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Preempting Parochialism and Protectionism in Power

Sandeep Vaheesan

PREEMPTING PAROCHIALISM AND PROTECTIONISM IN POWER

Sandeep Vaheesan[†]

ABSTRACT

In the twenty-first century, the electric power industry is becoming increasingly regional in geographic scope. Due to the creation of wholesale power markets and the development of renewable energy resources, greater quantities of power flow across state lines today than at any time in the history of the industry. With this growth in the interstate trade in power, expanding the transmission grid can yield significant regional benefits. New transmission lines can enhance system reliability, reduce the level and volatility of power prices, and improve the environment on a local and global scale. While the benefits of new transmission are broadly shared, the costs of new transmission – both economic and non-economic – tend to be concentrated on the localities through which the lines run.

Despite the potentially large benefits from new transmission interconnections, aggregate transmission investment has declined in recent decades. State jurisdiction over transmission siting has been cited as a chief cause of underinvestment in the grid. Because of the asymmetry of benefits and costs, states often do not want to authorize lines that would benefit their neighbors at the expense of their own citizens. Those residing near proposed transmission lines tend to be among the most vocal opponents of them. For them, new lines are blights on the horizon and potential hazards to their health that frequently offer no tangible benefits in return. To compound the state and local bias against new transmission investment, powerful incumbent utilities sometimes use regulatory processes to block new projects as a means of protecting their market power.

To facilitate the construction of socially beneficial grid expansions, Congress should preempt state and local authority over the funding and siting of new transmission lines. The Federal Energy Regulatory Commission should be granted exclusive authority over where to site and how to pay for new transmission. A federal regulator would approve transmission projects based on a comprehensive examination of their benefits and costs, instead of the parochial assessment often performed today by states. Congress would be acting well within its constitutional authority and would, in fact, be following past legislative enactments in other network industries. Congress must act if the United States is to realize the vision of affordable, reliable, and clean electricity for all Americans.

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I. INTRODUCTION

The integration of the world economy has been one of the major international developments of the past thirty years.[1] In addition to the reductions in tariffs and quotas that have occurred at the much-heralded Uruguay and Doha Rounds of multilateral negotiations and through bilateral agreements,[2] an important precondition for successful economic integration has been the existence of secure international transportation routes necessary to facilitate long-distance trade.[3] The elimination of regulatory trade barriers would not have had much practical effect if highways and rail networks were underdeveloped and ocean shipping lanes were plagued by piracy.[4] In other words, both legal and physical impediments to trade had to be overcome – one without the other would have been insufficient.

Yet, in the context of restructuring the American electric power industry, this is exactly what has occurred on a national scale. Legal barriers to new entry and competition in the generation sector have been steadily removed, with the next major goal being to place fossil fuel and renewable technologies on an equal economic footing.

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[1] *See* RONALD A. REIS, THE WORLD TRADE ORGANIZATION 30 (2009) ("Globalization, whether through finance, travel, communications, cultural penetration, or trade, is, in effect, all about connectivity: the closer integration of the countries and peoples of the world. Although the phenomenon of globalization has been with us, to varying degrees, for thousands of years, it is in the post-World War II period, and particularly since 1980, that globalization has become all-pervasive and encompassing.").

[2] Arvind Panagariya, *Think Again: International Trade*, FOREIGN POL'Y, Nov. 1, 2003.

[3] *See id.* ("With the enormous reductions in the cost of communication and transportation that have taken place in the past 25 years, the barriers to the flow of capital, goods, services, knowledge, and people also have fallen.").

[4] Going back further in history, the construction of the transcontinental railroads helped create a single national market in the politically unified but previously economically fragmented United States. *See* FRANK A. WOLAK, THE BENEFITS OF AN ELECTRIC SUPERHIGHWAY 1 (2003) ("The ability to move more products around the country at lower cost expands the size of any supplier's market. California provides a historic example. The transcontinental rail network dramatically expanded the size of the market for California fruits and vegetables, and benefited not only farmers here but also consumers throughout the United States.").

As hoped, significant new entry has occurred – with investment in natural gas generation leading the way in the late 1990s and early 2000s and wind energy gaining share in recent years.[5] The transmission grid – the "interstate highway system" of electric power – has, however, not been adequately expanded and remains largely tied to the old standard of geographically small, electrically isolated utilities.[6] Thus, a regime of long-distance trading of power has been superimposed on a fragmented grid. While the economic and environmental promise of regional markets and renewable energy is great, they are unlikely to realize their full potential without significant expansions of the existing transmission grid.[7]

While there are multiple reasons for underinvestment in new transmission facilities, the near-exclusive jurisdiction states retain over the siting and cost allocation of transmission facilities has been cited as a principal cause.[8] The political incentives of state regulators explain why they have been reluctant to permit transmission facilities that strengthen regional power markets. New transmission lines can enhance system reliability, reduce the level and volatility of power prices, and improve the environment on a local and global scale. In contrast to these broadly shared benefits, the costs of new transmission – both economic and non-economic – tend to be concentrated on the localities through which the lines run. State regulators are reluctant to authorize new

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[5] Ken Costello, *Increasing Dependence on Natural Gas for Electric Generation: Meeting the Challenge*, 17 ELECTRICITY J. 10, 10 (June 2004); Richard Schmalensee, *Renewable Electricity Generation in the United States*, *in* HARNESSING RENEWABLE ENERGY IN ELECTRIC POWER SYSTEMS: THEORY, PRACTICE, POLICY 209, 211-12 (Boaz Moselle, Jorge Padilla & Richard Schmalensee eds., 2010).

[6] *Id.*

[7] Ashley C. Brown & Jim Rossi, *Siting Transmission Lines in a Changed Milieu: Evolving Notions of the "Public Interest" in Balancing State and Regional Considerations*, 81 U. COLO. L. REV. 705, 711-712 (2010).

[8] *See, e.g.*, *id.* at 710; Richard J. Pierce, *Completing the Process of Restructuring the Electricity Market*, 40 WAKE FOREST L. REV. 451, 483 (2005); Hoang Dang, Note, *New Power, Few New Lines: A Need for a Federal Solution*, 17 J. LAND USE & ENVTL. L. 327, 338 (2001-2002); Steven L. Eagle, *Securing A Reliable Electricity Grid: A New Era in Transmission Siting Regulation?*, 73 TENN. L. REV. 1, 12-13 (2005-2006).

transmission lines that increase rates for local ratepayers and impose aesthetic and environmental harms within the state but primarily yield benefits for other states. Moreover, powerful local stakeholders, whether landowners or incumbent firms, have sometimes used state regulatory processes to protect their economic interests at the expense of the larger public good. Although some states have taken a broader view of the benefits of transmission investments, the legislative mandates of many state transmission planners and significant anecdotal evidence suggest that state actors will continue to frustrate the construction of transmission lines needed to strengthen regional electricity markets.

This Article argues that Congress should preempt state and local authority over the siting and cost allocation of *all* new transmission facilities. A federal agency like the Federal Energy Regulatory Commission (FERC) should be granted authority to site and allocate the costs of new transmission lines across the affected region. Federal preemption would recognize in law that electricity is traded increasingly in regional markets that ignore state boundaries and that the transmission grid is a highly integrated "machine." Unlike parochial-minded state regulators, federal regulators would authorize transmission applications based on a comprehensive examination of a new line's effects and allocate the costs in an equitable manner across states. Increased transmission investment is by no means a panacea to the electricity sector's economic and environmental challenges. Grid expansion must be pursued in conjunction with demand-side response, distributed generation, efficiency measures, and the establishment of a price on greenhouse gas emissions. While far from being sufficient, transmission grid

expansions are *one of several necessary steps* required to establish regional electricity markets producing clean, economical, and reliable power.

II. EVOLUTION OF THE INDUSTRY AND ITS REGULATION

i. Industry Overview

The electricity industry consists of four processes: generation, transmission, distribution, and retailing.[9] Generation involves the conversion of chemical, mechanical or nuclear energy into electrical power using gas, steam or water turbines. In the United States today, coal- and natural gas-fired power plants, hydroelectric dams, and nuclear power plants are the principal means of electricity generation.[10] Transmission lines move electricity from generation sources to substations near the load centers where power is consumed. The voltage on transmission lines is usually in excess of 69,000 volts and can be as high as 765,000 volts.[11] Regardless of the "source" and "sink" stipulated in wholesale transactions,[12] electrons on account of Kirchhoff's Law flow over the path of least resistance.[13] Unlike liquid pipelines, transmission lines that use alternating current cannot facilitate point-to-point movement of electrons. Due to the interconnections between utilities, the transmission grid in the United States and Canada can, in terms of physical flows, be thought of as three large integrated machines – one covering the West, one covering the East, and one covering most of Texas.[14] Distribution is the movement of

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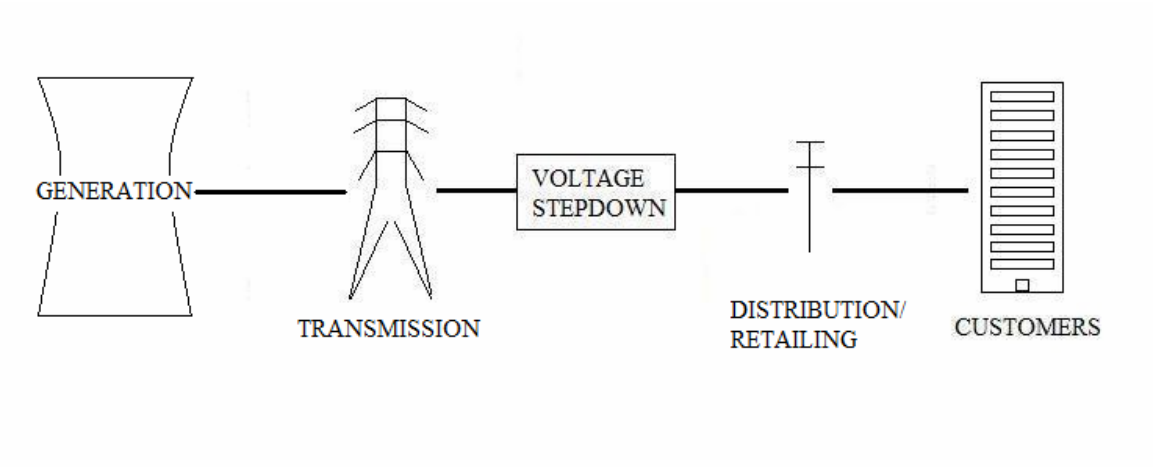
[9] Paul L. Joskow, *Restructuring, Competition and Regulatory Reform in the U.S. Electricity Sector*, 11 J. ECON. PERSP. 119, 121 (1997).
[10] *Electric Power Annual – Existing Capacity by Energy Source*, U.S. ENERGY INFO. ADMIN., http://www.eia.doe.gov/cneaf/electricity/epa/epat1p2.html (last updated Jan. 21, 2010).
[11] *Important factors Affecting Underground Placement of Transmission Facilities*, AM. ELEC. POWER, http://www.aep.com/about/i765project/docs/UGvsOVHDPaper.pdf.
[12] Generators who "inject" power on to the grid are referred to as "sources" while utilities and other consumers who "withdraw" power from the grid are referred to as "sinks."
[13] Pierce, *supra* note 8, at 462.
[14] *See id.* ("The amount of electricity generated in Ontario affects the amount and cost of the electricity available in Florida, while the amount of electricity consumed in California affects the amount of electricity

power at lower voltages from substations to local points of consumption. Transmission lines can be analogized to long-distance, limited-access highways while distribution lines can be thought of as local branch roads. Retailing is closely related to distribution and comprises the metering and billing of customers' electricity usage.

Figure 1



Historically, the entire industry was treated as a natural monopoly and regulated as such. Economies of scale and coordination were thought to exist at and between every stage of production from generation to retailing.[15] Utilities were granted exclusive franchises in a given territory and were responsible for constructing, maintaining and operating the entire infrastructure.[16] To protect consumers from this legally granted monopoly power, states imposed a cost-of-service regime on franchised utilities. Utilities were entitled to recover the costs they "prudently" incurred in providing service to

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that must be generated in Alberta and the price of electricity purchased in Salt Lake City. Electricity on an integrated transmission grid flows in extraordinarily complicated and volatile ways in inverse proportion to the resistance on each line.").

[15] Sidney A. Shapiro & Joseph P. Tomain, *Rethinking Reform of Electricity Markets*, 40 WAKE FOREST L. REV. 497, 505 (2005).

[16] *See* Pierce, *supra* note 8, at 453 ("The ownership structure of the industry was complicated and varied, but most consumers purchased electricity from a privately-owned monopoly service provider that was regulated primarily by one or more state public utility commissions ('PUCs'). The vast majority of electric utilities were completely vertically integrated—each engaged in generation, transmission, and distribution of electricity.").

customers as well as a reasonable rate of return on their capital investments.[17] Rates were adjusted periodically through an administrative proceeding before state utility commissions.[18] Customers paid a "bundled" rate that did not apportion costs among the generation, transmission, and distribution components of electricity service.[19]

Since the New Deal, utilities covering relatively small geographic territories have defined the industry. With the collapse of Samuel Insull's nationwide utility empire in the early 1933,[20] the federal government broke up the giant holding companies into smaller entities thought to be easier for states to regulate. As a result of the passage of the Public Utility Holding Company Act (PUHCA) in 1933, hundreds of local and state utilities dotted the nation.[21] Modest interconnections existed between utilities as a means of ensuring reliability.[22] A utility that could not satisfy its load using its own generation resources could obtain power from neighboring utilities that had spare capacity. Such trades were the exception rather than the rule for traditional utility operations; utilities expected to supply their own power during most times of the year.

ii. Regionalization of the Industry

[17] Shapiro & Tomain, *supra* note 15, at 508.
[18] David B. Spence, *The Politics of Electricity Restructuring: Theory vs. Practice*, 40 WAKE FOREST L. REV. 417, 421 (2005).
[19] Paul L. Joskow, *Transmission Policy in the United States*, 13 UTILITIES POL'Y 95, 99 (2005).
[20] Richard D. Cudahy & William D. Henderson, *From Insull to Enron: Corporate (Re)Regulation After the Rise and fall of Two Energy Icons*, 26 ENERGY L.J. 35, 65-69 (2005).
[21] *See id.* at 73 ("[T]he section 11 'death sentence' provision of the PUHCA was intended to permanently dismantle the power trust by local and regional power companies that could be effectively regulated at the state level.").
[22] *See* Richard Benjamin, *Principles for Interregional Transmission Expansion*, 20 ELECTRICITY J. 36, 36 (Oct. 2007) ("Transmission planning and construction in the United States has historically been done at the level of the vertically integrated utility (VIU). In this framework, interconnections between utilities served mainly to increase the reliability of the grid. A utility that faced a temporary generation shortfall (e.g., due to an unplanned outage of a generating facility) would attempt to import power over an interconnecting line, thus maintaining system reliability. Given the relatively minor role of interconnecting lines, there was limited investment in transmission capacity connecting large geographic areas."); Brown & Rossi, *supra* note 7, at 730 ("Under the traditional vertical integration monopoly paradigm, in which rate regulation was the norm, utilities had little incentive to expand transmission for non-utility generation sources that did not serve native load customers, since they could preserve their monopolies by building just enough transmission to allow their own power supply to reach their own customers.").

In the face of two powerful trends, the model of geographically fragmented utilities is under increasing stress. The creation of wholesale markets and the development of renewable energy are making the norm of localized utility operations anachronistic. In fact, the great promise of both is premised on the existence of strong regional transmission grids.

a. From State Natural Monopolies to Regional Markets

Rising power rates in the 1970s and 1980s motivated academic criticism and eventually, in many parts of the country, political rejection of the vertically integrated natural monopoly model.[23] Cost-of-service regulation was thought to encourage overinvestment in capital assets and weaken incentives for efficiency because utilities could persuade regulators to allow most costs to be passed through to ratepayers, regardless of whether they were prudently incurred.[24] Technological advances had also reduced the economies of scale in generation and created the possibility of a competitive wholesale market.[25] In 1978, Congress enacted the Public Utility Regulatory Policies Act (PURPA), which required utilities to purchase power from certain non-utility owned generation sources.[26] Even if it relied on a flawed pricing method, PURPA helped create a class of non-utility power generators.[27] In 1992, Congress passed the Energy Policy Act (EPAct of 1992), which removed remaining the regulatory barriers to entry in the

[23] *See* Pierce, *supra* note 8, at 454 ("Between 1974 and 1984, the average price of electricity in the United States increased by approximately 250 percent. That large price increase attracted the attention of consumers and politicians. State [Public Utility Commissions] and state legislators took action in response to the populist clamor to do something to stop the greedy utilities from ripping off the helpless consumers."); A landmark Brookings Institution study by now-Justice Stephen Breyer and Paul MacAvoy documented the inefficiencies of the cost-of-service model in electricity. STEPHEN G. BREYER & PAUL W. MACAVOY, ENERGY REGULATION BY THE FEDERAL POWER COMMISSION (1974).
[24] Pierce, *supra* note 8, at 457.
[25] *See* Joskow, *supra* note 9, at 123, 126.
[26] *Id.* at 124.
[27] Spence, *supra* 18, at 424.

generation sector and directed transmission owners to provide grid access to all generators on non-discriminatory terms.[28] Pursuant to the EPAct of 1992, FERC in 1996 issued Orders 888 and 889, which mandate open access over and transparent pricing of the transmission grid.[29] Transmission owners could no longer discriminate against non-affiliate generators. This was a critical step in facilitating wholesale market competition; transmission owners could otherwise manipulate their facilities to benefit affiliated generators at the expense of non-affiliates and stifle incipient competition.[30] Viewing this regulatory solution as inadequate, some states went further to address the this threat of monopoly "leveraging." They ordered transmission owners to sell their generation assets and create a non-profit independent system operator (ISO) or regional transmission organization (RTO) that would be responsible for the day-to-day management of the transmission grid and wholesale power markets.[31] Many of the same states, without direction from FERC,[32] also required utilities to "unbundle" their rates: separate aggregated retail rates into generation, transmission, and distribution components.[33]

These legislative and regulatory initiatives have transformed the industry, albeit to varying degrees, across the country. In a significant fraction of states, only transmission and distribution are treated as natural monopolies; generation and retailing have been opened to competition.[34] In many of the same areas, centralized wholesale markets today

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[28] *Id.*
[29] *Id.* at 133.
[30] Paul L. Joskow & Roger G. Noll, *The Bell Doctrine: Applications in Telecommunications, Electricity, and Other Network Industries*, 51 STAN. L. REV. 1249, 1298 (1998).
[31] Joskow, *supra* note 9, 132-33.
[32] Joskow, *supra* note 19, at 104; New York v. FERC, 535 U.S. 1, 27-28 (2002).
[33] *Id.* at 119.
[34] *See* Johannes Pfeifenberger, Joseph Wharton & Adam Schumacher, *Keeping up with Retail Access? Developments in U.S. Restructuring and Resource Procurement for Regulated Retail Service*, 17 ELECTRICITY J. 50, 51 (Dec. 2004) (map summarizing status of retail competition in all fifty states and District of Columbia).

facilitate the sale of billions of dollars of power annually.[35] In the Mid-Atlantic and portions of the Midwest, for example, an RTO called PJM operates the largest wholesale power market in the world.[36] In addition to entering into bilateral contracts, generators located everywhere from Illinois in the west to New Jersey in the east can submit hourly bids into the "day-ahead" and "real-time" wholesale markets. Even if market transactions do not correspond to the actual physics of the electricity grid,[37] coal-fired generators in Ohio and West Virginia can thus sell power to load-serving entities in cities like Washington, DC and Philadelphia located hundreds of miles away.[38] In much of the West and Southeast, in contrast, industry restructuring has not been quite as dramatic.[39] Centralized markets do not exist, and most utilities remain vertically integrated and regulated as natural monopolies. Under the auspices of Order 888, however, new firms can enter the generation sector even in these areas and sell their power to utilities through bilateral contracts.[40] Admittedly, the California Energy Crisis of 2000 and 2001 sapped much of the political pressure for industry restructuring and motivated multiple states to

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[35] *US Independent System Operators*, U.S. ENERGY INFO. ADMIN., http://www.eia.doe.gov/cneaf/electricity/page/channel/fig8.html.
[36] *PJM – Overview*, PJM, http://www.pjmenergy.com/about/overview.html.
[37] *See* Charles H. Koch, Sr., *Control and Governance of Transmission Organizations in the Restructured Electricity Industry*, 27 FLA. ST. U. L. REV. 569, 572 (2000) ("Envision a person in Spain buying a cup of water from someone in the United States. The seller in the United States must deliver the way by dropping it in the Atlantic Ocean. To receive the delivery, the purchaser in Spain then dips into the Atlantic Ocean to withdraw the cup of water. The seller delivered a cup of water into the system and the purchaser withdrew a cup, but in no sense can either party identify the particular molecules of water that were the subject of their market transaction. The transportation of the seller's cup never literally occurs, and the cup withdrawn actually comes from an unidentifiable source, which in all probability is not the seller. Similarly, a generator plant adds unidentifiable units of electricity to the flow from which a consumer extracts electricity for personal use. The generator plant's agreement to supply the consumer with electricity can be honored only in the most artificial sense. Adding to this artificiality is the fiction that a particular unit of electricity is transported and transmitted directly to the user. In actuality, the consumed unit may have traveled any number of routes from any number of sources to the consumer.").
[38] Clinton A. Vince et al., *What Is Happening and Where in the World of RTOs and ISOs?*, 27 ENERGY L.J. 65, 76-77 (2006).
[39] Pierce, *supra* note 8, at 479.
[40] Seth Blumsack, *Measuring the Benefits and Costs of Regional Electric Grid Integration*, 28 ENERGY L.J. 147, 153 (2007).

suspend plans for retail competition.[41] The prospects for competitive retail markets in much of the country appear dim.[42] Wholesale markets, however, have firmly established themselves on the American electricity landscape.

