposal was consistent with Governor Cuomo's "Energy Highway" initiative designed to "cut downstate power costs, offset retirements of aging plants, . . . and increase the potential for renewable energy, including wind, to supply New York City."[256] Also in 2015, the Texas PUC approved a new $600 million electric transmission line project, the Houston Import Project, designed to bring power from northern Texas to the Houston area.[257] Both the New York project and the Texas project are expected to be in service by 2018 or 2019.[258] These projects are in stark contrast to the Clean Line Energy Partners projects and other projects discussed in Part II, which have been mired in controversy and litigation for many years. The Texas and New York projects also differ from the Northern Pass transmission line and other lines designed to bring Quebec hydropower to cities in the northeast United States, which have been subject to long-term disputes.[259] Opposition to these interstate lines stems not only from landowner and environmental group concern over the physical impacts of the lines, but also from fear that significant imports of Canadian hydropower will diminish investment in and markets for in-state renewable energy development.[260]

As for flexibility regarding the location and amount of energy resources, a regulatory regime that facilitates long-distance transmission line development is optimal. As discussed in Part I, the United States has a new abundance of low-cost wind and solar energy capacity in parts of the Midwest, Plains states, and Southwest that are not well-served by existing

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255. Jim Polson, *New York Backs New Transmission Lines to Ease Power Prices*, 243 BNA DAILY ENVTL. REPORT, Dec. 18, 2015, at A-13.

256. *Id.*

257. Edward Klump, *Major Texas Transmission Project Gets Green Light*, ENERGYWIRE (Dec. 18, 2015), http://www.eenews.net/stories/1060029727.

258. Polson, *supra* note 255; Klump, *supra* note 257.

259. Erin Ailworth, *Transmission Projects Aim to Tap Canadian Hydroelectricity*, BOSTON GLOBE, July 20, 2014 (describing concerns that transmission lines will allow Canadian hydropower to flood New England electricity markets to the detriment of local renewable energy); Rik Stevens, *Can New England Plug in to Growing Canadian Hydropower?*, PORTLAND PRESS HERALD, Aug. 3, 2015 ("Aside from the question of routes, critics worry that a vast supply of power from Canada will lull states into a false sense of security and that they'll let efficiency efforts lapse or shirk requirements to find more renewable sources closer to home."). *See also* Hoecker & Smith, *supra* note 206, at 86–88 (describing interstate electric transmission line projects where state PUCs denied approval because the line would not provide power to in-state residents).

260. Ailworth, *supra* note 259; Stevens, *supra* note 259.

long-distance transmission lines.[261] More importantly, unlike oil or natural gas pipelines, which are devoted to a single energy resource, interstate transmission lines transport electrons that are created by coal, natural gas, hydropower, and other renewable electricity resources interchangeably. As a result, transmission lines that are built today to transport existing coal-fired electricity and low-cost natural gas-fired electricity can, if they are properly located, also be used to connect new wind farms and solar plants to the grid and can be upgraded as new battery technologies and other forms of energy storage are developed.[262]

One might argue that electric transmission lines themselves are significant sunk costs that may be rendered obsolete by rapid developments in battery technology and other forms of energy storage on the distribution side of the grid, illustrating a lack of flexibility. In other words, why not just focus on demand-side technologies, develop cost-effective micro-grids, and reduce dependence on the traditional interstate electric transmission grid (i.e., the "macro-grid")?[263] While such a future scenario cannot be discounted entirely, energy storage technologies appear to be developing in a way that both enhance the ability of the macro-grid and allow businesses and homes to create more resilient micro-grids. More importantly, very different sectors of the electricity market are simultaneously expanding the reach of renewable energy on both types of grids, with large investor-owned utilities adding large amounts of wind energy to regional grids in some parts of the country and companies like SolarCity and Tesla Motors creating new opportunities for micro-grids.[264] During this time of transition, hindering interstate grid expansion risks losing important momentum in the growth of renewable energy, particularly large-scale wind energy, where costs have decreased sufficiently to undercut both coal and natural gas on price in many parts of the country.[265] Rejecting legal reform that would facilitate regional

261. *See supra* notes 91–94 and accompanying text.

262. *See, e.g.*, *How the Electricity Grid Works*, UNION OF CONCERNED SCIENTISTS, http://www.ucsusa.org/clean-energy/how-electricity-grid-works#.V-MRILUW8uA (last revised Feb. 18, 2015).

263. CHRISTOPHER VILLARREAL ET AL., CALIFORNIA PUB. UTIL. COMM'N, MICROGRIDS: A REGULATORY PERSPECTIVE 4–9 (2014) (defining micro-grids and macro-grids and describing benefits of improvements to both types of grids and potential ways the two types of grids can support each other).

264. *See supra* notes 76–90, 111–119 and accompanying text (discussing developments in utility-scale wind power and distribution-side solar PV resources). *See also* BRUCE TSUCHIDA ET AL., THE BRATTLE GROUP, COMPARATIVE GENERATION COSTS OF UTILITY-SCALE AND RESIDENTIAL-SCALE PV IN XCEL ENERGY COLORADO'S SERVICE AREA (2015) (study showing greater cost-effectiveness of developing utility-scale PV solar as opposed to distributed, or micro-grid, solar).

265. *See, e.g.*, Katie Fehrenbacher, *Wind Now Competes with Fossil Fuels. Solar Almost Does*, FORTUNE (Oct. 6, 2015), http://fortune.com/2015/10/06/wind-cheap-coal-gas/; LAZARD, LAZARD'S LEVELIZED COST OF ENERGY ANALYSIS—VERSION 10.0 (Dec. 2016), https://www.lazard.com/media/

grid expansion also reduces the opportunities for technological developments to create valuable synergies between macro-grids and micro-grids.[266] These include allowing grid operators to rely on EVs and other energy storage devices in homes and businesses at times of peak grid demand, while re-charging those same distribution side resources when grid congestion as well as the price of electricity are low.[267] In sum, there are real economic, environmental, and distributional concerns associated with abandoning the macro-grid completely in favor of micro-grids.[268]

As for promoting state and federal clean energy policies, experts are already worried that significant reductions in CO_2 emissions from the electric power sector will be very difficult without the long distance transmission lines required to integrate more utility-scale wind and solar energy into the grid.[269] State barriers to interstate electric transmission lines also make it difficult for utilities in certain states to meet RPS mandates if in-state sources of renewable energy are limited. Thus, a federal or regional regulator that can take into account regional and national clean energy policies is preferable.

