Getting Green Electrons Plugged In:
Transmission Development and Planning for the Integration of Variable Energy Resources

Alan Gowell
Energy Law
Professor Burleson
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I. Introduction

As the risks, costs, and deleterious effects of climate change have become increasingly evident through scientific study and documentation, attaining real reduction in carbon emissions while promoting economic growth and fostering development has become a focus of governments and private entities throughout the globe. The potential for wide-scale federal regulation of carbon emissions is becoming increasingly probable. Following Supreme Court precedent,[1] the Environmental Protection Administration (EPA) issued an endangerment finding for various greenhouse gases effective January of this year.[2] In addition, the Securities and Exchange Commission has recently issued guidance regarding its disclosure requirements for corporations with potential liabilities due to forecasted climate-related regulation.[3] When one considers that electricity generation accounts for 41% of total anthropogenic carbon dioxide (CO_2) emissions in the United States, it is apparent that the electric utility sector in the U.S. must take steps to address its carbon emissions.[4]

[1] *Massachusetts v. EPA*, 549 U.S. 497 (2007).
[2] *Endangerment and Cause or Contribute Findings for Greenhouse Gases Under Section 202(a) of the Clean Air Act*, 74 Fed.Reg. 66496 (December 15, 2009).
[3] United States Securities and Exchange Commission. *Press Release: SEC Issues Interpretive Guidance on Disclosure Related to Business or Legal Developments Regarding Climate Change*, January 27, 2010, *available at* www.sec.gov/news/press/2010/2010-15.htm.
[4] U.S. Environmental Protection Agency, *Human Related Sources and Sinks of Carbon Dioxide. Available at* http://www.epa.gov/climatechange/emissions/co2_human.html.

While global warming has been acknowledged by Congressional committee as one of the greatest environmental challenges facing the United States,[5] the on-going oil spill disaster in the Gulf of Mexico has also sadly highlighted the need for the United States to decrease its reliance on hydrocarbon-based energy in the future. The inherent environmental risks of local hydrocarbon extraction and the financial and national security issues associated with the importation of foreign oil should be considered compelling enough to justify a large-scale shift from a fossil fuel-based national electricity sector to regionally available renewable generation technologies. Many states have taken the lead in mandating an increased utilization of renewable resources for electric generation through the implementation of statutory requirements known as Renewable Portfolio Standards (RPS) or Renewable Energy Standards (RES).[6] Given that the nation continues to experience population growth, in addition to continued per capita consumption of electricity, simply meeting projected electric load demand in the coming years will be a significant engineering challenge. Industry and government experts agree that a significant modification to the current mix of fuels used for electric generation in the United States will require a major overhaul, both expansion and upgrades to existing facilities, of the nation's transmission grid.[7]

The availability of sufficient amounts of usable renewable energy resources within a geographic area will be based primarily on prevailing meteorological and existing geological conditions. While the proximity of significant natural resources available for renewable energy generation to electric load centers can reduce the need for extensive transmission construction,

[5]U.S. Senate Committee on Environment and Public Works, *A Message from the Chairman*. *Available at* http://epw.senate.gov/public/index.cfm?FuseAction=Majority.WelcomeMessage.

[6] As of June 2010, 29 states and the District of Columbia have RPS statutes, seven of which establish voluntary goals. Database of Incentives for Renewables & Efficiency, *Renewable Portfolio Standards* (June 2010). *Available at* http://www.dsireusa.org/summarymaps/index.cfm?ee=1&RE=1.

[7] Western Governors Association & U.S. Department of Energy, *Western Renewable Energy Zones – Phase I Report* (2009). *Available at* http://www.westgov.org/index.php?option=com_joomdoc&task=doc_-download&gid=5&Itemid.

some level of transmission construction and/or upgrades will be necessary to continue to serve projected load growth and increase the penetration of renewable generation in our energy markets. In order to meet all of the nation's projected load growth demands with low or zero-carbon generation sources, even greater transmission infrastructure improvements will be needed. Increased penetration of renewable generation technology, which utilizes variable energy resources, will consequently increase the need to maintain the reliability of electrical grids within existing markets. In order to compensate for the inherent variability of these renewable resource generation technologies, such as wind and solar utility-scale generation technologies, transmission expansion and upgrades will be integral to the development of a renewable energy infrastructure.

For example, one method of developing robust renewable energy use while maintaining a reliable grid is to develop a more extensive and expansive geographic distribution of solar and wind generation units managed under a singular operating authority, thereby allowing the operator to more reliably predict operating conditions and anticipate the available supply to satisfy the predicted demand.[8] While outside the scope of this paper, concurrent natural gas generation development and its ancillary transmission infrastructure will also be critical in accomplishing a reliable deployment of new available renewable resources. Given the complexity of maintaining our nation's reliable electric supply and the evolving energy policies at both the state and federal levels, the need for significant investment in new electric transmission infrastructure is apparent.

This paper will discuss some of the current barriers to the implementation of a both "green" and reliable electric grid; who currently has, and who should have, a say in what and

[8] U.S. Department of Energy, 20% Wind Energy by 2025, Increasing Wind Energy's Contribution to U.S. Electricity Supply. July 2008. *Available at* http://www1.eere.energy.gov/windandhydro/ment-infrastructure/pdfs/4pdfs/41869.pdf

where critical transmission infrastructure projects are undertaken, and what may be a potential path forward for regulators seeking to implement a vital national goal of increased energy independence through renewable resources while balancing long-standing technological limitations of variable energy resources (VERs) and local land use authority. Striking an appropriate balance between these multiple and valid interests will be critical in attaining these states' goals and proposed federal mandates for significant implementation of renewable energy resources.

In general, two major barriers exist to the development of the critical transmission infrastructure improvements which must be addressed if increased renewable energy generation is to become a reality: a disparity of complex siting and approval processes for new or upgraded transmission amid an overarching need to maintain grid reliability, and unclear and non-uniform regulatory treatment as to who really benefits from these projects and therefore should bear the cost of these improvements.

