



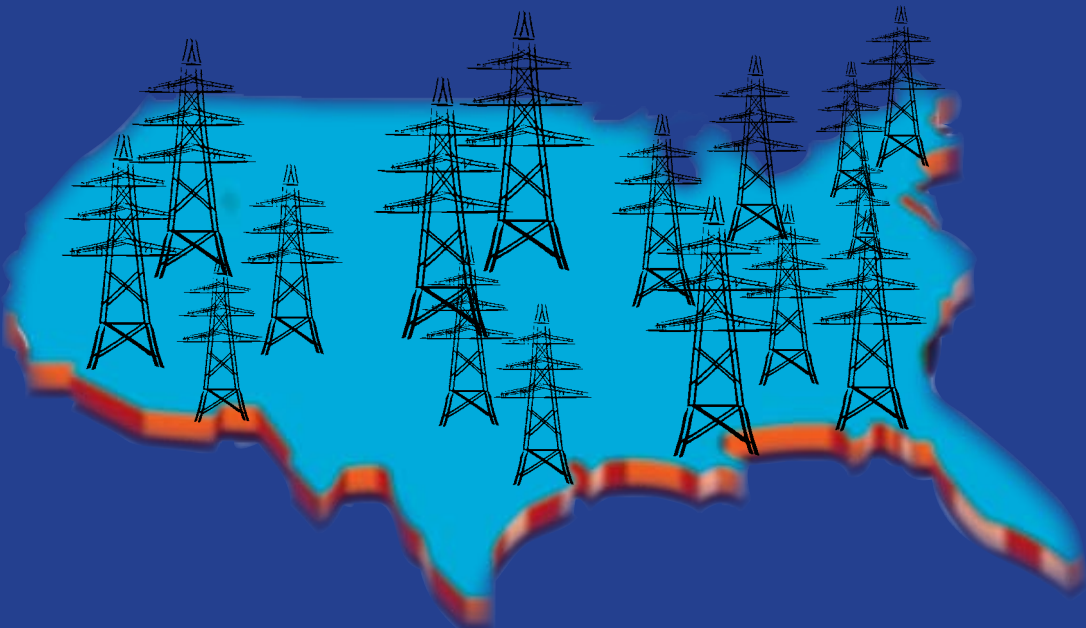
NATIONAL CONFERENCE
of STATE LEGISLATURES

The Forum for America's Ideas

NATIONAL GOVERNORS ASSOCIATION
CENTER FOR BEST PRACTICES

CONNECTING THE GRID

A REVIEW OF STATE AND REGIONAL TRANSMISSION PRACTICES



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By
Christie Rewey
and
Chloe Cromarty



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EXECUTIVE SUMMARY

The U.S. electric transmission grid¹ is an interstate system that must be expanded to accommodate increasing energy demand and the development of new generation resources and regional markets in the United States. The need for such expansion is becoming more critical; the growth of the transmission grid is lagging significantly behind the addition of new generation. The North American Electric Reliability Council (NERC) projected an increase in electricity demand of more than 20 percent between 2002 and 2011, but an increase of just 5 percent in the construction of new line miles of high-voltage transmission for that same time period.² Such a lag will contribute to transmission congestion,³ a precursor to reliability problems, and, in extreme cases, blackouts. Transmission congestion also can lead to higher prices as it becomes more difficult to move power from the generation source to its delivery point.

Given the interconnected nature of the grid, congestion in one region can translate into problems for others. As the primary stakeholders and regulators—along with the federal government—states need to understand the regional, interstate nature of the grid and work together to ensure proper expansion of the transmission grid in order to avoid high prices and to help ensure the reliability of the system.

This report examines the significant challenges for states associated with planning and constructing new electric transmission facilities. One challenge is to create the right market environment to encourage investment. A lack of investment has led to the second significant challenge, relieving congestion on a system that is already taxed. The third considerable challenge is the number of federal and state entities involved in the establishment of the regulations and policy that guide transmission.

In response to these challenges, this report identifies the opportunities that governors, state legislatures and state utility commissions have to establish and implement new transmission policies and to facilitate grid expansion. These opportunities include:

- Establishing transmission infrastructure authorities to ensure that transmission is constructed to export power from resource-rich areas,
- Entering into regional memorandums of understanding (MOUs) to facilitate interstate transmission planning,
- Passing legislation that authorizes commissions and other agencies to engage in interstate collaboration on transmission, and
- Creating multi-state advisory committees to facilitate state coordination on transmission planning

This report is intended to help state policymakers understand the need to be involved in regional collaboration on electricity issues and the policy options and strategies available to them. In doing so, the report provides some options and recommendations for how states can participate in regional electric transmission planning and lessons learned from current state and regional activities.

1. INTRODUCTION

The electric industry has undergone fundamental and sweeping changes as new laws and regulations have shifted the marketplace from the dominance of vertically integrated utilities to a hybrid system with a competitive wholesale market and both fully regulated and restructured retail markets. The U.S. electric transmission grid is an interstate system that is responsible for enabling the transmission of electricity within states and, increasingly, for the trading of electricity across states in various regional wholesale markets.⁴ The grid must be expanded to accommodate increasing energy demand and the development of new generation resources and markets in the United States. The need for such expansion is becoming more critical; the growth of the transmission grid is lagging significantly behind the addition of new generation. The North American Electric Reliability Council (NERC) projected an increase in electricity demand of more than 20 percent between 2002 and 2011. During the same period, however, NERC projects growth of new high-voltage transmission capacity of just 5 percent.⁵ Such a lag will contribute to transmission congestion, a precursor to reliability problems, and, in extreme cases, blackouts in areas where new lines are not built. Given the interconnected nature of the grid, congestion in one region may translate in to problems for others.

Although the states regulate aspects of interstate electricity transmission, electricity also is subject to federal laws.⁶ Significant opportunity exists for governors, state legislatures and state utility commissions to play a critical role in the establishment and implementation of new transmission policy and facilitating grid expansion. It is vital for states to participate in the rulemaking, policy development and regulation of

electric transmission in order to help ensure the best economic, environmental and reliable expansion of their respective state systems and the regional markets in which they participate. As the primary stakeholders, states will want to take advantage of all opportunities available to them to ensure proper expansion of the transmission grid. Failure to do so could lead to such crises as the Northeast Blackout of 2003 or rolling blackouts such as those experienced in California in the early 2000s.

This document is intended to help states participate in regional collaboration on electricity issues and to understand the policy options and strategies available to them. It highlights the challenges and opportunities for state policymakers to:

- Enable and promote collaboration among states and regions,
- Encourage investment in the electric transmission grid,
- Ensure adequate and diverse electric supply, and
- Influence regional economic development strategies.

The document also provides options and recommendations for how states can participate in regional electric transmission planning and lessons learned from current state and regional activities.

2. CHALLENGES IN REGIONAL TRANSMISSION PLANNING

Significant challenges are associated with planning and constructing new electric transmission facilities. One challenge is to create the right market environment for investment in transmission. While energy demand increased, annual investment in new transmission facilities declined during the past 25 years. This lack of investment led to the second significant challenge, relieving the increased congestion in areas of the system already taxed by supporting larger, regional, competitive electricity markets—a function for which it was not originally designed.⁷ The third challenge for the grid is the number of federal and state entities involved in the establishment of regulations and policy that guides transmission, from the federal government to governors, from state legislatures to state public utility commissions. The overlapping responsibilities complicate energy planning and may create a burdensome permitting and siting process.