A transfer of siting and eminent domain authority to a federal or regional regulator is also consistent with the "matching principle" within federalism theory, particularly as applied to environmental and energy law, which focuses on which level of government (generally state v. federal) is best suited to address a particular issue.[270] It is important to stress that many of

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438038/levelized-cost-of-energy-v100.pdf. *See also* THE UNIVERSITY OF TEXAS AT AUSTIN ENERGY INSTITUTE, NEW U.S. POWER COSTS: BY COUNTY, WITH ENVIRONMENTAL EXTERNALITIES 1-3 (2016) (finding that the Levelized Cost of Electricity ("LCOE") – "the estimated amount of money that it takes for a particular electricity generation plant to produce a kWh of electricity over its expected lifetime" – which varies based on local conditions and resources shows that "natural gas combined cycle power plants are the lowest cost option for at least a third of US counties" and that wind is also found to be the lowest cost option in many counties).

266. CHANG & PFEIFENBERGER, *supra* note 75, at 11–12 (discussing continuing need for long-distance electric transmission expansion even in a future with significantly greater reliance on distributed energy resources).

267. *See* VILLARREAL ET AL., *supra* note 263, at 9–11 (discussing how expansion of micro-grids can support macro-grid operations and efficiencies, provide additional resilience in times of macro-grid outages from storms or other electric disruptions, and effectively manage intermittency of micro-grid and macro-grid renewable energy resources by coordinating storage and demand with generator output).

268. *See, e.g.*, Boyd, *supra* note 7, at 1626 ("[E]ven though grid defection may become an increasingly attractive option for some, it is not optimal from either an economic or an environmental perspective and it has potentially serious distributional consequences.").

269. *See supra* notes 94, 96 and accompanying text (discussing grid expansion needs).

270. *See, e.g.*, Henry N. Butler & Jonathan R. Macey, *Externalities and the Matching Principle: The Case for Reallocating Environmental Regulatory Authority*, 14 YALE L. & POL'Y REV. 23, 25 (1996); Daniel C. Esty, *Revitalizing Environmental Federalism*, 95 MICH. L. REV. 570, 648 (1996) ("Problems that are by-and-large local in scope (waste site cleanups, drinking water quality, and

the federalism principles that would favor retaining strong state authority in a variety of areas of environmental and energy law do not apply to interstate electric transmission lines. In most areas of environmental and energy law, there are good arguments in favor of retaining strong state authority in connection with meeting both state and federal energy and environmental policy goals. For instance, there are robust arguments in favor of allowing states to experiment with regard to RPSs, phasing out the use of coal, restrictions on hydraulic fracturing, whether to build new nuclear facilities, and how stringently to set clean air, water, and soil standards beyond federal minimum standards. In each case, a state can, if it chooses, work independently in its own "laboratory of democracy" and develop policies that other states, and perhaps the federal government, can ultimately adopt.[271]

Interstate electric transmission lines are different. Outside of Texas, which has its own electric grid, interstate electric transmission lines form a network of regional, multi-state electric grids designed to meet regional energy needs.[272] Even if a state wishes to increase its own use of clean energy through an expanded transmission grid to, for instance, import more wind or solar from neighboring states, it cannot do so without the consent of adjacent states. By contrast, an energy generation facility like a coal plant or a wind farm may be large and may be controversial, but is almost always within a single state boundary and thus does not require the cooperation of at least two states. Moreover, a state energy policy or, in fact, any state policy, may have spillover effects in neighboring states but does not require the threat or use of eminent domain to take physical property in other states. This need for the use of land across a state's borders often prompts intense,

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spending on playgrounds, for example) should be regulated at the local level. Problems that arise on a regional scale (controlling pollution in a river system or an airshed, for example) should be managed on an ecosystem basis across states or even countries when necessary. To the extent that an environmental problem, such as acid rain, spans a great number of states, a national regulatory structure may be required."); Gregg P. Macey, *Boundary Work in Environmental Law*, 53 HOUS. L. REV. 103, 105–16 (2015) (discussing "matching principle" arguments in environmental law); Felix Mormann, *Clean Energy Federalism*, 67 FLA. L. REV. 1621, 1672–74 (2015) (describing classic federalism theory and the matching principle as applied to various issues in energy law); Hari M. Osofsky & Hannah J. Wiseman, *Dynamic Energy Federalism*, 72 MD. L. REV. 773, 807 (2013) (discussing "scale matching" in federalism debates).

271. Klass & Wilson, *supra* note 208, at 1830–31 (discussing application of Justice Brandeis's famous quote that "a single courageous state may, if its citizens choose, serve as a laboratory; and try novel social and economic experiments without risk to the rest of the country." (quoting New State Ice v. Liebman, 285 U.S. 262, 311 (1932) (Brandeis, J., dissenting))).

272. *See* Klass & Wilson, *supra* note 208, at 1831.

local opposition to the project in a neighboring state, pressuring regulators in that state to reject the project.[273]

Thus, interstate electric transmission lines are in a fairly small category of multi-state physical infrastructure projects that necessarily require the cooperation of at least two states and physically require land in multiple states. Such projects face unique roadblocks not easily remedied by state law. This problem is exacerbated by the fact that the expansion of regional electric grids creates positive network externalities with broadly dispersed benefits (in the form of increased grid reliability, lower overall grid-related costs, and greater flexibility and availability of energy resources) without easily quantifiable and immediately tangible local benefits.[274] Similar roadblocks caused Congress to transfer siting authority over interstate natural gas pipelines from the states to the federal government in the 1930s, and prompted Congress to assign federal authority over the interstate highway system from the outset in the 1950s. Interstate electric transmission lines also differ in important ways from interstate oil pipelines, which are also subject to state siting authority. In the case of oil, there are multiple methods of domestic, interstate transport—tanker, pipeline, and rail. Thus, state roadblocks to siting interstate oil pipelines can arguably be overcome by switching to a different form of transport, like rail, that is not subject to state control.[275] In this way, modern-day interstate electricity transport is much more similar to interstate natural gas transport than it is to interstate oil transport, even if that may not have been the case in the 1930s.