As regional power markets have developed, inadequate transmission capacity has become a serious problem. Power purchasers across the nation spend billions of dollars more per year due to congested transmission lines.[43] The August 2003 Northeastern Blackout served as perhaps the most dramatic illustration of the inadequacy of the existing grid. The failure of a local power plant and transmission lines feeding Cleveland, Ohio on a hot summer day triggered cascading line outages that left tens of millions people in the Northeastern United States and Ontario without power.[44] The series of

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[41] Kira R. Fabrizio, et al., *Do Markets Reduce Costs? Assessing the Impact of Regulatory Restructuring on US Electric Generation Efficiency*, 97 AM. ECON. REV. 1250, 1253 (2007).

[42] *Id.*

[43] *See, e.g.*, MONITORING ANALYTICS, LLC, 2009 STATE OF THE MARKET REPORT FOR PJM 65 (2010) ("Total congestion costs decreased by $1.397 billion or 66 percent, from $2.117 billion in 2008 to $719.0 million in 2009."); DAVID B. PATTON, ET AL., 2009 STATE OF THE MARKET REPORT: NEW YORK ISO 84 (2010) ("The general pattern of congestion in 2009 was similar to 2008, although the total congestion revenue in 2009 was more than 60 percent lower ($580 million lower) than in 2009. The sharp decline in the value of congestion were primarily due to the substantial decrease in fuel prices which leads to lower dispatch costs and correspondingly smaller congestion-related price differences. The frequency of congestion on each path was comparable from 2008 to 2009."); ISO NEW ENGLAND INC. INTERNAL MARKET MONITOR, 2009 ANNUAL MARKETS REPORT 87 (2009) ("Total congestion revenue decreased almost 80% from 2008 to 2009, dropping from $121 million to $25 million. This decrease in congestion revenue is consistent with recent improvements in the system's transmission infrastructure, lower load levels, and lower input fuel prices. The combined effect of lower load and transmission improvements means the number of hours with binding transmission constraints and the cost of redispatch to manage those constraints should decrease. The data bear this out; during 2008, 65% of hours were congested compared with 39% in 2009."); POTOMAC ECONOMICS, 2009 STATE OF THE MARKET REPORT FOR THE MIDWEST ISO 75 (2010) ("Day-ahead congestion costs declined by nearly $200 million (39 percent) [to $304 million] in 2009 compared to 2008. This reduction was due to reduced natural gas prices (which lower redispatch costs), lower average load, and transmission improvements.") (hereafter "MIDWEST ISO STATE OF THE MARKET"). Moreover, the reduced transmission congestion seen in 2009 on account of the recession appears to have been only a one-year reprieve in parts of the country. *See, e.g.*, MONITORING ANALYTICS, LLC, STATE OF THE MARKET REPORT FOR PJM 167 (2010); ("Total [economic] congestion costs increased by $237.3 million or 58 percent from $408.2 million in the first six months of 2009 to $645.5 million in the first six months of 2010.").

[44] *See* U.S.-CANADA POWER SYSTEM OUTAGE TASK FORCE, FINAL REPORT ON THE AUGUST 14, 2003 BLACKOUT IN THE UNITED STATES AND CANADA: CAUSES AND RECOMMENDATIONS 73-90 (2004) (explaining how overloading and failure of lines near Cleveland led to subsequent overloading and failure of other lines in Ohio and Pennsylvania – the so-called "cascade").

transmission line outages separated the power importing markets of New York State and points north from the power exporting markets of Ohio and Appalachia.[45] Without sufficient local generation, parts of the Northeast were in the dark for up to four days, resulting in economic losses of over $5 billion in the United States and Canada.[46] Notably, parts of the Northeast that had sufficient local generation – consistent with the traditional utility model – faced almost no disruptions in their power supply.[47] In short, superimposing regional markets on top of a grid not designed for them had contributed to the most spectacular failure of the electric power system in United States history[48] – a fact that even the circumspect official report on the blackout acknowledged.[49] Capturing public sentiment after the event and not without unjustified hyperbole, former Energy Secretary Bill Richardson condemned the condition of the electrical grid in the United States as "Third World."[50]

b. Development of Renewable Energy Sources

Based on the overwhelming scientific evidence, governments in the United States and abroad have increasingly begun to respond to the serious threat of anthropogenic

[45] *Id.* at 89-90.
[46] *Id.* at 1.
[47] *See id.* at 99-100 ("The small remaining load in the northern portion of the eastern [electrical] island (the Albany area) retained electrical service, supplied by local generation until it could be resynchonized with the western New York island.").
[48] *See id.* at 103-07 (comparing August 2003 blackout to other major blackouts in the twentieth century).
[49] *See id.* at 32 ("Load-serving entities today purchase power for the same reason they did before the advent of competition – to serve their customers with low-cost energy – and the U.S. Department of Energy estimates that Americans save almost $12 billion (U.S.) annually on the cost electricity from the opportunity to buy from distant, economical sources. But it is likely that the increased loads and flows across a transmission grid that has experienced little new investment is causing greater 'stress upon the hardware, software, and human beings that are the critical components of the system.'") (quoting Letter from Michael H. Dworkin, Chairman, State of Vermont Public Service Board, February 11, 2004, to Alison Silverstein and Jimmy Glotfelty); Wolak, *supra* note 4, at 3..
[50] Barton Gellman & Dana Milbank, *Blackout Causes Mass Disruption; Millions Struggle Without Power From N.Y. to Toronto to Detroit*, WASH. POST, Aug. 15, 2003.

climate change.[51] If greenhouse gas emissions are not reduced, global temperatures will steadily increase and unleash disastrous consequences. Because of the ensuing melting of polar ice caps and thermal expansion of oceanic waters, increasing sea levels will inundate low-lying areas and island nations.[52] Contrary to popular perceptions, the consequences of higher global temperatures will not be confined to higher sea levels. Rising average global temperatures will also alter climatic patterns.[53] Desertification could devastate the world's leading agricultural areas[54] and force mass resettlements and incite armed conflicts over scarcer farmland.[55] Because the Earth's climate is a highly complex system, the consequences of unabated greenhouse gas emissions cannot be exhaustively catalogued with much confidence.[56] Yet, the risks are all too apparent.

For the worst effects of climate change to be averted, the world's energy economy will require radical restructuring.[57] Electricity generation, which relies heavily on fossil fuels in the United States and many parts of the world, will be subject to a fundamental

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[51] *See* ULRICH CUBASCH ET AL., FOURTH ASSESSMENT REPORT OF THE INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE 2007: THE PHYSICAL SCIENCE BASIS 103 (2007) ("The common conclusion of a wide range of fingerprint studies conducted over the past 15 years is that observed climate changes cannot be explained by natural factors alone. A substantial anthropogenic influence is required in order to best explain the observed changes. The evidence from this body of work strengthens the scientific case for a discernible human influence on global climate.").

[52] Susan Solomon et al., *Irreversible Climate Change Due to Carbon Dioxide Emissions*, 106 PROC. NAT'L ACAD. SCI. 1704, 1704 (2009).

[53] *Id.* at 1705.

[54] *Id.* at 1707.

[55] Clionadh Raleigh & Henrik Urdal, *Climate Change, Environmental Degradation and Armed Conflict*, 26 POL. GEOGRAPHY 674, 676-78 (2008).

[56] Andrew J. Majda & Boris Gershgorin, *Quantifying Uncertainty in Climate Change Science Through Empirical Information Theory*, 107 PROC. NAT'L ACAD. SCI. 14958, 14958 ("The central difficulty in climate change science is that the dynamical equations for the actual climate are unknown. All that is available from the true climate in nature are some coarse-grained observations of functions such as mean or variance of temperature, tracer greenhouse gases such as carbon dioxide, or the large scale horizontal winds. Thus, climate change science must cope with predicting the coarse-grained dynamic changes of an extremely complex system only partially observed from a suite of imperfect models for the climate.").

[57] *See* ANTHONY ADEGBULULGBE ET AL., FOURTH ASSESSMENT REPORT OF THE INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE: MITIGATION OF CLIMATE CHANGE 253 (2007) ("To continue to extract and combust the world's rich endowment of oil, coal, peat, and natural gas at current or increasing rates, and so release more of the stored carbon into the atmosphere, is no longer environmentally sustainable, unless carbon capture and storage (CCS) technologies currently being developed can be widely deployed.").

makeover.[58] Although the federal government has yet to enact comprehensive climate regulations and appears unlikely to do so in the near future, [59] an assortment of measures to reduce greenhouse gas emissions have been implemented at the state and federal level. Along with encouraging competition in the generation sector, PURPA provides a production tax credit of 2.0 cents per kilowatt-hour of output to qualifying renewable energy generators in their first ten years of operation.[60] After the Supreme Court ruled in 2007 that the Environmental Protection Agency (EPA) is obligated to regulate greenhouse gases under the Clean Air Act,[61] the EPA is now in the midst of promulgating rules to regulate greenhouse gas emissions from new industrial facilities.[62] At the state level, several aggressive policies are being enacted to reduce greenhouse gas emissions in the coming years. Most ambitiously, a group of Northeastern states have established a regional cap-and-trade system known as the Regional Greenhouse Gas Initiative that puts a price on greenhouse gas emissions.[63] Another group of Canadian provinces and Western states soon will establish their cap-and-trade system under the Western Climate Initiative.[64] Nearly every state has also established renewable portfolio standards (RPSs) that require utilities to procure a certain fraction of their power supplies from renewable

[58] *See id.* at 303 ("[S]ignificant reductions in emissions from the energy-supply sector are technically and economically feasible using both the range of technology solutions currently available and those close to market.").
[59] Editorial, *Outlook chilly for a smart climate bill; A failure to prioritize limits Democrats' chances of putting a price on carbon*, WASH. POST, Jul. 25, 2010.
[60] Shelley Welton, *From the States Up: Building a National Renewable Energy Policy*, 17 N.Y.U. ENVTL. L.J. 987, 991 (2008-2009).
[61] Massachusetts v. EPA, 549 U.S. 497 (2007).
[62] Gabriel Nelson, *It's Red States vs. Blue in Legal War Over EPA Greenhouse Gas Rules*, NY TIMES, Oct. 12, 2010.
[63] Steven Ferrey, *Goblets of Fire: Potential Constitutional Impediments to the Regulation of Global Warming*, 25 ECOLOGY L.Q. 835, 838-39 (2008).
[64] *Id.*

sources by a target date.[65] Whether by putting a price on greenhouse gas emissions or through direct technological mandates, policymakers are encouraging utilities to invest more in renewable energy sources like solar and wind at the expense of polluting sources like coal.

Many of the most promising areas for geothermal, solar, and wind energy development are far from major urban centers. For example, the best areas to site wind farms are in the sparsely populated corridor running from the Dakotas to North Texas and in territorial waters off the Atlantic and Pacific coasts.[66] Likewise, the most promising regions for geothermal and solar development are the mountain West[67] and desert Southwest,[68] respectively. Unlike coal, natural gas, and other conventional fuels, which can be moved by pipeline, rail or ship, renewable resources are location-specific and cannot be transported to points closer to consumption and used to generate power there. For these non-polluting resources to be fully tapped, new transmission lines running hundreds of miles and crossing several states will need to be constructed.[69]

The inadequacy of the existing grid to handle output from renewable resources is apparent. For instance, Texas, an unexpected leader in wind energy development, has faced substantial difficulties in handling the output from wind farms. Noted oil executive T. Boone Pickens, who had announced a plan to build the world's largest wind farm in

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[65] Shelley Welton, Note, *From the States Up: Building a National Renewable Energy Policy*, 17 N.Y.U. ENVTL. L.J. 987, 988 (2008-2009).
[66] *Wind Resources and Transmission Lines*, U.S. DEPT. OF ENERGY NATIONAL RENEWABLE ENERGY LABORATORY ("NREL Wind"), http://www.nrel.gov/wind/systemsintegration/images/home_usmap.jpg.
[67] *Geothermal Resource of the United States*, U.S. DEPT. OF ENERGY NATIONAL RENEWABLE ENERGY LABORATORY, http://www.nrel.gov/gis/images/geothermal_resource2009-final.jpg.
[68] *Photovoltaic Solar Resource of the United States*, U.S. DEPT. OF ENERGY NATIONAL RENEWABLE ENERGY LABORATORY ("NREL Solar"), http://www.nrel.gov/gis/images/map_pv_national_lo-res.jpg; *Concentrating Solar Resource of the United States*, U.S. DEPT. OF ENERGY NATIONAL RENEWABLE ENERGY LABORATORY, http://www.nrel.gov/gis/images/map_csp_national_lo-res.jpg.
[69] Brown & Rossi, *supra* note 7, at 737-38.

the Texas Panhandle in 2008,[70] has decided to scale back his investments partly due to a lack of sufficient transmission capacity to send the power to in-state load centers like Dallas-Fort Worth and Houston.[71] Because of constraints on the existing grid, even commissioned wind farms in Texas have been forced to idle due to insufficient transmission capacity to handle their output.[72] This narrative is likely to repeat itself on a multistate level as renewable resources are developed throughout the country. In the Midwest, the prime location for wind energy development in the continental United States, these new resources are straining the existing grid, manifested as more frequent congestion on transmission lines in the Great Plains.[73]

iii. Partial Federalization and Regionalization of Transmission Planning

In the area of transmission planning, significant regulatory power remains vested at the state level in spite of the creation and expansion of regional power markets. State public utility commissions retain primary jurisdiction over the siting of transmission lines.[74] They authorize the route and construction of both intrastate and interstate transmission lines based on a state-level cost-benefit analysis,[75] which includes an examination of the proposed line's environmental effects.[76] To acquire the necessary

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[70] Clifford Krauss, *Move Over, Oil, There's Money in Texas Wind*, NY TIMES, Feb. 23, 2008.
[71] Kate Galbraith, *Pickens Scales Back Ambitious Wind Farm*, NY TIMES, Jul. 7, 2009.
[72] Kate Galbraith, *Texas Clean Energy Hampered by Location*, NY TIMES, Sep. 10, 2010.
[73] *See* MIDWEST ISO STATE OF THE MARKET, *supra* note 43, at 83 ("Congestion was down 10 percent in the East and 14 percent in the Central region, respectively, while it rose 50 percent (to $167 million) in the West due to increasing supply in that region (primarily wind resources).").
[74] Jim Rossi, *The Trojan Horse of Electric Power Transmission Line Siting Authority* ("Trojan Horse"), 39 ENVTL. L. 1015, 1019 (2009).
[75] *See id.* ("The need determination at the state level has historically balanced various interests within individual states, with the primary motivation of protecting in-state customers and ensuring that any new transmission line that was approved would benefit them. On the one hand, customers did not want to see utilities invest in wasteful projects, and the need determination served to ensure that the need for power transmitting over a new line was justified in light of alternatives, including conservation and improved efficiency at the local level. On the other hand, customers had an interest in seeing facilities expand in order to enhance the reliability of the system serving the customers within that state.").
[76] *Id.* at 1021.

rights-of-way for the project, states can exercise their power of eminent domain or delegate it to the transmission developer.[77] In some states, local governmental entities also have jurisdiction over transmission projects and can veto proposals that they believe would harm local interests without providing an adequate benefit to them.[78] State public utility commissions also regulate the rates of intrastate transmission lines included in "retail base."[79] For such facilities, the costs of transmission investment, including a reasonable rate of return, are incorporated into the retail rates of the transmission developer and recovered directly from its customers.[80] Because third parties frequently use the grid for their wholesale transactions today, the revenues from granting transmission access are used to reduce the costs passed through to local ratepayers.[81]

As electricity markets have expanded beyond state boundaries, the federal government and regional entities have assumed some regulatory authority. The Energy Policy Act of 2005 (EPAct of 2005) granted FERC backstop siting over transmission lines.[82] In areas that the Department of Energy has defined as National Interest Electric Transmission Corridors (NIETC), FERC can authorize the construction of transmission lines if the relevant state actors cannot approve the line under state law or fail to take action in a timely manner.[83] In addition, FERC is responsible for allocating the costs of interstate transmission facilities and intrastate facilities in areas where rates have been

[77] *Id.* at 1019.
[78] Dang, *supra* note 8, at 343.
[79] Joe McGarvey, *Transmission Investment: A Primer*, 19 ELECTRICITY J. 71, 74 (Oct. 2006).
[80] *Id.* at 76.
[81] *Id.*
[82] Debbie Swanstrom & Meredith M. Jolivert, *DOE Transmission Corridor Designation & FERC Backstop Siting Authority: Has the Energy Policy Act of 2005 Succeeded in Stimulating the Development of New Transmission Facilities?*, 30 ENERGY L.J. 415, 431 (2009).
[83] *Id.* at 443-45.