Challenge: Encouraging Transmission Investment

According to the Edison Electric Institute, transmission investment decreased by \$115 million per year for 25 years from about \$5 billion in 1975 to \$2 billion in 2000 (measured in 1997 dollars).⁸ The U.S. Energy Information Administration has reported that, of the \$200 billion invested in new generation during the last decade, only \$40 billion was invested in transmission. With energy demand projected to increase by 75 percent in the commercial sector, 47 percent in the residential sector, and 24 percent in the industrial sector by 2030,⁹ it is

imperative that states provide financing opportunities and incentives for transmission expansion—not only in their states but also in their region.

A number of factors have contributed to the lack of construction of transmission facilities since the 1990s. These include siting difficulties, no assurance of cost recovery and insufficient investment. The federal government has attempted to address these problems in the Energy Policy Act of 2005¹⁰ (EPACT) by calling for the creation of tax incentives for transmission construction, requiring the U.S. Department of Energy to designate transmission corridors of national interest, and giving the Federal Energy Regulatory Commission the ability to issue construction permits in these corridors if a state fails to approve the project in one year.¹¹

Several states have introduced financial tools such as loans, grants, and bonds¹² or have formed specific authorities to promote transmission. These actions can help provide the private sector with a more predictable business environment that encourages and supports new transmission investment. Ensuring that transmission lines are built also can present trade opportunities and new markets for states that seek to leverage their natural resources and export power.

Challenge: Relieving Congestion on the Grid

Given that transmission investment is lagging significantly behind investment in new generation and that demand is increasing rapidly, the existing transmission system in a number of regions in the country is handling more transactions and is under more strain than it was originally constructed to sustain. The result is congestion and bottlenecks—well-known precursors to blackouts—that not only threaten system reliability but also have considerable financial repercussions. The cost of transmission congestion in the most developed wholesale power market in the United States grew eight-fold between 1999 and 2002, reaching \$401 million in 2002. Nationwide, such costs

are in the billions.¹³ States may face an economic threat if they do not take steps to change the rate at which new transmission is being constructed within their own borders and in states to which they are interconnected. Due to the system's integrated structure, problems in one state or region may cause congestion or reliability issues in another.

Table 1. Regional Demand Resulting in Congestion in 2004		
Region/State	Hours of Future Congestion Caused	Percent of Total Hours*
	ICF 2004 Forecast	
California	8,271	94%
New York	7,474	85%
Florida	5,416	62%
South Central (Alaska, La.)	4,668	53%
Central (Okla., Kan.)	4,206	48%
Tennessee region (TVA)	3,872	44%
South (Miss., Ala., Ga., S.C.)	3,774	43%
South Atlantic (Va., N.C.)	3,726	42%
New England	3,094	35%
Mid-Atlantic (Pa., N.J., Del., Md.)	3,074	35%
Upper Midwest (Wis., Ill., Mo.)	2,028	23%
Midwest (W. Va., Ky., Ind., Mich., Ohio)	1,966	22%
Northern Midwest (N.D., S.D., Neb., Minn., Iowa)	1,654	19%
*There are 760 hours in a year; however, 2004 is a leap year so there are 8,784 hours. This forecast assumes various projections for natural gas prices and generation unit availabilities that may be different from actual market conditions. Generation dispatch has been based on production cost rather than a bid-based market.		
Source: ICF Consulting, 2004.		

Challenge: Multiple Transmission Regulators

The electric grid encompasses local, county and state borders, necessitating effective coordination among all levels of government in to ensure reliability. Each level of government plays a significant role in such coordination. Although the federal government controls many aspects of the interstate electricity transmission system, state legislatures, governors and regulatory agencies also play critical roles in shaping the policies that regulate transmission and facilitate transmission expansion.

With oversight responsibilities spread across so many different levels and bodies of government, however, permitting, siting and the review process can become long and burdensome. In some instances, new electric transmission projects are not approved, despite industry acknowledgment of regional need for infrastructure enhancements to ensure a reliable grid. Conflicts can exist between state regulators, local landowners and electricity transmission companies. They also can exist among states—for example, when one state does not recognize the direct benefit of a line that must pass through its borders to link two other states and thus refuses to permit construction. Instances such as these call for all regulators of electricity markets to coordinate and compromise in the interest of energy assurance and reliability.

Each level of government holds specific responsibilities for regulating particular aspects of the electric industry. These regulator responsibilities can vary according to market structures of each region.

The Federal Role

The federal government has important policy and regulatory roles in electricity transmission. The Federal Energy Regulatory Commission (FERC or the Commission), an independent agency, is responsible for: 1) regulating the transmission and sale of natural gas for resale in interstate commerce, 2) regulating the transmission of oil by pipeline in interstate commerce, 3)

regulating the unbundled transmission and wholesale sales of electricity in interstate commerce, 4) ensuring the reliability of high-voltage interstate transmission systems, 5) monitoring and investigating energy markets, 6) invoking civil penalties and other means against energy organizations and individuals who violate FERC rules in the energy markets, and 7) other environmental and financial oversight.

The U.S. Department of Energy (DOE) also plays a role in transmission oversight. DOE is required by the Energy Policy Act of 2005 (EPACT), passed by Congress on August 8, 2005, to designate certain National Interest Electric Transmission Corridors (NIETC). These corridors are specific locations on the grid where transmission is particularly congested. As already mentioned, if states fail to approve a permit application for the construction of interstate transmission lines in a NIETC within one year, EPACT authorizes FERC to preempt the states and issue permits.

The State Role

In light of the passage of EPACT 2005, states need to effectively coordinate their powers to successfully permit and build new transmission infrastructure and avoid preemption by the federal government. In fact, EPACT encourages states to work together through interstate compacts. In Section 216, the law states, “The consent of Congress is given for 3 or more contiguous States to enter into an interstate compact, subject to approval by Congress, establishing regional transmission siting agencies to (A) facilitate siting of future electric energy transmission facilities within those States; and (B) carry out the electric energy transmission siting responsibilities of those States.”¹⁴

Governors

Governors play a significant role in promoting the expansion and efficient operation of the transmission system by announcing energy industry initiatives and encouraging state legislators to introduce and pass legislation to facilitate transmission expansion.

Their responsibilities and activities include addressing the need for development in the electric system by promoting policies that facilitate transmission siting, offering tax breaks or other financial incentives for construction of new infrastructure, and assisting with the establishment of several states' infrastructure financing authorities.

State Legislatures

State legislatures also wield significant influence over the policies and governance of the electric industry. Legislatures determine whether to grant a state agency approval authority over new power plants or power lines. State statutes control the budgets of utility commissions and other agencies, and laws frequently are needed to enable these agencies to cooperate with counterparts in other states.

State Utility Commissions

State utility commissions exercise considerable regulatory control over utilities and are responsible for regulating these utilities in the public interest. Commission rules establish the rate structures that utilities use to charge their electricity customers and the extent to which utilities may pass their costs on to ratepayers. In many cases, commission approval is necessary for construction of a new power plant or power line. Commissions often play a role in electric system planning, based on future projections of population and other factors, and are significantly responsible for the evolution of retail electricity markets as a result of their regulatory authority. In several areas of the country, state utility commissions have formed commissioner associations with their colleagues in neighboring states. These associations allow the states to address issues of common interest, often regional, in a coordinated fashion.