Nevertheless, there are costs to any transfer of authority for interstate electric transmission line siting from the states to a federal or regional permitting authority. The local costs of a project in the form of impacts on

273. *See supra* notes 210–228 and accompanying text (discussing local opposition to interstate transmission lines).

274. *See, e.g.*, Ill. Commerce Comm'n v. FERC, 576 F.3d 470, 479 (7th Cir. 2009) (Cudahy, J., concurring in part, dissenting in part) ("However theoretically attractive may be the principle of 'beneficiary pays,' an unbending devotion to this rule in every instance can only . . . discourage construction [of long-distance, high voltage transmission lines] while the nation suffers from inadequate and unreliable transmission. Unsurprisingly, it is not possible to realistically determine for each utility and with reference to each major project . . . the precise value of not having to cover the costs of power failures and of not paying costs associated with congestion, and all of this over the next forty to fifty years.").

275. The only time there has been federal siting authority for oil pipelines in the United States was during World War II, when German bombers cut off oil shipping routes from Texas to northeastern states. At that time, Congress created federal siting authority for oil pipelines to address the refusal of several states to approve oil pipelines to transport oil to Northeastern cities, and several key oil pipelines were built. However, federal authority lasted only until the end of the war, when siting authority was transferred back to the states. *See* Klass & Meinhardt, *supra* note 30, at 962–63.

private property and aesthetic values are not unimportant, and a state regulator will certainly be more responsive to the local communities impacted by the proposed project. The threat of a state permit denial may cause a transmission line company to re-route the line, re-think the project entirely, or come up with a less costly or more modest project with more limited environmental and land use impacts.[276] This is particularly true for public utility transmission lines projects (as opposed to merchant projects), because the public utility is incentivized to build large infrastructure projects to obtain a rate of return on those investments from ratepayers.[277] Moreover, delays in electric transmission line projects may give time for new technologies, like large scale batteries and other forms of energy storage to reduce or eliminate the need for certain projects in the first place.

Despite these arguments that favor state primacy over interstate electric transmission line siting, a federal or regional approach appears to be a better solution based on the arguments set out above. On balance, a regulatory structure that gives states primary authority over interstate electric transmission lines does not appear to meet the criteria developed earlier to future-proof energy transport laws and energy transport infrastructure. While not every "big" transmission project should ultimately be built, there are benefits to building at least some of them, in order to determine the full extent to which more significant amounts of renewable energy, particularly utility-scale wind, can transform the electric grid. To date, state law has made such projects costly and difficult in many parts of the country.

Thus, it is not surprising that scholars have argued in recent years that regulatory authority over interstate electric transmission lines should shift from the states to FERC; to a regional entity that could more fully take into account national and regional electric energy needs; or to a group of states through interstate compacts.[278] Another option is the path Congress used in the Telecommunications Act of 1996 to address local government

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276. *See* Huntoon, *supra* note 243 (discussing how state regulatory scrutiny can result in more modest and more appropriate transmission line projects).

277. *Id.*; Rebecca Smith, *Utilities' Profit Recipe: Spend More*, WALL ST. J., Apr. 20, 2015; Werntz, *supra* note 95 (discussing differences between merchant transmission line companies and public utilities); Order Adopting a Ratemaking and Utility Revenue Model Policy Framework, N.Y. Pub. Serv. Comm'n, Case 14-M-0101 (May 19, 2016), http://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId=%7BD6EC8F0B-6141-4A82-A857-B79CF0A71BF0%7D (adopting new revenue model for New York utilities and discussing limitations of traditional ratepayer recovery model that rewards investment in capital intensive infrastructure projects and replacing it with a revenue model based on performance metrics). For a discussion of utility ratemaking, see KLASS & WISEMAN, *supra* note 208, at ch. 6.

278. *See* Klass, *supra* note 51 (discussing potential for federal or regional siting authority for interstate electric transmission lines); *id.* at n.1 (collecting citations to scholarship arguing for increased federal authority over siting of intestate electric transmission lines).

roadblocks to siting cell phone towers.[279] In that law, Congress retained siting authority with local governments but created new, federal standards for processing applications, prohibited outright bans on cell phone towers, set deadlines for local government decisions, and created an expedited right of review in federal court.[280]

There are also concerns over whether existing state laws violate the dormant Commerce Clause by elevating state interests over interstate movement of electric energy resources.[281] Creating more federal authority or regional authority over interstate electric transmission line siting would help address these issues. Indeed if merchant transmission line companies or others parties adversely affected by state permitting processes begin to bring successful dormant Commerce Clause challenges in these cases, Congress may be compelled to address this issue, as it did in 1935 with the enactment of Part II of the Federal Power Act, after the U.S. Supreme Court held that the dormant Commerce Clause prevented states from regulating interstate electricity sales.[282]

2. Transporting Oil by Rail vs. Pipeline

The prior illustration focused primarily on who should regulate the only currently available means of energy transport for electricity—interstate electric transmission lines—to best future proof the electricity sector. This second illustration focuses not on who should regulate but, instead, *how* to choose between two options for transporting crude oil—today's dominant energy resource in the transportation sector. As explained in Part I, although interstate pipelines have been the primary form of oil transport for decades,

279. Telecommunications Act of 1996, 47 U.S.C. § 332(c)(7) (2012).

280. For a discussion of the cell phone tower siting provisions of the Telecommunications Act of 1996 and their potential application to electric transmission line siting as well as renewable energy generation facilities, see Ashira Pelman Ostrow, *Process Preemption in Federal Siting Regimes*, 48 HARV. J. ON LEGIS. 289, 293 (2011); Klass, *supra* note 51, at 1951–52; Klass & Wilson, *supra* note 208, at 1865–66.

281. *See* Klass & Rossi, *supra* note 122 (discussing dormant Commerce Clause concerns with existing state transmission siting laws).

