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The Need to Coordinate Transmission Policy: An Overview of the Issues

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Abstract

Energy transmission plays a key role in today's energy industry, because it is the system by which energy is sent to customers and end-users. Without it, generators would not be able to distribution companies would not be able to bring power from utility plants to distribution lines to send power to consumers.[1] Furthermore, as the federal government continues to encourage renewable energy development, the role of transmission becomes more important for the integration of renewable energy sources into the nation's grid.[2] Because renewable sources tend to be area-specific and isolated from populated areas (for example. wind power in the Great Plains, solar power in the Southwest deserts), the transmission grid "serves as the vehicle to help ensure reliable service at reasonable cost over broad regions."[3] Recently, the drive for new transmission projects has been "to improve the integration" of renewable energy sources.[4] Figure 1 illustrates one option for a renewal energy transmission network.

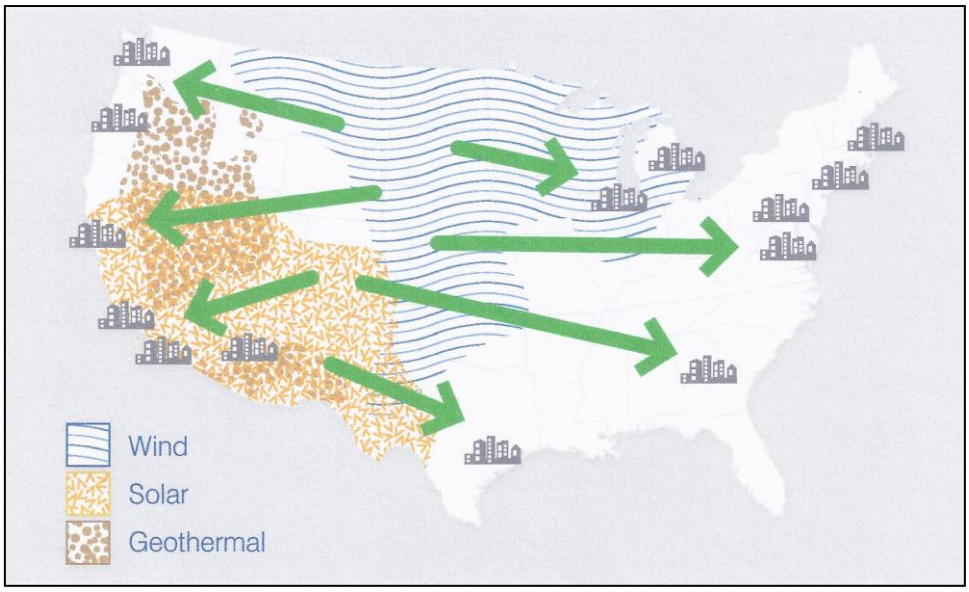

Figure 1: Nationwide Green Power Superhighways: A Conceptual Vision
Source: American Wind Energy Association & Solar Energy Industry Assoc. *Green Power Superhighways: Building a Path to America's Clean Energy Future*, 4 (Feb. 2009)

[1] Michael H. Brown & Richard P. Sedano, *Electricity Transmission: A Primer*, Department of Energy, 9 (Jun. 2004)
[2] American Wind Energy Association (AWEA) & Solar Energy Industry. Association (SEIA), *Green Power Superhighways: Building a Path to America's Clean Energy Future*, 4 (Feb. 2009),.
[3] Ross Baldick et. al., *A National Perspective on Allocating the Costs of New Transmission Investment: Practice and*
[4] Gilbert E. Metcalf, *Financing a National Transmission Grid: What Are the Issues?*, Manhattan Institute, 4 (Sept. 2010),

In addition to increasing access to renewable energy sources, the other challenges of transmission today are to improve the reliability of the grid and relieve congestion in high-demand areas. Addressing these challenges will require modernization and expansion of today's energy grid, as the nation's grid is currently struggling to meet energy demands.[5] Building additional transmission lines and updating the current infrastructure with new technology would provide the necessary congestion relief and broader access to renewable energy sources; however, improving the system cannot be accomplished without appropriate policy measures to address the barriers that are involved with transmission planning and investment. As the American Wind Energy Association (AWEA) and the Solar Energy Industries Association (SEIA) point out, "policy barriers – not technical or economic barriers – are the chief factors impeding the construction" of transmission lines needed to integrate renewable energy.[6] Therefore, the focus of this paper is to identify the policy drivers for and barriers to transmission development, explain the policy issues and how those issues are currently being addressed, and outline some proposed policies.

[5] Ibid.
[6] AWEA & SOIA, *supra* note 2.

1. The Need to Reform Transmission Policy

To better understand the importance of transmission development and policy, both the drivers behind and the barriers to transmission development need to be identified. The driving forces behind transmission development have usually been and continue to be factors of reliability and congestion relief. More recently, however, renewable energy policy has amplified the need for transmission. As will be explained below, renewable energy integration cannot advance without building the necessary transmission network.

Although transmission network development is by no means a cheap investment, the bigger hurdles to attracting and maintaining developers are the site selection and permit processes along with cost allocation.[7] *The 2010 Long-Term Reliability Assessment*, conducted by the North American Electric Reliability Corporation (NERC), found that transmission development was delayed primarily due to the siting and permitting process.[8]

Often impacting the site selection process is cost allocation, which the Department of Energy (DOE) found to be "the single largest impediment to transmission development."[9] In order to accelerate the transmission development process, transmission policies will need focus on alleviating the issues associated with both site selection and cost allocation. As Baldick, et. al. noted clear policies are "far more likely to attract investment in transmission and to increase the likelihood of informed planning and debate and greater efficiency in reaching decisions."[10] The following chart shows investment growth in transmission systems from 1977 to 2007.

[7] Ibid. at 16-17. *See also* Metcalf, *supra* note 4.
[8] North American Electric Reliability Corp. (NERC), *2010 Long-Term Reliability Assessment*, 15 (Oct. 2010).
[9] Stan Mark Kaplan, "Electric Power Transmission: Background and Policy Issues", *Congressional Research Service* (Apr. 2009).
[10] Baldick, et. al., *supra* note 3.