II. Geographical Availability of Natural Resources

When considering the deployment of the most prevalent forms of potential zero-carbon renewable energy such as wind and solar power, it is evident that not all geographic regions are created equally. Many states have taken the initiative to identify and map natural resources available to renewable energy generation development areas.[9] While some sources of alternative energy, such as biomass, landfill gas, and geothermal generation are not dependant on prevailing

[9] *See* Western Governors' Association, et al., *supra* n. 6 (2009).

meteorological conditions, utility-scale development of these technologies is relatively less frequent than their wind and solar counterparts.[10]

In general, the potential for utility-scale solar and wind generation is greatest in the West, the Northeast, the Central Plains, and the mountainous portions of the Appalachians.[11] There exists the theoretical potential for 10,000 megawatts (MW) of both on-shore and off-shore wind energy development throughout New England[12]. Colorado has identified and mapped ten renewable resource generation development areas, which would be capable of providing more than 96,000 MW of wind generation and 26,000 MW of solar generation.[13] The National Renewable Energy Laboratory (NREL) has also identified significant potential geothermal resources in western states, although further study is needed to ascertain the availability of geothermal energy elsewhere in the country.[14] At this point in time, it appears that some states or interstate regions may have an excess of potential renewable energy resources, whereas others may be sorely lacking in abundant resources of this type.

Even in states or regions rich in renewable resources available for generation, the existing electric transmission infrastructure is generally not sufficient to bring a sufficient amount of utility-scale renewable generation on-line to meet stated policy goals. As a general matter, many of the country's best renewable energy sources are a long way from the places that require the most electricity, or are located near existing transmission sites which have inadequate remaining transmission capability at the point of interconnection. The Department of Energy (DOE) has

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[10] U.S. Department of Energy. *Annual Energy Review 2008* at 288. (July 2009).

[11] U.S. Department of Energy. *20% Wind Energy by 2025, Increasing Wind Energy's Contribution to U.S. Electricity Supply*. July 2008. *Available at* http://www1.eere.energy.gov/windandhydro/ment-infrastructure/pdfs/4pdfs/41869.pdf

[12] *New England Governors' Renewable Energy Blueprint*, Sept. 15, 2009. *Available at* http://www.negc.org/documents/2009/Renewable_Energy.pdf.

[13] Colorado Governor's Energy Office. Renewable Energy Development Infrastructure, December 2009.

[14] U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy. *U.S. Geothermal Resources Map*. *Available at* http://www1.eere.energy.gov/geothermal/geomap.html.

recognized that significant development of transmission capability from potential wind-generation areas (and presumably other renewable resource-rich areas) to load centers will be required.[15]

III. Transmission Siting and Renewable Resource Energy

The original design of the nation's electric grid was not done with the consideration of extending transmission infrastructure to (often sparsely-populated) high-wind and solar areas, as traditional fossil-based generation required only access to transportation or pipeline facilities adequate to maintain a supply of fuel to the plant. However, the construction of extensive additional transmission for new energy sources is not without precedent. The development of nuclear energy later in the 20th century necessitated the need for additional transmission system construction and upgrades.

Likewise, the federally backed development of large-scale hydropower beginning in the 1930's also required the construction of ancillary transmission from these projects to the load centers. The problems associated with the development of hydropower transmission infrastructure probably most closely parallel those encountered in the development of transmission for distant renewable energy zones. Just as hydropower development was constrained by available geologic and hydrological conditions, available capacity for wind and solar generation is also limited by prevailing environmental conditions. The expansion or upgrades of existing long-range hydropower transmission to accommodate potential solar and wind generation may be a viable alternative to constructing new transmission in many

[15] U.S. Department of Energy. 20% Wind Energy by 2025, Increasing Wind Energy's Contribution to U.S. Electricity Supply. July 2008. *Available at* http://www1.eere.energy.gov/windandhydro/ment-infrastructure/pdfs/4pdfs/41869.pdf

instances.[16] Pursuing renewable transmission projects which can tap into existing hydropower infrastructure may provide benefits to renewable generation beyond the avoidance of constructing entirely new facilities. Because the implementation of variable energy resources such as wind and solar create challenges for grid operators in attempting to balance load with available supply, the concurrent availability of controlled hydropower generation (such as pumped storage) within a given locality can be advantageous to further implementation of utility-scale development of wind and solar resources.[17]

This does not mean that siting new or upgraded transmission capacity for renewable energy projects is without significant complications. The permitting, siting, and financing of new high-voltage transmission projects, which themselves are often located in environmentally sensitive or rural areas, are often pursued, at some level, concurrently, and these demands can sometimes be prohibitive for proposed projects. Several states, such as those in New England, have enacted legislation creating a state-level agency or commission with almost exclusive jurisdiction for reviewing and approving the siting of qualifying generation or transmission projects.[18] The state-level commissions (public utility commissions and/or siting authorities) are often required to receive comments and input from affected localities, but retain ultimate authority to approve projects largely independent of federal oversight.

In contrast, county or local governments retain control over land use decisions for such projects in many western states, which in most circumstances complicates coordination of the approval process for a developer. Attempting to obtain right-of-ways on federal land would entail additional regulatory requirements, including compliance with the National Environmental

[16] Electric Power Research Institute, *Assessing the Value of Hydropower to the Electric Grid*, March 2010. *Available at* http://mydocs.epri.com/docs/public/000000000001020799.pdf.
[17] *Id*.
[18] See C.G.S. §16-50(i) *et.eeq*.

Policy Act (NEPA)[19] requirements for environmental studies of the impact of a proposed project on federal land or receiving significant federal funding. Given the low percentage of federally owned land in the east, additional federal requirements for the siting of new transmission on federal land are of greater importance in the western portion of the country.