282. *See* Pub. Utils. Comm'n of R.I. v. Attleboro Steam & Elec. Co., 273 U.S. 83 (1927) (holding that Rhode Island could not regulate electricity sales from a utility in Rhode Island to a customer in Massachusetts without violating the dormant Commerce Clause); Federal Power Act §§ 201–06 (codified at 16 U.S.C. §§ 824–824e) (addressing the "*Attleboro* gap" and granting the Federal Power Commission—now FERC—authority to regulate the transmission of electricity in interstate commerce and wholesale sales of electricity in interstate commerce); FERC v. Elec. Power Supply Ass'n, 136 U.S. 760, 767 (2016) (discussing Congress's enactment of the Federal Power Act in 1935 to respond to the *Attleboro* gap).

there has been a growing reliance on rail to transport oil from the Bakken shale region in North Dakota and other new production areas to refineries.[283] Thus, the question here is whether the future proofing criteria identified above favors relying more heavily on an expanded rail system to supplement existing pipelines for new U.S. oil transport needs or whether these criteria support additional pipeline expansion.

With regard to the ability to balance regional and national energy transport needs against the local costs of energy transport infrastructure, existing laws governing railways already promote national, interstate transportation interests over more localized concerns. The U.S. Department of Transportation's Surface Transportation Board ("STB")[284] has broad jurisdiction over "transportation by rail carriers" as well as the construction and operation of tracks and facilities under the Interstate Commerce Commission Termination Act ("ICCTA").[285] The Federal Railroad Administration ("FRA") is responsible for railroad safety.[286] The ICCTA also includes an express preemption clause, which courts have interpreted as displacing state and local regulation that would "manage," "govern," or interfere with rail transportation but does not necessarily displace state or local public health and safety laws of general applicability that have only an incidental impact on rail transportation, such as local electric, building, fire, and plumbing codes.[287]

This stands in stark contrast to the regulatory regime governing interstate oil pipelines, which allows states to promote state and local needs over

283. *See supra* notes 38–42 and accompanying text.

284. *See About*, SURFACE TRANSPORTATION BOARD, www.stb.dot.gov/stb/about/overview.html.

285. Island Park, LLC v. CSX Transp., 559 F.3d 96, 102 (2d Cir. 2009) (quoting 49 U.S.C. § 10501(b)(1)); Norfolk S. Ry. Co. v. City of Alexandria, 608 F.3d 150, 157 (4th Cir. 2010) (discussing enactment of ICCTA and creation and jurisdiction of the STB); 49 U.S.C. § 10501(b)(1).

286. *See* U.S. DEP'T. OF TRANSP., FED. R.R. ADMIN., https://www.fra.dot.gov/Page/P0002. *See also* SURFACE TRANSPORTATION BOARD, *supra* note 284 (discussing history of ICC and STB); 49 U.S.C. § 10102(9); *Norfolk Southern Ry. Co*., 608 F.3d at 157 (explaining that "transportation" by rail carriers is defined broadly in ICCTA as including any facility or services relating to movement of passengers or property by rail).

287. *See* 49 U.S.C. § 10501(b); *Norfolk Southern Ry Co.*, 608 F.3d at 157–58, 160 (discussing scope of ICCTA preemption clause); Green Mountain R.R. Corp. v. Vermont, 404 F.3d 638, 643 (2d Cir. 2005) (state and local governments may regulate certain areas affecting railroad activities such as local electric, building, fire, and plumbing codes); Borough of Riverdale Petition for Declaratory Order, 4 S.T.B. 380, 389, 1999 WL 715272 (S.T.B., Sept. 9, 1999) (local governments can enforce in non-discriminatory manner electrical and building codes and can take action to address genuine emergencies on railroad properties). *See also* Jim Anderson, *Railroad Steams Ahead with St. Paul Rail Yard Expansion*, STAR TRIB., Sept. 19, 2014 (discussing inability of City of St. Paul to impose environmental review or permitting requirements on Canadian Pacific Railway in connection with controversial switching yard expansion in wetland and wildlife area after Canadian Pacific sought a preemption determination from the STB).

national energy needs. While not all states have stringent permitting requirements for oil pipelines,[288] growing opposition to oil pipelines in many regions of the country, as a result of the controversy over Keystone XL and Dakota Access, coupled with new alliances between climate change activists and landowners, are making oil pipelines more difficult to permit and construct. Moreover, state agencies and courts are becoming more receptive to such arguments.[289] This is in large part because concerns about state and local environmental and landowner costs are more easily able to dominate the state regulatory process.[290] One can argue quite persuasively that the federal regime governing railroads places too much weight on national transportation needs and too little weight on state and local health and safety concerns.[291] But to the extent new infrastructure is necessary to transport oil across the country, it makes approving new railroad lines far easier than approving new pipelines, at least in some states, thus meeting current energy needs.

As for flexibility regarding the amount and location of energy resources, rail would appear to be superior to pipelines to transport oil. As discussed in Part I, rail is established infrastructure that already serves every oil refinery in the country, and using it to transport oil requires only the construction of new loading and unloading facilities and some track expansion, which can be approved more quickly than pipelines, thus allowing greater flexibility, increased response time to market fluctuations, and fewer capital risks.[292] This is why some producers favor transporting oil

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288. For a discussion of the permitting requirements for oil pipelines in all 50 states, see Klass & Meinhardt, *supra* note 30, at 982–89 and app. A.

289. *See supra* notes 35–37 and accompanying text (discussing growing opposition to oil pipelines and decisions by state PUCs and courts to reject proposed pipelines or limit eminent domain rights in part because adverse impacts on state residents exceed state benefits regardless of national benefits); Sawyer, *supra* note 36 (discussing protests for Sandpiper oil pipeline and diversity of participants).

290. *See, e.g.*, *Iowa Landowners Cry Foul Over Eminent Domain Claim*, ENERGYWIRE (July 29, 2015), http://www.eenews.net/energywire/stories/1060022550/feed (reporting on lawsuit questioning Iowa PUC's authority to grant eminent domain authority to interstate oil pipeline company on grounds that "[o]ut-of-state companies shouldn't be allowed to use Iowa law to take farmland from Iowans and install a hazardous pipeline and then not be subject to our laws about safety."); Jenny Mandel, *Protesters' Win "a Wakeup Call" for Other Pipeline Projects*, ENERGYWIRE (Dec. 6, 2016), http://www.eenews.net/energywire/2016/12/06/stories/1060046715 (quoting oil pipeline company public affairs expert stating that it is easier "'to deal with an agency like FERC, and your senator and your congressman, and to get support that way,' than it is to go to 50 different towns along your pipeline route holding open houses and coffee gatherings, only to be met by state officials worried about the level of local opposition they're experiencing.").