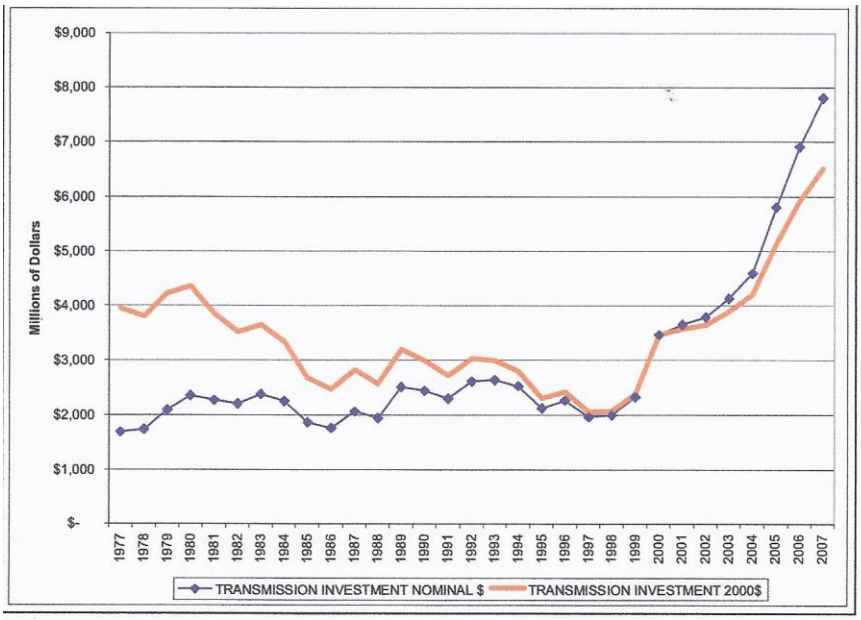

Figure 2: **Transmission Investment by Investor-owned Utilities 1977 –2007**
Source: Stan Mark Kaplan, *Electric Power Transmission: Background and Policy Issues*. 2009

1.1. Updating and Expanding The Transmission Grid

A strong transmission system should improve the reliability of the electric power system and provide access to a diversified mix of energy sources.[11] The nation's transmission system is facing congestion on existing lines, increasing energy demands, and the challenge of connecting renewable energy sources to load centers.[12] Thus, in order to strengthen our system, transmission investment must focus on maintaining reliability to meet current and growing demands; reliving congestion in high-demand areas; and facilitating the integration of renewable energy sources. These three focus areas are the main drivers for transmission development.

1.1.1. Improve Reliability, Relieve Congestion

Meeting energy demands creates two problems – reliability and congestion. According to NERC's *2010 Long-Term Reliability Assessment*, it is expected that peak demand will be realized in 2012.[13] In other words, the system will experience its maximum power requirement in 2012 in order to meet growing consumer demands. The assessment also found that the overall load factor is expected to increase, indicating that average demand will increase at a higher rate

[11] Brown & Sedano, *supra* note 1.
[12] The Nat'l Council on Electricity Policy, *Coordinating Interstate Electric Transmission Siting: An Introduction to the Debate*, 1 (Jul. 2008), *See also* NERC, *supra* note 7.
[13] NERC, *supra* note 8, at 5.

than peak demand.[14] This increase may put additional strain on the bulk power system. NERC notes that while the industry may be prepared to handle long-term demand growth, rapid demand growth in the short-term can create reliability issues.[15] Although NERC does not indicate that additional transmission development will be necessary, transmission still requires investment to maintain reliability standards and meet demand.

In addition to addressing reliability issues, transmission investment will be needed to alleviate congestion issues. The Department of Energy's most recent congestion study identified severe congestion problems in several high-demand areas of the United States, including the urban areas of southern California, the San Francisco Peninsula, the Seattle-Portland area, and the area along the Atlantic coast from mid-state New York southward to Northern Virginia.[16]

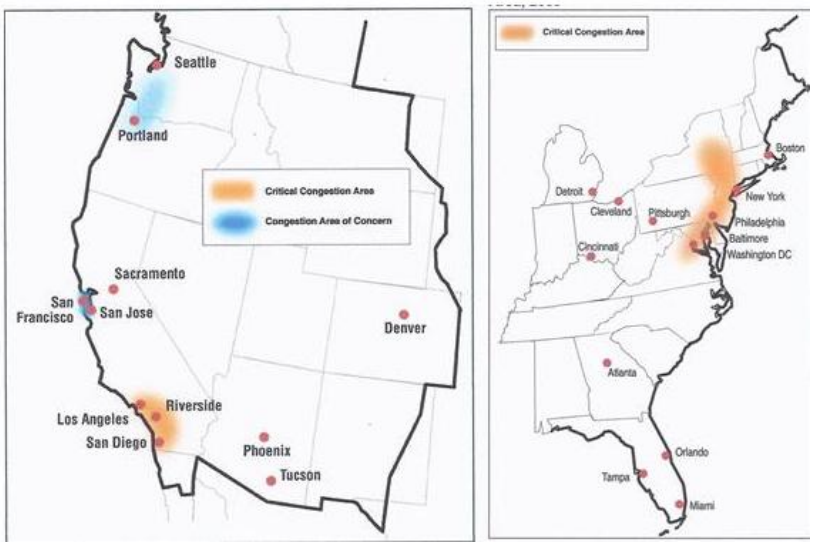

Figure 3: Transmission Congestion Areas in the United States – 2009
Source: U.S. Department of Energy. *National Electric Transmission Congestion Study*, 2009

The DOE congestion study also observed that few new transmission lines had been built in these regions to alleviate congestion and thus, "it is likely to be several years before current congestion levels ease."[17] According to Kaplan's Congressional Research Service (CRS) Report, studies suggest that the annual costs of congestion may reach anywhere from hundreds of millions to billions of dollars.[18] Thus, improving transmission in these areas would have great cost-saving effects. Additionally, the role of transmission in the energy industry becomes more