unbundled.[84] Although they lack the powers of eminent domain and cannot authorize line construction, RTOs, where they exist, now play a lead role in regional transmission planning. Based on their system modeling, RTOs identify corridors in need of transmission upgrades for reasons of economics or reliability.[85] RTOs also make cost allocation decisions for transmission projects subject to FERC approval.[86] Even in parts of the country without RTOs, transmission planning at the regional level will soon become the norm. In 2007, FERC issued Order 890, which requires that all utilities join a regional transmission planning body.[87]

III. TRANSMISSION INVESTMENT IN THE NEW MILIEU: REGIONAL BENEFITS AND LOCAL COSTS

In the new milieu of wholesale markets and renewable energy, the construction of new transmission lines – even wholly intrastate lines – can yield significant regional benefits.[88] The inadequacy of the existing grid most commonly manifests itself in the form of transmission "congestion." When a transmission line is congested, the desired amount of power cannot be transmitted over it due to its physical limits.[89] Exceeding the

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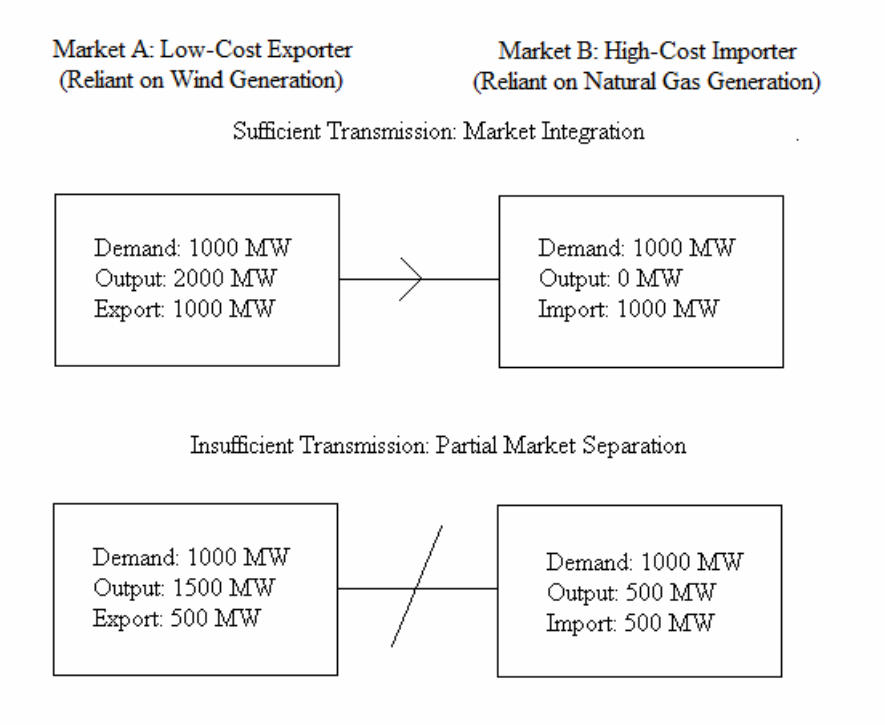
[84] McGarvey, *supra* note 79, at 76.
[85] Brown & Rossi, *supra* note 7, at 758.
[86] Hearing on Legis. Regarding Electric Transmission Lines Before the S. Comm. on Energy and Natural Resources, 111th Cong. 2 (2009) (statement of Jon Wellinghoff, Acting Chairman, Federal Energy Regulatory Commission)
[87] *Id.* at 8.
[88] *Effective Solutions for Getting Needed Transmission Built at Reasonable Cost*, TRANSMISSION ACCESS POLICY STUDY GROUP, at 6, available at http://www.tapsgroup.org/sitebuildercontent/sitebuilderfiles/effectivesolutions.pdf ("Due to the dynamic and highly integrated nature of the AC grid, an upgrade in one state may be required to enhance reliability and relieve congestion in an adjacent state. Also, a transmission addition may be required in a state to enable an upgrade undertaken in an adjoining state to function as planned.").
[89] *See* Brendan Kirby & Eric Hirst, *Maintaining Transmission Adequacy in the Future*, 12 ELECTRICITY J. 62, 65-66 (Nov. 1999) ("Congestion is not related to the actual flow on lines. Congestion occurs when security-constrained dispatch requires modification of the economic dispatch. This situation occurs most frequently as the result of contingency analysis rather than because of steady-state line flows. The generation dispatch is modified because a line will overload if a specific contingency occurs (e.g., a generator or transmission line trips). Because there is no time to take corrective action to prevent cascading failures, it is necessary to preemptively modify the generation dispatch.").

physical limits of the line can result in the failure of the larger system.[90] To avoid this system emergency, generation on the export side of the transmission constraint needs to be reduced while generation on the import side needs to be increased. In effect, transmission congestion can cleave a single geographic market into multiple, smaller markets that need to rely on local generation to meet demand.

Figure 2



Transmission expansions can reduce the occurrence of congestion and widen the geographic reach of electricity markets. This market expansion can yield four-fold benefits – enhanced system reliability, lower energy costs due to more efficient generation dispatch and greater market competition, increased fuel diversity, and reduced

[90] *Id.*

emissions of air pollutants – that are often regional in nature.[91] In contrast to the dispersed benefits of transmission development, the costs, both economic and non-economic, tend to be concentrated in the areas where the lines are located. They include cost recovery from ratepayers and the adverse aesthetic, environmental, and health effects. In economic terms, transmission lines generate broadly dispersed positive externalities but locally concentrated negative externalities.

i. Regional Benefits of Transmission Investment

a. Enhanced System Reliability

System reliability is the most important feature of any electrical system. With electricity's central and only growing role in modern society, a reliable supply of power at all times is especially essential. Unlike other forms of energy, electricity cannot be stored in an economical manner.[92] With the infeasibility of electricity storage, supply therefore has to equal demand at every second. Because supply and demand must always equate and generators experience periodic scheduled and unscheduled outages, every electrical system must have generation reserves in excess of peak demand to avoid blackouts and brownouts.

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[91] *Effective Solutions for Getting Needed Transmission Built at Reasonable Cost*, TRANSMISSION ACCESS POLICY STUDY GROUP, at 6, available at http://www.tapsgroup.org/sitebuildercontent/sitebuilderfiles/effectivesolutions.pdf ("Due to the dynamic and highly integrated nature of the AC grid, an upgrade in one state may be required to enhance reliability and relieve congestion in an adjacent state. Also, a transmission addition may be required in a state to enable an upgrade undertaken in an adjoining state to function as planned."); In the current regulatory environment, these benefits may not always be in harmony. More efficient and lower-cost dispatch, for example, may mean increased greenhouse gas emissions as cheap coal-fired generators displace more expensive gas-fired units.

[92] Pumped storage hydroelectricity that uses surplus power during low-demand hours to pump water to the top of a dam and then releases the water to produce electricity during high-demand hours can in effect "store" power. Its economics, however, prevent its widespread use at present. *See* Claude Crampes, *Pumped Storage and Cost Saving*, 32 ENERGY ECON. 325 (2010).

Fundamentally, reliability is function of how much backup generation capacity can be accessed in response to outages.[93] Building more generation is the most obvious way to enhance reliability. A system with more surplus generation capacity is more reliable than an otherwise equal system with less spare generation capacity. More generation capacity, however, is not always the most efficient way to obtain reliability. Generation development entails significant fixed costs and so constructing "reserve margins" that remain idle at most times is not necessarily the most economical means of guaranteeing system reliability. Under certain circumstances, transmission can serve as a more cost-effective way of protecting system reliability. Interconnections can facilitate trade among utilities; one utility can purchase power from another when its own generation resources cannot meet load.[94] Historically, the primary reason utilities built intersystem transmission lines was to strengthen reliability.[95]

A hypothetical two-utility world demonstrates how transmission lines can strengthen system reliability. Both utility 1 and utility 2 are electrically isolated from each other and all other utilities. They must each build their own reserve margins to ensure system reliability. In the event of a "perfect storm" of plant outages, both utilities expect generation resources to fall 30% short of peak demand. To protect against this worst-case scenario, they must build total generation capacity equivalent to 130% of peak demand. Due to different climatic patterns and generation portfolios, however, the two utilities are generation-constrained at different times of the year. Consequently when utility 1 experiences a substantial generation shortfall, utility 2 always has spare

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[93] *See* PETER FOX-PENNER, SMART POWER: CLIMATE CHANGE, THE SMART GRID, AND THE FUTURE OF ELECTRIC UTILITIES 25-26 (2010) (explaining role of generation and transmission in promoting system reliability).
[94] *Id.*
[95] Rossi, *Trojan Horse*, *supra* note 74, at 1019.

generator capacity, and vice-versa. To take advantage of different seasonal supply-demand conditions, the two utilities construct a transmission line that facilitates the shipment of power between their service areas. This allows each utility to use the other's spare generation capacity when it experiences a shortfall of its own. The transmission line therefore reduces the amount of reserve capacity each utility must build to protect itself against this contingency. Because of the possibility of purchasing power from each other, both utilities only have to construct 15% spare generation capacity instead of the 30% needed without the transmission line. Each utility can use its reserve generation as well as the reserve generation of the other utility to meet demand in the event of widespread outages. This stylized example shows how increasing transmission interconnections can enhance reliability without requiring the construction of more redundant backup generation.[96] As the number of interconnected utilities increases, the amount of required reserve margin declines in turn, saving the public money without undermining reliability.

b. Reduced Energy Costs from Improved Dispatch and Diminished Market Power

In theory, a competitive market for electricity could function like a competitive market for any other good or service. In a well-functioning market with load serving entities submitting hourly demand schedules, all generators should bid their marginal cost

[96] A real world example of such mutually beneficial trade occurs between Southern California and the Pacific Northwest over the course of every calendar year. In the summer when Southern California experiences high temperatures while the Pacific Northwest is mild, surplus generation exists in Washington State because its hydroelectric dams are not operated at full capacity. In winter, the roles are reversed: the Pacific Northwest experiences cold temperatures while Southern California remains temperate. Fossil fuel generators in Southern California operate below maximum capacity. To allow North-South trade in summer and South-North trade in winter, the federal government constructed in the 1960s and 1970s the Pacific Intertie, a system of two alternating current lines and one direct current line running from the Washington-Oregon state line to Los Angeles. As a result, both regions can rely on the spare generation of the other to ensure reliability, instead of constructing expensive reserve generation that would remain idle for much of the year. *See* Paul L. Joskow, *California's Electricity Crisis*, 17 OXFORD. REV. ECON. POL'Y, 365, 367 (2001).

of production.[97] Arranging the bids from lowest- to highest-cost, the marginal cost of the most expensive generator needed to meet demand in each hour sets the market-clearing price.[98] The market operator dispatches only units with bids at or below the market-clearing price and pays them all the market price irrespective of their bids.[99] This process minimizes the aggregate cost of generating power.[100] Because demand fluctuates during the course of the day, the cost of meeting load can vary widely within a twenty-four-hour period.[101] During off-peak hours, coal-fired and nuclear power plants, which usually have low marginal costs, are adequate to meet demand and set low market prices.[102] At hours with higher demand, gas-fired combustion turbines, which have higher marginal costs but can quickly be "ramped" up and down in response to changing demand conditions, are run to meet load and set the market price at a higher level.[103] In most markets, energy is not the only product being sold and so a similar price-setting process takes place for "ancillary services," which help accommodate real-time deviations from predicted demand.[104]

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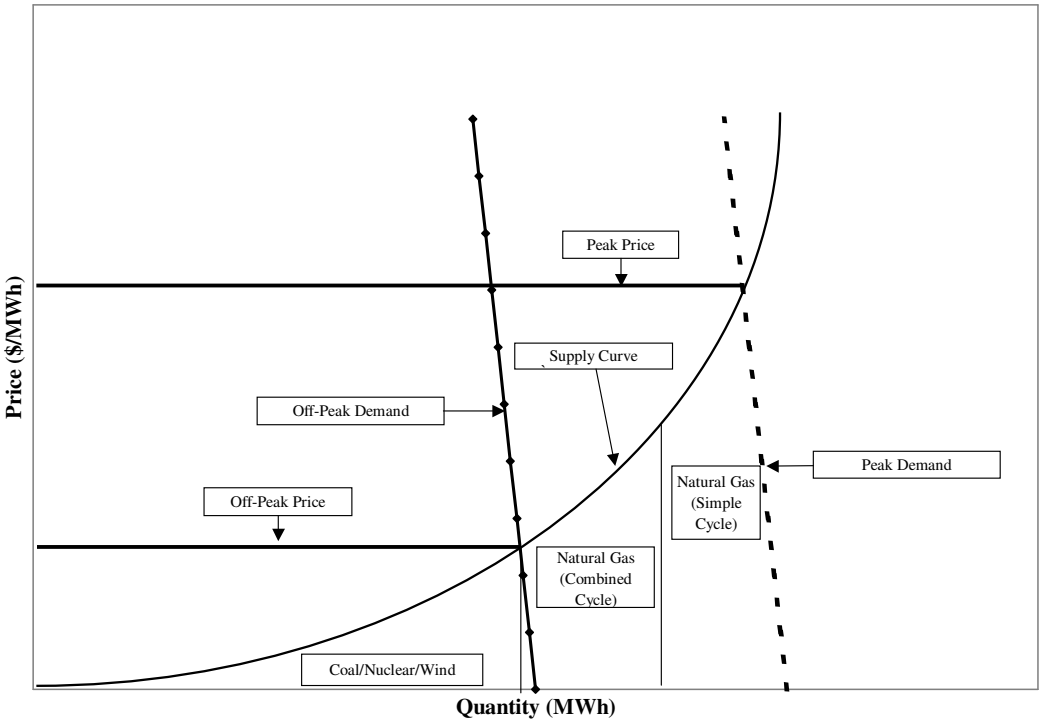
[97] *See* Richard Green, *Reshaping the CEGB: Electricity Privatization in the UK*, 1 UTIL. POL'Y 245, 246 (1991) (describing the operation of a single-price power "pool"). Only some parts of the United States have such markets, other areas have bilateral markets. In theory, bilateral markets should produce market outcomes like power pools.
[98] *Id.*
[99] *Id.*
[100] *Id.*
[101] Severin Borenstein, *The Trouble with Electricity Markets: Understanding California's Restructuring Disaster*, 16 J. ECON. PERSP. 196 (2002).
[102] Darren Bush & Carrie Mayne, *In (Reluctant) Defense of Enron: Why Bad Regulation Is to Blame for California's Power Woes (or Why Antitrust Law Fails to Protect Us Against Market Power When the Market Rules Encourage Its Use)*, 83 OR. L. REV. 207, 236 (2004).
[103] *Id.*
[104] ERIC HIRST & BRENDAN KIRBY, ANCILLARY SERVICES, available at http://www.ornl.org/sci/engineering_science_technology/cooling_heating_power/Restructuring/Ancillary_Services.pdf.

Figure 3



In the absence of transmission constraints, the United States could consist of three geographic markets – a single market for each grid system. When transmission lines are congested, however, generators cannot be dispatched in the lowest-cost manner.[105] Congestion creates load pockets that must rely on local generators to meet demand instead of on lower-cost units located further afield. In effect, transmission constraints cleave a single geographic market into several smaller markets each with their own market-clearing price. This suboptimal dispatch of generators increases the aggregate costs of producing power. Due to wide variations in demand over the course of a day, the size of geographic markets can also change from hour-to-hour. On a summer day, for

[105] *See* Kirby & Hirst, *supra* note 89, at 65-66 ("Congestion is not related to the actual flow on lines. Congestion occurs when security-constrained dispatch requires modification of the economic dispatch. This situation occurs most frequently as the result of contingency analysis rather than because of steady-state line flows. The generation dispatch is modified because a line will overload if a specific contingency occurs (e.g., a generator or transmission line trips). Because there is no time to take corrective action to prevent cascading failures, it is necessary to preemptively modify the generation dispatch.").

instance, an integrated regional market in the low-demand morning hours can fragment into multiple markets in the high-demand afternoon hours due to transmission congestion. It is an especially acute problem in large metropolitan areas: inadequate capacity on transmission facilities feeding these cities often necessitates the dispatch of old, high-cost generators within the load pocket.[106] In principle, the high price of power within load pockets should induce the construction of new generators in these areas in the long term. This new generation would displace output from high-cost units and lower market prices, indirectly eliminating the economic costs of transmission congestion. Due to the stringent local environmental and zoning laws that exist in many cities, however, new generators are often very difficult to construct where they are needed.[107] With congested lines requiring the dispatch of expensive generators and yet failing to stimulate the construction of new generation in load pockets, the increased energy costs can be significant and persistent.[108]

To compound the inefficient generation dispatch it necessitates, transmission congestion can confer market power on generators situated within load pockets, allowing

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[106] *See, e.g.*, U.S. DEPARTMENT OF ENERGY, NATIONAL ELECTRIC TRANSMISSION CONGESTION STUDY ("DOE CONGESTION STUDY") 46 (2009) ("Transmission congestion affects New York's day-ahead and real-time markets, preventing customers from buying power from the least expensive producers."); *id* at 90 ("A combination of supply and demand relief are likely to be needed to reduce congestion and maintain reliability on the San Francisco Peninsula, but only a few of the needed measures are making substantive progress over the near term. Until there is a clearer picture of how and when all the needed supply and demand-side elements will materialize and improve conditions on the San Francisco Peninsula, the Department will continue to identify the San Francisco Peninsula as a Congestion Area of Concern.").

[107] *See* EDWARD N. KRAPELS, GOODBYE GRIDLOCK (2): HOW TO END THE SHORTAGE IN TRANSMISSION INVESTMENT THAT LED TO THE NORTHEAST BLACKOUT 7-8 (2003) ("In 90 percent of the landscape of the United States, it is challenging, but possible to establish a mix of generation and transmission assets that constitute an efficient power infrastructure. In the other 10 percent, it is extremely difficult to do so, and over time these areas have evolved into 'load pockets.' There are typically densely populated areas where generation facilities were built decades ago, are difficult to refurbish (and thus highly polluting) and where transmission grids are similarly dated and compressed.").

[108] *See e.g.*, PJM STATE OF MARKET, *supra* note 43, at 167 ("Total congestion costs increased by $237.3 million or 58 percent from $408.2 million in the first six months of 2009 to $645.5 million in the first six months of 2010.").