FERC §216 Siting Authority

Traditionally, the states have retained jurisdiction to approve or deny permits for transmission projects. However, §216 of the Federal Power Act[20] (FPA), added in 2005 under the colloquial name EPAct 2005, authorizes the Federal Energy Regulatory Commission (FERC) to issue permits for the construction or modification of transmission facilities in areas designated as "National Interest Electricity Transmission Corridors" corridors by the Secretary of Energy under certain circumstances. In essence, EPAct §216 gives FERC conditional preemptive siting authority in the hopes of overcoming local regulatory delays and facilitating facility construction.[21] Although the process for obtaining approval to construct transmission facilities vary from state to state, most invariably need to proceed through a series of design review, land use approvals, and environmental assessments at both the state and local levels which may take a period of years.[22] Section 216 allows a developer who fails to obtain the necessary approvals through this usual process to appeal directly to FERC, and if the proposed project lies within a FERC-designated National Interest Electricity Transmission Corridor (NIETC) and is

[19] 42 U.S.C. §4321 *et seq*.
[20] 16 U.S.C. §791 *et seq*.
[21] R. Seth Davis, Note, *Conditional Preemption, Commandeering, and the Values of Cooperative Federalism: An Analysis of Section 216 of EPAct.* 108 Colum. L. Rev. 404 (March 2009).
[22] *Id*. at 409.

subsequently approved by FERC, state permitting regulations would not apply to the proposed project.[23]

This legislation was enacted by Congress out of concerns about the capacity and reliability of the three continental electrical grids, known as interconnections, in the continental United States, but was not necessarily intended to promote renewable resource generation.[24] Prior to enacting the Energy Policy Act[25] of 2005 (EPAct), the U.S. DOE issued a report, which states in part:

> Rules and regulations that will improve procedures for the siting and permitting of transmission lines should be implemented immediately. The FERC should play a limited role focused on supporting state and regional efforts, but should also possess backstop authority to ensure that transmission facilities that eliminate national interest transmission bottlenecks are sited and constructed. The FERC should act if state and regional bodies are unsuccessful in siting and permitting national interest transmission lines.[26]

The language of the EPAct amendments to the FPA allows FERC to step in and authorize such projects in nationally-designated transmission corridors in several situations, including situations where the project is not approved because it would not deliver electricity to users within the state, or if the state does not fully consider the interstate benefits (to electric grid reliability) in the course of denying a proposed project.[27] Another instance in which FERC could potentially supersede state authority would be a situation where the state authority has "withheld approval" of the project for a period of more than a year.[28] However, last year in *Piedmont Environmental Council v. FERC*, a divided panel of the Fourth Circuit determined that if a state authority affirmatively denies such a proposed project, FERC would be barred from using its "backstop

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[23] *Id*. at 410.
[24] Erich W. Struble, Comment, *National Interest Electric Transmission Corridors: Will State Regulators Remain Relevant?* 113 Penn St. L. Rev. 575, 577-578 (2009).
[25] 42 U.S.C. §13201 *et seq.* (2005).
[26] U.S. Dep't of Energy, National Transmission Grid Study (May 2002), at 58-59 *available at* http://www.ferc.gov/industries/electric/gen-info/transmission-grid.pdf.
[27] Davis, *supra* n. 21, at 410.
[28] Federal Power Act § 216(b)(1)(C)(i)

authority" to overrule the decision.[29]

The *Piedmont* case highlights the complexities in pursuing a climate-change agenda by increasing the capabilities of the electric grid, especially when there is wide consensus that increased transmission capabilities can be an effective means of promoting renewable energy project development and financing. The case was brought by environmental groups seeking to strike down FERC's rulemaking conducted pursuant to the statutory language seeking to expand FERC's authority. The legislative intent of this statute was presumably to override local "NIMBY" opposition in the siting and approval of such critical transmission infrastructure. Opposition from state and local siting authorities within these national interest corridors is understandable, since when presented with a viable transmission project therein, they would have little choice but to approve the project or wait for FERC to do so itself.

Why then, would there be such reluctance on the part of environmental non-governmental organization (NGOs) such as Piedmont to embrace such an important piece of the nation's developing energy policy? An interesting aspect of the *Piedmont* case is that different proponents of renewable energy supported both the 4th Circuit's narrow and FERC's expansive interpretation of the "backstop authority".[30] The nub of the concern among some in the environmental community with regards to the issue presented in *Piedmont* is that under §216, FERC's power to overrule state siting authorities for transmission projects in National Corridors is not limited to those projects which would utilize clean or renewable energy resources.[31] Because electricity is a nameless, fluid, and fungible commodity, a lack of distinction between the two is understandable from a technical viewpoint. Indeed, under FERC's disallowed interpretation, it appears there would have been little to prevent relatively cheap and reliable hydrocarbon-based electrical generation from expanding its market share based on grid reliability or transmission "bottleneck" justifications even more rapidly than new green generation projects.

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[29] *Piedmont Environmental Council v. FERC*, 558 F.3d 304 (4th Cir. 2009), cert. denied, 130 S.Ct. 1138 (Jan. 19, 2010)(No. 09-343).

[30] John Noor. *Herding Cats: What to do When States Get in the Way of National Energy Policy*, 111 N.C.J.L. & Tech., (Fall 2009) at p. 4.

[31] *Id*.

Under EPAct and left unmodified by *Piedmont*, FERC's siting powers under §216 still enable it to override an adverse ruling by a state commission or entity if the applicant is solely seeking to add transmission capability but does not deliver power to end-users within the state.[32]

> Specifically, if a state is within a National Corridor designated by the DOE, and that state's vision regarding electric transmission capacity issues extends only to its own borders, the Federal Energy Regulatory Commission may have jurisdiction to effectively preempt the state's siting regime.[33]

This authority may become critical if Congressional proposals, discussed in greater detail below, for "energy superhighways", "green energy superhighways", or otherwise named national-scale high-voltage transmission infrastructure projects are authorized. State and local authorities are thus effectively barred from denying an otherwise worthy transmission project (sited within a designated National Corridor) solely because the proposed facility will not deliver electricity directly to the citizens of that state, even though citizens of such a state would presumably realize no direct benefit from the construction of such a facility.

When considering the need for renewable energy production as a national energy policy imperative, many commentators have argued forcefully that the effect of primarily state administration of transmission approvals is "devastating" to proposed projects and that attaining articulated (although unenacted at the federal level) national energy policy goals requires explicit field preemption.[34] Proponents of the federalization of the transmission planning process seek to ensure that the "big picture" is taken into account when considering the merits of new transmission projects.[35] It may indeed be the case that federal agency preemption of this authority is generally more beneficial, even essential, to review such ambitious proposals on a more macro-level, especially for those areas in the United States which continue to operate outside of an independent regional grid operator. These positions should receive ample consideration, since as an independent federal commission, FERC may be less beholden to political pressures or biases as

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[32] 16 U.S.C.A. § 824p(b)(1)(B)
[33] Struble, *supra* n. 15, at 578, FN 14.
[34] Struble, *supra* n. 15, at 578, fns 11 and 12, (internal citation omitted).
[35] Struble, *supra* n. 15, at 578, (internal citation omitted).

might their local counterparts, where "NIMBY" concerns from constituents can often result in a "NIMTOO" ("not in my term of office") reaction from local boards.