3. OVERCOMING CHALLENGES: WHAT STATE POLICYMAKERS CAN DO

Governors, state legislatures and state utility commissions across the country are taking steps to recognize the regional nature of the transmission system and overcome the challenges to building new electric transmission. These strategies and practices illustrate that coordination among state policymakers helps to facilitate a more successful, economically viable and efficient transmission planning and expansion process.

Facilitating New Infrastructure: Transmission Infrastructure Authorities and Other Approaches

One area in which a number of legislatures and governors have worked together is in the establishment of state entities to ensure and promote the flow of reliable energy within their state and across state boundaries. A small but growing number of governors and state legislatures have created transmission infrastructure authorities to help ensure that transmission is constructed. The goal of an infrastructure authority is typically to find a way to export power from resource-rich areas. Because its motivation is primarily to send power to other states, the transmission infrastructure authority may need to work with other state governments or with utilities in other states.

Wyoming was the first state to create an infrastructure authority through legislative action. On June 10, 2004, Governor

Dave Freudenthal signed legislation creating the Wyoming Infrastructure Authority. When he signed the legislation, the governor stated that coal production had progressed in Wyoming, increasing the availability of new power sources, but that the transmission system had not kept pace to allow electricity in Wyoming to reach markets.

The Wyoming Infrastructure Authority was created to diversify and expand the state's economy through the development of electric transmission, thereby increasing the use of and access to the state's rich coal, wind and natural gas resources to supply large power markets, such as Colorado or California. This independent authority—not a state agency—is responsible for using business principles and practices in planning, financing, building, maintaining, operating and acquiring electric transmission and related facilities.

State law empowers the Wyoming Infrastructure Authority to do the following:

- Issue at least \$1 billion in bonds to finance new transmission lines (bonds are not backed by the full faith and credit of the state, as the authority is independent of state government);
- Own and operate lines in instances where private investment is not offered;
- Enter into partnerships with public or private entities to build and upgrade transmission lines;
- Condemn private land in the state for siting transmission infrastructure;
- Establish and charge fees and rates for use of its facilities in consultation with the public service commission and other related government entities; and
- Set rates on facilities it owns without approval by the Wyoming Public Service Commission.

The governor appoints the Wyoming Infrastructure Authority's five members, with the advice and consent of the Senate. Thus far, the authority has initiated financing for its first transmission

project, agreeing to sell to the state treasurer almost \$35 million in bonds to finance a transmission line in northeast Wyoming. It also has collaborated with Arizona Public Service and National Grid to study the feasibility of new lines between Arizona and Wyoming. This study expands upon the authority's participation in two other studies of transmission expansion between Wyoming and other western states: the TransWest Express Project and the Wyoming-West Transmission Study. During the 2006 legislative session, the Legislature strengthened its support for the Wyoming Infrastructure Authority, including approving the authority's 2007-2008 budget of \$1.6 million and increasing the funding available for project feasibility studies. The Legislature also empowered the Authority to encourage development of clean coal technology within the state.

On April 22, 2005, North Dakota Governor John Hoeven signed a law establishing a new agency, the North Dakota Transmission Authority, bringing to fruition an idea he began promoting almost a year earlier after observing Wyoming's innovation. Governor Hoeven believed that a lack of transmission infrastructure was stifling his state's energy-exporting potential and called for an authority "to jump start the [transmission-building] process and expedite the kinds of large investments we need to expand the grid and build new power plants and wind facilities."¹⁵ The North Dakota Transmission Authority is responsible for planning, financing, constructing, developing, acquiring and operating electric transmission facilities to aid in electricity production, transportation and use.

To achieve these goals, the authority can:

- Make grants and loans;
- Establish reasonable fees, rates, tariffs and other charges;
- Obtain permits and acquire rights-of-way;
- Identify, plan, prioritize and propose electric transmission corridors; and
- Create and execute interest rate exchange contracts.

The state's Industrial Commission administers the North Dakota Transmission Authority and calls upon the governor to serve as one of the authority's three members, along with the state attorney general and agriculture commissioner. Kansas, South Dakota, and Wyoming have also established infrastructure financing authorities, while Montana and Utah have considered but have not created such an entity. New Mexico considered a bill in 2006 that would have established a similar authority, with the express purpose of exporting the state's ample renewable energy resources.

Wisconsin Governor Jim Doyle's idea for his "Grow Wisconsin" plan was to link "building a world class infrastructure" in the state with job creation and economic growth. One key way that the plan seeks to accomplish these goals is to coordinate and shorten the process of siting new power plants, natural gas pipelines and electric transmission lines. The Legislature in 2003 supported the plan by introducing and passing Senate Bill 300 (2003 WI Act 89). Among other provisions, the "Grow Wisconsin" measure instructs the state's Public Service Commission and Department of Natural Resources to coordinate on siting of transmission lines located within the state. Under the law and its detailed procedures for collaboration, the two agencies work to improve and streamline their regulatory processes to allow existing or planned transportation corridors and rights-of-way to be used, when possible, to site electric transmission lines and other infrastructure.

Establishing Regional Memorandums of Understanding (MOU)

A number of governors have gone beyond facilitating the expansion of their respective states' electric infrastructure and are focusing on how best to facilitate regional transmission planning. Governors wield significant influence over regional transmission planning and expansion efforts. This influence is evidenced in promoting policies focused on regional planning, by signing legislation that provides for regional transmission planning

means, and by signing memorandums of understandings (MOUs) to facilitate such planning. Efforts by governors to promote cooperative regional transmission planning are highlighted below.

Governors in the west are working together to ensure the flow of reliable and affordable energy into a region as a whole, not just into their respective states. In 2002, the Western Governors Association developed a Transmission Permitting Protocol that predates the midwest agreement and was signed by 12 governors, four federal agencies and the Premier of Alberta. This protocol was intended to establish a streamlined framework to incorporate all interested parties in review and approval of proposed transmission lines that would cross state boundaries in the West.

In April 2005, California Governor Arnold Schwarzenegger, Nevada Governor Kenny Guinn, Utah Governor Jon Huntsman and Wyoming Governor Dave Freudenthal signed an MOU to promote the creation and siting of an interstate electric transmission line in the west. This project, the Frontier Line, would originate in Wyoming and have terminal connections in California, Nevada, and Utah.

As outlined in the MOU, each of the four western states would appoint a representative to a transmission coordinating committee. That committee, in turn, would be responsible for defining and studying the proposed route for the Frontier Line and associated legal, regulatory, financial, environmental, permitting and other developmental issues. The committee also was charged with developing a funding plan; considering proposals for complementary transmission projects in the West; and working with federal, state and local officials who have jurisdiction over various aspects of the project.

In a similar agreement a group of 12 governors and the premier of Manitoba, Canada, will work together to promote electric transmission investment and to cooperate on permitting and

siting interstate and international electric transmission lines in the Midwest. By signing the Midwest Electric Transmission Protocol, the governors of Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota and Wisconsin and the premier of Manitoba have committed to support the following:

- Additional investment in the electric transmission grid when it is both needed and in the public interest;
- Cooperative efforts to improve the evaluation and processing of permit applications for electric transmission lines that cross state and national boundaries;
- Legislation that gives state permitting and siting authorities the power to work with other governmental permitting and siting authorities on activities regarding proposed electric transmission lines and to consider state and regional needs when evaluating a proposed transmission line; and
- A regional, cooperative approach to solving problems related to the improvement of the midwestern electric transmission grid.