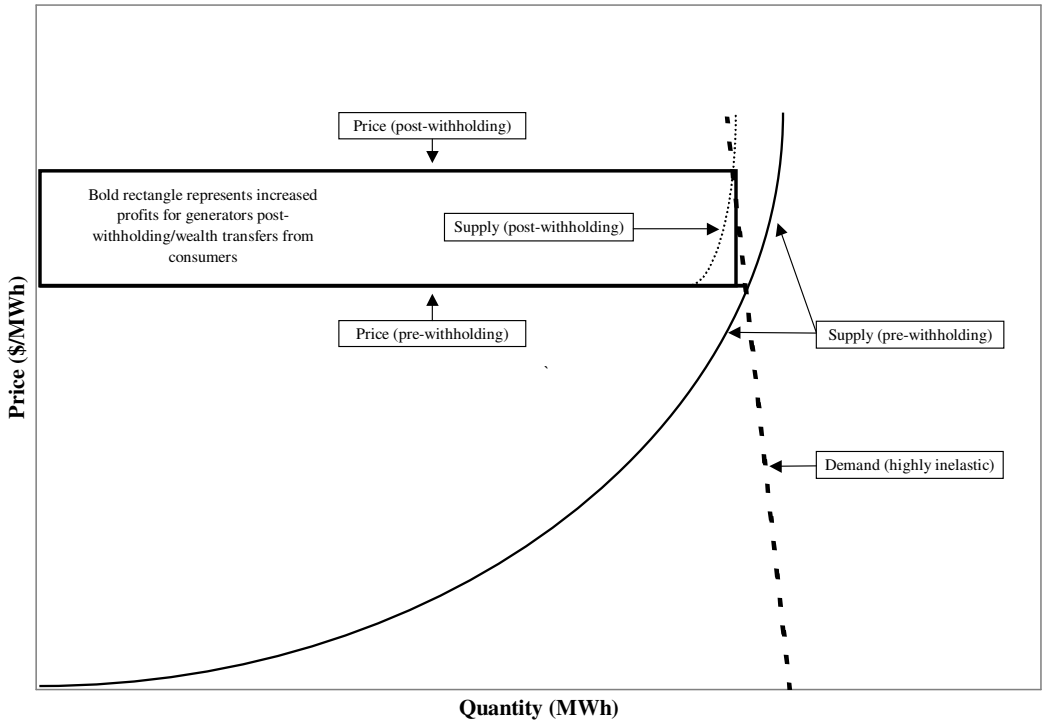
them to raise energy prices well above competitive levels. The institutional features of power markets make them vulnerable to exercises of market power. Supply must equal demand every moment and cannot be expanded easily in the near-term due to the substantial lead-time involved in building new generation.[109] Also, most consumers face a time-invariant, weighted average unit price and so pay the same rate over the course of a day regardless of the wholesale price.[110] Because ratepayers are insulated from underlying price signals, the elasticity of demand for electricity is low – the quantity of power demanded is insensitive to hourly price changes in the wholesale market.[111] Even if wholesale prices spike, demand is unlikely to fall because consumers still pay the same rate.

Due to the inelasticity of demand and supply, generators that are critical to meeting demand can profitably submit bids above their marginal cost ("economic withholding") or refrain from offering all or a portion of their capacity into the market through pretextual outages ("physical withholding") to raise prices well in excess of the competitive level.[112] Because demand is fixed, generators that are "pivotal" to meeting demand know that they will be dispatched regardless of how high their bids are. In addition to the exercise of unilateral market power, the repeated game nature of

[109] Borenstein, *supra* note 101, at 196.
[110] *Id.* at 196.
[111] Demand-side response programs would expose customers to some daily price fluctuations and, in theory, make demand more price elastic. *See* Jon Wellinghoff & David L. Morenoff, *Recognizing the Importance of Demand Response: The Second Half of the Wholesale Electric Market Equation*, 28 ENERGY L.J. 389, 393-96 (2007).
[112] *See* Borenstein , *supra* 101, at 200 ("[I]n a market with no demand elasticity and strict production constraints, a firm with even a small percentage of the market could exercise extreme market power when demand is high. On a hot summer afternoon, when the system operator needs 97 percent of all generators running to meet demand, a firm that owns 6 percent of capacity can exercise a great deal of market power. In fact, a seller will find it profitable to exercise market power any me the elasticity of residual demand the firm faces is sufficiently small. That elasticity is determined by the elasticity of market demand and the elasticity of supply from other producers.").

centralized power markets is also conducive to tacit collusion between generators.[113] The figure below demonstrates how generators can, unilaterally or collectively, withhold supply to cause dramatic price spikes and increase their own profits.

Figure 4



Market power abuse can result in massive wealth transfers from purchasing utilities (and ultimately their consumers) to generators.[114] Market power abuse by generators has been an unfortunate feature of wholesale power markets around the world.[115] In the United

[113] LUIS M.B. CABRAL, INTRODUCTION TO INDUSTRIAL ORGANIZATION 130 (2000).
[114] *See, e.g.*, Borenstein, Bushell & Wolka, *supra* note 115, at 1398 ("Between the summers of 1998 and 2000, the wholesale market cost of power rose from $1.67 billion to $8.98 billion. Efficient production costs more than tripled between these periods and with the marginal unit having higher costs, competitive rents for lower cost units quadrupled. Oligopoly rents, however, increased by an order of magnitude, from about $425 million to $4.44 billion between these summers.").
[115] *See, e.g.*, Andrew Sweeting, *Market Power in the England and Wales Wholesale Electricity Market 1995-2000*, 117 ECON. J. 654, 681 (2007); Severn Borenstein, James B. Bushnell & Frank A. Wolak, *Measuring Market Inefficiencies in California's Restructured Wholesale Electricity Market*, 92 AM. ECON. REV. 1376, 1398 (2002); Svend Hylleberg, *On the Exploitation of Market Power in the Nordic Electricity Markets: The Case of Elsam* 19 (Univ. of Aarhus – De., Dep't of Econ. Working Paper No. 2004-05, Aug. 2004), available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=585401; Diana L. Moss, *Electricity and Market Power: Current Issues for Restructuring Markets (A Survey)*, 1 ENVTL. & ENERGY L. & POL'Y J. 11, 15-24 (2005-2007) (reviewing theoretical and empirical literature on market power in electricity).

States, furthermore, the courts, applying arguably inappropriate immunities, have rendered the antitrust laws powerless to tackle manipulation of electricity markets ex post.[116] The most dramatic example of generator market power abuse in the Untied States occurred in California in 2000 and 2001 when tight supply-demand conditions combined with rampant market manipulation, including the unilateral withholding of generation,[117] led to a tenfold rise in wholesale prices and rolling blackouts across much of the state.[118]

New transmission investment can widen geographic markets and reduce the occurrence of load pockets. By relieving constraints on the grid, new lines can facilitate the lowest-cost dispatch of generators.[119] Along with permitting the most efficient dispatch of power plants on the grid, new transmission widens markets and reduces the pivotal status of plants within load pockets. If these units are no longer necessary to meet demand, they lose their ability to raise prices above competitive levels.[120] When other competitive generators are on the market, a plant that submits high bids follows a potentially unprofitable strategy because it runs the risk of being idle and foregoing power sales. Because collusive arrangements are easier to maintain with fewer suppliers, a larger geographic market with more generators is also less susceptible to tacit collusion.

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[116] Darren Bush, *Mission Creep: Antitrust Exemptions and Immunities as Applied to Deregulated Industries*, 2006 UTAH L. REV. 761, 796-800 (2006) (describing how courts have applied the filed rate doctrine to bar private damages actions against generators accused of anticompetitive conduct in deregulated power markets).
[117] Frank A. Wolak, *Diagnosing the California Electricity Crisis*, 16 ELECTRICITY J. 11, 14 (Aug.-Sep. 2003).
[118] *See, e.g.*, Borenstein, Bushell & Wolka, *supra* note 115, at 1398 ("Between the summers of 1998 and 2000, the wholesale market cost of power rose from $1.67 billion to $8.98 billion. Efficient production costs more than tripled between these periods and with the marginal unit having higher costs, competitive rents for lower cost units quadrupled. Oligopoly rents, however, increased by an order of magnitude, from about $425 million to $4.44 billion between these summers.").
[119] Joe Rossingnoli, Mary Ellen Paravalos & Janet Gail Besser, *Transmission: The Critical Link Delivering the Promise of Industry Restructuring to Customers*, 18 ELECTRICITY J. 18, 19-20 (Nov. 2005).
[120] *Id.* at 20-21.

The market expansion effect of new transmission lines, by allowing economical dispatch and reducing generator market power, can save the public billions over time.[121]

c. Increased Fuel Diversity

Fuel diversity in a generation fleet can be analogized to financial portfolio diversification.[122] If a region's generation fleet is dependent largely on one fuel source, it may be exposed to dramatic swings in the price of electricity. For a region to rely on a single fuel for its electricity is akin to an investor placing her entire savings in a single stock.[123] With the construction of hundreds of gigawatts of natural gas-fired generation over the past fifteen years due to its efficiency and relative cleanliness, however, the American electric power industry has followed just such a course and made the volatility of power prices more salient than ever.[124] Because the demand for natural gas varies seasonally and must be met principally by North American supplies, the price of gas is very volatile.[125] In many markets, natural gas units are "on the margin" and set the price of power. The price of power in these regions thus closely tracks the price of natural gas. Because of constraints in the natural gas pipeline network, over-reliance on natural gas may even compromise system reliability. If gas-fired generators cannot obtain sufficient quantities of natural gas, non-gas generators may not be able to increase their output

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[121] *Id.* at 24.
[122] Ken Costello, *A Perspective on Fuel Diversity*, 18 ELECTRICITY J. 28, 36 (May 2005) ("In the context of electricity, portfolio theory says that electric power sources should not be selected only for characteristics that are unique to an individual power source; rather, the utility resource planner should account for how each electric power source co-moves, in terms of price and other attributes, with all other electric power sources. In addition, taking these comovements into account makes it possible to design and implement a portfolio that has the same expected value and less risk than a portfolio constructed by ignoring the interaction between different electric power sources. For example, a portfolio of natural gas and renewables may be preferred to a portfolio of natural gas and oil just because of the hedging benefits from renewables when natural gas prices rise.").
[123] *Id.*
[124] Costello, *supra* note 5, at 10.
[125] *U.S. Natural Gas Wellhead Price (Dollars per Thousand Cubic Feet)*, U.S. ENERGY INFO. ADMIN., available at http://www.eia.gov/dnav/ng/hist/n9190us3m.htm.

sufficiently to compensate.[126] Access to non-gas generation, by reducing the dependence on gas-fired units, can reduce power price volatility. When natural gas prices spike, power can be obtained from lower-cost generators and displace natural gas-fired generation.

Market expansion through transmission investment can increase the fuel diversity of the power supply. New transmission lines can facilitate trade between markets with very different generation portfolios. From a price stability perspective, this can be especially beneficial when the two markets' primary fuels exhibit weak or no correlation in their prices.[127] A gas-dependent market can, for example, obtain access to renewable generation in adjacent markets. If the price of gas rises, utilities can obtain power from wind turbines instead of from expensive gas generators.[128] Similarly, the wind-dependent market can obtain power from fossil fuel generators during seasons with fewer windy days. New transmission facilities can act like a financial hedge against volatility: in exchange for upfront investment in new lines, utilities and their customers may be able to obtain power at more stable prices over time.

d. Decreased Emissions of Local and Global Air Pollutants

Electricity generation is among the biggest sources of local air pollutants[129] and greenhouse gas emissions.[130] New lines into load pockets are likely to improve air quality in metropolitan areas currently dependent on old, inefficient gas turbines to meet peak demand. Increased transmission capacity can allow cleaner, more efficient generators

[126] Costello, *supra* note 5, at 13.
[127] Costello, *supra* note 122, at 42.
[128] MARK BOLINGER ET AL., QUANTIFYING THE VALUE THAT WIND PROVIDES AS A HEDGE AGAINST VOLATILE NATURAL GAS PRICES 13-14 (2002).
[129] Shapiro & Tomain , *supra* note 15, at 501-2.
[130] ADEGBULULGBE ET AL., *supra* note 57, at 253.

located upstream to displace the output from local high-pollution power plants. From the perspective of global climate change, the effects of transmission investment are more ambiguous because the large social cost of greenhouse gas emissions is not embedded in the price of fossil fuels at present. New transmission investment today can increase the output from "cheap" coal-fired generators because the actual cost of their power does not reflect the true social cost of burning coal. If policymakers put a price on greenhouse gas emissions, new transmission investment can facilitate the entry of new renewable resources without necessarily increasing the output from fossil fuel units.

Building new transmission lines into major metropolitan areas can have significant benefits for local air quality. Due to congestion on transmission lines feeding major cities, old, inefficient peaking units within the metropolitan region often need to be run to maintain system balance.[131] Because of their obsolete technology, these units often emit high levels of sulfur dioxide, nitrogen oxides, and particulate matter.[132] Operation of these units is blamed for impaired air quality in several major cities.[133] New transmission facilities can relieve congested lines and allow cleaner generators located further away to displace the output from polluting generators located in or near population centers.

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[131] *See* KRAPELS, *supra* note 107, at 7-8 ("In 90 percent of the landscape of the United States, it is challenging, but possible to establish a mix of generation and transmission assets that constitute an efficient power infrastructure. In the other 10 percent, it is extremely difficult to do so, and over time these areas have evolved into 'load pockets.' There are typically densely populated areas where generation facilities were built decades ago, are difficult to refurbish (and thus highly polluting) and where transmission grids are similarly dated and compressed."); Kevin Cooney & Heidi Nelson Ries, *Options for Improving Reliability: How Do They Impact Air Quality?*, 17 ELECTRICITY J. 30, 33 (Jun. 2004) ("In general, generating units that operate only during periods of peak demand are inefficient engines or simple cycle combustion turbines that are oil- or gas-fired and have minimal air pollution controls.").

[132] Cooney & Ries, *supra* note 131, at 37-38.

[133] *See, e.g.*, Jerry Markon, *Mirant Wants to Reopen Power Plant in Alexandria; In the Meantime, Pepco Looks to Fill Void*, WASH. POST, Sep. 15, 2005 (describing how Mirant's Potomac River plant in Alexandria, Virginia is necessary to maintain reliability but also produces significant amounts of air pollution); Kirk Johnson, *Promise and Peril in New York Power Plans*, NY TIMES, Aug. 14, 2000 (explaining tension between economical and reliable power, on one hand, and clean air, on the other, in New York City).

Reduced operation of these peaking units can lead to significant improvements in air quality within metropolitan areas. Lower concentrations of air pollutants, in turn, can produce tangible benefits for human health, including fewer asthma and heart attacks and premature deaths.[134]

In the long run, the greatest environmental benefits of transmission investment come from integrating renewable generation sources like geothermal, solar, and wind into regional power markets. With increased deployment around the world and the imminent adoption of a price on greenhouse gas emissions in several parts of the country, many of these non-polluting technologies are likely to become cost-competitive, vis-à-vis fossil fuel generation, in the coming years.[135] In the United States, however, the most promising sources of renewable energy development are often far from major cities. The desert Southwest and Great Plains – two areas with comparatively few population centers – have the greatest solar[136] and wind energy potential, respectively.[137] Because these areas did not represent an important source of power until recently, they have few transmission connections to regional grids.[138] New transmission lines will be needed to connect solar and wind farms to regional power markets.[139] At present, for example, wind facilities are often in generation pockets – areas of the grid where generation is, in effect, "trapped"

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[134] *See, e.g.*, Susannah Landes Weaver, *Setting Air Quality Standards: Science and the Crisis of Accountability*, 22 TUL. ENVTL. L.J. 379, 382 (2008-2009) ("Studies have linked particulate matter exposure to premature death in people with heart or lung disease, decreased lung function, irregular heartbeat, nonfatal heart attacks, development of chronic bronchitis, and asthma exacerbation.");
[135] *See* Brett Buchheit, *The Economics of Alternative Energy: Decisions Following the IPCC's Report on Climate Change*, 38 TEX. ENVTL. L.J. 73, 96-97, 100-2 (2007-2008) (explaining the improving economics of solar and especially wind power).
[136] NREL Solar, *supra* note 68.
[137] NREL Wind, *supra* note 66.
[138] Steven Ferry, *Restructuring a Green Grid: Legal Challenges to Accommodate New Renewable Energy Infrastructure*, 39 ENVTL. L. 977, 997 (2009).
[139] *Id.* at 998.

and cannot reach loads due to congested transmission lines.[140] Because of their unfavorable location, wind resources often receive depressed prices for their energy, weakening the incentive to invest in new wind farms.[141] Although the marginal cost of solar and wind energy is close to zero, investors need high market prices to recover their upfront fixed costs and earn an adequate return on their investment.[142]

In addition to improving their access to power markets, transmission upgrades can increase the reliability of renewable generators. One persistent concern with renewable resources like solar and wind is that their power is intermittent and unpredictable. A wind farm, for example, produces energy only when the wind is blowing. Moreover, the periods of maximum wind gusts often do not coincide with high-demand periods.[143] Because electricity cannot be stored in an economical manner, the intermittency of renewable resources requires the construction of fossil fuel-fired backup capacity, which can be operated when wind turbines and solar panels cannot produce power.[144] High output intermittency, however, is not an entirely inescapable shortcoming of renewable resources. Due to variations in atmospheric and topographic conditions, high wind gusts occur at different locations at different times.[145] Because of this less than perfect correlation between wind conditions, geographically dispersed wind turbines have been

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[140] Matthew Barmack, et al., *Performance Incentives for Transmission*, 16 ELECTRICITY J. 9, 12 (Apr. 2003).
[141] POTOMAC ECONOMICS, LTD., 2008 STATE OF THE MARKET REPORT FOR THE ERCOT WHOLESALE ELECTRICITY MARKETS XXXVIII (2010).
[142] *See, e.g.*, Matthew L. Wald & Tom Zeller, Jr., *Cost of Green Power Makes Projects Tougher Sell*, NY TIMES, Nov. 7, 2010 ("Electricity generated from wind or sun still generally costs more — and sometimes a lot more — than the power squeezed from coal or natural gas. Prices for fossil fuels have dropped in part because the recession has reduced demand. In the case of natural gas, newer drilling techniques have opened the possibility of vast new supplies for years to come.").
[143] Ronald H. Rosenberg, *Diversifying America's Energy Future: The Future of Renewable Wind Power*, 26 VA. ENVTL. L.J. 505, 526 (2008).
[144] *Id.*
[145] Edward Kahn, *The Reliability of Distributed Wind Generators*, 2 ELECTRIC POWER SYSTEMS RESEARCH 1 (1979).

found to exhibit less volatility in output than similar sized turbines built in close proximity.[146] When one site is experiencing calm conditions not conducive to wind generation, another may be experiencing strong wind gusts and capable of producing significant quantities of electricity. Five geographically scattered 20 MW wind farms can be expected to produce more steady levels of power than a single 100 MW wind farm. A similar phenomenon of output "smoothing" exists with respect to geographically dispersed solar photovoltaic systems.[147]

Transmission expansions can allow scattered wind turbines and solar panels to operate more like a "single unit" producing relatively constant levels of power.[148] The Atlantic Wind Connect, proposed by a group of investors including Google,[149] seeks to exploit this principle. According to the developers' public announcements, the project would be an offshore transmission "backbone" that would run along the Atlantic coast from southern Virginia to the New York metropolitan area and bring the bountiful wind resources of the shallow coastal waters to the Northeast Corridor.[150] If constructed, it would not only transmit but also smooth the joint output from future offshore wind turbines spread along the Mid-Atlantic coast.[151] While complete elimination of the intermittency of renewable generation sources is likely not possible, the reduction of

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[146] TROY K. SIMONSEN & BRADLEY G. STEVENS, REGIONAL WIND ENERGY ANALYSIS FOR THE UNITED STATES 13.
[147] Matthew Lave & Jan Kleissl, *Solar Variability of Four Sites Across the State of Colorado*, 35 RENEWABLE ENERGY 2867, 2872 (2010).
[148] *Id.* at 9; Recognizing that wind gusts across regions do not exhibit perfect positive correlation, the futurist and engineer R. Buckminster Fuller imagined a fantastic system of wind turbines around the world, presumably millions of them, connected through an intercontinental transmission grid that would produce the lion's share of the world's electricity at zero marginal cost. *See* R. BUCKMINSTER FULLER, CRITICAL PATH 208 (1981).
[149] Matthew L. Wald, *Offshore Wind Power Line Wins Backing*, NY TIMES, Oct. 12, 2010.
[150] Wald, *supra* note 149.
[151] Willett Kempton et al., *Electric Power from Offshore Wind Via Synoptic-Scale Interconnection*, 107 PROC. NAT'L ACAD. SCI. 7240, 7242-45 (2010).

output variability can greatly increase the large-scale feasibility of renewable technologies.