Resistance to the increased federalization of the siting process from states traditionally in charge of transmission siting has been strong. Critics of federal preemption of FERC-sited transmission superhighways claim that state and local control has succeeding in creating and managing, to this point, an adequate and reliable grid. In addition, local expertise may be critical when dealing with sensitive local land use issues, and a locally accountable siting authority would likely best serve interested stakeholders who may be affected by a proposed project.

As discussed by Tara Bendetti in her recent article, the administration of Connecticut Governor Rell strongly opposed any increased federal siting authority for FERC.[36] Among the numerous battles between Connecticut and FERC mentioned in the article as examples of overbearing and uncooperative federal interference with Connecticut's sovereign rights: the installation of the Cross Sound Cable (connecting Long Island, NY to Connecticut via a subsea transmission project); the siting of a natural gas compressor plant in Brookfield, and the proposed siting of an off-shore liquefied natural gas facility, under New York jurisdiction, known as Broadwater. (New York authorities eventually rejected the latter project, primarily on the grounds that the proposed use was not compatible with the proposed location.) In light of the minimal benefits to Connecticut residents as a result of the Cross Sound Cable project, one can be sympathetic to Connecticut's efforts to protect and preserve the resources of its share of Long Island Sound. One may also concede that the level to which Connecticut was shut out of the initial New York decision-making process in the Broadwater project may be a cause for concern for all states if a similarly leading role for FERC in electric transmission siting (as it currently possesses for natural gas projects under the Natural Gas Act) is adopted by Congress. Proponents of increased federalization of this process point to the protracted resistance to the Cross Sound Cable by Connecticut as exactly the type of issue requiring at least some level of increased regional

[36] Tara Bendetti. *Running Roughshod? Extending Federal Siting Authority Over Interstate Electric Transmission Lines*. 47 Harv. J. on Legis. 253, 273-274, Winter 2010.

cooperation and/or federal oversight.[37]

Congressional Response to Piedmont

Primarily in response to the decision in *Piedmont*, Senators Reid and Bingham, among others in Congress, have proposed legislation, essentially amending §216 of EPAct with the intention of further streamlining the siting of critical transmission development by legislatively expanding FERC's backstop authority to issue construction permits. Various bills would expand this authority to instances where a project is deliberately disapproved by the authorized state agency or commission, and in some cases would vest FERC with eminent domain in certain situations in which such authority is not yet available to FERC.[38] The proposals vary to the degree to which they seek to promote solely green or renewable energy development as opposed to simply increasing the capacity and reliability of the existing grids. The status of these proposals remains unresolved at this time, but there is a strong possibility that FERC's role in transmission siting will soon be expanded. A brief summary of some of the key elements of the various proposals are discussed below:

Sen. Bingham, *Draft Siting of Interstate Electric Transmission Infrastructure*

This proposed legislation requires regional planning entities, or utilities themselves if no such regional entity exists, to identify and plan for national high-priority transmission projects. These plans would address how identified national transmission corridors would be addressed and would be subject to FERC approval. The plan would also retain siting "backstop" authority for FERC, and as well as mandate that FERC establish a methodology to allocate costs of the transmission project, either across all or part of a region, but not disproportionate to the benefits in any given area. Furthermore, the proposal allows for the allocation of costs on a generation project which is connected to the grid through a National Corridor, although FERC is required to give deference to

[37] *See Id*. at 274.
[38] S.539, Clean Renewable Energy and Economic Development Act of 2009.

allocations agreed to among the states involved. While there is no explicit requirement to identify and plan for the connection of renewable energy zones (REZs), such zones are likely to be considered in transmission planning.

As discussed below, the official designation of identified REZs for generation development, as opposed to a general planning survey, may be a critical missing component in this proposal. Potential project development areas which hold a legislative designation as areas where energy infrastructure development is encouraged and viewed as compatible with existing local land use, are likely to be more attractive to renewable energy investors by reducing uncertainty and risk in both generation and transmission project siting.

Sen. Nelson, Smart Management of America's Energy & Technologies Energy Act[39]

Senator Nelson's proposed legislation calls for the creation of an interstate "energy superhighway", to be preferably sited in existing right-of-ways, such as highway and railroad infrastructure. This plan would call for the construction of more than 10,000 miles of high voltage transmission, with up to 90% of the project costs funded by the federal government. Under this model, FERC would have the sole and primary responsibility for the siting and planning of this project, and would be subject to Congressional approval within 1 year. FERC would also have the secondary "backstop" siting authority for secondary lateral connections to the superhighway, especially when connecting renewable resources. Remaining costs would be allocated among all shareholders, included ratepayers, who bear a "reasonable interest or benefit" from the superhighway. This proposal would provide a tariff rebate for renewable energy generators.

While a proposal for the federal subsidization of a large amount of high-voltage transmission is worthy of consideration, one should question whether the goal of a certain length of new transmission is construction would be prudent or rational. Sen. Nelson's proposal represents a breathtaking expansion of federal planning and authority, and would seem function as a Congressional mandate for FERC to begin construction of a massive infrastructure project with

[39] S. 807, 111th Cong. (2009).

little to no input from state, local, or industry authorities. In the end, transmission exists to generation capacity to load-serving entities, and plans for such should be carefully coordinated and focused on areas which have the greatest need for such projects. Arbitrary construction of such facilities may lead to a sub-optimal utilization of available resources, both financial and renewable.

Sen. Dorgan, National Clean Energy Security Act of 2009[40]

The intent of Senator Dorgan's proposed bill similarly is the creation of a national transmission "superhighway" but with special focus on development of renewable and low-carbon resources. Planning for this project would fall on 1 to 4 regional entities within the Eastern and Western Interconnections (excluding ERCOT) selected by FERC. Governors and Indian tribes would be invited in the planning process, with FERC having the final approval of regional plans. This proposal would require costs for the superhighway to be allocated throughout each interconnection using a load to ratio share basis. FERC would also be the lead coordinating federal agency and conduct the necessary environmental reviews and maintain final approval of the submitted regional plans. Again, this proposal does not mandate the connection of REZs, but does require the DOE to identify such areas for potential development.