[14] Ibid.
[15] Ibid. at 7.
[16] U.S. Department of Energy (DOE), *National Electric Transmission Congestion Study*, (Dec. 2009)
[17] Ibid. at 10.
[18] Kaplan, *supra* note 9.

expansive when considering the addition of large amounts of variable generation resources and increased demand over the next ten years.[19]

1.1.2 Integrate Renewable Energy

In addition to congestion relief and improved reliability, the transmission grid needs to be updated and expanded to facilitate the integration of renewable energy. In recent years, renewable energy policy has started to change the landscape of the energy industry. The United States government has increasingly recognized the importance of renewable energy sources as a result of mounting concerns about the environment, climate change, and dependency on foreign oil.[20] As a result, industry players have begun tapping into renewable energy sources. The nation's renewable energy potential is large, with vast biomass potential along the East and West coasts; wind potential in the Great Plains; solar potential from southern California to central Texas; and hydropower potential in Arkansas, California, Oregon, Tennessee, and Washington.[21] While major advances have been made in renewable energy technologies,[22] issues with transmission are preventing these sources from reaching many consumers.[23]

Renewable energy sources are often located in remote locations, away from populated areas, and many states have little to no renewable energy potential. Therefore, additional transmission lines must be developed to connect renewable sources to the grid; to carry additional power, and move the power across vast distances in order for renewable energy sources to be more accessible.[24]

[19] NERC, *supra* note 8.
[20] DOE, *supra* note 16
[21] Peter Behr & Christa Marshall, "Regional and State Interests May Dominate Future Climate and Energy Policy," *THE NEW YORK TIMES*, Jul. 26, 2010.
[22] DOE, *supra* note 16.
[23] AWEA & SOIA, *supra* note 2.
[24] Metcalf, *supra* note 4.

Figure 4: Current Transmission Systems Must Be Upgraded and Expanded to Support Renewable Energy
Source: American Wind Energy Association & Solar Energy Industry Assoc. *Green Power Superhighways: Building a Path to America's Clean Energy Future*, 4 (Feb. 2009)

Not only does the grid need to be expanded to reach these sources, but it also needs to be updated to accommodate the influx of energy that would be flowing through. Failure to invest in transmission networks will significantly delay efforts to generate and integrate renewable energy sources and stunt the growth of the renewable energy industry.[25] But, as the Department of Energy points out, "renewable projects … have been subject to the 'chicken and egg' timing problem – new transmission will not be built unless there is specific generation to deliver from and specific customers to deliver to; but, remote renewables cannot be developed unless the transmission is there to serve them."[26]

[25] AWEA & SOIA, *supra* note 2, at 5; DOE, *supra* note 16
[26] DOE, *supra* note 16

2.1. Alleviating Barriers to Transmission Investment

Originally built by individual utilities to serve small regions, the grid was comprised of monopolies that planned and built to serve their own needs.[27] The grid has evolved into a structure that "involves broad regional markets crossing both service territories and state boundaries."[28] States depend upon each other to export or import power across state lines and "electricity consumers in one area depend upon resources and reserves located in others."[29]

Additionally, because mergers and acquisitions have occurred in the electric industry and many utility companies have expanded, multi-state companies operating across state lines have become the norm.[30] The grid is owned by several hundred different entities, operated by 130 different balancing authorities, and regulated at the state, regional, and federal levels.[31] As a result, the current power grid is comprised of a patchwork of different regulators and participants and the challenge of coordinating within this diverse network remains a major barrier to transmission investment.

Data in Miles [and Regional %] for the 48 Contiguous States for Transmission Lines of 230 kV and Higher

Owner Type	Northeast /Midwest	Southeast	Southwest	Upper Plains	West	U.S. Total
Federal	21 [0%]	2,768 [7%]	0 [0%]	2,541 [17%]	18,214 [27%]	23,544 [14%]
Other Public Power	964 [3%]	2,079 [5%]	731 [5%]	1,798 [12%]	5,525 [8%]	11,098 [7%]
Cooperative	0 [0%]	2,993 [8%]	387 [2%]	2,908 [20%]	4,496 [7%]	10,784 [6%]
Subtotal – All Public Power and Cooperatives	986 [3%]	7,840 [20%]	1,118 [7%]	7,247 [49%]	28,235 [42%]	45,426 [27%]
Independent Transmission Companies	4,640 [15%]	0 [0%]	351 [2%]	1,045 [7%]	0 [0%]	6,036 [4%]
Investor Owned Utilities	24,968 [81%]	31,412 [79%]	12,408 [80%]	5,402 [36%]	37,034 [56%]	111,223 [66%]
N/A	260 [1%]	264 [1%]	1,686 [11%]	1,148 [8%]	1,250 [2%]	4,609 [3%]
Total	30,853 [100%]	39,516 [100%]	15,563 [100%]	14,843 [100%]	66,519 [100%]	167,294 [100%]

Figure 5: High Voltage Transmission by Owner and Region
Source: Stan Mark Kaplan, *Electric Power Transmission: Background and Policy Issues*. 2009

[27] Baldick et. al., *supra* note 3
[28] Ibid. at 8.
[29] Ibid.
[30] New York v. Federal Energy Regulatory Commission, 535 U.S. 1, 7-8 (2002).

Notes: The Northeast/Midwest region is the combination of the RFC and NPCC NERC regions; the Southeast is the combination of SERC and FRCC; the Southwest is the combination of ERCOT and SPP; the Upper Plains is the MRO region; and the West is the WECC region. N/A signifies that ownership information is not available. Other Public Power includes municipal and state systems. kV = kilovolt. Detail may not add to totals due to independent rounding.