Today, transmission expansions can sometimes be in tension with cleaner electric generation. Grid expansions can increase the output from polluting power plants. Under current regulatory policies, coal-fired generation, which produces massive global environmental externalities,[152] is often the lowest-cost source of electricity today.[153] Widening electricity markets through new transmission can cause cheap but environmentally damaging coal generation to displace more expensive but cleaner sources of power. In fact, several transmission projects, originating in coal-rich Appalachia and running to the Eastern Seaboard, have been described unflatteringly as "coal-by-wire."[154]

Categorical opposition to transmission projects on climate change grounds overlooks the underlying reason why coal and fossil fuels, in general, are cost-competitive today. If policymakers put a price on greenhouse gas emissions,[155] transmission investment can have significant environmental benefits on a local, regional and global level. Coal likely would not enjoy its current cost advantage if its entire environmental costs were factored into its market price.[156] In effect, consumers of all

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[152] *See* Melissa Powers, *The End of Coal as a Source of "Cheap" Electricity*, 12 U. PA. J. BUS. L. 407, 420 (2009-2010) ("In 2007, coal-fired power plants accounted for eighty-two percent of all carbon dioxide emissions from the electricity sector and over twenty-seven percent of the country's greenhouse gas emissions.").
[153] *Id.* at 408.
[154] Eric Schelzig, *Eastern-bound transmission projects could cost $4 billion*, ASSOC. PRESS, June 11, 2005.
[155] *See* William D. Nordhaus, *Economic Aspects of Global Warming in a Post-Copenhagen Environment*, 107 PROC. NAT'L ACAD. SCI. 11721, 11721 ("The model … calculates the path of carbon prices necessary to keep the increase in global mean temperature to 2ºC or less in an efficient manner. The carbon price for 2010 associated with that goal is estimated to be $59 per ton (at 2005 prices), compared with an effective global average price today of around $5 per ton.").
[156] *See* Powers, *supra* note 152, at 424 ("Although traditional electricity regulation has favored the use of coal thus far, the costs associated with climate change, combined with the electricity sector's experiences with nuclear energy, make it likely that coal will lose its dominance within the electricity sector."); Darrell

fossil fuels, especially coal, receive a "subsidy" today because they do not bear the costs of emissions that damage the local and global environment. If this subsidy were eliminated through a carbon tax or cap-and-trade system, wind energy – the most cost-competitive renewable technology – could displace significant amounts of coal- and natural gas-fired generation and eliminate the emissions of millions of tons of carbon dioxide and other greenhouse gases annually.[157] The threat of increased coal-generated power should not be used to justify the preservation of an antiquated grid; instead policies to encourage new transmission development should be implemented in conjunction with putting a price on greenhouse gas emissions.

Promisingly, several European countries with less wind energy potential (but arguably more farsighted policymakers) than the United States already derive a significant fraction of their power needs from wind.[158] Given the significant contribution of electricity generation to domestic and global greenhouse gas emissions,[159] the integration of renewable energy resources into the grid can yield significant benefits. Increased output from renewable resources could displace coal-fired generation and yield a true global externality.[160] A reduction in greenhouse gas emissions can help reduce the likelihood of disastrous climate change and protect vulnerable populations around the

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Blakeway & Carol Brotman White, *Tapping the Power of Wind: FERC Initiatives to Facilitate Transmission of Wind Power*, 26 ENERGY L.J. 393, 398 (2005) ("In ISOs and RTOs, the market and operating rules and centrally dispatched balancing markets tend to be wind-friendly by their very nature.").

[157] Buchheit, *supra* note 135, at 100.

[158] Bent Ole Gram Mortensen, *International Experiences of Wind Energy*, 2 ENVTL. & ENERGY L. & POL'Y J. 179, 181 (2007-2008).

[159] *Carbon Dioxide – Human-Related Sources and Sinks of Carbon Dioxide*, US ENVTL. PROTECTION AGENCY, available at http://www.epa.gov/climatechange/emissions/co2_human.html ("The process of generating electricity is the single largest source of CO_2 emissions in the United States, representing 41 percent of all CO_2 emissions.").

[160] Jonathan B. Wiener, *Think Globally, Act Globally: The Limits of Local Climate Policies*, 155 U. PA. L. REV. 1961, 1964 (2006-2007).

world, ranging from residents of low-lying coastal areas and oceanic islands to those living in (presently) semi-arid regions of Africa, from its cruel effects.[161]

ii. State and Local Costs of Transmission Development

In contrast to their (often) regional benefits, the costs of transmission projects tend to be concentrated in particular states and localities. The principal costs are the recovery of the upfront investment and a reasonable return from ratepayers, the aesthetic and environmental harms on areas surrounding the line, and the possible adverse health effects on those living nearby. The aesthetic and environmental effects could be mitigated, at least partly, through the placement of lines underground instead of on the conventional overhead pylons. Burying transmission lines, however, is economically infeasible in most areas and can counter intuitively reduce system reliability.[162]

a. Recovering Project Costs

Notwithstanding the dramatic changes in the electricity sector, transmission will continue to be viewed as a natural monopoly and regulated as such for the most part.[163] For intrastate transmission facilities in parts of the country that still have bundled electricity rates, transmission developers recover the costs of construction as well as a reasonable rate of return from their customers.[164] If other utilities use the line, these

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[161] *See, e.g.*, Ruth Gordon, *Climate Change and the Poorest Nations: Further Reflections on Global Inequality*, 78 U. COLO. L. REV. 1559 (2007).
[162] AMY ABEL, ELECTRIC TRANSMISSION: APPROACHES FOR ENERGIZING A SAGGING INDUSTRY 16 (2007) ("Although underground distribution is generally more reliable during storms, corrosion from water infiltration can cause outages in the days and weeks after severe storms. The uprooting of trees can damage underground lines directly. Underground lines can be more expensive and take longer to repair. Replacing overhead lines with underground cable is also expensive. Analysis by the Florida Public Service Commission (FPSC) has found that replacing overhead transmission lines in Florida with underground lines over a 10-year period might require a rate increase of nearly 50% spread over all kilowatt hours.").
[163] *See* Pierce, *supra* note 8, at 461 ("Transmission and distribution remain natural monopoly functions. No one except the folks at the Cato Institute support deregulation of transmission or distribution.").
[164] Brown & Rossi, *supra* note 7, at 709.

revenues are used to offset the amount recoverable from ratepayers.[165] Over the life of the project, parties may thus bear the costs in rough proportion to the benefit they derive from the line. Nonetheless, the customers of the transmission line developer are responsible for the residual costs that are not recovered through wholesale transactions regardless of whether they receive any actual benefits from the project.[166] For interstate transmission lines and lines not included in rate base, FERC authorizes cost recovery.[167] FERC has used multiple cost allocation methods in the past and has sometimes imposed costs on utilities (and their customers) even if they received only nominal benefits from a transmission project.[168]

In theory, merchant transmission projects could obviate the issue of cost allocation because they derive their revenues by exploiting the price differentials between the nodes they connect on the grid.[169] Developers of these projects bear the economic risk, eliminating the need for regulators to determine beneficiaries and allocate costs accordingly.[170] This is a significant virtue of transmission lines developed on a merchant basis. Yet, merchant transmission is likely to remain an unfulfilled theoretical ideal for the most part. The economic and physical traits of the electricity grid suggest that merchant transmission investment cannot be expected to occur at socially desirable levels.[171] The public good benefits of transmission grid expansions may mean that market

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[165] *Id.*
[166] *Id.*
[167] McGarvey, *supra* note 79, at 76.
[168] *See infra* part V.b (explaining how FERC allocates the costs of transmission projects).
[169] *See, e.g.*, James Bushnell & Steven Stoft, *Electric Grid Investment under a Contract Network Regime*, 10 J. REG. ECON. 61, 79 (1996).
[170] *Id.*
[171] *See* Seth Blumsack, Lester B. Lave & Marija Ilic, *The Real Problem with Merchant Transmission*, 21 ELECTRICITY J. 9, 12-16 (Mar. 2008) (explaining why the economics and engineering aspects of an alternating current-based transmission grid are not conducive to merchant investment).

mechanisms alone will generally not provide adequate incentives for investment.[172] Regulatory cost-allocation thus remains the norm for transmission funding.

b. Aesthetic and Ecological Effects

While they can symbolize humankind's ingenuity and be appealing to some people's subjective sense of beauty, transmission lines are generally thought to mar local landscapes. Because their steel pylons can be over a 100 feet high, opponents of transmission projects have described them as "aerial junkyards."[173] Along with being visual eyesores, transmission lines can generate audible corona noise when carrying current, a sound reminiscent of a running air conditioner.[174] While the precise aesthetic reasons for finding transmission lines objectionable may often not be as colorful as "aerial junkyards," contingent valuation studies, a method used commonly to "price" non-market goods, have found that those living near transmission lines are willing to pay non-trivial amounts of money in return for less intrusive transmission tower designs.[175] Transmission lines may be especially unattractive when located in areas of historic significance or natural beauty that either have been unchanged for decades or remain in their natural state.[176] Beyond these real aesthetic costs, the visual effect of transmission facilities can translate into tangible economic harm. To protect against falling trees and other potential obstructions, transmission lines generally require corridors that are

[172] Vikram S. Budhraja, et al., *Improving Electricity Resource-Planning Processes by Considering the Strategic Benefits of Transmission*, 22 ELECTRICITY J. 54, 57 (Mar. 2009).
[173] Eugene Levy, *The Aesthetics of Power: High-Voltage Transmission Systems and the American Landscape*, 38 TECH. & CULTURE 575, 584 (1997).
[174] John A. Molino, et al., *Use of the "Acoustic Menu" in Assessing Human Response to Audible (Corona) Noise from Electric Transmission Lines*, 66 J. ACOUST. SOC. AM. 1435, 1442 (1979).
[175] Giles Atkinson, et al., *'Amenity' or 'Eyesore'? Negative Willingness to Pay for Options to Replace Electricity Transmission Towers*, 11 APP. ECON. LETTERS 203, 207-8 (2004); Stale Navrud, et al., *Valuing the Social Benefits of Avoiding Landscape Degradation from Overhead Power Transmission Lines: Do Underground Cables Pass the Benefit-Cost Test?*, 33 LANDSCAPE RES. 281, 288-93 (2008).
[176] Levy, *supra* note 173, at 580.

hundreds of feet wide and completely free of other structures and vegetation.[177] Establishing such corridors can interfere with existing land uses and necessitates the condemnation of significant areas of land.[178] Local tourism may be harmed because visitors are less willing to visit an area where transmission lines blight previously pristine landscapes or interfere with recreational activities.[179] For local landowners, the visual pollution from transmission lines can result in reduced property values.[180]

New transmission lines can also have adverse effects on local ecosystems, especially on bird species. Given the height of most transmission lines, the adverse effects on bird populations are not surprising. Birds can collide with or be electrocuted by transmission lines while on their normal flight patterns.[181] Because of their permanence, transmission lines may in the longer term affect bird breeding habits and reduce their population densities in the vicinity.[182] Smaller bird species may feel the ecological effects of transmission lines most acutely. In addition to impeding their flight patterns, transmission lines can serve as perches for predatory birds, which can use them to hunt smaller birds and other wildlife more effectively.[183] The effects on threatened and endangered bird populations are especially worrisome – protecting these species obviously transcends local interests and is a matter of national and international

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[177] J.C. MOLBURG, ET AL., THE DESIGN CONSTRUCTION, AND OPERATION OF LONG-DISTANCE HIGH-VOLTAGE ELECTRICITY TRANSMISSION TECHNOLOGIES 18 (2007).
[178] *Id.* at 20.
[179] MOLBURG ET AL., supra note 177, at 60.
[180] Stanley W. Hamilton & Gregory M. Schwann, *Do High Voltage Electric Transmission Lines Affect Property Value?*, 71 LAND ECON. 436, 442-43 (1995).
[181] Kjetil Bevanger, *Biological and Conservation Aspects of Bird Mortality Caused by Electricity Power Lines: A Review*, 86 BIOLOGICAL CONSERVATION 67, 67 (1998).
[182] João Paulo Silva et al., *Estimating the Influence of Overhead Transmission Power Lines and Landscape Context on the Density of Little Bustard Tetrax Tetrax Breeding Population*, 221 ECOLOGICAL MODELLING 1954, 1959 (2010).
[183] *Id.*

concern.[184] While the effects are most pronounced on birds and other aerial species, the impact of transmission lines is not confined to them. Transmission corridors are usually wide enough to avoid contact with nearby structures and trees and are cleared of all vegetation to reduce the risk of fire.[185] While enhancing grid integrity and system reliability, these wide corridors can bisect wildlife habitats.[186] The resulting habitat fragmentation can reduce the long-term populations of animal and plant species and harm biodiversity.[187]

c. Possible Health Effects on Nearby Residents

In recent decades, transmission lines have generated controversy and fear in the public's mind because of the alleged effects of electromagnetic fields (EMF) on human health. All electrical appliances and systems emit low-frequency electrical and magnetic fields. Due to the ubiquity of electrical appliances and devices, virtually every member of industrialized society is exposed to EMF on a daily basis.[188] Electrical fields cannot penetrate something as thin as a piece of paper and so are easily shielded by clothing and physical structures.[189] Magnetic fields, in contrast, can penetrate the walls of most residential structures.[190] Because of this quality, magnetic fields are considered more worrisome from a public health perspective. The strength of a magnetic field is a positive function of current and a negative function of distance; field strength diminishes rapidly

[184] Bevanger, *supra* note 181, at 72.
[185] Donna J. Clarke et al., *Powerline Corridors: Degraded Ecosystems or Wildlife Havens?*, 33 WILDLIFE RESEARCH 615, 615 (2006).
[186] *Id.*; Gary Allen Breece & Bobby J. Ward, *Utility Terrestrial Biodiversity Issues*, 20 ENV'TL MGMT. 799, 802 (1998).
[187] *See, e.g.*, Gary M. Koehler, et al., *Habitat Fragmentation and the Persistence of Lynx Populations in Washington State*, 72 J. WILDLIFE MGMT. 1518 (2008); Ramiro Aguilar, et a., *Genetic Consequences of Habitat Fragmentation in Plant Populations: Susceptible Signals in Plant Traits and Methodological Approaches*, 17 MOLECULAR ECOLOGY 5177 (2008).
[188] *Electromagnetic Fields and Cancer: A Legitimate Cause of Action or A Result of Media-Influenced Fear?*, 21 OHIO N.U. L. REV. 551, 554 (1994-1995).
[189] *Id.*
[190] *Id.* at 554-55.

as the distance from an electric current increases.[191] In other words, individuals who reside in close proximity to high voltage transmission lines can be expected to receive the greatest exposure to magnetic fields, all else being equal.

Although empirical studies have not found a conclusive and consistent evidence of a connection,[192] some research has reported a small but statistically significant association between magnetic field exposure and childhood leukemia.[193] Magnetic fields are on the low-energy end of the electromagnetic spectrum and cannot damage human genetic material in the same manner as ionizing radiation like gamma rays and x-rays.[194] The theoretical connection between magnetic field exposure and leukemia is unclear but a few links have been posited. First, magnetic fields may suppress the human body's nighttime production of melatonin, a compound thought to have anti-carcinogenic properties.[195] Alternatively, these fields may generate small amounts of current in the body that can damage bone marrow where new blood cells are produced.[196] In addition to the association with childhood leukemia, magnetic field exposure has been correlated with an increased incidence of other types of cancer. Exposure to magnetic fields has been associated with a small increase in the likelihood of developing brain tumors[197] and breast cancer.[198] Because the elevated risk of cancer is small and has an uncertain

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[191] *Id.* at 555-56.
[192] *Electric and Magnetic Fields (EMF) Radiation from Power Lines*, US ENVTL. PROTECTION AGENCY, http://www.epa.gov/radtown/power-lines.html.
[193] *See, e.g.*, Gerald Draper, et al., *Childhood Cancer in Relation to Distane from High Voltage Power Lines in England and Wales: A Case-Control Study*, 330 BRITISH MED. J. 1290, 1292 (2005);
[194] *Id.* at 556.
[195] Joachim Schuz, et al., *Nighttime Exposure to Electromagnetic Fields and Childhood Leukemia, An Extended Period Analysis*, 166 AM. J. EPIDEMIOLOGY 263 (2007).
[196] Leeka Kheifets & Riti Shimkhada, *Childhood Leukemia and EMF: Review of the Epidemoilogical Evidence*, 7 BIOELECTROMAGNETICS SUPPLEMENT S51, S55-S56 (2005).
[197] James G. Gurney & Edwin van Wijngaarden, *Extremely Low Frequency Electromagnetic Fields (EMF) and Brain Cancer in Adults and Children: Review and Comment*, 1 NEURO-ONCOLOGY 212, 212 (1999).
[198] Maria Feychting et al., *Magnetic Fields and Breast Cancer in Swedish Adults Residing near High-Voltage Power Lines*, 9 EPIDEMIOLOGY 392, 395-96 (1998);

biological mechanism, some researchers have suggested public fixation on the connection between EMF and leukemia is misplaced and may ignore other more serious carcinogenic and non-carcinogenic health risks.[199]

Even if research deems magnetic field exposure to be of secondary or insignificant concern in the universe of carcinogens, mistaken public perceptions of a connection may nonetheless persist. Due to widespread concerns about the health risks of magnetic field exposure, transmission lines may create a feeling of dread among nearby residents – a real cost even if it is based on unfounded fears.[200] Because of the often-unfavorable prognosis and dire popular associations with cancer, individuals may be acutely aware of all carcinogenic risks and treat them all equally even if risks such as EMF exposure are probabilistically insignificant.[201] Media coverage may also contribute to skewed popular perceptions: scientific reports showing a causal connection between EMF and cancer are more likely to receive press coverage than those studies finding no link. Families with young children may view residences near power lines as especially undesirable on account of health grounds.[202] For all these reasons, buyers of properties near transmission lines may demand a discount for assuming a "risk" that is actually

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[199] A.W. Wood, *How Dangerous Are Mobile Phones, Transmission Masts, and Electricity Pylons?*, 91 ARCH. DISEASE IN CHILDHOOD 361, 365 (2010) ("Causality has not been established, but if it were, estimates put the percentage of childhood leukaemia cases attributable to [magnetic fields from transmission lines] at around 1%. Some precautions with respect to the forms of EMF emissions are warranted, but given the enormous societal benefits of electric power …, any such precautionary measures should take these benefits into account and also be commensurate with informed estimates of putative risk.").

[200] Lita Furby et al., *Public Perceptions of Electric Power Transmission Lines*, 8 J. ENVTL. PSYCH. 19, 30 (1988).

[201] *See* Paul Slovic & Ellen Peters, *Risk Perception and Affect*, 15 CURR. DIRECTIONS IN PSYCHOLOGICAL SCI. 322, 324 (2006) ("When the consequences of an action or event carry strong affective meaning, as is the case with a lottery jackpot or a cancer, the probability of such consequences often carries too little weight. As Loewenstein, Weber, Hsee, and Welch (2001) observe, responses to uncertain situations appear to have an all-or-none characteristic that is quite sensitive to the possibility of strong positive or negative consequences, regardless of their probability.");

[202] Furby, *supra* note 200, at 71.

trivial or non-existent.[203] Even if the cause is unfounded, a reduction in local property values due to health fears is a real cost to landowners.