Enacting State Statutes and Regulations for Interstate Collaboration

State legislation may be necessary in order to authorize commissions and other agencies to engage in interstate collaboration on transmission. Several states have enacted legislation that acknowledges the interstate nature of the system and some have specifically empowered or directed state agencies to take part in multistate activities. The following examples of state statutes illustrate specific state approaches to enhance regional coordination.

Ohio and Nevada have different motivations but similar approaches for interstate cooperation on transmission. Ohio requires the regulatory commission to coordinate with those in partnering states as the state becomes part of a regional transmission organization (RTO). Nevada is not focused on

participation in an RTO but, rather, on the siting and permitting process for utility facilities; the state also requires its commission to work with other states.

By statute, Ohio law (Rev. Code Ann. §4928.12 D) requires owners or operators of transmission lines to be members of and allow their transmission lines to be operated by a FERC-approved “transmission entity” or RTO. To form and participate in an RTO, the statute requires that the commission work with other commissions in several ways:

- (1) The commission shall make joint investigations, hold joint hearings, within or outside this state, and issue joint or concurrent orders in conjunction or concurrence with any official or agency of any state or of the United States, whether in the holding of those investigations or hearings, or in the making of those orders, the commission is functioning under agreements or compacts between states, under the concurrent power of states to regulate interstate commerce, as an agency of the United States, or otherwise.
- (2) The commission shall negotiate and enter into agreements or compacts with agencies of other states for cooperative regulatory efforts and for the enforcement of the respective state laws regarding the transmission entity.

Nevada law includes statutory language similar to Ohio’s. According to the Nevada Utility Environmental Protection Act (Nev. Stats., Chap. 703.820 to 704.900), the state Public Utilities Commission must consider environmental effects, costs to society, and need for power before issuing permits for construction of any new generation facilities or transmission lines in the state. In doing so, Nevada requires that the commission:

...shall, to the extent practicable, make joint investigations, hold joint hearings within or without the State, and issue joint or concurrent orders in conjunction or concurrence with any official or agency of any state or of the United States, whether in the holding of such investigations or

hearings, or in the making of such orders, the Commission functions under agreements or compacts between states or under the concurrent power of states to regulate interstate commerce, or as an agency of the United States, or otherwise. [Nev. Rev. Stat. §704.900 (Added to NRS by 1971, 558; A 2001, 2990)]

In addition, the statute permits, but does not require, the commission to:

... negotiate and enter into agreements or compacts with agencies of other states, pursuant to any consent of the Congress, for cooperative efforts in permitting the construction, operation and maintenance of utility facilities in accord with the purposes of *NRS 704.820 to 704.900*, inclusive, and for the enforcement of the respective state laws regarding them.¹⁶

Washington also approaches collaboration from a siting perspective. In this state, the Energy Facility Siting Council must approve large new energy facilities. Among its powers and responsibilities, the Siting Council is authorized “(t)o present state concerns and interests to other states, regional organizations, and the federal government on the location, construction, and operation of any energy facility which may affect the environment, health, or safety of the citizens of the state of Washington...”¹⁷

Washington is the least prescriptive of the three examples presented above. Yet, it is still somewhat unique in its specific authorization of the communication of its public interests regarding proposed energy facilities with other states.

Forming Regional Commissioner Associations

In recognition of the cross-border nature of utility issues, many regulatory commissioners have established their own regional associations. These nonprofit organizations have no regulatory

authority but exist to enhance cooperation both within and among regions. Membership in the regional associations includes commissioners from each member state. They hold meetings to discuss issues of common interest, conduct studies, promote uniform regulation and cooperation among member states, and communicate with their counterparts in other regions. These associations can also be called upon to represent their member states before FERC and Congress. Active commissioner associations include:

- The New England Conference of Public Utilities Commissioners Inc. (NECPUC), representing all commissioners from Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island and Vermont.
- The Southeastern Association of Regulatory Utility Commissioners (SEARUC) is comprised of 11 states: Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, South Carolina, and Tennessee.
- The Mid-Atlantic Conference of Regulatory Utility Commissioners (MACRUC) includes the commissions of Delaware, the District of Columbia, Kentucky, Maryland, New Jersey, New York, Pennsylvania, Virgin Islands, Virginia, and West Virginia.
- The Mid-America Regulatory Conference's (MARC) member states include Arkansas, Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, Oklahoma, South Dakota, Texas, and Wisconsin.
- The Western Conference of Public Service Commissioners (WCPS), the regional organization of regulatory utility commissioners from Alaska, Arizona, California, Colorado, Hawaii, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, Wyoming, and Guam.

Creating Multistate Advisory Committees

In 2002, the National Governors Association Center for Best Practices' Electricity Infrastructure Task Force issued *Interstate Strategies for Transmission Planning and Expansion*, a report that identified the four primary planning and siting challenges to states.¹⁸ To help address those challenges, the report recommended establishment of multistate entities (MSEs). The MSEs would be voluntary organizations of state officials from a given region, established through a memorandum of understanding signed by governors and organized to facilitate state coordination on transmission planning. MSEs posed a new approach to transmission planning, embracing its multistate nature while maintaining protection of individual state interests.

This task force's recommendations ultimately were endorsed by FERC when former FERC Chairman Pat Wood stated, "This voluntary process fully retains state authority, and requires each state to consider neighboring states' needs so that regional solutions are developed. A regional process, which considers benefits for an entire market territory, is vastly superior to a process that pits the interests of individual states against each other."¹⁹

The MSE concept has been credited as a basis for establishment of the Organization of MISO States Inc. (OMS), a nonprofit, self-governing organization of representatives from each state with regulatory jurisdiction over entities that participate in the Midwest Independent System Operator RTO, known as MISO. (MISO is discussed further in appendix C). OMS coordinates with and makes recommendations to MISO, the MISO board of directors, FERC and state commissions. OMS is a mechanism through which MISO and its industry members can communicate with regulators in the states that belong to MISO. The organization has no formal authority to approve or disapprove MISO activities, including plans for regional transmission expansion within the RTO's region, but it has an important advisory role.

State representatives to OMS include members and staff of state public utility commissions. Consumer advocates and public interest groups also participate as associate members of OMS. Examples of OMS activities include:

- **State-to-state:** The OMS Planning and Siting Working Group, along with the Edison Electric Institute (the trade association for investor-owned electric utilities), recently completed a survey of transmission siting processes in each of the member states. The study will enable the states to compare processes and analyze whether they should take steps to make their processes more similar to one another. In a change to traditional siting processes, OMS states may change their policies to include considerations of building transmission in one state that offers benefits principally to other states. The OMS regulators and regulatory staff from the MISO member states will use OMS as a forum for discussing accounting and rate issues related to the RTO. The OMS Pricing Working Group has discussed methods for allocating costs of upgrading the transmission system.
- **State-to-federal government:** OMS coordinates filings to FERC from the MISO states. As long as a majority of OMS members generally support the comments in a filing, that filing can be made under the aegis of OMS. All filings include a disclaimer listing the state commission members who approved the comments and those who did not participate. Individual OMS members reserve the right to file clarifying comments or their minority views on issues discussed in OMS filings.
- **MISO-to-OMS:** MISO benefited from OMS support in designing the Midwest Energy Markets. The ability of OMS to enable participation of state regulators was an important aspect of designing markets that would meet the requirements of state regulatory agencies. OMS keeps current on and informs the MISO regional planning process, providing a forum for discussion between MISO

and the states. The OMS board of directors meets monthly and often includes MISO representatives.