291. *See, e.g.*, Anderson, *supra* note 287 (discussing inability of City of St. Paul, Minnesota to apply its environmental protection provisions to railroad expansion project).

292. *See supra* note 40 and accompanying text. *See also* QER, *supra* note 4, at 5-5 (discussing

by rail over pipeline in some parts of the country despite the fact that it costs $5-10 more per barrel for rail transport.[293] Indeed, the railroad industry spent $575 billion on rail network expansion and maintenance between 1980 and 2014, and will likely continue to invest in expansion of rail facilities in light of an expected 45% overall increase in freight shipments from an estimated 19.7 billion tons in 2012 to 28.5 billion tons in 2040.[294]

More important, the benefits of any expansion or upgrades to existing rail infrastructure to transport oil are not limited to fossil fuel resources. Railroads are used to transport a variety of agricultural commodities, other freight, and of course people. As a result, investments in rail infrastructure can be valuable to the economy as a whole, not just to the oil industry.[295] Finally, even beyond the flexibility that comes with the ability to transport a variety of commodities and passengers, rail infrastructure has an impressive history of being able to convert to entirely new uses, as shown by the federal Rails to Trails program, which has converted over 20,000 miles of unused rail lines to bicycle and walking trails.[296] By contrast, billions of dollars of investments in new oil pipelines benefit the oil industry in the short term but create capital-intensive infrastructure that cannot easily be converted to other purposes. This is a major limitation, particularly if the nation ultimately is able to reduce reliance on oil in the transportation sector and transition to more efficient gasoline vehicles, EVs, or whatever new technologies may be developed in the future.[297]

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flexibility of rail for oil transport as compared to pipelines); Russell Hubbard, *Union Pacific Aims to Be First Railroad to Haul Liquefied Natural Gas*, OMAHA WORLD-HERALD, Mar. 19, 2015 ("[T]he fact is that railroads are the best bet to get significant amounts of natural gas to market given the decades it takes to permit and construct pipelines."); ALLIANCE FOR INNOVATION AND INFRASTRUCTURE, BACK ON TRACK: BRINGING RAIL SAFETY TO THE 21ST CENTURY 1, 3–4 (2015) (discussing limitations of U.S. pipeline system to transport new sources of shale oil, difficulty of building new pipelines because of local opposition, and why the rail system is a more flexible and extensive transportation network for transporting new sources of oil if safety measures can be implemented).

293. *See supra* notes 38–40 and accompanying text; Tracy Johnson, *Pipelines vs. Trains: Which is Better for Moving Oil?*, CBC NEWS (Mar. 10 2015), http://www.cbc.ca/news/business/pipelines-vs-trains-which-is-better-for-moving-oil-1.2988407.

294. ASS'N OF AMERICAN R.RS., RAILROADS AND COAL 10 (2015).

295. *See supra* note 45 and accompanying text (discussing inability of existing rail system to accommodate growth in oil transport without adverse impacts on grain and passenger rail transport).

296. *See, e.g.*, *History of RTC and the Rail-Trail Movement*, RAILS TO TRAILS CONSERVANCY, http://www.railstotrails.org/about/history/; Jason Keyser, AP, *Abandoned Chicago Railway Reborn as Commuter Corridor*, SALON (Aug. 23, 2015), http://www.salon.com/2015/08/23/abandoned_chicago_railway_reborn_as_commuter_corridor/.

297. *See supra* notes 3–8 and accompanying text (noting concerns that investment in new oil and gas pipeline infrastructure will create a path dependency that will lock in continued reliance on fossil fuels for decades); Andrew Leach, *Is Canada Headed for a Pipeline Bubble?*, MACLEAN'S, May 27, 2014 (questioning whether Canada needs new pipeline expansion if it intends to abide by its international commitments to reduce GHG emissions, which would require limiting oil sands development). *But see*

With regard to promoting state and federal clean energy goals, building new oil pipelines locks in continued reliance on fossil fuels for decades and thus is not consistent with policies encouraging a transition away from such energy sources. By contrast, an expanded rail system would facilitate continued short-term use of fossil fuels by transporting oil to refineries without precluding the use of that infrastructure expansion at a later date for other purposes unrelated to fossil fuel transport. Thus, this crierion also supports greater use of rail for transporting oil not served by existing oil pipeline infrastructure.

However, in the context of rail versus pipelines for oil transportation, there are also important questions regarding which form of oil transport better protects overall human health, safety, and the environment. These questions are at least equal in importance, if not more important, than the criteria already discussed in considering the benefits and drawbacks of rail and pipelines for oil transport. On this issue, the evidence appears to be mixed. Although there have been several recent oil-by-rail disasters resulting in death and destruction of property, there have also been several recent major oil pipeline spills that have had significant adverse effects on human health and the environment.[298] Pipeline supporters contend that accidents happen more frequently on railways,[299] while rail supporters counter that when pipelines fail, they spill many more gallons of oil.[300] According to government statistics, both claims are accurate.[301] Data also

KUB, *supra* note 45 (contending that building new pipelines to accommodate oil transport is better for the grain industry than railroad expansion but recognizing that rail expansion can also help alleviate current bottlenecks).

298. *See, e.g.*, PAUL F. PARFOMAK, CONG. RESEARCH SERV., R41536, KEEPING AMERICA'S PIPELINES SAFE AND SECURE: ISSUES FOR CONGRESS (2013), https://www.fas.org/sgp/crs/homesec/R41536.pdf (detailing several high-profile pipelines spills); FRITTELLI ET AL., *supra* note 40, at 10–14 (discussing recent oil pipeline spills and oil train derailments); PAUL W. PARFOMAK, CONG. RESEARCH SERV., R44201, DOT'S FEDERAL PIPELINE SAFETY PROGRAM: BACKGROUND AND KEY ISSUES FOR CONGRESS (2016) (discussing data on pipeline spills and federal laws and regulations governing pipeline safety).