Although the transmission grid has evolved into a regional network, local and state agencies often do not recognize broader regional benefits of improved transmission.[32] As Metcalf claims, "[t]he bottleneck in investment in grid expansion and improvement is not lack of federal funding but rather a failure to recognize that grid investments offer benefits that transcend state boundaries…."[33] This failure to recognize the interstate benefits of transmission investment has had an adverse impact on both cost allocation and the site selection and permit processes. Site selection and cost allocation decisions are often made using on a narrow scope of information and interests, with state and local agencies weighing only the benefits that will accrue to their own residents.[34] As the Department of Energy notes, "transmission planning requires broad scenario analyses" and without considering benefits on a regional level, siting and cost allocation will remain as hindrances to transmission development."[35]

Current delays in transmission projects have largely been attributed to the debate over cost allocation and delays in the site selection and permit process.[36] Projection of transmission circuit mile growth over the next decade is only about half of the projected growth of peak demand.[37] In the *2010 Long-Term Reliability Assessment*, NERC reported that almost 6,500 miles of transmission network construction are currently behind schedule, with a majority of the lines delayed up to three years.[38]

2.1.1. Site Selection and Permit Processes

Interstate transmission projects require site permits from every jurisdiction through which the line will travel and many industry observers believe that the multi-state permit process has inhibited the development of new long-distance transmission lines.[39] Because a patchwork of federal, state, and local rules would apply to the construction of transmission projects, the

[32] William W. Hogan, *Electricity Market Structure and Infrastructure*, ACTING IN TIME ON ENERGY POLICY, 153 (Kelly Sims Gallagher ed., 2009).
[33] Metcalf, *supra* note 4
[34] AWEA & SOIA, *supra* note 2
[35] DOE, *supra* note 16.
[36] Ibid. at 14.
[37] Hogan, *supra* note 32.
[38] NERC, *supra* note 8.
[39] Kaplan, *supra* note 9.

location process can be long and complicated.[40] The process has no set timeframe and can vary greatly depending on proposed locations.[41] According to NERC, once a transmission project is identified, it can take up to ten years to complete and a majority of this time will be devoted to the site selection and permit processes. At least 40 projects, or 1,500 miles of transmission, have been delayed solely because of these issues.[42]

Compliance with other regulatory authorities, in addition to the Federal Regulatory Energy Commission (FERC) is the main factor behind these delays. Transmission, as with any other type of construction projects in the industry, is subject to a variety of different regulatory agencies in addition to FERC and several legislative acts, including the Environmental Protection Agency, the National Environmental Protection Act, the Fish and Wildlife Service, the Endangered Species Act, and the Clean Water Act.[43]

Even outside of wildlife and environmental considerations, compliancy encompasses less obvious authorities, including the Department of Defense, the Federal Aviation Administration and the National Historic Preservation Act. Moreover, every state, with its own regulatory agencies, along with city and country agencies, are also regulatory players in the site selection and permit processes.[44] With the need to transcend all these regulatory barriers, it is easy to see how the process can become significantly delayed. The following chart shows just a few of the regulatory agencies that are involved in granting permission for wind energy projects. Figure 6 lists just a few of the agencies involved in the permit process for wind energy.

[40] AWEA & SOIA, *supra* note 2
[41] NERC, *supra* note 8.
[42] Ibid. at 24.
[43] American Wind Energy Ass'n, *Wind Energy Siting Handbook*, (Feb. 2008).
[44] Ibid.

Regulatory Authority	Statute	Permit/Approval	Description	Triggers
Federal (Cont'd)				
Advisory Council on Historic Preservation, Tribal Historic Preservation Office and State Historic Preservation Office (36 CFR 60 and 800)	National Historic Preservation Act (16 USC 470)	Section 106 Consultation	Requires federal agencies to review impacts to historic and Tribal resources and allows ACHP to provide comments. Consultation authority delegated to SHPO and THPO.	■ Consultation with the SHPO is always recommended to determine need for Section 106 Consultation ■ Federal permit or approval required ■ Activity may impact property listed in or eligible for listing in the National Register of Historic Places (NRHP) ■ Activity may impact Tribal resources
U.S. Army Corps of Engineers (33 CFR 320-331 and 40 CFR 230)	Clean Water Act (33 USC 1251 et seq) Section 404 (33 USC 1344)	Individual, general, and nationwide permits	Regulates discharge of dredged or fill materials into waters of the United States	■ Activities that may impact federal waters, including wetlands
U.S. Army Corps of Engineers (33 CFR 320-331)	Rivers and Harbors Act of 1899 (33 USC 401 et seq) Section 10 (33 USC 403)	Section 10 Permit	Regulates obstructions to navigable waters of the United States	■ Building or replacing bridges
Environmental Protection Agency and state agencies (40 CFR 122 and 123)	Clean Water Act (33 USC 1251 et seq) Section 402 (33 USC 1342)	National Pollution Discharge Elimination System (NPDES) Stormwater Permit	Regulates discharges into waters of the United States. Usually delegated to state authority.	■ Potential for discharge from site assessment, construction, and operation
Federal Aviation Administration (14 CFR 77)	49 USC 44718	Notice of Proposed Construction (Form 7461-1) Hazard Determination	Notifies FAA of proposed structures that might affect navigable airspace. Form requires proposed markings and lighting. FAA must review possible impacts to air safety and navigation, as well as the potential for adverse effects on radar systems.	■ Construction or alteration of structures standing higher than 200 feet above ground level ■ Construction or alteration of structures near airports ■ 14 CFR 77.13 provides details ■ Siting within radar line-of-sight of an air defense facility

Figure 6: Typical Federal Permitting Requirements for Wind Energy Projects
Source: American Wind Energy Association, *Wind Energy Siting Handbook*, (Feb. 2008)

In addition to the problems of getting approval from all regulators involved, another hindrance to the site selection process is the failure of states to recognize the interstate benefits of improved transmission. As mentioned above, states often apply a narrow focus when considering transmission permits, weighing "only the benefits of transmission investment that will accrue to residents of that state."[45] Moreover, "regulators in a single state can effectively veto a multi-state transmission network by refusing to grant the permits needed…if they feel that

[45] AWEA & SOIA, *supra* note 2.

the state would not receive an adequate share of the benefits."[46] Thus, even if the transmission investment will have broad regional benefits, a state may not grant the necessary permits if the benefits to its residents do not outweigh the potential costs. As a result, cost allocation is another factor affecting the delays experienced in the site selection and permits processes.