Following the model established by OMS, in July 2005, the regulatory commissions of 13 states²⁰ and the commission of the District of Columbia formed the Organization of PJM States Inc. (OPSI) to work on issues of mutual interest related to PJM operations; the electricity generation and transmission system serving the PJM states; FERC matters; and systems within the states' boundaries.

Similarly, six states in New England petitioned FERC in 2004 to form the New England States Committee on Electricity (NESCOE). NESCOE would be a vehicle for the states to communicate and collaborate with ISO New England, the New England Power Pool (NEPOOL), transmission-owning entities and other stakeholders in the region in developing regional electricity policies, including reliability of and planning for the transmission system in New England.

4. THE FUTURE OF REGIONAL TRANSMISSION PLANNING

Lessons Learned in Interstate Planning and Siting

The accompanying NCSL document, *Regional Reliance: Why Transmission Coordination Is Key*, discusses how the U.S. electric transmission grid is an interstate system that moves electricity within states and, increasingly, across states in various regions. A wide variety of state entities, regulations, formal statutes, market structures, and informal, nonauthoritative organizations have been established to facilitate proactive, safe and efficient operation and expansion of the transmission system. After examining the different types of planning and regulatory organizations, the challenges associated with the operation and expansion of the system, and the priorities of the different stakeholders, one message remains clear: States will need to continue to work together to efficiently operate and expand the nation's electric system. States can learn from the initiatives already implemented and continue to work toward more efficient coordination.

Future interstate transmission planning should be proactive, rather than reactive. One aspect of proactive planning by states should be the required submission by transmission-owning entities to the state public utility commission of a standard report detailing plans for future investments in electricity infrastructure (generation, transmission, and distribution). Such a requirement will help states ensure that transmission planning does not lag behind generation planning. A focus by states on proactive planning not only for transmission expansion, but also

for increasing the number of interstate interconnections will augment the capacity to use regional resources—the greater the number of interconnections, the less likely outages (transmission or generation) are to cause congestion or, in extreme cases, blackouts.

Transmission planning task forces are a valuable tool for states. These task forces should comprise representatives from the public and private sectors. States that have membership in an RTO should appoint a representative to advocate the state's interests before the RTO. These task forces and representatives should work to implement policies that provide incentives for the development of new technologies, including “non-wires” alternatives (for example, management of customer demand or energy efficiency programs), which allow for more efficient and reliable transmission of electricity.

Governors, legislators and state regulators may want to collaborate and introduce legislation that will provide appropriate financial incentives for transmission expansion where needed. In July 2005, the National Conference of State Legislatures published *Electric Transmission Planning and Siting: Sample Legislation*,²¹ with language options for granting agencies that already have jurisdiction over planning and siting of electricity transmission the legal authority to enter into discussions and collaborate with similar agencies in other states. Among its provisions, the legislation:

- Contains provisions for those states that are affiliated with RTOs and for those states that are not;
- Encourages interstate cooperation on determining the need for new transmission lines and necessitates an attempt to reach consensus with affected states and tribes;
- Authorizes pertinent state agencies to collaborate with corresponding agencies in other states; and
- Calls for coordination among states in interacting with the public and filing for permits.

The sample legislation takes some of its language directly from the actual state statutes described above. It is not “model” legislation but, rather, is intended to be used as a guide.

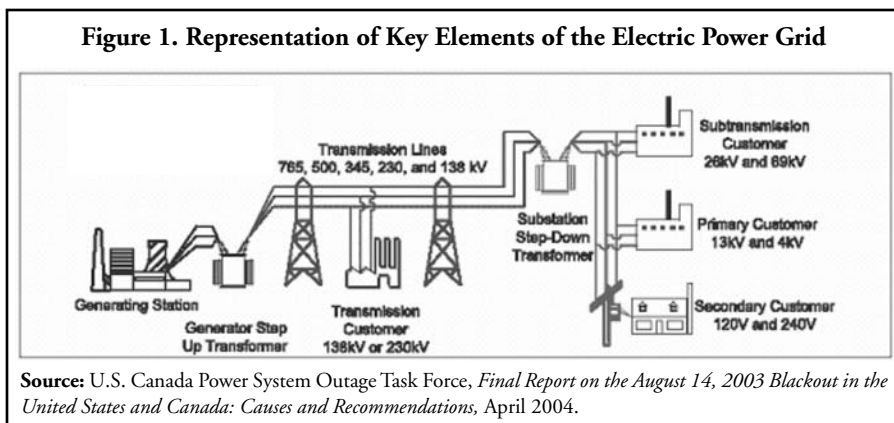
5. CONCLUSION

The electric industry has undergone fundamental and sweeping changes in recent decades. Federal actions such as FERC orders 888 and 2000 set the stage for a shift from the dominance of regulated, vertically integrated utility companies to a hybrid system with a competitive wholesale market and both regulated and restructured retail markets. This shift has created extensive policy and operational implications for transmission. In many areas of the country, transmission no longer is controlled directly by utilities. Transmission assets in multiple states often are operated by large, centralized RTOs or ISOs. Such a shift has translated into significant portions of the electric transmission grid being used to complete an ever-increasing number of transactions, thereby placing more demand on the system. To accommodate these new market structures and increased demand and to avoid serious negative economic implications, state policymakers will want to ensure that the electric transmission system is expanded.

State policymakers face significant challenges with respect to expanding the electric transmission system to ensure a reliable supply of electricity. Several options are available to state policymakers to help negotiate these challenges. These options range from establishing appropriate financial mechanisms to encourage investment in the transmission grid to establishing transmission infrastructure authorities, and from signing MOUs for regional transmission planning to establishing multistate commissioner associations. These options will help to establish coordinated regional transmission processes that actively and continually engage public agencies and companies. Such a regional, coordinated approach will meet with the most success and has already proved to be a critical component to the successful future expansion of the electric transmission grid.

APPENDIX A. BASICS OF THE TRANSMISSION SYSTEM

Since its experimental origins in Thomas Edison’s Manhattan, the electricity transmission system has become perhaps the world’s largest and most intricate infrastructure. The transmission system (or “grid”) is now an extremely complex network that interconnects more than 150,000 miles of lines operating at many different voltages and hundreds of thousands of power plants and power substations. Figure 1 depicts the key elements of the grid.



As transmission technology has become exponentially more complex, so has power plant technology. Power plants in diverse locations of different sizes (capacity) and fuels (i.e., nuclear, natural gas, coal, etc.), serve various types of customers (residential, industrial, wholesale, etc.). Some power plants are built to run continuously (“base load” generators); others need to run only at peak hours when the demand for electricity is at its highest (“peaking units”). Some power plants, such as increasingly popular wind plants or hydroelectric units, operate

intermittently, when sufficient wind blows or water flows. Power plants may shut down or power lines may fail unexpectedly due to technological failures, weather or natural disasters.