As with the Bingham proposal, the lack of official designation of REZs for development may dissuade potential investors. A clear designation of the intended use of a proposed REZ decrease investor uncertainty. In addition, while not as prominent as in Senator Nelson's bill, state sovereignty questions will likely need to be litigated in light of the slightly more modest proposed expansion of FERC planning and siting powers.

Sen. Reid, Clean Renewable Energy and Economic Development Act[41]

Senator Reid's proposal seeks to enhance the nation's electric grid by taking advantage of available renewable resources through the creation of an interconnection-wide "green energy

[40] S. 774, 111th Cong. (2009).
[41] S. 587, 111th Cong. (2009).

backbone" of high voltage transmission (reserved for at least 75% green generation) with renewable energy feeder lines. FFRC would be tasked with approving regional plans for the implementation of this project on an annual basis, which would require the identification and planning for green energy transmission. The Reid plan specifically calls for the creation of national REZs on federal or rural land with inadequate transmission to develop the potential available energy output from these areas. A project developer would not be precluded from having to comply with state siting requirements, but FERC would be enabled to issue permits for development of the REZs, and a finding of public need would be assumed for all green transmission projects. Because the Senator Reid's proposal would likely increase FERC's siting powers only within REZs established on federal land, this policy may minimize federal encroachment into traditional state jurisdiction.

Some of these proposed Congressional solutions essentially look to create a transmission "carve-out" for renewable projects. However, this presents the obvious question of whether the creation of a distinct transmission planning protocol for green projects would discriminate against existing fossil-based generation capabilities within the National Interest Corridors. The physical reality of the operation of the electrical grid does not allow "green" electrons to be segregated from "brown" electrons once an interconnection to the grid has been made. The difficulties of equitably allocating the costs and accommodations required to integrate these renewable yet inherently variable energy resources into the grid is discussed further below as FERC attempts to devise new transmission policies under the *pro forma* Open Access Transmission Tariff (OATT) to promote this type of development.

Another potential major concern with the proposals would be the difficulty for areas served by public power producers and other stakeholders such as state, local, and tribal governments to embrace the burdens and cost allocations of so-called "fly-over" high-voltage transmission superhighways, green or not, when they would be unlikely to realize significant direct benefits from the proposed project. This is precisely the conundrum faced by regulators in situations exemplified

by Connecticut's experience with the Cross Sound Cable project, discussed above. These concerns will need to be ironed out not only in determining the extent of FERC's siting authority for the proposed projects, but also in the methodology used to allocate costs for these regional or national-scope infrastructure improvements.

Eminent Domain Authority for FERC

Currently, FERC does not have the power of eminent domain to take land for proposed transmission "superhighways" in most situations[42], although it does have such power for the siting of natural gas pipelines[43]. The power of eminent domain has been used successfully at the federal level for the completion of the interstate highway system, railroad infrastructure, and the natural gas pipeline system. In August of 2009, U.S. Senator Harry Reid, in discussing the possibility of a comprehensive energy bill, stated:

> We have 120-some-odd agencies that have a lock, a stranglehold on the ability to move electricity. They are antiquated; they've been in existence for more than 100 years, most of them, and they stop power from being transmitted… We have got to give FERC the same power with electric transmission that they have for natural gas.[44]

The option of providing FERC with an increased power of eminent domain for designated transmission projects may be one tactic the federal government may use to ease congestion bottlenecks and promote renewable energy developments in dealing with interstate infrastructure development. Under traditional state siting regimes, the siting of more local transmission can be eased in some instances when the developer is, under state law, a public utility who is generally granted the power of eminent domain through state public utility commissions. This helps to ensure that a "public good" such as a transmission line cannot be blocked by hold-out landowners.

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[42] Under EPAct §216, in those situations where FERC is still currently authorized to issue permits for transmission construction in NIETCs (not including the scenario presented and resolved in the *Piedmont* decision), the permit holder will have federal takings power which can be implemented through either federal district or state courts. *See* Davis, *supra* n. 21 at 410.

[43] 15 U.S.C.A. §717(f)(h)

[44] Kathleen Hart, Reid Calls for FERC Eminent Domain Powers to Site Electric Transmission, *available at* http://moveitmoveit.org/issue-links/reid-calls-for-ferc-eminent-domain-powers-to-site-electric-transmission/.

Local processes can create burdens on the design of proposed transmission projects for renewable resources. Conditions imposed can include a requirement to place transmission lines underground or require extraordinary routing to accommodate aesthetic interests. For example, placing transmission lines on overhead towers has the advantage of lower costs and ease of maintenance, although such construction may be considered aesthetically unappealing and also has the practical effect of encouraging local opposition to the project. The question of who should bear the excess incremental cost of placing transmission lines underground is unsettled in at least some states.[45] A public utility is typically under a statutory obligation to provide power to its customers effectively with a set rate of return, so there is great pressure to pursue the functionally equivalent and substantially cheaper overhead transmission option as opposed to an underground installation design.

Another potential legal concern with vesting expanded eminent domain authority directly with FERC would be the possibly negligible "public use or necessity" requirement for such takings in order to develop the proposed "fly-over" high-voltage transmission superhighways. Green transmission or not, one may argue that citizens not connected to such a "superhighway" would be unlikely to realize significant direct benefits from the proposed project. On a macro-level, one might argue that enhanced grid reliability and energy independence is in the national interest, regardless of how attenuated the public benefits may be to those facing condemnation of their property. These concerns will need to be addressed out not only in determining the extent of FERC's siting authority for the proposed projects, but also in the methodology used to allocate costs for these regional or national-scope infrastructure improvements.

IV. The Chicken or the Egg

In reality, when looking at developing renewable energy generation at remote locations, one of

[45] In Decision No. C05-0627, the Colorado Public Utility Commission ordered a transmission operator to proceed with aboveground installation of a 115-kV line unless underground construction was more cost effective, overruling a condition imposed by county permitting officials.

the largest obstacles a potential developer faces is reluctance on the part of transmission service providers to make a significant capital outlay to expand transmission to an undeveloped area without an appropriate security, or some type of performance-type bond. However, the comparatively lengthier development times for transmission projects presents a burden to generation developers. Transmission service providers would need assurance that the project would be beneficial, and therefore a prudent investment to be borne by the ratepayers.