2.1.2. Cost Allocation

Cost allocation is the other major impediment to transmission development and oftentimes, the debate over cost allocation is what ultimately stalls the site selection and permits processes. Baldick et. al. observed, "there has been a lack of consensus about who should pay for transmission grids, especially where benefits are either in dispute or accrue to parties other than the traditional customers of the transmission company that would need to receive the benefit."[47] As mentioned earlier, many regulators calculate the costs and benefits of transmission on a narrow scope and "regulators have little authority or incentive to require ratepayers in their state to help pay for an interstate network with regional benefits."[48]

Ideally, a *beneficiary pays cost allocation* approach should be adopted to ensure that only those who benefit from additional transmission lines would bear the costs.[49] However, because of the interstate nature of the transmission industry, it can be difficult to identify exactly who benefits from a transmission upgrade and expansion.[50] Thus, the common approach taken by local and state agencies is *cost-causer pays*, requiring power generators seeking to connect to the grid to pay the full cost, even though the majority of benefits would accrue to electricity consumers spread across a broad region.[51] As a result, competitors could then piggyback on these investments and potential investors have little incentive to invest in transmission and more of an incentive to let others pay for the upgrade.[52] Without clear guidance on cost allocation, transmission projects will not get the permit needed if cost allocation is set too broadly nor will there be any investment if cost allocation is narrowly applied.[53]

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[46] Id. at 16.
[47] Baldick et. al., *supra* note 3.
[48] AWEA & SOIA, *supra* note 2.
[49] Stan Mark Kaplan, *Electricity Transmission Cost Allocation* (Apr. 2010), http://www.wiresgroup.com/images/WIRES_Report_CostAlloc_041910.pdf.
[50] Ibid. at 13.
[51] AWEA & SOIA, *supra* note 2.
[52] Ibid.
[53] Ibid., Kaplan, *supra* note 9.

2. Current Policies and Actions

The importance of transmission and the barriers to transmission investment have not gone unnoticed. The Energy Policy Act of 2005 (EPAct of 2005), passed to reform federal energy laws, addressed several transmission concerns. FERC has also issued several rulings aimed at facilitating the transmission investment process. Additionally, NERC, regional efforts like Western renewable Energy Zone (WREZ), and private investment efforts have all recognized the role that transmission is expected to play in today's energy industry and have made addressed transmission development through policy and investment initiatives. While efforts have been made to promote and facilitate transmission investment, there still remain obstacles that need to be addressed.

2.1. Federal

The Federal Energy Regulatory Commission (FERC) derives its authority from the Federal Powers Act (FPA), which initially granted FERC the authority to address interstate transmission rates and charges to ensure that no undue discrimination took place in the energy industry.[54] FERC authority has expanded under the FPA and the additional legislation has broadened FERC authority in the Energy Policy Act of 2005. The EPAct of 2005 comprehensively reformed federal energy laws to promote energy efficiency; reduce dependency on foreign fuel sources; and strengthen the interstate delivery system for energy supplies.[55] Specifically, with respect to transmission, it required the formal creation of electric reliability organizations (ERO) responsible for developing and implementing mandatory reliability standards, subject to FERC oversight and approval.

[54] Kaplan, *supra* note 49.
[55] Debbie Swanstorm & Meredith M. Jolivert, *DOE Transmission Corridor Designations and 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, 420 (2009).

It granted FERC authority to issue permits to locate interstate electric transmission facilities in designated congestion regions, as determined by the DOE. This is often referred to as FERC's "backstop" site location authority. The EPAct of 2005 also directed the Department of Energy to engage in greater coordination with other federal agencies to streamline and expedite site requests on federal lands. Finally, the act required FERC to adopt rules on incentive-based transmission rates for electric transmission providers.[56]

Thus, FERC is the main agency responsible for setting forth and addressing transmission policy. It has issued several rules to address the issue of transmission, most notably Order 888, Order 890, and Order 1000. Together, the goal of these three orders is to remove barriers to transmission; facilitate investment in transmission planning; and promote coordination among the different regulatory agencies and governments in order to expedite the development process.

Order 888 was issued in 1996 in an effort to promote wholesale competition through non-discriminatory practices by public utilities. It detailed how transmission owners should be charged for use of their lines and the terms under which they should give access to others.[57] FERC ordered functional unbundling of wholesale generation and transmission services, requiring that each utility separate its rates for wholesale generation, transmission, and ancillary services.[58] Transmission providers were required to offer open-access transmission service on a non-discriminatory basis to wholesale transmission customers. For public utilities, that offer unbundled retail access, or if a state required it, FERC imposed a similar open-access requirement.[59]

Order 890, issued in 2007, reformed Order 888 to "improve the operation of the open access transmission market" and further prevent undue discrimination and preference in transmission service.[60] But, it keeps the core elements of Order 888, including functional unbundling.[61] In addition to amending Order 888, another purpose of Order 890 is to ensure that open access transmission tariffs achieve their original purpose of remedying undue discrimination. It provides greater specificity to reduce undue discrimination and facilitate the Commission's enforcement. It also increases transparency in the rules as they apply to transmission planning

[56] *I*bid. at 422-23.
[57] Federal Energy Regulatory Commission (FERC), *FERC: Landmark Orders – Order No. 888,*.
[58] New York v. FERC, 535 U.S. at 11.
[59] Ibid.
[60] FERC, *FERC: Industries – Open Access Transmission Tariff (OATT) Reform,*; *See also* Kaplan, *supra* note 49.
[61] FERC, *FERC: Industries – Open Access Transmission Tariff (OATT) Reform, supra* note 60.

and use.[62] According to Baldick et. al., the policy of open access to transmission is closely linked to a better cost allocation model and the need to integrate the nation's grid.[63]