A strong, robust transmission system can withstand these failures without massive blackouts because other parts of the system have in place technological mechanisms that will compensate for failed components, at least temporarily. An important area of research focuses on ways to make the system stronger and more reliable at acceptable financial costs. Power itself is fluid on the grid, so that an excess of power in one part of the system may automatically flow to another part of the system that is low on power. This is because once on the grid, electricity follows the path of least resistance. An electron generated by a plant in Indiana may ultimately power a light bulb in Illinois.

For more information on transmission, see National Council on Electricity Policy, *Electricity Transmission* (Annapolis, Md.: NCEP, 2004).²²

APPENDIX B. WHAT IS AN RTO?

Electricity markets and the electric industry experienced tremendous changes following the issuance and implementation of FERC Order 888,²³ which essentially established competitive wholesale power markets. The changes included restructuring, or a movement to retail competition, in a number of states; an increase in mergers of traditional electric utilities and gas pipeline companies; an increase in the number of power marketers and independent generation developers; the establishment of independent system operators (ISOs) as managers of large portions of the transmission system; and an overall increase in use of the transmission grid. As a result of these changes, the transmission system was showing signs of strain, posing a threat to efficient, reliable operation of the grid.

To address such threats, on May 13, 1999 FERC issued a notice of proposed rulemaking on regional transmission organizations (RTOs). The final result, Order 2000, required each public utility that owns, operates or controls facilities for the transmission of electric energy in interstate commerce to make certain compliance filings with the commission with respect to forming and participating in an RTO or ISO.

Although many different governance structures exist for RTOs and ISOs, two characteristics are common to all; all RTOs and ISOs operate as nonprofit entities, and all RTOs and ISOs include both public and nonpublic utilities. FERC established the following minimum characteristics for RTOs:

- An RTO must be independent and not affiliated with entities participating in the RTO market.

- An RTO must have the right to operate all transmission facilities under the RTO's control.
- An RTO must have exclusive authority to operate the transmission system (i.e., transmission owners surrender operating rights of their system to the RTO) to ensure reliability.

FERC also prescribed minimum functions of RTOs. An RTO must:

- Maintain responsibility for billing its customers and employ a transmission pricing system that promotes efficient use and expansion of transmission and generation facilities.
- Create pricing signals in the market to indicate areas where transmission congestion exists.
- Operate an Open Access Same Time Information System site for all transmission facilities under its control, with the responsibility for independently calculating the amount of transmission capacity that has not been reserved for any given time.
- Monitor markets to identify operating issues and instances of market power, or the ability of market participants to discriminate against other participants.
- Plan and coordinate necessary transmission additions and upgrades.

The mechanisms by which today's existing RTOs and ISOs were developed vary. Order 888 required that there be a single, system-wide transmission tariff for any given regional area, and it is speculated that was the impetus for the formation of the following RTOs: PJM, Independent System Operator–New England (ISO–NE), and the New York Independent System Operator (NYISO). The California Independent System Operator (CAISO) and the Electric Reliability Council of Texas (ERCOT) ISO were established by state mandates in California and Texas. Finally, the Midwest Independent System Operator (MISO), another RTO, was established in a voluntary, consensual process.

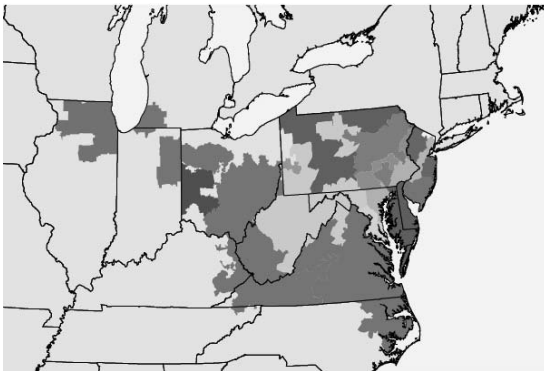
Issuance of FERC's Order 2000 demonstrated the federal government's recognition of the interstate nature of electricity, particularly transmission. FERC issued this order with the goal of promoting efficiency in wholesale electricity markets and ensuring that consumers paid the lowest price possible. One important function of RTOs is to take a regional view of upcoming transmission infrastructure needs. FERC authorization is necessary for an RTO to begin operating, and FERC also performs oversight to ensure that RTOs operate markets that provide open access to the transmission system and ensure reliability. Since the issuance of Order 2000, ISOs or RTOs are operating in large portions of the U.S. electric transmission system. With passage of Order 2000, FERC called for the formation of RTOs; however, emphasis was placed on voluntary participation. Currently, many transmission-owning entities are compliant with Order 2000 and are members of an RTO; however, efforts to form RTOs in the west outside California and in the southeast have been stalled.

APPENDIX C. EXISTING FORMAL AND INFORMAL REGIONAL TRANSMISSION ORGANIZATIONS²⁴

Formal RTOs

PJM Interconnection

Figure 2. PJM Territory Served



Source: PJM, 2006.

History

PJM, the world's first power pool, began in 1927 when three utilities realized the benefits and efficiencies of sharing resources. When it was first established, PJM was operated by a department of one member utility. Additional utilities joined PJM in 1956, 1965 and 1981. In 1962, PJM installed its first online computer to control

generation, and its first Energy Management System (EMS) was installed in 1968. The shaded areas in figure 2 show PJM's territory.

In 1993, PJM began the transition to an independent, neutral organization called the PJM Interconnection Association. At that time, it had 10 members, served 22 million people in five

states and the District of Columbia, and had 55,575 megawatts of generating capacity. On April 1, 1997, PJM Interconnection LLC, an independent organization, contractually replaced the PJM Interconnection Association, thus becoming the nation's first bid-based energy market operating with a multistate regional transmission tariff. Its 24 members consisted of power marketers, independent power producers and utilities inside and outside the PJM region. Later in 1997, FERC approved PJM as the nation's first fully functioning ISO. In 2001, PJM became the nation's first fully functioning regional transmission organization (RTO).

Statistics

Today, PJM has more than 400 members, serves a 164,260-square-mile territory in 13 states and the District of Columbia, has about 164,634 MW of generating capacity, and has a peak demand of nearly 134,017 MW. As an RTO, PJM ensures the reliability of North America's largest centrally dispatched control area. It operates the largest competitive wholesale electricity market in the world, planning generation and transmission expansion to ensure the reliability of the system. PJM coordinates the movement of electricity through its region and provides real-time information to its members and customers to support their decision making.

The scope of PJM's operations is approximately as follows:

- Population – 51 million
- Generating sources – 1,271 with diverse fuel types
- Generating capacity – 164,634 megawatts
- Peak demand – 134,017 megawatts
- Annual energy delivery – 728 million megawatt-hours
- Transmission lines – 56,070 miles
- Members/customers – more than 400
- Cumulative billing – \$52 billion since 1997

Membership

PJM member operate in all or parts of the following states and jurisdictions: Delaware, Illinois, Indiana, Kentucky, Maryland, Michigan, New Jersey, North Carolina, Ohio, Pennsylvania, Tennessee, Virginia, West Virginia and the District of Columbia. This service area population is approximately 51 million.

Governance Structure

PJM's two-tiered governance structure consists of a board of managers and a members committee. The Board of Managers (elected by the Members Committee from a list of candidates compiled by an independent consultant) is charged with ensuring that PJM safely and reliably operates the grid and creates and operates fair energy markets. To establish and maintain neutrality, the board may have no personal affiliation or ongoing professional relationship with, or any financial stake in, any PJM market participant.