IV. REGULATORY FEDERALISM FRUSTRATES SOCIALLY DESIRABLE TRANSMISSION UPGRADES

In spite of the potentially large *net* benefits of transmission expansions in the new environment of regional markets and renewable energy, transmission investment has been modest and declining in recent decades.[204] Theoretical and anecdotal evidence of state decision-making suggests that state jurisdiction over transmission siting and cost allocation has blocked necessary grid expansions. State obstructionism occurs for three principal reasons. First, state regulators may be reluctant to approve a project whose *in-state* costs – both economic and non-economic – exceed the *in-state* benefits. Likewise, landowners and officials in local government may resist the erection of transmission lines that diminish property values without providing an adequate local benefit in return – *local* costs may exceed *local* benefits. These two obstacles to transmission can be dubbed "parochialism" and "NIMBYism," respectively. Furthermore, incumbent utilities with significant political clout in state government can use state regulatory processes to block new transmission lines as a means to protect their existing market power. Utilities, in other words, can use the siting process to insulate themselves from competition, a classic case of protectionist conduct.

i. Parochialism

[203] Peter Elliott & David Wadley, *The Impact of Transmission Lines on Property Values: Coming to Terms with Stigma*, 20 PROP. MGMT. 137 (2002).
[204] *See* F.F. Wu, F.L. Zheng & F.S. Wen, *Transmission Investment and Expansion Planning in a Restructured Electricity Market*, 31 ENERGY 954, 959 (2006) ("[A]nnual investment on transmission in the US has dropped 50% since 1975.").

State regulators are politically accountable only to residents of their state and so can be expected to value in-state benefits and costs more highly than regional benefits and costs. The degree of inward-orientation in transmission line siting varies across states. Some states prohibit regulators from considering any out-of-state benefits when making their decisions.[205] Regulators in other states have the discretion to consider out-of-state benefits.[206] Finally, statutes in a small group of states encourage regulators to consider the regional benefits of proposed transmission grid upgrades.[207] Even in more regional-minded states, however, political pressures are likely to encourage parochial decision-making. Because state regulators have an incentive to avoid creating political backlash from executive and legislative officials and voters in their states, parochialism, to some degree, is an intrinsic feature of state-level decision-making to some degree. When considering the costs and benefits of a new transmission project, state officials likely place a greater weight on in-state costs and benefits and discount costs and benefits accruing to other states.[208]

Because they often generate local costs and regional benefits,[209] many socially beneficial transmission projects face regulatory obstacles from the very outset. Intrastate and interstate transmission lines that yield a net benefit to a state may be able to win approval. Lines that, however, fail to yield positive net benefits to an affected state are likely to face significant regulatory resistance, regardless of whether they are desirable from a larger regional perspective. For defensible political reasons, regulators may not

[205] Ashley C. Brown & Damon Daniels, *Vision Without Site; Site Without Vision*, 15 ELECTRICITY J. 23, 27 (Oct. 2003).
[206] *Id.* at 29.
[207] *Id.* at 32.
[208] Brown & Rossi, *supra* note 7, at 710.
[209] *See supra* part III.

want to foist the economic and non-economic costs of transmission projects on state residents for the purpose of benefiting out-of-state residents to who they owe no legal or political duty. In the calculus of state regulators, the regional benefits of transmission investment are externalized to other states while the costs are internalized. This type of decision-making is sensible from the state regulator's perspective: voters should not have to pay for and tolerate the environmental blight and the possible health effects of a new transmission line to benefit neighboring states. In effect, states often look at the entire cost ledger but truncate a portion of the benefit column. This narrow focus, while rational for state regulators, is undesirable from a regional or national viewpoint. A project that does not yield a net benefit for one of the affected states may produce significant net benefits for the region. As is often the case when externalities are present, the presence of regional benefits frustrates optimal decision-making from a larger societal perspective.[210]

Southern California Edison's unsuccessful attempt to build a 230-mile transmission line from Palo Verde, Arizona to Devers, California, partly parallel to an existing line,[211] exemplifies the power of parochial-minded state regulators. The project appeared to be a sensible way to strengthen wholesale markets in the Southwest. Arizona has surplus low-cost generation while California has tight supply margins.[212] The line could have facilitated the export of power from Arizona to California, enhancing reliability and competition and allowing solar energy to reach West Coast consumers. Regulators at the Arizona Corporation Commission unanimously rejected Edison's

[210] WILLIAM J. BAUMOL & ALAN S. BLINDER, MICROECONOMICS: PRINCIPLES AND POLICY 313 (2008).
[211] Paul Davenport, *California utility presses for new electricity link with Arizona*, ASSOC. PRESS, Sep. 9, 2007.
[212] *See Power line battle with California heats up*, ASSOC. PRESS, Nov. 9, 2008 ("California customers pay about double what Arizonans pay for a kilowatt-hour of electricity, and the line would allow California to tap cheap electricity."); Leonard Anderson, *Southern California pushes for more reliable grid*, REUTERS, Nov.22, 2006.

proposal, however.[213] For them, the project was categorically unwelcome, as it would benefit California at the expense of Arizona. While customers of Southern California Edison would have paid for the project through higher retail rates, Arizona residents would have borne the aesthetic and environmental harms of a new transmission line and paid higher prices for electricity due to increased exports of power to California.[214] One Arizona regulator memorably made this point, describing Edison's proposed line as a 230-mile "extension cord" for the Golden State.[215] Although it requested FERC to invoke its backstop siting authority and overrule the Arizona decision, Southern California Edison ultimately decided to scale back the project and settle for the construction of an intrastate line in California.[216]

While it eventually obtained all the necessary approvals, the Trans-Allegheny Interstate Line being developed by Allegheny Power and Dominion Power encountered similar resistance from some Pennsylvania regulators. When completed, the line will run from Southwestern Pennsylvania across West Virginia and terminate in the Northern Virginia suburbs of Washington, DC.[217] The logic of the project is apparent: connect the low-cost generation of southwestern Pennsylvania and West Virginia with the growing Washington, DC metropolitan area and reduce electricity prices and strengthen reliability in the nation's capital and other parts of the East Coast.[218] PJM, whose geographic footprint includes all the affected states, had deemed the project essential to strengthening

[213] Paul Davenport, *Arizona regulators reject new electric line to California*, ASSOC. PRESS, May 30, 2007.
[214] *Id.*
[215] *Id.*
[216] Cassandra Sweet, *Edison International Unit Wins Approval for Calif Transmission Line*, DOW JONES BUSINESS NEWS, Nov. 20, 2009.
[217] Sean D. Hamill, *Vast Power Line Project Irks Monastery and More*, NY TIMES, Apr. 9, 2008.
[218] *Maryland Regulators Highlight Precarious Supply Situation*, POWER MARKET TODAY, Jan. 22, 2007.

the grid in its Eastern region.[219] Two administrative law judges (ALJs) in the Pennsylvania Public Utilities Commission approached the matter differently, however.[220] Taking a Pennsylvania-centric view of the project, they recommended that the commissioners deny approval to the line on the grounds that it facilitated the export of cheap power from Pennsylvania to Eastern metropolises. The project developers, PJM, and the judges did not dispute the underlying facts: the project would strengthen regional markets and reduce congestion on lines feeding Washington. The ALJs, however, viewed the economic benefits accruing to other states as being immaterial to their decision.[221] Their unconditional recommendation to deny approval created uncertainty over the project's future. Fortunately, for consumers on the East Coast, a majority of the commission and the Pennsylvania Supreme Court took a more holistic view of the project's benefits and authorized the project on the grounds that it strengthened the regional grid.[222]

Despite the growing public affinity for renewable energy, parochial-minded opposition to transmission development has reared its head in Wyoming, one of the most promising areas for onshore wind energy development in the contiguous United States.[223] To its credit, the state government has taken some significant steps to facilitate the development of its wind resources.[224] It, however, has not been immune to taking a

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[219] *Id.*
[220] Marc Levy, *Judges deal Setback to Proposed Power Line*, PITTSBURGH POST-GAZETTE, Aug. 22, 2008.
[221] *See id.* ("Judges Michael A. Nemecc and Mark A. Hoyer said approving such a line would reward a lack of foresight and substandard maintenance of existing line, while serving only to move cheap coal power from Appalachia to the eastern seaboard.").
[222] Janice Crompton, *Power line foes to discuss energy options*, PITTSBURGH POST-GAZETTE, Nov. 23, 2008; The dissenting commissioner endorsed the ALJs' recommendation and found it unfair that Pennsylvania ratepayers would bear a portion of the line's costs despite receiving no benefit from it. *See id.*
[223] NREL WIND, *supra* note 66.
[224] *See* Brown & Rossi, *supra* note 7, at 724 ("Wyoming has created the Wyoming Infrastructure Authority … to promote the selling of energy output produced in the state." *See id.* at 737 "(Wyoming [has] …

narrow view of this development. Being the least populous state in the Union, Wyoming's wind energy development is going to occur primarily for the purposes of exporting power to other Western states like California and Nevada.[225] To capture some of these benefits, the legislature in February 2010 passed a $1 per megawatt-hour tax on wind energy, which effectively amounts to an export tax.[226] In addition to this measure, the Wyoming Senate's Minerals Committee voted for a moratorium on the use of eminent domain for constructing transmission lines connecting wind turbines to the grid.[227] Governor Dave Freudenthal has supported this restriction and urged the legislature to modify the state's condemnation statute accordingly.[228] The political reason for limiting the scope of eminent domain is not hard to divine. The construction and operation of these connector lines would impose sizeable aesthetic and environmental costs within Wyoming but primarily benefit other states. If enacted, however, these limitations on eminent domain would likely make land acquisition for these lines more difficult and could undermine Wyoming's larger strategy of promoting wind development. Several proposed major interstate projects that would increase transmission capacity from Wyoming to major Western cities have been heralded as "highways for clean energy."[229] Their lofty promise though is contingent on wind generators being able to connect to the regional grid.

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created [a] special-purpose [entity] with the ability to obtain siting permits and construct facilities using lower-cost public finance mechanisms.").

[225] Mark Golden, *Proposed Western Power Project Would Aid California, Nevada*, WALL ST. J., Apr. 17, 2006.

[226] Matt Joyce, *Wyoming Legislature votes for wind energy tax; committees pass tighter wind development rules*, ASSOC. PRESS, Feb. 26, 2010.

[227] *Id.*

[228] Dustin Bleizeffer, *Freudenthal: Wyoming must address use of eminent domain for wind turbine power lines*, CASPER STAR-TRIBUNE, May 3, 2010.

[229] *See, e.g.*, *Zephyr and Chinook Power Transmission Lines*, TRANSCANADA, http://www.transcanada.com/zephyr.html; *TransWest Express Transmission Project: Delivering Wyoming*

ii. NIMBYism

The phenomenon of local residents opposing industrial and public projects in their neighborhoods has become prevalent enough to warrant its own acronym – NIMBY (not-in-my-backyard).[230] Except for arising at the local level instead of the state level, NIMBYism is similar to parochialism in that it results from the asymmetric distribution of costs and benefits of a proposed project.[231] Those living near proposed transmission lines oppose them, believing that they will bear the aesthetic and environmental costs without necessarily receiving any offsetting benefits.[232] Beyond the psychological impact, the aesthetic and environmental harms can translate into reduced property values, a serious worry for many modern households who have much of their wealth in real estate.[233] For many Americans, a substantial diminution in the value of their real property can thus have a substantial effect on their standard of living.[234] Because projects like transmission lines yield concentrated costs and diffuse benefits,[235] opponents often have a strong personal incentive in resisting public projects while beneficiaries do not have enough at stake to make public action worthwhile. Furthermore, the threat of a prospective loss may be more likely to motivate public action than a prospective gain of

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Wind Energy, TRANSWEST EXPRESS LLC, http://www.transwestexpress.net/; *Gateway West Transmission Line Project*, IDAHO POWER & ROCKY MOUNTAIN POWER, http://www.gatewaywestproject.com/contact_us.aspx.

[230] Orlando E. Delogu, *"NIMBY" Is A National Environmental Problem*, 35 S.D. L. REV. 198, 198 (1990).

[231] *Id.*

[232] *See supra* Part IV.

[233] William A. Fischel, *Voting, Risk Aversion, and the NIMBY Syndrome: A Comment on Robert Nelson's "Privatizing the Neighborhood"*, 7 GEO. MASON L. REV. 881, 884-885 (1998-1999) ("The typical homeowner is the sole claimant to the equity value of her house. Households whose members were approaching retirement age in the middle 1980s had, on average, more than six times as much equity in their home than they held in financial assets. The exposure of risk that homeowners face is analogous to having nearly all of one's retirement wealth invested in the stock of a single, undiversified company with only one huge plant.").

[234] *Id.*

[235] Barak D. Richman & Christopher Boerner, *A Transaction Cost Economizing Approach to Regulation: Understanding the NIMBY Problem and Improving Regulatory Responses*, 23 YALE J. ON REG. 29, 32 (2006).

similar magnitude.[236] In short, adversely affected parties will typically organize and resist unwelcome projects while beneficiaries will remain unorganized and passive.[237] NIMBYism, like state-level parochialism, can be undesirable from a larger societal perspective.[238] When the aggregate benefits are considerable but dispersed across a multitude of citizens and the collective costs are comparatively less but concentrated among a small subset of the population, NIMBYism can impede the development of socially desirable projects.[239]

Strong NIMBY resistance partly explains why the New York Regional Interconnection (NYRI) was abandoned. This direct current line was proposed to run from upstate New York to the suburbs of New York City.[240] From a system-wide perspective, the need for the project was clear. New York City has limited generation reserves while upstate New York has surplus capacity.[241] During thousands of hours during the year, the lack of adequate transmission capacity prevents the most economical power plants from serving the nation's largest metropolitan area; low-cost generators, including wind farms,[242] in Upstate New York cannot serve the New York City market due to congested transmission lines. As a result, inefficient generators within the New

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[236] Christine Jolls, Cass R. Sunstein & Richard Thaler, *A Behavioral Approach to Law and Economics*, 50 STAN. L. REV. 1471, 1484 (1997-1998).
[237] MANCUR OLSON, THE LOGIC OF COLLECTIVE ACTION: PUBLIC GOODS AND THE THEORY OF GROUPS 53 (1965).
[238] Michael B. Gerrard, *The Victims of NIMBY*, 21 FORDHAM URB. L.J. 495 (1993-1994).
[239] Richman & Boerner, *supra* note 235, at 37.
[240] *New York Regional Interconnection – Project Overview*, http://www.nyri.us/.
[241] *See* DOE CONGESTION STUDY, *supra* note 106, at 44-45 ("Most of the electricity flows in upstate New York are either west-to-east or north-to-south, and all move electricity toward the New York City area. Because transmission capacity into this area is limited, New York City is an epicenter of transmission congestion and its delivered energy prices are higher than in other eastern load centers.").
[242] *Wind Power Growing in New York*, NEW YORK INDEPENDENT SYSTEM OPERATOR, Apr. 22, 2009, Apr. 22, 2009, http://www.nyiso.com/public/webdocs/newsroom/press_releases/2009/Wind_Power_Growing_In_NY_04222009.pdf; Matthew L. Wald, *Wind Energy Bumps Into Power Grid's Limits*, NY TIMES, Aug. 26, 2008.

York City load pocket need to be dispatched to ensure demand is satisfied.[243] This frequent separation between New York City and the rest of the New York market has adverse consequences on local competition[244] and air quality.[245] In other words, residents of New York City pay both from their pocketbook and long-term health on account of inadequate transmission capacity. By facilitating greater power flows from Upstate New York, NYRI would have produced major benefits for the millions of residents of New York City and its suburbs.

Despite its substantial benefits, the NYRI project ran into a classic case of NIMBY resistance. Residents living along the route of the NYRI line mounted significant opposition to the project. They argued that the line would mar the bucolic landscape of the Upper Delaware River valley.[246] Specifically, they cited the line's potential effects on endangered species, tourism, property values, and the health of nearby residents as grounds to block the project.[247] Opponents contended that they would bear the costs of a project that would benefit outsiders.[248] New York politicians, including Senator Charles Schumer and then-Senator Hillary Clinton,[249] took up the opponents' cause and pledged

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[243] *See* DOE CONGESTION STUDY, *supra* note 106, at 45 ("As a result of transmission congestion and losses, there was considerable variation in clearing prices across the system. In the day-ahead market, eastern up-state prices were 27% higher than average prices in western New York, New York City prices were 8% higher than average prices in the eastern up-state region, and Long Island prices were 22% higher than average prices in the eastern up-state region.").
[244] Daniel L. Shawhan et al., *An Experimental Test of Automatic Mitigation of Wholesale Electricity Prices*, 28 INT'L J. INDUS. ORG. ("[C]oncentrated ownership and frequent transmission congestion give NYC's generation owners market power. … [S]ix companies own 99% of the generation capacity in NYC.").
[245] *See* U.S. PIRG EDUCATION FUND, POLLUTION ON THE RISE: LOCAL TRENDS IN POWER PLANT POLLUTION 45, 56 (2005) (indicating 337% rise in SO2 emissions and 14% rise in NOx emissions from Ravenswood generation station in Queens, New York between 1995 and 2003).
[246] Anthony DePalma, *Chafing at a Plan to Add Power Lines to the Landscape*, NY TIMES, July 10, 2006.
[247] *Id.*
[248] *Id.*
[249] *Sens. Schumer, Clinton Introduce Bill to Protect State's Right to Oppose New York Regional Interconnect's Current Power Line Route*, US FED NEWS, Aug. 14, 2007.

to fight the project at all levels.[250] This political dynamic illustrates how the individual stakes often matter much more than the aggregate benefits and costs. The project would have yielded significant benefits to residents of New York City; the costs while real and deserving of regulatory attention were probably much smaller in comparison. Because the costs were concentrated among a few hundred and the benefits were dispersed among millions, however, opponents were much more active in opposing the project and mobilizing legislative resistance. To put it more concretely, the owner of a bed-and-breakfast in the Catskills, who feared losing guests because of the transmission line, was much more likely to participate in public activism and the regulatory process than a Manhattan resident, who would have saved $200 in annual energy costs and breathed cleaner air on account of the line. Statewide New York politicians like Senator Schumer sided with one group of New Yorkers over another group of New Yorkers because of this asymmetry in individual benefits and costs. In the face of NIMBY opposition and an unfavorable cost allocation mechanism, the sponsors of the NYRI project gave up on it in 2009.[251]

As it faced parochial-minded opposition from Pennsylvania regulators, the Trans-Allegheny Interstate Line provoked fierce NIMBY resistance near its terminus in Northern Virginia. Although the line would benefit the larger Washington, DC area, its route through still (comparatively) undeveloped parts of Prince William and Loudoun Counties triggered vocal opposition from local landowners.[252] They feared that the line

[250] Devlin Barrett, *NY lawmakers seek to block NYRI power line*, ASSOC. PRESS, Feb. 5, 2007.
[251] *Commission Officially Dismisses NYRI*, NY PUBLIC SERVICE COMMISSION, Apr. 21, 2009, http://www3.dps.state.ny.us/pscweb/WebFileRoom.nsf/0/AF865D6E5239CC858525759F0053BA39/$File/pr09033.pdf?OpenElement; Kathy Larsen et al., *NYRI line developers pull plug on state siting process after FERC ruling on cost recovery*, ELECTRIC UTIL. WEEK, Apr. 13, 2009.
[252] Sandhya Somashekhar, *Hearing on Path of High-Voltage Lines to Resume*, WASH. POST, June 18, 2006.

would diminish the natural beauty of their area and reduce property values.[253] Many local residents also believed that the line would not provide them with offsetting benefits like lower electricity prices and improved reliability and would instead "deliver electricity to lucrative markets in New York and New Jersey."[254] These opponents were a vocal presence at local hearings and in regulatory and legal proceedings. Due to this strident local resistance, the line was successfully delayed for several years. In October 2008, however, the Virginia Corporation Commission approved the project[255] and had its decision upheld on appeal at the Virginia Supreme Court,[256] paving the way for construction to commence.

iii. Protectionism

The market expansion function of transmission can harm the profitability of entities possessing market power. In contrast to consumers and utilities purchasing power, generators within load pockets profit from having market power and would like to continue maintaining the "quiet life"[257] of a monopolist. These entities stand to lose from a transmission line that exposes them to competition and drives market prices closer to marginal cost.[258] Moreover, a new transmission line can create competition for an existing line connecting two otherwise isolated markets. To stave off this competition, incumbent generation and transmission owners can use local and state regulatory

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[253] Sandhya Somashekhar, *Power Crisis Is Overstated, Experts Say; High-Voltage Risky, Opponents' Advisors Say*, WASH. POST, Jan. 28, 2007.
[254] Sandhya Somashekhar, *Officials Back Power Line Plan; Dominion Still Face Fight for N.Va. Route*, WASH. POST, Jul. 29, 2008.
[255] Nick Miroff, *Neighbors Dismayed at Power Line Approval; Some in Pr. William Resigned to Project that Stretches Across N.Va.*, WASH. POST, Oct. 12, 2008.
[256] James Hohmann, Va. *Court allows Dominion's controversial power line*, WASH. POST, NOV. 6, 2009.
[257] John R. Hicks, *Annual Survey of Economic Theory: The Theory of Monopoly*, 3 ECONOMETRICA 1, 3 (1935).
[258] Enzo E. Sauma & Shmuel S. Oren, *Do Generation Firms in Restructured Electricity Markets Have Incentives to Support Social-Welfare-Improving Transmission Investments?*, 31 ENERGY ECON. 676, 678 (2009).

procedures to block the construction of new lines. By virtue of their size, these entities often have considerable clout in the halls of state government and can join with local and other non-utility opponents to derail a project. As with NIMBY-based opposition, a firm possessing market power may have strong incentives to oppose a transmission line while individual beneficiaries of the line do not have enough at stake to lobby regulators collectively.[259] As a result, states, when making decisions regarding the construction of transmission lines, may favor the interests of powerful incumbent utilities at the expense of in-state residents who would benefit from lower power prices.