FERC issued Order 1000 in July 2011, establishing requirements for transmission planning and cost allocation by transmission-owning utilities and public utilities[64]. As of this paper's publication, the rule has yet to take into effect; but, according to the Center for American Progress (http://www.americanprogress.org/), the rule will "fundamentally improve the way new transmission lines are planned and paid for, resulting in thousands of miles of new lines that will bring renewable energy to consumers."[65] The rule broadens the scope of transmission planning by addressing the regional planning process and requiring that jurisdictional public policy requirements be considered in transmission planning. It also clarifies cost allocation rules to require that regional transmission planning processes have a regional cost allocation method and ensure that those who do not benefit from power transmission do not have to pay for it.[66] This should allow for consumer protection, preventing free riders who receive benefits without paying for them while ensuring that those who do not receive benefits are not required to pay.[67]

Figure 7: The Mountaineer Wind Energy Center in West Virginia is Regulated by Order 1000
Source: Caperton, R.W. "*Order 1000 Addresses Hurdles in Planning Processes and Cost Allocation*," *Center for American Progress*, July 28, 2011

[62] *Ibid.*
[63] Baldick et. al., *supra* note 3.
[64] FERC, *FERC: Industries – Transmission Planning and Cost Allocation*.
[65] Richard W. Caperton, *Order 1000 Addresses Hurdles in Planning Processes and Cost Allocation*, *Center for American Progress*, July 28, 2011.
[66] *FERC: Industries – Transmission Planning and Cost Allocation*, *supra* note 64.
[67] Caperton, *supra* note 65.

2.2. Regional

In compliance with the EPAct of 2005, FERC designated the North American Energy Reliability Corporation (NERC) as the self-regulatory electric reliability organization for the United States.[68] The bulk-power system is divided into eight regional entities, all of which are subject to NERC oversight. The regions include:

- Florida Reliability Coordinating Council (FRCC)
- Midwest Reliability Organization (MRO)
- Northeast Power Coordinating Council (NPCC)
- Reliability First Corporation (RFC)
- Southwest Reliability Corporation (SERC)
- Southwest Power Pool (SPP)
- Texas Reliability Entity (TRE)
- Western Electricity Coordinating Council (WECC).[69]

The following map shows eight regions that make up NERC.

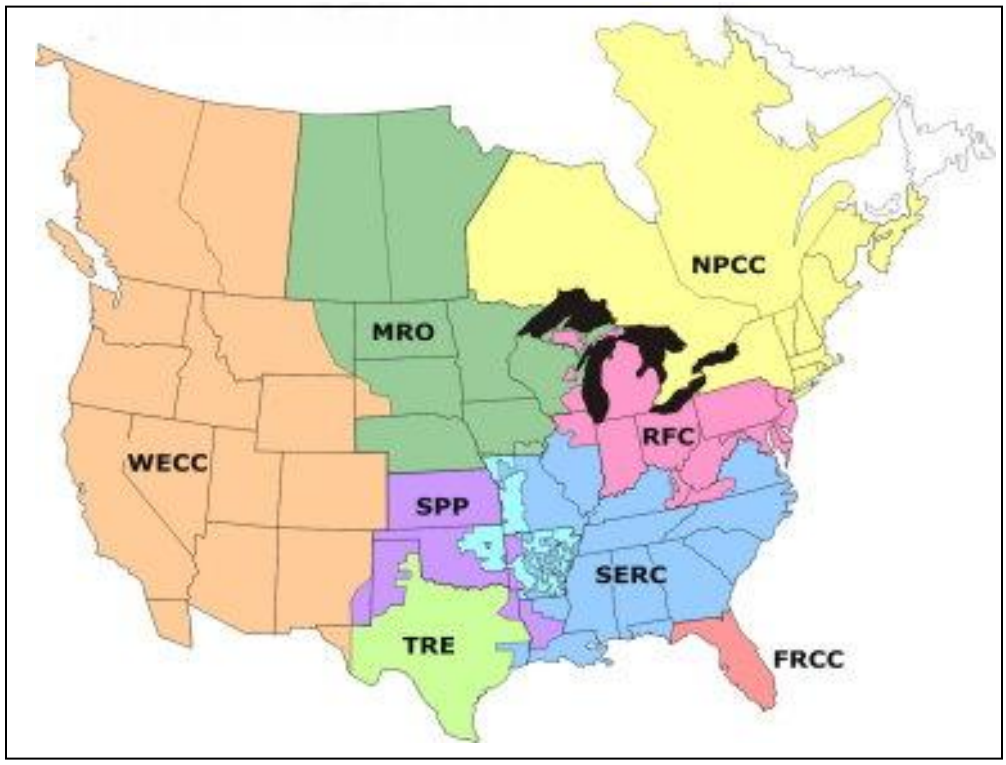

Figure 8: NERC Regional Areas
Source: North American Electric Reliability Corporation (NERC), *Regional Entities*, 2011

[68] Swanstorm & Jolivert, *supra* note 55 at 421 n.10, 422, 463-64.
[69] North American Electric Reliability Corporation (NERC), *Regional Entities*, 2011

NERC establishes and enforces reliability standards for the bulk-power system, including those affecting generation and transmission. Compliance is mandatory and enforceable, although its standards are subject to FERC authority.[70] The organization develops and enforces reliability standards and annually assesses adequacy over a 10-year forecast, as well as summer and winter forecasts. In addition, NERC has designated a task force to collect and analyze transmission outage data to provide data for performance measures and to improve reliability.[71]

Other regional efforts have also been made on transmission policy. To promote regional coordination, FERC issued Order 2000 to encourage transmission-owning utilities to form regional transmission organizations (RTO).[72] The purpose of forming RTOs is to administer the transmission grid on a regional basis. The Western Governor's Association established another regional coordination effort known as the Western Renewable Energy Zone Initiative.[73] The project was started to help increase access to renewable resources in the west by identifying renewable energy zones within the WECC and developing transmission paths to deliver that energy.[74] It should help expedite renewable energy development and build interstate cooperation to facilitate the transmission process.