Conversely, developers often require at least a firm transmission plan to be in place in order to secure a power purchase agreement with a load-serving entity, which in turn increases the likelihood of obtaining financing for the project. Ultimately, no matter how socially beneficial the proposed project may be, what can't be financed usually cannot be built. This is the classic "chicken or egg" problem that confronts the integration of the renewable resources throughout the country.

In some instances, a private renewable generation project may develop transmission independently to an interconnection with the grid, known as an "extension cord" approach, thereby avoiding the need for justifying the expenditure to a regulatory agency. While this approach may simplify the permitting process for the project, this additional capital expenditure may preclude the project from becoming economically viable and effectively derail the project. In some states where deregulation of the electric industry has not eliminated vertically integrated utilities, the recovery of costs associated with transmission facilities developed by investor-owned utilities (IOUs) can potentially ease the often lengthy delay in capitalization on these improvements.[46]

However, an issue, which may arise with the "extension-cord approach" to new generation development and independent financing of new transmission infrastructure, would be the potential for "freeridership". If a project developer upgrades or constructs a significant transmission line to bring the power to market, subsequent developers in the surrounding area may receive a windfall in reduced capital project costs by obtaining access to new transmission facilities at reduced or little to no cost.[47] These issues, discussed further below, can complicate and discourage the development of

[46] Colo. Rev. Stat. §40-2-126.

[47] Issues in Renewable Energy Transactions. (Informational Booklet) Day Pitney, LLP, February 2010.

new projects, especially those renewable generation projects, which typically require significant transmission investments.

Another important consideration in this type of development planning with an "extension cord" approach is the possibility that developers seeking to build and operate generation facilities might be treated as transmission owners or providers under the Federal Power Act (FPA) and thus be subject to FERC oversight and obligated to comply with the North American Electric Reliability Council's (NERC) reliability rules. Project developers need to either structure their projects or corporate form to avoid being treated as a transmission operator or, in the alternative, comply with NERC's reliability requirements.[48]

The Texas Solution

Texas currently leads the nation in total wind energy development and the rate at which additional wind energy projects are scheduled to come on line. Several factors account Texas' success in renewable energy development. First, Texas possesses an abundant and consistent wind supply in the northern panhandle area of the state. Second, because much of Texas operates independently of the two other continental grid interconnections, proposed transmission projects to foster development of the wind resources are not subject to federal jurisdiction, with planning conducting by the Texas grid operator ERCOT and approval completed by the state PUC. Furthermore, much of the wind infrastructure development in Texas to date has taken place in sparsely populated areas within the state, often amidst large tracts of underutilized, privately owned land. The relative low population density of these areas and the more limited number of easements or rights-of-way required for these projects may have also contributed to less opposition from area stakeholders based on aesthetic or hold-out concerns. These issues continue to complicate such development in more densely populated metropolitan areas on the east and west coasts.

However, many consider the creation of Competitive Renewable Energy Zones in 2005 as the most important component of Texas' successful renewable energy policy. Wind power installed

[48] Issues in Renewable Energy Transactions. (Informational Booklet) Day Pitney, LLP, February 2010.

capacity in the state is expected to reach 21,664 MW in 2015 on the back of the Competitive Renewable Energy Zone program and other federal and state support policies.[49] Because the 2005 bill creating these zones made no provision for the development of ancillary transmission infrastructure associated with the Competitive Renewable Energy Zones, a 2006 enactment made such transmission planning a requirement.[50] The Competitive Renewable Energy Zone program, administered by the Public Utility Commission of Texas, is the mechanism by which the state identified wind-rich zones to expand and construct transmission in the coming years so as to promote sustainable renewable energy development in Texas.[51] Currently, the Competitive Renewable Energy Zone program is undertaking one of the largest new transmission construction projects planned for the United States to be run by a joint venture of subsidiaries of American Electric Power and MidAmerican Energy Holdings Company at an estimated cost of $4.9 billion.[52] The overall Competitive Renewable Energy Zone program will almost triple Texas' current level of wind generation capacity to 18,456 megawatts (MW) and increase the reliability of the ERCOT grid.

Several other states have begun to implement a similar planning process, including California, Colorado, Nevada, and other western planning organizations.[53] However, only Texas' model confers a legal status on approved Competitive Renewable Energy Zones through which transmission projects are assumed to be useful and associated development costs are deemed prudent and recoverable through the ratepayers.[54] In contrast, other states' planning processes are conducted primarily for a technical assessment of available resources, without affording these

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[49] *Competitive Renewable Energy Zones (CREZ) in Texas Driving Wind Power Development*, November 27, 2009, available at http://www.pr-inside.com/competitive-renewable-energy-zones-crez-r1604747.htm.
[50] Texas Utilities Code §39.904 (2007), 16 TAC §25.173 (PUCT Substantive Rule) (2009).
[51] 16 TAC §25.173 (PUCT Substantive Rule) (2009).
[52] *URS to Manage Portion of Texas Renewable Energy Program*, Press Release, June 6, 2010. Available at https://thesourse.urscorp.com/Corporate/intranet/sv3/sourseartic les.nsf/0/0B2EB407696036558525773600825DE5?opendocument.
[53] *Transmission Development Zones for Renewable Energy Resources*. Prepared for the National Renewable Energy Laboratory by Dr. David Hurlbut, February 2, 2009.
[54] *Id*. at p. 4.

potential development areas preferential legal status for accelerated development.[55]

The Texas approach to facilitating wind farm development has been embraced to varying degrees in the Congressional bills addressing energy and infrastructure development. Of these, the Reid bill comes closest to the Texas model by mandating Presidential designation of REZs on federal land with the accompanying assumed status of need and prudent development. The Bingham and Dorgan bills more closely resemble to required planning and consideration process adopted to this point by other western states, however without a specific mandate to expedite the permitting of these areas. Given the vast amount of unused federal land in the west available for energy development and the long distance to load centers over multiple jurisdictions, it would seem the Reid/Texas approach is the boldest initiative to ramp up renewable energy production in the United States.

V. The Transmission Planning Process Under FERC Order 890

While the legal and technical demands of siting and constructing a more robust transmission grid that is able to access the nation's remote but abundant renewable resources are daunting and subject to the state legislative mandates and potential increased federal oversight, much of what the United States' electrical grid will look like and how it will operate will be determined by policy considerations currently underway with FERC.