The board ensures that no member or group of members has undue influence. It is required to prevent the undue exercise of market power, or the discriminatory allocation of transmission rights to one entity over another, by any market participant. To support this goal, PJM's Market Monitoring Unit constantly analyzes market data and takes action to make operational or rule changes to resolve any issues.

The Members Committee, comprised of a representative from each member or customer of PJM, provides advice to the board by proposing and voting on changes and new programs. The committee is composed of five voting sectors, representing power generators, transmission owners, electric distributors, power marketers and consumers. Only one affiliate of a member corporate entity may vote in the committee.

Current Activities

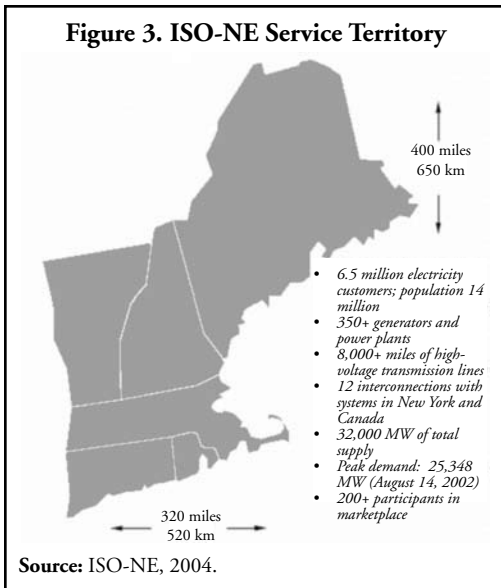
PJM is working to enhance reliability and provide value to its members in the following ways.

- Promoting regional transmission planning — PJM’s regional transmission planning process is designed to create the proper incentives to attract future transmission and generation investments. Since the first PJM regional transmission plan in 2000, more than \$1 billion in transmission upgrades have been approved.
- Implementing new methods for generation scheduling— PJM has implemented new “unit commitment” software, which more efficiently plans and schedules the dispatch of generating units. By more accurately scheduling the hours that generating units must be ready to run, PJM has been able to reduce the cost for customers to reserve generation in order to meet peak demand.
- Implementing a demand response program—By implementing demand response programs, PJM has enabled its customers to manage their own electricity costs. Since 2003, PJM’s load-response programs have more than doubled to 2,803 MW, with more than 5,000 sites participating.

For more information about PJM, see:

- PJM Operating Agreement: (page 182 addresses Regional Transmission Expansion Planning Protocol), <http://www.pjm.com/documents/downloads/agreements/oa.pdf>
- Web page on seams issues: <http://www.pjm.com/documents/seams.html>

ISO - New England (ISO-NE)



History

After the 1965 Northeast blackout, the need for a regional effort to manage daily electricity demand and ensure stable supply became evident in the New England region. The New England Power Pool (NEPOOL) was created in 1971, integrating the majority of New England's utilities and municipal systems, establishing a central dispatch system, and enhancing the region's overall system reliability. In 1996, when FERC began enabling the restructuring of wholesale electric power, NEPOOL's role changed and led to creation of ISO New England

(ISO-NE). Figure 3 outlines the ISO-NE service territory.

Created as an independent organization in 1997, ISO New England is responsible for the day-to-day, reliable operation of New England's bulk power generation and transmission system, for oversight and fair administration of the region's wholesale electricity markets, and for management of a comprehensive regional bulk power system planning process. Its commencement as a full RTO in 2005 signaled a new level of independence and responsibility for ISO-NE, when it assumed broader authority over the day-to-day operation of the region's transmission system, bulk electric power system, and competitive wholesale electricity markets.

Statistics

ISO-NE's grid now includes more than 350 separate generating plants and more than 8,000 miles of transmission lines. It is interconnected with 12 neighboring systems in New York and Canada and serves 6.5 million New England businesses and

households. NEPOOL has more than 31,000 MW of total supply and an all-time peak demand of 25,348 MW. Today more than 260 market participants compete for excess wholesale electricity in excess of \$10 billion annually.

Membership

ISO New England has members in Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, and Vermont. Its members consist of entities that generate, buy, sell and transport electricity in New England.

Governance Structure

ISO New England is run by an independent board of directors comprised of energy and financial industry experts who are not affiliated with any company that is conducting business in the region's power markets. ISO New England consults with NEPOOL, now a voluntary association of more than 200 entities engaged in the electric power business in New England, to develop the market rules and tariff provisions for the wholesale electricity market. These 200 entities generally are divided into five categories: generators, suppliers, transmission providers, publicly owned utilities and end users. Ultimately, all rules and tariffs are submitted to FERC for approval.

To maintain an "arm's-length" business relationship between the ISO and NEPOOL, the two parties entered into a services agreement, or contract. Under this agreement, there are procedures that govern the interface between the ISO and NEPOOL. Standards and policies for system reliability, market rules and dispute resolution are established by mutual consent. However, under emergency conditions, the ISO can unilaterally establish new rules or change existing rules, as deemed necessary to ensure system reliability or to protect the competitiveness of the marketplace. The agreement also authorizes the ISO to operate the generation and transmission systems and the residual wholesale electric market.

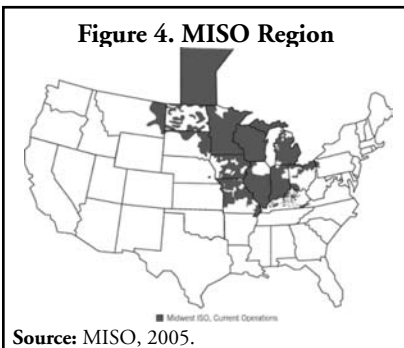
Current Activities

It is projected that ISO-NE will need up to \$4 billion in transmission expansion during the next 10 years. To date, four of six proposed 345-kilovolt projects have been approved by state siting councils. More than 40 percent of the region's electricity supply is generated using natural gas, which is characterized by volatile prices. ISO-NE currently is working to diversify the region's fuel sources to address such pricing issues. ISO-NE is also faced with reliability issues; the region needs not only added transmission infrastructure but also added generation resources. ISO-NE now is monitoring generator fuel inventories and delivery schedules and is encouraging the use of dual-fuel units.

For more information about ISO-NE, see:

- Information on committee structure: <http://www.iso-ne.com/committees/>
- Seams resolution Web page: <http://www.iso-ne.com/FERC/seams/>
- ISO New England Planning Procedure 4-1, Cost Responsibility for Transmission Upgrades with Multiple Needs: http://www.iso-ne.com/ISO_new_england_planning_procedures/PP4-1_R1.doc
- Transmission Quick Links: <http://www.iso-ne.com/transmission/transmap.html>•

Midwest Independent System Operator (MISO)



History

MISO is a not-for-profit RTO founded by transmission-owning companies in 1996. In 2002, MISO began selling transmission service over the grid that it operates. Today, MISO is responsible for managing and monitoring reliability of an open, competitive access to the grid that delivers power to much of the Midwest. On April 1, 2005, MISO began operation of the

Midwest Energy Markets, one of the largest such markets in the world.