2.3. States

On the state level, one of the major efforts affecting transmission has been to enact laws mandating renewable portfolio standards. These standards are set to encourage renewable energy development, thereby encouraging transmission planning and development. According to the Environmental Protection Agency, renewable portfolio standards (RPS) require utilities to supply a state-specified minimum amount of renewable energy sources to customers.[75] The goal is to stimulate development in the renewable energy sector so that renewable energy is competitive with traditional energy sources.[76] According to Swanstorm and Jolivart, renewable portfolio standards have been the driving force for many transmission projects.[77]

[70] NERC, *Company Overview*, 2011
[71] Ibid..
[72] FERC, *FERC: Industries – RTO/ISO*, 2011
[73] Swanstorm & Jolivart, *supra* note 55, at 464-65.
[74] Ibid. *See also* Western Governors' Association (WGA), *Initiative on Energy and Transmission*, 2011
[75] U.S. Environmental Protection Agency (EPA), *Renewable Portfolio Standards Fact Sheet*, 2011
[76] Ibid.
[77] Swanstorm & Jolivart, *supra* note 55.

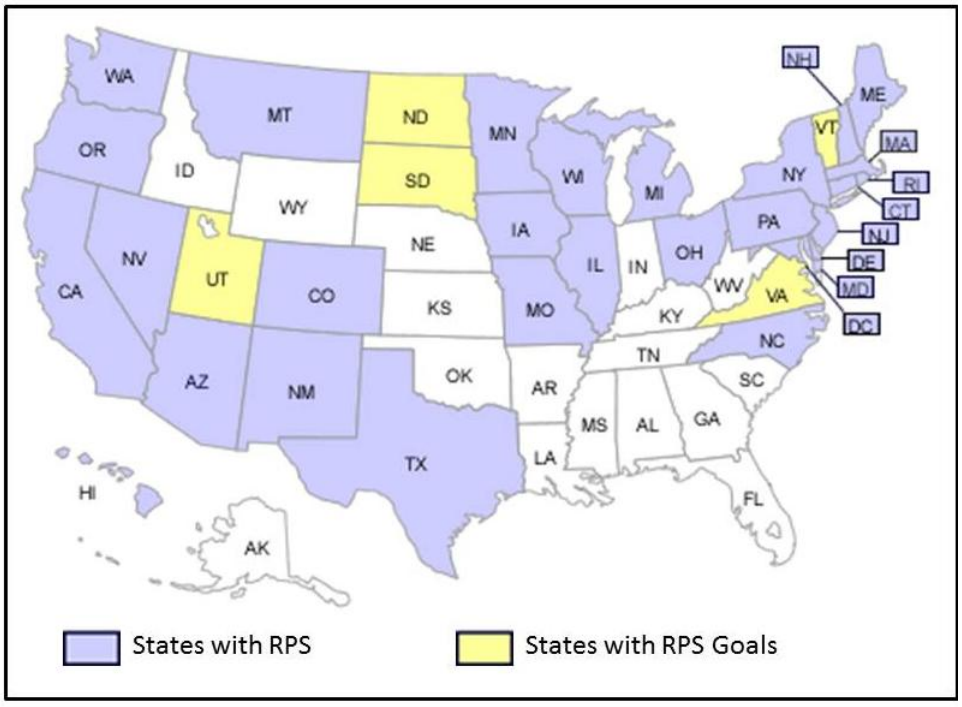

Figure 9: States With RPS Requirements, 2009
Source: U.S. Environmental Protection Agency (EPA), *Renewable Portfolio Standards Fact Sheet*, 2011

In addition to the renewable portfolio standard, the state of California has also adopted the Renewable Energy Transmission Initiative in an effort to coordinate state regulators and industry utilities.[78] The goal of the initiative is to "help identify transmission projects needed to accommodate … renewable energy goals, support future energy policy, and facilitate transmission corridor designation and transmission and generation siting and permitting."[79]

2.4. Private Investments

Currently, there are two major private investments that have taken up the challenge of transmission expansion—Tres Amigas and the Atlantic Wind Connection. The two projects are "focusing on the issue of American's antiquated electricity grid to transform the way power gets from wind farms and solar arrays to consumers."[80] These proposed projects are still subject to regulatory scrutiny; but, if approved, the benefits derived from the projects could be monumental and drastically change the state of the nation's grid.

[78] California Energy Commission, *Renewable Energy Transmission Initiative (RETI)*.
[79] *Ibid.*
[80] Matt Sledge, *Google, Tres Amigas Aim to Fix America's Electrical Grid With Novel Technologies*, *Huffington Post*, May 21, 2011.

Tres Amigas is a project to unite the nation's electric g rid, connecting the Western Interconnection, the Eastern Interconnection, and the Texas Interconnection.[81] The goal of the project is to create a 22-square mile superconductor that "will serve as the nation's first renewable energy market hub."[82] If successful, it will allow renewable energy producers to connect to the grid and export power all across the United States. This would enable the grid to improve reliability through interconnectedness and expand access to renewable energy.[83] Figure 10 shows the proposed Tres Amigas site.