The two-year fight from 2002 to 2004 over the now-operational Cross Sound Cable is suggestive of the power of incumbents in opposing new transmission lines. The line is a direct current cable that runs underneath the Long Island Sound from New Haven, Connecticut to Shoreham, New York and connects the New England and New York power markets.[260] The developers proposed the line as a merchant project whose economic risk they would bear in its entirety – in other words, they would make money based on the existence of price differentials between the two markets.[261] From the very beginning, the project was controversial as some critics worried that the line would damage fragile shellfish beds in New Haven harbor.[262] After the developer agreed to route the line so that it would avoid the shellfish beds for all but 700 feet of its subsea

[259] *See id.* ("In general, transmission investment effects rent transfers from load pocket generators and generation pocket consumers to load pocket consumers and generation pocket generators. However, load pocket consumers and generation pocket generators cannot simply decide to build a line linking them. Their decision will be subject to scrutiny by not only an ISO, but also state and federal energy and environmental regulators. In this type of environment, the 'losers' from transmission investment could be expected to expend up to the amount of rents that they stand to lose to block the transmission investment. This rent dissipation is wasteful. Moreover, it may block socially beneficial projects from being built.").
[260] Jim Rossi, *Transmission Siting in Deregulated Wholesale Power Markets: Re-Imaging the Role of Courts in Resolving Federal-State Siting Impasses* ("Siting in Deregulated Markets")), 15 DUKE ENVTL. L. & POL'Y F. 315, 316 (2005).
[261] *Id.*
[262] Linda L. Randell & Bruce J. McDermott, *Chronicle of a Transmission Line Siting*, 141 PUB. UTIL. FORT. 34, 36 (Jan. 2003).

route, the Connecticut state siting council gave the project environmental clearance. Attorney General Richard Blumenthal, with the support of other state and local politicians, appealed the siting council's decision.[263] During the course of the unsuccessful appeals, the line was installed and ready to begin operation.[264] Because of the uncertainty over whether the line could be legally operated under Connecticut law, the Department of Energy in the summer of 2002 issued an emergency order requiring the line to transmit power if the Long Island Power Authority's (LIPA) reserve margins fell below a certain threshold.[265] The emergency order lapsed in late 2002 without having once been used to mandate operation of the line.[266]

In 2003, the line's regulatory woes only continued. Although the line had not been buried to the required depth at certain points, the Army Corps of Engineers found that this would have no adverse environmental impact.[267] Nonetheless, the Connecticut Department of Environmental Protection barred the line from transmitting power because of this technical violation of the state permit.[268] Moreover, the state legislature passed a moratorium on the construction of underwater transmission lines in 2002 that prevented the project developer from either seeking a modification of its permit or reburying the line at the required depth.[269] Even with the Northeastern Blackout of August 2003 underscoring the fragility of the grid and the importance of maintaining reserve margins, the dispute over the line continued. Finally in 2004, FERC intervened and after an

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[263] *Id.*
[264] *Id.*
[265] *Id.*
[266] *Id.*
[267] Linda Randell & Bruce J. McDermott, *Cross-Sound Blues*, 142 PUB. UTIL. FORT. 20, 20 (Feb. 2004).
[268] *Id.*
[269] *Id.* at 20-21.

extended battle forced the parties to reach an agreement allowing the Cross Sound Cable to transmit power in June of that year.[270]

Northeast Utilities, an incumbent utility in Connecticut, was a vocal opponent of the Cross Sound Cable in regulatory proceedings.[271] It had an obvious incentive to oppose the project: Northeast owned an older line across the Long Island Sound and had proposed expanding its capacity instead of allowing the construction of the parallel facility.[272] The presence of a powerful utility lobbying for anticompetitive ends likely had some effect on the intensity of political opposition. Northeast's lobbying, at the very least, amplified the opposition to the operation of the Cross Sound Cable. Revealingly, the final settlement between New York and Connecticut involved LIPA grudgingly agreeing to pay $80 million toward the upgrade of Northeast's existing undersea line.[273] Some of the opposition was probably based on a legitimate concern for environmental protection. Yet, Northeast's prominent presence in the Cross-Sound Cable saga is suggestive of how anticompetitive motives can frustrate transmission grid expansions.

V. FEDERAL PREEMPTION: THE REMEDY FOR PAROCHIALISM AND PROTECTIONISM

State jurisdiction over the siting and cost allocation decisions for electric transmission lines allows parochial and protectionist interests to frustrate the creation of stronger regional grids. Their motives often conflict with the regional and national interest in expanding the transmission grid to establish a clean, economical, and reliable supply of electricity. While in an ideal world state regulators would act in a more enlightened fashion, it is unrealistic to expect them to act consistently against their own

[270] Bruce Lambert, *New York and Connecticut Agree to End Cable Dispute*, NY TIMES, June 25, 2004.
[271] Rossi, *Siting in Deregulated Markets*, *supra* note 260, at 317.
[272] *Id.*; Jim Brumm, *Northeast Utilities Plans 600 MW Line*, REUTERS, June 27, 2001.
[273] Lambert, *supra* note 270.

political interests.[274] To overcome these obstacles, Congress should preempt local and state authority over transmission planning and vest a single federal regulator with the authority to site and allocate the costs of all new transmission lines. Based on history and institutional expertise, the Federal Energy Regulatory Commission (FERC) is the agency best suited to regulate the construction of new transmission lines.

i. The Inadequacies of Reforms in the EPAct of 2005

Congress recognized in the EPAct of 2005 that state-siting authority is an impediment to socially beneficial transmission investment. The backstop siting authority given to FERC has, however, proven to be a paper tiger. The agency's authority is limited to proposed lines in so-called National Interest Electric Transmission Corridors (NIETC), as defined by the Department of Energy. The DOE has identified two NIETCs – the corridor running from New York City through Northern Virginia and the region comprising Southern California and Western Arizona.[275] As a result, sizeable portions of the country, including some of the areas with the greatest renewable resource potential, are not subject to the federal backstop authority.[276] Even if the DOE designated the entire country an NIETC, FERC would be able to exercise its authority under only limited circumstances. FERC can intervene only when a state either cannot legally consider the out-of-state benefits of a project or approve the transmission proposals of non-utility developers or fails to issue a decision within one year of receiving an application.[277] Most critically, the EPAct did not change the fundamental process of transmission siting; the option of federal intervention was merely grafted on to a regulatory regime in which

[274] Brown & Rossi, *supra* note 7, at 710.
[275] Swanstrom & Jolivert, *supra* note 82, at 433-36.
[276] *Compare id.* at 433-36 *and* NREL WIND, *supra* note 66 *and* NREL SOLAR, *supra* note 68.
[277] Swanstrom & Jolivert, *supra* note 82, at 443-44.

states still retain primary jurisdiction. Even if developers of transmission lines can eventually obtain regulatory relief from the federal government, it may come only after a protracted and costly battle to win over state regulators. This significant likelihood of delay can deter prospective project developers from investing in transmission.

The lack of federal involvement in transmission siting since 2005 has been telling. Notably, FERC has not used its backstop authority even once in the past five years. Only a single application, later withdrawn, has been filed during this time.[278] In theory, this lack of regulatory activity at the federal level does not signify federal impotence. If the states viewed backstop authority as a credible threat, they would expedite the approval of transmission projects and refrain from blocking new lines on parochial and protectionist grounds. This, however, does not appear to be the case as states continue to obstruct the construction of regionally beneficial transmission facilities.[279] With a 2009 Fourth Circuit ruling further curtailing the reach of FERC's backstop siting authority, the federal government is effectively powerless to override the will of states that are determined to block the construction of transmission facilities.[280]

ii. Congress Should Preempt State and Local Authority Over Transmission Siting and Ratemaking

Congress should acknowledge the inadequacy of its earlier attempt to fix the broken siting process and grant FERC exclusive authority over the siting and cost

[278] Brown & Rossi, *supra* note 7, at 746.
[279] *See, e.g.*, *supra* Parts IV.A & B.
[280] *See* Piedmont Envtl. Council v. Fed. Energy Regulatory Comm'n, 558 F.3d 304, 311 (4th Cir. 2009) (holding that a state's denial of permission to site a transmission line does not allow FERC to invoke its backstop authority); Santosh Sagar, Note, *A Twenty-First Century Lazarus? The Demise and Possible Rebirth of FERC Backstop Siting Authority*, 37 ECOLOGY L.Q. 693, 699 (2010) ("[In the wake of *Piedmont*], state regulators retain the authority to block the construction of interstate transmission projects, regardless of their potential national benefits.").

allocation for all[281] new electric transmission lines. FERC should be empowered to authorize the routes of transmission facilities and exercise eminent domain powers in order to obtain the necessary rights-of-way. In addition, Congress should mandate the unbundling of all transmission rates. FERC presently authorizes cost recovery over transmission lines in states that have required utilities to unbundle their rates. This, however, leaves bundled rates subject to state regulation. Mandatory unbundling of all transmission rates would bring all cost allocation issues under FERC jurisdiction. Because states can block transmission projects through one of two means – withholding siting approval or denying cost recovery,[282] Congress must grant both siting and cost allocation powers to FERC if transmission projects are to be immune to state obstructionism. One without the other is insufficient. FERC's granting of higher rates of return to transmission developers will be to little avail if states retain the authority to prohibit the construction of new facilities. Likewise, federal siting authority will not

[281] Congress should not confine the FERC's jurisdiction to only interstate transmission lines. Because of the integrated nature of the electric grid, state boundaries do not provide an accurate demarcation of how a proposed line may affect the larger grid. Unlike gas or water, electricity cannot be directed to a particular destination. Instead, electrons flow over the path of lowest impedance or resistance. Often, as a result, a line that is located entirely within one state can affect reliability, energy costs and air quality in a neighboring state. To confine federal jurisdiction to interstate transmission lines would be to ignore the actual physics of the electrical grid. Distribution is a different matter as it is a local activity and should remain under state regulation. The distinction between distribution and transmission is unclear but voltage levels can provide a line of demarcation between the two. In contrast, an approach that determines on a case-by-case basis whether a proposed line is under federal siting jurisdiction, while politically more appealing in the near term, is likely to create tremendous uncertainty and produce significant litigation. *See, e.g.*, Steven J. Eagle, *Wireless Telecommunications, Infrastructure Security, and the NIMBY Problem*, 54 CATH. U. L. REV. 445, 489-90 (2004-2005) (explaining how the allocation of power between federal and state governments over wireless tower siting is "vague in its reach and implications" because of its "attempt to have it both ways – to bridge the gap between NIMBY concerns and telecommunications infrastructure expansion with legislation that would have local rules and practices regulated by federal procedural devices.").

[282] ROSS BALDICK ET AL., A NATIONAL PERSPECTIVE ON ALLOCATING THE COSTS OF NEW TRANSMISSION INVESTMENT: PRACTICE AND PRINCIPLES 34 (2007).

encourage transmission construction if states still have the power to deny cost recovery to project developers.[283]

Federal preemption would eliminate the parochialism that characterizes transmission planning in many states today. Because of the presence of regional externalities, states are not the appropriate political units to exercise jurisdiction over transmission.[284] Current state processes systematically discount or ignore transmission benefits that are realized outside state lines. Under federal jurisdiction, transmission projects would be evaluated on a more complete, national cost-benefit perspective because federal officials are accountable to all Americans and not just to the residents of a particular municipality or state. A federal agency like FERC would credit the regional economic and reliability benefits of a transmission line instead of discount them as externalities as many states currently do.

NIMBY and protectionist opponents would still have a forum in which to resist transmission projects. Nonetheless, for the reasons James Madison explained over two centuries ago, federal jurisdiction would likely diminish their actual power to block

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[283] *See id.* at 35-36 ("In examining the question of need siting agencies will inevitably consider the question of whose need is being addressed by the project but also the question of the costs to be borne by consumers in their own state. Thus the allocation of costs to the ratepayers of the jurisdiction where the line is being proposed is a very significant factor in determining the outcome of an application. If the costs of the line are to be put in rate base of a jurisdictional utility thus imposing 100 percent of the residual revenue responsibility on the state's ratepayers the cost/benefit analysis is almost certain to be weighed differently than if the ultimate revenue responsibility were spread more widely across the multi-state region whose needs are to be served. In short, the State rate basing of transmission creates policy legal, and economic biases, in even the fairest and most substantive of siting processes against approving new transmission facilities whose benefits are regional in nature. It also provides a powerful incentive for a state to disapprove the siting of a line that it believes benefits other states more than itself.").

[284] *See* JAMES M. BUCHANAN & GORDON TULLOCK, THE CALCULUS OF CONSENT 113 (1962) ("[I]t is relatively straightforward to construct a theory for the optimum size of the collective unit, where this size is also subject to constitutional determinations. The group should be extended so long as the expected costs of the spillover effects from excluded jurisdictions exceed the expected incremental costs of decision-making resulting from adding the excluded jurisdictions.").

proposed lines because jurisdiction would be vested at a higher level of government.[285] Local landowners, who sometimes have tremendous political clout in state government, can lobby legislators and regulators to oppose transmission projects. Their power at the federal level is almost certainly much less. The same is likely true for incumbent utilities; political giants at the state level may often be only dwarves before federal regulators. Furthermore, at the federal level, stakeholders in favor of constructing transmission are likely to have equal and offsetting political clout.

Granting FERC exclusive jurisdiction over transmission planning would replace the multiple regulators who presently decide the siting of transmission lines with a single federal agency. At present, transmission developers often have to seek approval from multiple local, state, and federal entities before they can construct a new line. These regulators are often pursuing conflicting objectives; a town zoning authority may, for example, want to minimize the impact of the line on local landscapes and property values while a state utility commission may want to reduce the economic cost of the project to ratepayers. These conflicting regulatory missions can introduce tremendous uncertainty into the siting process. The potential for interminable delay can deter prospective investors from undertaking transmission projects and further deprive the sector of needed upgrades. Even if the process were completely predictable, navigating multiple regulatory channels increases the initial costs of project development without necessarily providing

[285] *See* JAMES MADISON, THE FEDERALIST NO. 10 (1787) ("The smaller the society, the fewer probably will be the distinct parties and interests composing it; the fewer the distinct parties and interests, the more frequently will a majority be found of the same party; and the smaller the number of individuals composing a majority, and the smaller the compass within which they are placed, the more easily will they concert and execute their plans of oppression. Extend the sphere, and you take in a greater variety of parties and interests; you make it less probable that a majority of the whole will have a common motive to invade the rights of other citizens; or if such a common motive exists, it will be more difficult for all who feel it to discover their own strength, and to act in unison with each other. Besides other impediments, it may be remarked that, where there is a consciousness of unjust or dishonorable purposes, communication is always checked by distrust in proportion to the number whose concurrence is necessary.").

any social benefit in return.[286] A single federal regulator would eliminate the current administrative duplication and introduce greater predictability into the siting process.[287]

As part of granting FERC exclusive authority over transmission siting and cost allocation, Congress should require FERC to perform a comprehensive cost-benefit analysis of transmission line proposals. At present, FERC reviews transmission proposals using woefully deficient models – they examine only the generation cost savings from the grid expansion but fail to consider the line's environmental, market competition, and reliability benefits.[288] This neglect means, for example, a transmission project that reduces the market power of generators and, as a result, saves customers millions over the long term may not pass cost-benefit muster in current FERC models, which assume markets always reach competitive outcomes. If transmission investment is to occur at a socially optimal level, FERC must consider the economic, environmental, and reliability benefits of projects when deciding whether to approve them. It would be ironic if transmission-planning authority were stripped from the states on account of their

[286] *See infra* Part V.iii (explaining how federal regulators can be required to pay due concern to the state and local effects of transmission lines).

[287] *See* Dang, *supra* note 8, at 344 ("Consolidating the siting process into a one-stop permitting process has many benefits. Substantial costs can be reduced because of the elimination of the multiple approval process.").

[288] FERC at present assesses the benefits of a proposed transmission project in an incomplete manner. It looks at how the new transmission line would reduce dispatch costs. FERC's analysis does not attempt to quanity the benefits of enhanced reliability and fuel diversity, increased market competition, and reduced emission of various air pollutants. If transmission investment is to occur in a socially desirable and efficient way, FERC must attempt to, at least, approximately quantify and consider these other benefits when evaluating transmission proposals. *See, e.g.*, Budhraja, et al., *supra* note 172, at 56-61 (explaining limitations of traditional electrical market models and oft-ignored benefits of transmission investments); BALDICK ET AL., *supra* note 282, at 20 ("Lines that do not carry much power can still enhance efficiency if, through the threat of competition, they reduce supplier market power and limit the need for more intrusive market power mitigation rules. Projects that substantially reduce local market power will also likely have a dramatic impact on prices in a constrained region. Therefore it is also reasonable for the modeling of project benefits to consider the potential for market power, and not just model scenarios where all suppliers are assumed to be operating as 'price-taking,' perfectly competitive, suppliers. Traditional production cost models in effect assume such perfectly competitive behavior and can therefore understate both the efficiency and consumer price benefits of certain projects.").

systematic neglect of regional benefits only to be given to a federal agency that commits a similar omission due to its flawed modeling methods.