On February 16, 2007, FERC amended regulations and the *pro forma* open access transmission tariff (OATT) originally adopted in Order Nos. 888 and 889 by issuing Order No. 890.[56] Order No. 890 was intended to address shortcomings in the OATT that undermined the efficient functioning of wholesale energy markets. This 1,200 document sought to modify certain aspects of existing regulatory rules allowing transmission providers to unduly discriminate against

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[55] *Id.*

[56] *Preventing Undue Discrimination and Preference in Transmission Service*, Order No. 890, FERC Stats. & Regs. ¶ 31,241 at P 418-602, *order on reh'g*, Order No. 890-A, FERC Stats. & Regs. ¶ 31,261 (2007), *order on reh'g*, Order No. 890-B, 123 FERC ¶ 61,299, (2008) *order on reh'g*, Order No. 890-C, 126 FERC ¶ 61,228 (2009).

third-party transmission customers. In general, Order No. 890 mandates that transmission providers conduct a transparent and participatory transmission planning process, with involvement and input from potential stakeholders, in order to alleviate perceived opportunities for undue discrimination.[57]

On October 8, 2009, FERC issued an extensive *Notice of Request for Comments* in order to obtain input from stakeholders as to the effectiveness of Order No. 890, and what, if any, modifications should be made to enhance the regional transmission planning process and in allocating the cost of transmission.[58] A partial summary of some of the extensive concerns is as follows:

- How should merchant and independent transmission projects be treated for purposes of regional transmission planning?
- Are there barriers to the development of merchant or independent transmission and how might they be addressed?
- Should different considerations be addressed regarding resource availability for generation owned by transmission operators and merchant transmission developers?
- Assuming that a lack of certainty about cost allocation, especially for transmission projects that cross multiple jurisdictions, inhibits transmission development, should processes be established to allocate costs over larger geographic regions?
- How should customers that benefit from a particular facility be identified? Should beneficiaries include generators as well as customers?
- Should costs for transmission projects designed with excess capacity (known as right sized lines) for subsequent resource development be re-allocated as the lines are subscribed by new customers?

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[57] *FERC Order 890 Strawman Proposal*. Prepared by California Independent System Operator, Planning and Infrastructure Development (May 29, 2007).

[58] Federal Energy Regulatory Commission, October 8, 2009. *Notice of Request for Comments, Transmission Planning Processes Under Order No. 890*. (Docket No: AD09-8-000).

The Congressional legislative proposals discussed above begin to address at least some of these concerns. Various proposals for the cost allocation of large scale transmission projects are addressed, including largely subsidizing the cost for such projects with federal funding and allocating the costs amongst large, interconnection-wide geographic areas. Ultimately, most proposals call for FERC to make an equitable determination as to who would benefit from a proposed project. Depending on how direct or attenuated the benefit of a proposed project may be for a particular jurisdiction, FERC will need to ensure that those costs are allocated in an equitable manner. In addition, project developers who bear the cost of installing transmission with capacity beyond what their current need may be should be able recover those incremental costs as new generation comes on line, thereby avoiding a "freeridership" problem and consequently avoiding a "wait and see" approach by potential renewable generation developers to transmission availability.

As for the concerns raised by FERC in its request for comments, there is a focus primarily on two areas: inadequate or inconsistent transmission planning among neighboring systems and between resource types which may lead to less efficient or cost-effective transmission, and a lack of a mechanism to consistently and equitably allocate costs for needed transmission. The FERC notice notes that the Electric Advisory Committee has identified cost allocation as "the single largest impediment to any transmission development…"[59] The notice goes on to note that cost allocation is not a new dilemma, but as the demand for new transmission increases in the face of state statutory requirements for increased renewable resource generation, this problem will grow in magnitude.[60]

Due to the large amount of capital required for the construction of new transmission facilities, a developer must be able to determine that it will have a reasonable opportunity to recover its costs. However, the increasing trend of renewable energy requirements has put pressure on the development of transmission that crosses multiple utility and or RTO jurisdictions, complicating the

[59] Federal Energy Regulatory Commission, October 8, 2009. *Notice of Request for Comments, Transmission Planning Processes Under Order No. 890 at* 5, (Docket No: AD09-8-000).
[60] *Id.*

determination of who the beneficiaries are and what is an equitable allocation of the costs. The notice also makes the stark assessment that, given the uncertainties in allocation for these large projects, many existing projects have stalled without a reasonable certainty on the part of the developer as to the ability to recover their costs, and that until a comprehensive allocation scheme is developed for these types of projects, many potential beneficiaries of the projects will postpone moving forward in the hope that another entity will make the initial capital expenditure.[61] While FERC has implemented policies to help standardize the cost allocation process within an RTO, it now believes it's "best remaining opportunity" to eliminate barriers to transmission construction would be to provide greater certainty in the cost allocation process for those projects which cross or link multiple utility systems.[62]

Responses from various stakeholders illustrate a diversity of opinion on how to properly resolve these issues. The American Public Power Association agrees in principle with many of the policy goals advanced under Order 890, and concedes that member load-serving entities (LSEs) often face resistance from incumbent transmission operators in attempting to upgrade transmission even within "local" areas, and even greater variability and uncertainty in transmission planning in regions operating without a RTO.[63] As stated within their comments, "It is difficult for these public power systems to embrace the payment of an allocated share of proposed 'fly over' 765 kV transmission facilities that they may never see the benefits of, when they cannot even succeed in obtaining upgraded substations or 69 kV facilities needed to improve sub-transmission service to their own retail customers."[64] This viewpoint tends to lend credence to the APPA's overall position that, for planning purposes, transmission projects may be best evaluated at a local, or at least regional, level.