299. *See, e.g.*, KENNETH P. GREEN & TAYLOR JACKSON, FRASER RESEARCH BULLETIN, SAFETY IN THE TRANSPORTATION OF OIL AND GAS: PIPELINES OR RAIL? (2015) (using U.S. and Canadian data to conclude that oil transport by pipeline is safer than rail). *But see* Blake Sobczak, *Pipelines Safer than Rail for Moving Oil—Study*, ENERGYWIRE, Aug. 14, 2015 (discussing data limitations of Fraser Institute study).

300. ALLIANCE FOR INNOVATION AND INFRASTRUCTURE, *supra* note 292 (discussing benefits of shipping oil by rail, the strong safety record for rail, and ability to improve rail safety for oil transport through new regulations and best practices).

301. *See, e.g.*, Emily Atkins, *Data: Oil Trains Spill More Often But Pipelines Spill Bigger*, CLIMATE PROGRESS, Feb. 18, 2015 (reporting on higher accident rate for rail but larger volume spills for pipelines and concluding that "both rail and pipelines pose serious risks to human health, and instead of forcing people to choose between two dangerous options, we should focus on improving the safety of both

suggests that while rail accidents cause more harm to human health and property, pipeline spills cause more harm to natural resources and ecosystems.[302] Moreover, many oil spills that cause significant environmental harm go undetected because they are underground, while rail accidents are very visible, encouraging public and legislative demands for additional safety measures. According to the Pipeline and Hazardous Materials Safety Administration ("PHMSA"), existing pipeline leak detection systems have only detected 5% of pipelines spills over the past decade, and it often takes time for sensors to let operators know to shut off delivery when a problem exists.[303] For instance, in 2010, it took seventeen hours to detect the release from the Enbridge oil pipeline into the Kalamazoo River near Marshall, Michigan, which released nearly 850,000 gallons of Canadian oil sands, covering thirty-six miles of riverbed and resulting in significant harm to aquatic ecosystems and over $1 billion in remediation costs.[304] Experts at the International Energy Agency evaluated

modes of transport while transitioning to inherently less dangerous sources of energy."); Christopher Ingraham, *It's a Lot Riskier to Move Oil by Train Instead of Pipeline*, WASH. POST, Feb. 20, 2015 (reporting on PHMSA data on oil spills from pipelines and rail and using graphs to show relative number of accidents and volume of spills for each method); Rebecca Leber, *Exploding Oil Trains Aren't a Convincing Reason to Build the Keystone Pipeline*, NEW REPUBLIC, Feb. 17, 2015 (reporting on spill data from both forms of oil transport).

302. *See, e.g.*, Conca, *supra* note 3 (citing data showing transporting oil by rail poses more risk to humans and property while transporting oil by pipeline poses more risk to the environment); PARFOMAK, DOT'S FEDERAL PIPELINE SAFETY PROGRAM, *supra* note 298, at 3–4 (detailing major pipeline accidents from 2010–2016 and noting that while "pipeline releases have caused relatively few fatalities in absolute numbers, a single pipeline accident can be catastrophic in terms of public safety and environmental damage.").

303. Lisa Song, *Few Oil Pipeline Spills Detected by Much-Touted Technology*, INSIDECLIMATE NEWS (Sept. 19, 2012), https://insideclimatenews.org/news/20120919/few-oil-pipeline-spills-detected-much-touted-technology (reporting on PHMSA data showing that remote sensors detected 5% of the nation's pipeline spills between 2002 and 2012, as compared to 22% reported by members of the public and 62% reported by company employees at the scene of the accident). *See also* James MacPherson, AP, *Massive 2013 Oil Spill in North Dakota Still Not Cleaned Up*, ABC NEWS (Dec. 19, 2016), http://abcnews.go.com/US/wireStory/massive-2013-oil-spill-north-dakota-cleaned-44266811 (reporting on slow cleanup of 840,000 gallon oil spill in North Dakota in 2013 and noting that industry leak detection technology did not identify the 2013 spill or a more recent 2016 pipeline spill in North Dakota; instead landowners discovered both leaks by smelling oil in the vicinity many days after the leaks began).

304. *See* David Hasemyer, *Enbridge Faces Maximum Fine of $86 Million for Kalamazoo Spill*, INSIDECLIMATE NEWS (Aug. 28, 2014), https://insideclimatenews.org/news/20140828/enbridge-faces-maximum-fine-86-million-kalamazoo-spill; Alex Mitchell, *Timeline of Major Events in Kalamazoo River Spill*, MLIVE (July 20, 2015), http://www.mlive.com/news/kalamazoo/index.ssf/2015/07/kalamazoo_river_oil_spill_time.html; *2010 Enbridge Oil Spill in Michigan*, U.S. FISH & WILDLIFE SERVICE, NATURAL RESOURCES DAMAGES ASSESSMENT AND RESTORATION, http://www.fws.gov/midwest/es/ec/nrda/MichiganEnbridge/. *See also N.D. Officials Consider Easing Pipeline Spill Fine*, AP, Dec. 14, 2015 (reporting that North Dakota officials were considering easing a $2.4 million fine against a Texas company for an oil pipeline spill that "spewed saltwater and oil for three months before being discovered" and that regulators say such settlement efforts "promote[] cooperation.").

data on both pipeline spills and rail spills in recent years and agreed that although rail accidents were more frequent, pipeline spills were often more serious and also were underreported.[305] These facts suggest that the health and environmental risks associated with pipelines may be understated as compared to rail accidents, which are immediately visible to regulators and the public and subject to immediate emergency response.

In light of the safety-related shortfalls of both means of transporting oil, an equally relevant question may be whether new regulations governing rail or pipeline safety can significantly improve the safety record of either form of oil transport. Significantly, because very little oil had been shipped by rail before the fracking boom in the late 2000s, there was little need for developing new rules for tank cars, tracks, and other safety measures for the industry relating specifically to the transportation of oil.[306] By contrast, pipelines have been the dominant method for transporting oil in the United States for many decades, meaning that any lag in safety improvements can be more easily attributed to inadequate government regulation, industry compliance failures, inadequate enforcement failure, or a combination of these factors.