Furthermore, Congress should require that FERC establish cost allocation principles or rules through a rulemaking process. At present, even where FERC has authority to allocate transmission costs, it does so on an ad hoc basis.[289] The uncertainty over how costs are to be allocated has spawned protracted litigation and has surely deterred some investors from developing new transmission lines. While there are multiple allocation methods, the two general approaches to cost allocation can be described as "beneficiary pays" and "socialization." Under beneficiary pays, utilities and their customers are responsible for the amount of costs roughly corresponding to the benefit they derive from the new line. When costs are socialized, they are, as the name suggests, equalized across the affected geographic footprint without strict correspondence to the actual expected benefits for each utility and its ratepayers. A recent Seventh Circuit ruling rejected FERC's proposal to socialize transmission costs across a broad geographic area.[290] As a policy matter, there are arguments in favor of both beneficiary pays and socialization methods of cost allocation.[291] Beneficiary pays may be more conducive to

[289] *See* Brown & Rossi, *supra* note 7, at 764-65 (explaining how FERC approved radically different cost allocation principles in NYISO and the Southwest Power Pool).

[290] Ill. Commerce Comm'n v. Fed. Energy Regulatory Comm'n, 570 F.3d 470, 477 (7th Cir. 2009) (holding that FERC cannot impose the costs of a transmission project on utilities that derive no benefit from the project).

[291] *See* BALDICK, *supra* note 282, at 3 ("Attempts to identify – once and forever, and with complete precision – the exact beneficiaries of specific incremental investments in the transmission system is virtually impossible. To suggest that is possible flies in the face of the realities as we understand them: the use of electric systems change over time in innumerable and very often unpredictable, unforeseen ways. Changes in the identity of beneficiaries and "cost causers" over time arising from changes in patterns of economic activity can lead to changes in the usage of the electric system. Similarly, a rigid rule that simply socializes all transmission costs can, and sometimes does, cause distortions in price signals and inequities among users that are best avoided.").

strengthening competitive regional markets and renewable energy development.[292] Socialization is administratively simpler because it removes the need to determine the benefits that would accrue to different parties.[293] When the primary effects of a transmission project are improved reliability and reduced emissions of air pollutants, socialization of costs may also be appropriate because of the public good nature of both benefits.[294] Whether FERC should allocate costs of new projects on the basis of beneficiary pays or socialization across a geographic footprint is beyond the scope of this paper. Even if FERC were to establish an imperfect method of cost allocation, however, it would create a regulatory norm and likely represent an improvement over the status quo under which there is no default framework.[295]

iii. Preemption Would Be Constitutional and Consistent with Prior Federal Legislation

Although some may decry the proposed expansion of federal authority as an improper infringement of "states' rights," Congress under the Supremacy Clause[296] and modern Commerce Clause jurisprudence has broad authority to regulate the electric power sector. In *Connecticut Light & Power v. Federal Power Commission*, the Supreme

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[292] *See id.* at 54 ("[C]ost socialization poses risks of diluting price signals, skewing competition, and allowing waste and inefficiency.").

[293] *See Ill. Commerce Comm'n*, 570 F.3d at 485 (Cudahy, J. dissenting) ("However theoretically attractive may be the principle of 'beneficiary pays,' an unbending devotion to this rule in every instance can only ignite controversy, sustain arguments and discourage construction 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 likelihood that rate-simplification will reduce litigation, or to calculate the precise value of not having to cover the costs of power failures and of not paying costs associated with congestion, and all this over the next forty to fifty years.").

[294] Paul Joskow & Jean Tirole, *Reliability and Competitive Electricity Markets*, 38 RAND J. ECON. 60, 60-61 (2007); HORST SIEBERT, ECONOMICS OF THE ENVIRONMENT: THEORY AND POLICY 70 (2008).

[295] *See* BALDICK, *supra* note 282, at 48 ("The problem is not that competing groups do not have legitimate interests to protect, but rather that absent clear policy, the jockeying can be neither fully informed nor focused, and is therefore unnecessarily protracted, and disruptive to the orderly evolution of the grid and of the market it enables.").

[296] *See* U.S. CONST. ART. VI, §1, CL. 2 ("This Constitution, and the Laws of the United States which shall be made in Pursuance thereof; and all Treaties made, or which shall be made, under the Authority of the United States, shall be the supreme Law of the Land; and the Judges in every State shall be bound thereby, any Thing in the Constitution or Laws of any State to the Contrary notwithstanding...").

Court stated in dictum that the electric utility industry is "so fused and interdependent that the whole enterprise is within the reach of Congress."[297] The Court, illustrating its point, described the "the cord from a light plug to a toaster on the breakfast table"[298] as a "facility for transmission of interstate energy if any part of the load is generated without the state."[299] Even with the Supreme Court placing limits on Congress' previously unbounded Commerce Clause authority over the past fifteen years,[300] it is difficult to construe these "New Federalism" decisions as somehow limiting Congress' power over the electric power industry. The Supreme Court has held that Congress has the authority under the Commerce Clause to regulate the instrumentalities of interstate commerce, the channels of interstate commerce, and all economic activity with substantial effects on interstate commerce.[301] Electric transmission is certainly a channel of interstate commerce because it facilitates the interstate sale of power.[302] Moreover, the sale of electricity is an economic activity that has a substantial effect on multiple streams of interstate commerce.[303]

As a political matter, federal preemption would not be an unprecedented deviation from past Congressional action. In fact, preemption would be analogous to what Congress has done in the natural gas industry as its market has steadily expanded beyond

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[297] 324 U.S. 515, 529-30 (1945).
[298] *Id.* at 530.
[299] *Id.* at 529.
[300] *See* United States v. Lopez, 514 U.S. 549 (1995) (holding that Congress exceeded its authority under the Commerce Clause in enacting the Gun-Free School Zones Act of 1990); United States v. Morrison, 529 U.S. 598 (2000) (ruling that Congress does not have the power under the Commerce Clause to pass certain provisions of the Violence Against Woman Act of 1994).
[301] Gonzales v. Raich, 545 U.S. 1, 16-17 (2005).
[302] *See* Pierce, *supra* note 8, at 462 ("The amount of electricity generated in Ontario affects the amount and cost of the electricity available in Florida, while the amount of electricity consumed in California affects the amount of electricity that must be generated in Alberta and the price of electricity purchased in Salt Lake City. Electricity on an integrated transmission grid flows in extraordinarily complicated and volatile ways in inverse proportion to the resistance on each line.").
[303] Robin Kundis Craig, *Constitutional Contours for the Design and Implementation of Multistate Renewable Energy Programs and Projects*, 81 U. COLO. L. REV. 771, 780 (2010).

the confines of state boundaries. In the natural gas industry, Congress preempted significant state regulatory over eighty years ago in the Natural Gas Act.[304] Unlike the electricity industry, natural gas has been sold on a national market for several decades. The largest gas reserves are located in the Gulf Coast region[305] far from most urban areas and industrial regions.[306] From the early years of the industry, a well-developed interstate pipeline network has thus been needed to ship gas from production areas to consumption points. To facilitate the construction of this network, Congress vested the Federal Power Commission, FERC's predecessor, with exclusive authority over the regulation and siting of interstate natural gas pipelines.[307] More recently, Congress has expanded the scope of federal preemption over natural gas facilities in the EPAct of 2005. Due to the growing reliance on the imports of liquefied natural gas (LNG) to meet domestic demand and inadequacy of existing LNG terminals, new facilities have to be built.[308] These projects, however, face vigorous local opposition on environmental and safety grounds.[309] If state and local governments could exercise veto power over these projects, new LNG terminals would be very difficult to site and build. Without an expansion in LNG import facilities, sufficient gas supplies would not be able to reach the United States, leading to higher

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[304] *See* Paula A. Zinozich, et al., *The Role of Preemption in Administrative Law*, 45 ADMIN. L. REV. 107, 128 (1993) ("When the formerly local industry was transformed into an interstate industry with increasing importance to the national economy, Congress moved in to regulate the activities that the states could not under the Commerce Clause cases. In addition to Commerce Clause limitations, the states now had to be concerned with preemption by the new federal statutes. The NGA specifically applied to the transportation of natural gas in interstate commerce, the sale of natural gas for resale, and to any "natural gas companies" engaged in such activities.").
[305] *Gas Production in Conventional Fields, Lower 48 States*, ENERGY INFO. ADMIN., http://www.eia.gov/oil_gas/rpd/conventional_gas.pdf.
[306] *Share of Total U.S. Natural Gas Delivered to Consumers*, ENERGY INFO. ADMIN., http://www.eia.gov/dnav/ng/ng_cons_pns_a_EPG0_VRP_pct_a.htm.
[307] Charles G. Stalon & Reinier H.J.H Lock, *State-Federal Relations in the Economic Regulation of Energy*, 7 YALE J. ON REG. 427, 476 (1990).
[308] James B. Lebeck, Note, *Liquefied Natural Gas Terminals, Community Decisionmaking and the 2005 Energy Policy Act*, 85 TEX. L. REV. 247 (2006).
[309] *Id.* at 249.

energy prices and harm to the national economy.[310] Perceiving the grave harm from local and state obstructionism, Congress in the EPAct of 2005 granted FERC exclusive authority over the siting of LNG terminals.[311]

Congress's recent preemption measures over infrastructure siting have not been confined to natural gas. It took a similar step with respect to the siting of microwave towers for wireless communications in the Telecommunications Act of 1996. Microwave towers are aesthetically similar to electric transmission lines: tall metal structures widely thought to blight local landscapes and emit radiation harmful to the health of nearby residents.[312] If local governments had unfettered authority over the siting of microwave towers, they could prevent the construction of towers needed to establish comprehensive national wireless telecommunications networks.[313] Given the ability and incentive for local governments to frustrate an important national policy objective, Congress prohibited local and state siting decisions that restricted the provision of or limited market competition for wireless services.[314] Although its preemption clause is arguably too nebulous,[315] the Telecommunications Act limited state and local regulatory authority over a matter of national significance and helped usher in twenty-first century wireless telecommunications.

Similar to what Congress had done in natural gas and telecommunications, many states have preempted local regulatory over the siting of transmission lines. As is now occurring now at the state level, local governments were rejecting proposed transmission

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[310] Kathryn E. Kransdrof, Note, *Not on My Coastline: The Jurisdictional Battle over the Siting of LNG Import Terminals*, 17 FORDHAM ENVTL. L. REV. 37, 87 (2005-2006).
[311] Energy Policy Act of 2005 § 311, 15 U.S.C.A. § 717b(e)(1) (Supp. 2006).
[312] John Copeland Nagle, *Cell Phone Towers As Visual Pollution*, 23 NOTRE DAME J.L. ETHICS & PUB. POL'Y 537, 538 (2009).
[313] Eagle, *supra* note 281, at 454.
[314] *Id.* at 464-66.
[315] *Id.* at 489-90.

lines based on strictly local cost-benefit calculations. Local governments typically do not want to authorize transmission projects that would impose aesthetic and environmental costs on their residents while benefiting the residents of neighboring counties and towns.[316] The obstructionism of local government, however, was blocking the construction of transmission lines needed to improve the reliability and efficiency of state electrical systems.[317] To address this problem, many states preempted local regulatory authority over transmission siting.[318] A single state regulator, typically the public utility commission, was vested with the authority to site all transmission lines.[319]

If Congress were to preempt state authority over transmission siting, it would be constitutional and consistent with past federal legislative action in network industries. Congress has broad economic regulatory power under the Supreme Court's post-New Deal Commerce Clause jurisprudence. From a political perspective, Congressional action would hardly be an unprecedented "usurpation" of states' rights. As federal legislation concerning the natural gas and telecom industries illustrates, the balance between federal and state authority is constantly evolving rather than being ossified at some point in the (distant) past. In the context of transmission planning, numerous state governments themselves have recognized the risks of vesting too much power at the lowest levels of government. While recognizing the importance of federalism in the American system of government, Congress has been willing to expand federal authority, at the expense of state sovereignty, in response to economic and technological developments. The creation of federal backstop siting authority in the EPAct of 2005 and recent proposals to expand

[316] Dang, *supra* note 8, at 343.
[317] *Id.*
[318] *Id.*
[319] *Id.*

federal transmission siting authority[320] suggest the political tides are shifting even in the context of electricity. Senator Jeff Bingaman's proposal was especially promising and would have granted the federal government exclusive siting authority over all new interstate transmission facilities.[321] Based on these recent initiatives, Congress may soon be willing to codify exclusive federal authority over transmission siting and cost allocation.

iv. FERC Would Not "Run Roughshod"[322] Over Local and State Interests

While the ever-present fear of federalization in any realm is that local and state interests will be ignored,[323] federal agencies do not retain unlimited discretion and, in fact, are subject to well-established limitations on their decision-making. The National Environmental Policy Act (NEPA) requires that federal agencies examine the environmental consequences of every action that is likely to have a "significant" environmental impact.[324] Given the substantial environmental impact of transmission development,[325] NEPA would require FERC to prepare an Environmental Impact Statement (EIS) examining the environmental consequences of constructing the line.[326] Once the draft EIS is issued, a forty-five day public comment period, in which all affected parties can make submissions, would follow.[327] This requirement would facilitate the participation of state and local stakeholders who often possess the greatest knowledge of the potential environmental implications of a project. Based on the

[320] Brown & Rossi, *supra* note 7, at 746-48 (summarizing proposals in Congress to expand federal siting authority).
[321] Sagar, *supra* note 280, at 698.
[322] Tara Benedetti, *Running Roughshod – Extending Federal Siting Authority over Interstate Electric Transmission Lines*, 47 HARV. J. ON LEGIS. 253 (2010).
[323] *See, e.g.*, *id.*; Lebeck, *supra* note 308, at 266.
[324] 42 U.S.C. § 4331(a).
[325] *See supra* Part III.ii.b.
[326] 42 U.S.C. § 4332.
[327] *Id.*

comments received, FERC would revise the draft EIS and releases a final EIS.[328] Although an agency is not required to abide by the findings of an EIS,[329] the preparation of these reports often motivates agencies to factor environmental implications into their decisions.[330] In addition, the federal courts have the authority to review agency decision-making under the "arbitrary and capricious" standard as established in the Administrative Procedure Act (APA).[331] While this standard of review is deferential, an agency must reply to objections that raise significant concerns and cannot disregard them on account of administrative convenience or its desired outcome.[332]

As part of preempting state authority over transmission planning, Congress should go beyond the requirements of NEPA and APA to protect local interests adequately. This would be consistent with recent federal preemption in the energy sector. The safeguards Congress included when it preempted state siting authority over LNG terminals in the EPAct of 2005 could serve as a model. The law requires the developer of the proposed terminal to follow a prefiling process before submitting its application to FERC.[333] In the prefiling process, the project developer must submit information about the project to FERC and then contact all affected parties and hold open houses where they can offer their opinions on the matter.[334] Because of the requirement to disclose information to FERC and host local open houses, affected parties can offer meaningful input regarding

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[328] *Id.*
[329] *Id.*
[330] Michael C. Blumm, *National Environmental Policy Act at Twenty: A Preface*, 20 ENVTL. L. 447, 456 (1990).
[331] 5 U.S.C. §706(2)(A) (2000).
[332] PPL Wallingford Energy LLC v. FERC, 419 F.3d 1194, 1198 (D.C. Cir. 2005) (citing Canadian Ass'n of Petroleum Producers v. FERC, 254 F.3d 289, 299 (D.C. Cir. 2001)).
[333] 15 U.S.C.A. § 717b-1 (Supp. 2006).
[334] 18 C.F.R. § 157.21 (2006).

the project at comparatively little cost.[335] In addition to providing a forum for meaningful local participation, the EPAct of 2005 allows the governors of affected states to appoint an agency, like the state public utility commission or department of environmental protection, to represent local interests before FERC.[336] This agency has the opportunity, though not the obligation, to file a report within thirty days of the commencement of the formal FERC process.[337] Although FERC has discretion over what submission to credit most, the APA once again places limits on its range of action and prohibits it from disregarding significant pieces of information in its decision-making.[338] Even if the local protections of the LNG siting provisions in the EPAct of 2005 are arguably inadequate,[339] it provides a workable template of balancing local, state, and federal interests on which Congress can build.

These limitations would disappoint transmission developers who hope that federal siting authority would mean expedited approval of every project proposal. Yet, these checks would be a feature rather than a bug of federal siting authority. For federal transmission planning to be a true success, it must feature thorough regulatory processes and include participation rights for all stakeholders. The local economic, environmental, and health costs associated with transmission development can be significant and deserve regulatory attention. A federal regulator would consider these local effects when deciding whether to approve a line and require appropriate mitigation measures such as environmentally sensitive line routing and the installation of wildlife deterrent devices if the project is approved. A well-designed federal preemption statute would recognize the

[335] Lebeck, *supra* note 308, at 252.
[336] 15 U.S.C.A. § 717b-l.
[337] *Id.*
[338] 5 U.S.C. §706(2)(A) (2000).
[339] Lebeck, *supra* note 308, 266-68.

important distinction "between having input and having decision-making powers."[340] State and local entities would be able to express their views on transmission projects but would not be able to exercise decision-making authority over them. The local costs that are of most salience to state and local regulators cannot be viewed in isolation and need to be weighed against the regional benefits of grid upgrades. By vesting a federal regulator with transmission planning powers, preemption would ensure that the local costs of grid expansions are balanced against the regional and national benefits.[341]

VI. CONCLUSION

Federal and state initiatives will continue to encourage new entry and competition from both non-renewable and renewable generation in electricity markets. The success of these efforts is contingent on the existence of a strong electric transmission grid. Due to the history of American electric utilities, the grid in its present form is structured to facilitate power generation and consumption primarily on a local scale rather than over long distances. Moreover, under present institutional arrangements, state regulators have the incentive and ability to block the construction of new transmission facilities. Localities and states exemplify the "tyranny of small decisions"[342] and make choices that are narrowly rational but undesirable from a national (and global) perspective. To mitigate these parochial tendencies and allow for needed transmission investment to occur, Congress should grant exclusive jurisdiction over transmission planning to the Federal Energy Regulatory Commission. Congressional preemption of local and state

[340] Brown & Rossi, *supra* note 7, at 719.
[341] *See* BUCHANAN & TULLOCK, *supra* note 284, at 113 ("[I]t is relatively straightforward to construct a theory for the optimum size of the collective unit, where this size is also subject to constitutional determinations. The group should be extended so long as the expected costs of the spillover effects from excluded jurisdictions exceed the expected incremental costs of decision-making resulting from adding the excluded jurisdictions.").
[342] Alfred E. Kahn, *The Tyranny of Small Decisions: Market failures, Imperfections, and the Limits of Economics*, 19 KYKLOS 23 (1966).

authority over transmission development is by no means *sufficient* to create the new energy economy – it must be implemented together with policies that promote energy efficiency and non-carbon resources. Federal jurisdiction over transmission planning, however, is a *necessary* pillar of a modern energy policy that seeks to create regional electricity markets producing affordable, clean, and reliable power.