The APPA comments present a compelling argument, which seems to run counter to current mood in Congress to expedite the construction of large-scale transmission projects to serve

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[61] *Id*. at 6.
[62] *Id*. at 7.
[63] Comments of The American Public Power Association, November 20, 2009. F.E.R.C. Docket No. AD09-8-000 at 4.
[64] *Id*.

renewable resource generators. Noting that under §217(b)(4) of the FPA, the Commission is to use its authority to facilitate planning of transmission facilities to meet the needs of load-serving entities, the APPA questions whether FERC would be acting outside its statutory authority in seeking to better support renewable transmission as opposed to solely seeking to facilitate securing adequate resources to allow LSEs to meet their obligations to provide reliable power to their customers.[65] While proposed legislative amendments by Congress expanding FERC authority would ostensibly sidestep this argument, this would not resolve whether such legislation would be an unconstitutional encroachment on state sovereignty. The APPA goes on to acknowledge that the two goals, of meeting the needs of LSEs in a pragmatic and legal manner, and the promotion of renewable energy, are not mutually exclusive. However, this acknowledgement comes with the following cautionary proviso:

> Renewable generation is needed not as an end in itself, but as a resource to serve load. By concentrating on the planning of transmission facilities required to support the resource needs of LSEs, transmission facilities needed to support renewable resources will be necessarily included, as LSEs act to comply with state renewable portfolio standards and the potential for federal renewable energy requirements and carbon caps. But the chances are greater under a transmission planning paradigm that concentrates on LSE and state resource plans that the right transmission facilities in the right regions will be planned and constructed. Resource planning should consider the respective costs and benefits of demand and supply-side resources, different fuel types, distributed generation, and energy efficiency, as well as the costs and benefits of transmission facilities needed (or not needed) to support those resource choices. Pursuing the construction of "renewable transmission" as an end in itself short cuts the resource planning process and could lead to very suboptimal outcomes.[66]

Comments from the American Wind Energy Association (AWEA) indicate agreement that modification of existing cost allocation methods is the most critical reform needed to ensure that the appropriate amount of needed transmission infrastructure is constructed in a timely manner.[67] In other filings, AWEA has, not surprisingly, advanced the position that current cost allocation methodologies are flawed because they too narrowly define the beneficiaries of renewable energy,

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[65] *Id*. at p. 10.
[66] *Id.*
[67] Comments of The American Wind Energy Association, November 23, 2009. F.E.R.C. Docket No. AD09-8-000, *available at* http://www.awea.org/newsroom/releases/11-24-09_AWEA_Transmission_Filings_with_FERC.html

to whom such costs should be assigned. AWEA also argues that current transmission planning practices have hindered investment in the nation's transmission network.[68] Given that wind farm developers have, in many instances, had to step in to finance transmission upgrades in order to access the energy market, the AWEA's position that these costs would be more fairly spread among the ratepayers is not surprising. What traditional power producers would term "socializing" the costs of these private renewable generation projects throughout the grid, proponents of large-scale wind and other renewable energy generation would view as an equitable apportionment and reasonable accommodation of a vitally important and still largely untapped resource. The importance of the cost allocation will only be magnified if proposed "green transmission superhighways," connecting distant renewable resource-rich areas with load centers moves forward.

VI. Conclusion

Comments received in the FERC proceedings illustrate the fundamental disputes within the power industry over how the grid should be planned, who should pay to expand it, and how wind and solar power's climate benefits should figure in future transmission projects' costs. What FERC's staff will propose, and what its commissioners will ultimately do, on this proceeding remains unclear.[69]

What is at least slightly clearer, however, is the increasing likelihood of Congressional action to revisit and address our national energy policy. The ongoing damage to the Gulf Coast, on a scale never before seen in the United States, and the potential political fallout from the BP oil spill should spur increased legislative backing of clean energy sources and their requisite ancillary transmission infrastructure. While it does not appear at this time that there is the political will to implement significant carbon regulation in the form of climate legislation, broad support of increasing

[68] *Id.*

[69] Behr, Peter. *Do The Rules of the Nation's Electric Grid Discriminate Against Wind Power?* New York Times; April 27, 2010. *Available at* http://www.nytimes.com/cwire/2010/04/27/27climatewire-do-the-rules-of-the-nations-electric-grid-di-49343.html?pagewanted=1

renewable energy generation and a general consensus that the nation's electrical grid is in need of modernization are both policy goals within reach. Given increasing calls for energy independence and against the backdrop of the country's worst environmental disaster unfolding in the Gulf of Mexico, a national policy goal of climate change mitigation may not be necessary in order to bring about changes within the electric industry which would effectuate a largely equivalent response.

Opinions diverge as to exactly what shape any legislation Congress may advance in order to implement these policy reforms should look like. Due to the unique design of the nation's existing electric infrastructure, developed over the past century in a somewhat patchwork fashion in response to emerging generating technologies, this policy change will likely be best implemented by broader regulation and policy changes at the federal and regional levels. A limited expansion of FERC condemnation authority would be a useful federal policy initiative to promote the increased transmission capability needed to enhance the nation's renewable energy development.

Under current federal law, FERC retains the "backstop" authority required to site needed facilities only when state and regional agencies are unable to do so. It would seem evident that for interstate projects, additional federal oversight would prove beneficial to both national energy goals and transmission reliability. Proposed projects of the scale required to move away from a hydrocarbon-based energy infrastructure are likely to cross at least one, if not multiple jurisdictional lines. Just as individual landowners would not be able to stop a more local transmission project deemed necessary and prudent by state authorities, individual states should not have veto power over significant projects with regional benefits.

However, Congress should be careful to not place the cart before the horse in pursuing an aggressive transmission expansion plan. Given the enormous complexities of the nation's grid and the varying geographical requirements, state and local regulations, resource distribution, and

market structures throughout the country, it appears that conceptual transmission planning should be a "bottom up" activity. The availability of FERC to "referee" disputes towards states with an eye towards promoting renewable energy (if given the statutory authority by Congress to do so) could be very effective in bringing disagreeing states to the bargaining table to hammer out more equitable solutions.

While certain Congressional proposals may prove highly beneficial for certain rural and resource-rich states, and the promotion of renewable energy is consistently favored by the public, there would be little value added by removing transmission planning responsibilities from operators and regional organizations which have a singular purpose: to maintain a functioning and reliable electric supply to the country. In states which choose to pursue renewable energy through RPS or RES statutes, affected operators will bear the burden of compliance with these requirements.

If Congress chooses to nationalize what appear to be successful state policies of renewable energy promotion, such as the creation of national REZs or the implementation of a national RPS, additional transmission planning at the federal level will be an integral component of such a strategy. Until then, Congress should not mandate the construction of large-scale transmission infrastructure without extensive consultation with state, regional, and local administrators and grid operators. Renewable energy, while popular, does no good if it does not provide consistent power to the grid at the expense of either more expensive or less environmentally sound generators.