A review of new safety proposals for both methods of oil transport also reveals mixed results, although there appears to be more potential for relative safety increases for rail than for pipelines in the near future. With regard to pipelines, Congress enacted a major pipeline safety bill in 2011, The Pipeline Safety Act, following the Kalamazoo River oil spill that, among other things, increased the maximum civil fine for safety violations, required DOT to develop new safety rules for oil and gas pipelines including requiring automatic shut-off valves on new pipelines and new release reporting requirements, and directed DOT to prepare reports to Congress on a variety of pipeline safety issues.[307] But in July 2015, members of the U.S.

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305. Esser, *supra* note 3. According to the analysis, although reported rail spills are more frequent than pipeline spills, federal regulations require reporting for rail spills of any amount but require reporting only for pipeline spills greater than nineteen liters. Thus, once small rail spills are removed, the difference between the number of pipeline spills and the number of rail spills narrows considerably. *Id. See also* Liz Hampton, *With Dakota Access in Limbo, More Bakken Crude to Move on Trains*, REUTERS (Dec. 6, 2016), http://www.reuters.com/article/us-north-dakota-pipeline-rail-idUSKBN13V2IC?feedType=RSS&feedName=domesticNews (reviewing PHMSA data and noting that "oil spills more frequently with pipelines than rail cars" and that with lower volumes of oil traveling by rail since 2015 as a result of lower oil prices and decreased production in the Bakken region, spills from rail cars have decreased significantly).

306. *See, e.g.*, ALLIANCE FOR INNOVATION AND INFRASTRUCTURE, *supra* note 292, at 1 ("Many of the existing safety regulations [for rail] were not implemented under current railway-usage conditions, where increased freight volume amplifies the likelihood of a hazard.").

307. Dan Frosch, *Congress Approves Pipeline Safety Bill*, N.Y. TIMES, Dec. 11, 2011; Mark C.

House Energy and Commerce subcommittee questioned the PHMSA Interim Director at a hearing as to why the agency had not yet implemented most of the rules and reports mandated under the 2011 legislation.[308] Although the agency released a set of proposed safety rules in October 2015,[309] the rules were still not final at the end of 2016 and, even when final, industry compliance and DOT enforcement will remain an issue.[310] Many pipeline spills have occurred when industry has not followed current safety standards. For instance, Plains Pipeline, the company responsible for the May 2015 Santa Barbara oil spill that released over 100,000 gallons of oil near a state beach as a result of significant corrosion in the pipeline, had accumulated 175 safety and maintenance violations since 2006, resulting in over $115,000 in civil penalties, releasing more than 688,000 gallons of oil, and causing $23 million in property damage, prior to its most recent spill.[311]

As for rail safety, an analysis of freight train derailments from 2001 to 2010 found that broken rails or track welds were the leading cause of derailments with 665 derailments; track geometry defects were the next leading problem with 317 derailments; and other track, train car, and operator errors made up the remainder.[312] Despite these statistics, most of the regulatory activity on improving oil-by-rail safety has been on rail car design to prevent accidents and mitigate damages in the case of an accident. In May 2015, the PHMSA and FRA jointly issued a final rule for "Enhanced

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Kalpin et al., *Recently Enacted Pipeline Safety Act Will Increase Federal Oversight of Oil and Gas Pipelines*, WILMERHALE PUBLICATIONS AND NEWS (Jan. 5, 2012), https://www.wilmerhale.com/pages/publicationsandnewsdetail.aspx?NewsPubId=94953; Pipeline Safety, Regulatory, Certainty, and Job Creation Act of 2011 (Pipeline Safety Act, P.L. 112-90); PARFOMAK, DOT'S FEDERAL PIPELINE SAFETY PROGRAM, *supra* note 298, at 8, 12–18 (discussing provisions of Pipeline Safety Act).

308. Nick Snow, *U.S. House Panel Grills PHMSA's Interim Chief Over Pipeline Safety Delays*, OIL & GAS J., July 14, 2015; PARFOMAK, DOT'S FEDERAL PIPELINE SAFETY PROGRAM, *supra* note 298, at 29 (discussing frustration by members of Congress regarding PHMA's failure to complete Pipeline Safety Act statutory mandates which has delayed implementation of required safety regulations and makes it difficult for Congress to evaluate the effectiveness of the statutory provisions).

309. U.S. Dept. of Transp., Pipeline and Hazardous Materials Safety Admin., Pipeline Safety: Safety of Hazardous Liquid Pipelines, 80 Fed. Reg. 61,610 (Oct. 1, 2015); Rachel Leven, *PHMSA Release Hazardous Liquid Pipeline Proposal*, 191 BNA DAILY ENVTL. REP. A-25, Oct. 2, 2015.

310. *See* PARFOMAK, DOT'S FEDERAL PIPELINE SAFETY PROGRAM, *supra* note 298, at 18–21, 24–26 (discussing long-term staffing shortages at DOT to implement and enforce pipeline safety and potential inadequacy of enforcement penalties on industry).

311. Julie Cart et al., *Santa Barbara Oil Spill: Pipeline Operator has Long Record of Problems*, L.A. TIMES, May 20, 2015. Plains Pipeline is part of Plains All American Pipeline, which owns and operates over 18,000 miles of pipeline networks in several states, and reported $43 billion in revenue and $878 million in profit in 2014. *Id*.

312. M. RAPIK SAAT ET AL., U.S. DOT REGION V REGIONAL UNIVERSITY TRANSPORTATION CENTER, ANALYSIS OF CAUSES OF MAJOR TRAIN DERAILMENT AND THEIR EFFECT ON ACCIDENT RATES 154–63 (2012), http://www.purdue.edu/discoverypark/nextrans/assets/pdfs/Integrating%20Hazardous%20Materials%20Transportation%20Safety%20Risk%20Management%20Framework.pdf; FRITTELLI ET AL., *supra* note 40, at 19.