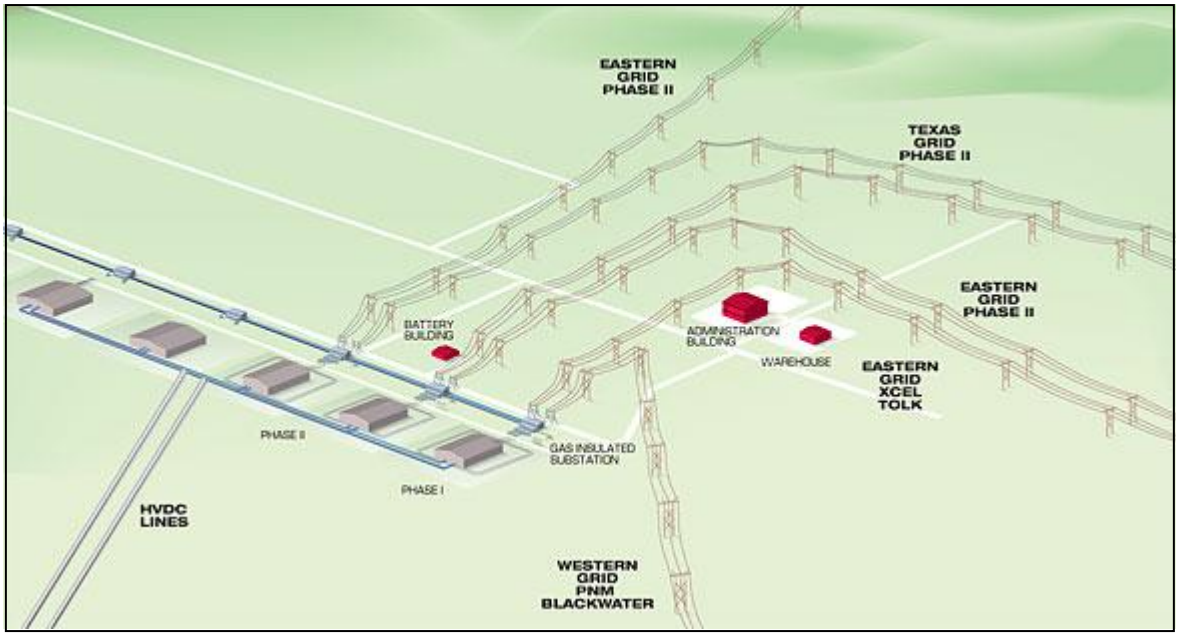

Figure 10: Tres Amigas Superconductor Site
Source Tres Amigas LLC *Overview, 2011*

The other major transmission-based project is the Atlantic Wind Connection. It is a backbone transmission project designed to accelerate wind development by enabling the Atlantic offshore wind industry to connect to the grid.[84] The plan is to build a 350-mile long undersea cable to reduce the need for renewable energy producers to build multiple lower-capacity transmission lines. The project is expected to relieve congestion in the DOE-designated NIETC along the mid-Atlantic coast.[85]

[81] Tres Amigas, *Tres Amigas*, 2011
[82] Tres Amigas, *Benefits – Tres Amigas, LLC.*, 2011
[83] Ibid.
[84] Atlantic Wind Connection, *AWC Intro – Atlantic Wind Connection*, 2011
[85] Ibid.

3. Recommendations

The current FERC rulings on "open access rules and common market framework are necessary for the market to support infrastructure investment, but are not yet sufficient."[86] Although Order 1000 should greatly improve transmission expansion by strengthening regional planning and clarifying cost allocation rules, site location issues and investment incentives are still significant barriers to transmission development. Additionally, Order 1000 is but one step towards building greater uniformity in the energy industry. The ruling serves as a general guideline for cost allocation, requiring "that the costs … be born by those who benefit."[87] However, FERC has yet to "specify what the formula should be used for allocating costs, or precisely how new lines should be planned."[88]

Figure 11: Construction of Wind Energy Transmission Power Lines Near Sweetwater, Texas
Source: Gredau, A. "Wind Power Transmission Lines Rise Across Texas," *The Texas Tribune, July 21, 2012*

While a uniform rule or policy would be ideal, it is highly unlikely that one will emerge, given the diverse energy network.[89] As mentioned throughout this report, the energy network is patchwork of federal, regional, state, and local agencies and entities. Therefore, coordination

[86] Hogan, *supra* note 32, at 147.
[87] *FERC: Industries – Transmission Planning and Cost Allocation*, *supra* note 64.
[88] Wald, M.L., "U.S., Seeking to Reshape Electric Grid, Adopts a Power Line Rule," *N.Y. TIMES*, July 21, 2011,
[89] National Science and Technology Council, *A Policy Framework for the 21st Century Grid: Enabling Our Secure Energy Future*, 2 (June 2011), http://www.whitehouse.gov/sites/default/files/microsites/ostp/nstc-smart-grid-june2011.pdf

among these industry regulators and players is vital to easing the barriers to transmission development and the federal government should take a more direct leadership role to promote coordination.

The American Wind Energy Association (AWEA) and the Solar Energy Industry. Association (SEIA) suggest interconnection-wide transmission planning, starting with a comprehensive plan between the Western and Eastern Interconnections.[90] Their report also suggests an open and transparent planning process, involving all those who would be affected including governors, public utility commissions, and stakeholders.[91] With respect to site location issues, AWEA & SEIA suggest that the most effective method would be to give FERC full site selection authority, similar to its authority over natural gas pipelines.[92] Currently, FERC has backstop authority but it has been rarely used, if ever. Additionally, this authority only applies to federal lands and would not resolve site issues over state land or private property.[93] However, giving FERC full site authority may raise other issues including federal verses states' rights; jurisdictional concerns; and complications in the application process. These issues should be fully considered before granting FERC full authority over the national grid.

Another suggestion, which may be a less invasive federal role, is for the federal government to adopt a national renewable portfolio standard. As mentioned previously, renewable portfolio standards in the several states have been a driver for renewable energy development and transmission. A national renewable portfolio standard could push those states without a mandatory renewable portfolio standard towards renewable energy and transmission development. Depending on how stringent a national renewable portfolio standard would be, it could further drive states that have already implemented a renewable portfolio standard to meet a higher standard on par with leading states, such as California.

[90] AWEA & SOIA, *supra* note 2.
[91] Ibid.
[92] Ibid. at 21.
[93] Ibid.. at 21-22.

4. Conclusion

As long as concerns for reliability, congestion, and renewable energy integration continue to remain prevalent, those concerns will continue to drive the need to update and expand the transmission grid. But, in order to foster investment in transmission development, push projects forward, and prevent unnecessary delays, the site selection and cost allocation issues must be addressed. Behind these issues are the underlying difficulties of coordinating federal, regional, state, and local regulatory authorities and agencies. With the release of Order 1000, regional transmission planning is expected to see greater coordination, as public policy is now factored into planning and cost allocation decisions. However, the role of the federal government should not stop there. Rather, it should continue to adopt and implement clear policies to help guide planning, cost allocation, and site decisions and encourage greater coordination among the various federal, regional, state, and local regulatory authorities and agencies.

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