Tank Car Standards and Operational Controls for High-Hazard Flammable Trains," which included requirements for enhanced braking, increased thickness and thermal protections for tank shells in high-hazard flammable train cars, reduced operating speeds, rail routing risk assessments, and rail routing information access.[313] The rules required tank cars built prior to 2011, which have the fewest safety features, to be replaced by 2018, while newer tank cars must be retrofitted or replaced by 2020.[314] The railroad industry opposed the rules as too restrictive and unnecessary while safety advocates as well as members of Congress from high rail traffic areas argued the rules did not provide sufficient protections for the increased transport of oil by rail.[315] Others contended that the rules were a step in the right direction but could be more effective if they focused more heavily on assessing and improving track integrity and providing more automatic safety backups to reduce the risk of human error, since track-related problems are the highest cause of derailments in the first place.[316]

Just a few months later, in December 2015, Congress enacted the "Fixing America's Surface Transportation Act of 2015" or "FAST Act."[317] The FAST Act was the first multi-year federal transportation bill in over a decade, and included provisions governing the safe transport by rail of energy products such as oil and other and hazardous materials.[318] The statute required a commodity-specific phase out of pre-2011 tank cars and created statutory mandates for thermal blankets, top fitting protections on tank cars, and provisions to harmonize the tank retrofit schedule with the schedule Transport Canada has set for its tank cars.[319] The FAST Act schedule for tank car upgrades accelerated the upgrade schedule for unrefined petroleum

313. *Rule Summary: Enhanced Tank Car Standards and Operational Controls for High-Hazard Flammable Trains*, U.S. DEP'T. OF TRANSP., https://www.transportation.gov/mission/safety/rail-rule-summary; Blake Sobczak, *Stung by Derailments, U.S. and Canada Rewrite Crude-by-Rail Regs*, GREENWIRE (May 1, 2015), http://www.eenews.net/stories/1060017838.

314. U.S. DEPT. OF TRANSP., *supra* note 313; Jad Mouawad, *New Oil Train Rules Are Hit from All Sides*, N.Y. TIMES, May 1, 2015.

315. Mouawad, *supra* note 314.

316. ALLIANCE FOR INNOVATION AND INFRASTRUCTURE, *supra* note 292, at 9–17 (setting forth policy recommendations for new rules to increase safety of oil transport by rail).

317. P.L. 114-94.

318. *See* FAST Act Overview, U.S. DEPT. OF TRANSP., https://www.fra.dot.gov/Page/P0919.

319. *See* U.S. Dept. of Transp., Pipeline and Hazardous Safety Admin., Hazardous Material: FAST Act Requirements for Flammable Liquids and Rail Tank Cars, 81 Fed. Reg. 53935 (Aug. 15, 2016) (describing relevant provisions of FAST Act). *See also* Kevan Stone, NAT'L ASSOC. OF COUNTIES, *PHMSA Codifies FAST Act Requirements for Hazardous Liquids and Rail Tank Cars* (Aug. 17, 2016), http://www.naco.org/blog/phmsa-codifies-fast-act-requirements-flammable-liquids-and-rail-tank-cars (summarizing provisions).

products and relaxed it for certain other products, although the number and types of cars required for upgrade and retrofit did not change.[320] In August 2016, the PHMSA issued new regulations to harmonize its earlier regulations with the requirements of the FAST Act.[321]

In sum, there is clearly room for improving safety associated with transporting oil by both pipeline and by rail. The federal agencies responsible for regulating the safety of both forms of oil transport are in the process of enacting new rules and safeguards. There is perhaps more reason to be cautiously optimistic regarding the ability of regulators to improve rail safety more quickly than pipeline safety. Pipelines continue to suffer significant spills, delays in rulemaking, and compliance problems despite having served as the dominant form of oil transport for many decades. Pipelines themselves are not visible to the public, regulators, or operators, and the ability to respond to problems and keep the issue salient with Congress, regulators, and the public is hampered by this lack of visibility, making regulatory improvements more difficult. Rail regulators, by contrast, have responded relatively quickly with new rules after industry began transporting increased amounts of oil by rail and are also subject to new Congressional mandates. The public, activists, members of Congress and state officials are able to visibly monitor oil by rail transport activities on a daily basis, which results in additional pressure on Congress and federal agencies to impose new safety regulations and encourage compliance. Only time will tell if new rail safety standards will continue to be imposed and whether those standards have a real impact on oil-by-rail accidents. But the benefits of transporting oil by rail discussed earlier in this section coupled with the mixed data on the relative safety of transporting oil by pipeline as opposed to rail appear to favor a greater reliance on rail in the short term to transport oil. Rail expansion would avoid significant investment in new pipeline infrastructure that can only be used for fossil fuels. It would also focus investment in infrastructure that could be used later to transport a wide variety of commodities and passengers if the nation is ultimately successful in reducing domestic oil demand.

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320. 81 Fed. Reg. at 53941.

321. *Id.* at 53935. *See also* PHMSA Codifies FAST Act Requirements for Flammable Liquids and Rail Tank Cars, PHMSA (Aug, 10, 2016), http://www.phmsa.dot.gov/hazmat/phmsa-codifies-fast-act-requirements-for-flammable-liquids-and-rail-tank-cars.

CONCLUSION

This Article considers the important decisions the United States must make now regarding how to shape the expansion of energy transport infrastructure. The nation is faced with a new abundance of low cost fossil fuel and renewable energy resources at a scale not contemplated by industry experts as recently as ten years ago. Although, for the most part, it is the private sector that will make the investment decisions on whether to expand energy transport infrastructure and where that expansion will take place, legal structures governing siting permits and eminent domain authority necessary for some forms of expansion will influence those decisions greatly. This Article illustrates why choices made now on energy transport infrastructure will heavily impact whether the nation continues to rely significantly on fossil fuel resources for decades to come or can aid the transition to low-cost and no-carbon sources of renewable energy for electricity generation and in the transportation sector. This Article also suggests that in order to best future-proof energy transport infrastructure, it is important to create regulatory frameworks that: (1) grant federal or regional authority for approving energy transport infrastructure that physically spans multiple states; (2) do not lock-in assumptions regarding the location and amount of expected energy resources to transport, import, or export; and (3) support current and future federal and state clean energy policies. With these criteria in mind, policymakers and industry can better use energy transport laws and energy transport infrastructure to meet today's energy needs and at the same time integrate the rapid technological and economic changes in the U.S. energy landscape.