Statistics

MISO has 88 members, serving an area of more than 1.1 million square miles—all or parts of 15 states and the Canadian province of Manitoba—with more than 100,000 miles of transmission lines. With installed capacity of 131,365 MW, MISO's peak demand is 119,207 MW. MISO directs supply from the 1,504 power generation plants in the system to meet that demand. From its control center in Carmel, Indiana, MISO uses sophisticated technology to monitor activity of all the generation plants and transmission lines that are in constant communication with Midwest ISO computers, ensuring that the grid runs smoothly. Other RTOs use similar technology.

Membership

MISO membership consists of vertically integrated utilities that own transmission lines under MISO control, independent transmission companies that operate in the MISO area, companies that own and/or operate generation facilities, utilities that do not own transmission, and other energy companies, including power marketers. To become a MISO member, utilities or transmission owners pledge to work toward implementing approved transmission plans. They do so by bringing MISO's proposals for transmission lines to the agency or other entity that has jurisdiction over the transmission planning and siting process in each state.

Governance

MISO's board of directors provides oversight over the organization's activities and must approve MISO initiatives, including regional infrastructure expansion plans. Bylaws separate directors from MISO's members and users, prohibiting the election of a director who has or has had financial or employment relationships with member or affiliate companies within the last two years.

MISO also has an advisory committee, which is made up of consumer advocates, public interest groups, electricity consumer groups, state regulatory authorities, environmental organizations, power marketers, municipal and cooperative electric companies, and other energy companies. The advisory committee makes recommendations and provides advice to MISO management and the MISO board of directors.

Current Activities

In April 2005, MISO began to coordinate the purchase and sale of wholesale electricity and transmission service. By operating these Midwest Energy Markets, MISO acts as the central point through which utilities and power marketers reserve wholesale power in advance. This is done in three ways:

- Through self-scheduling and bilateral contracts (contracts between a power seller and power purchaser), in which load-serving entities such as utilities arrange for delivery of a certain amount of power at a specific time. This also involves reserving enough transmission capacity to transport the power.
- In the day-ahead market, in which values are set for each hour of the following day based on bids and offers.
- Through the real-time market, in which buyers and sellers can balance their day-ahead sales and purchases to actual requirements in five-minute increments.

MISO continues to play a key role in planning the electricity system, including forecasting future needs for transmission lines and substations. MISO creates plans for local areas based on projections of electricity demand, the generation resources available at any given time, and transmission infrastructure that may need to be added to the system to connect supply and demand. MISO then develops regional plans by incorporating its local plans with requests that come from transmission owners and utilities for interconnections and transmission service. Several stakeholders review the plans to ensure that they will achieve maximum benefit for the system as a whole.

All states that are shaded in figure 4 (above) also are members of the Organization of MISO States, discussed earlier in this document.

For more information about MISO, see:

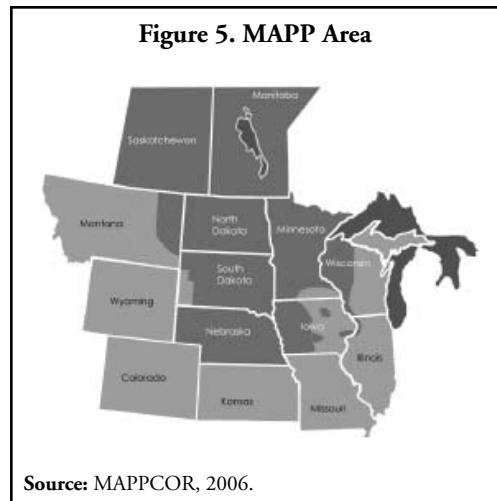
- <http://www.midwestiso.org/>
- <http://misostates.org/>

Less Formal Organizations

Mid-Continent Area Power Pool (MAPP)

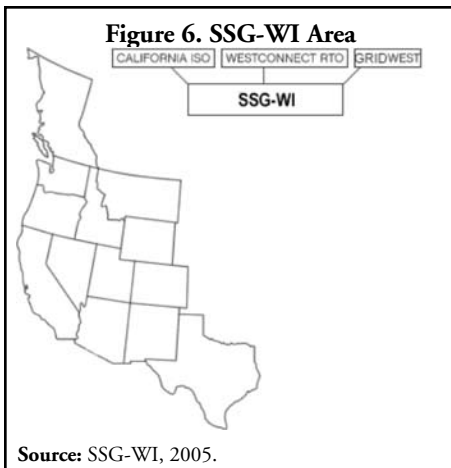
The Mid-Continent Area Power Pool (MAPP), an association of electric utilities and other electric industry participants, was formed in 1972. MAPP serves more than 16 million people and spans nearly 1 million square miles. Its primary function as a regional transmission group is to “pool” generation and transmission. It does so in two ways: By maintaining responsibility for facilitating open access to the transmission system, and by overseeing generation reserve sharing to ensure that power generation is available where it is needed to serve the industrial and residential customers of the upper Midwest. The shaded area in figure 5 designates MAPP.

Membership is voluntary and members include investor-owned utilities, cooperatives, municipals, public power districts, a power marketing agency, power marketers, regulatory agencies and independent power producers. The members are from the following states and provinces: Minnesota, Nebraska, North Dakota, Manitoba, Saskatchewan, parts of Wisconsin, Montana, Iowa, South Dakota and parts of Kansas and Missouri.



Three main MAPP committees are responsible for governance—the MAPP Executive Committee, the MAPP Regional Transmission Committee and the MAPP Pool Committee. The MAPP Executive Committee, the governing body of the MAPP association, is made up of 12 representatives who are elected by the member organizations. The MAPP Regional Transmission Committee is tasked with planning for the future transmission needs of the region and ensuring that each member is provided with equal access to the transmission system. Members of the Regional Transmission Committee develop a biennial regional transmission plan, establish regional transmission tariffs, and establish operating policies and procedures. The MAPP Pool Committee is responsible for ensuring that generation reserves are adequate and meet the requirements of the NERC and of the regional reliability organizations in which MAPP's members are located.

Seams Steering Group - Western Interconnection (SSG-WI)



History

In the late 1990s, governors of many western states requested the creation of an organization to coordinate the planning of transmission throughout the western power interconnection. Subsequently, the three proposed western regional transmission organizations (RTOs)—the California Independent System Operator (CAISO), RTO West (now Grid West), and WestConnect—formed SSG-WI, the states of which are shown in figure 6. In early 2003, due to the interstate

nature of the organization, the proposed RTOs filed a report with FERC discussing issues of interest and a timeline for the formal organization of SSG-WI. The transmission company

representatives believed that those proposed RTOs would be fully functioning by 2005 and so gave SSG-WI the objective to develop and support an evolving seamless western wholesale energy market that minimizes trade barriers and promotes common business practices for inter-RTO transmission services. Although the western RTOs are not yet functional, SSG-WI still plays an important role in addressing regional transmission issues and seams between control areas and transmission owners in the West.

Governance Structure

The SSG-WI Steering Committee consists of representatives from each of the three proposed western RTOs (most of whom work for transmission-owning companies). All electricity stakeholders in the West—including utilities, energy companies and transmission companies of the proposed RTOs—are encouraged to participate in the organization and its five working groups, which conduct the bulk of SSG-WI's work. These working groups are organized by task: transmission planning, market monitoring, price reciprocity, common systems interface coordination, and congestion management alignment.

Transmission Planning

The focus is of SSG-WI's transmission planning working group is to develop a reliable transmission system. SSG-WI sees this system as fundamental to supporting a competitive and smoothly functioning wholesale electricity market throughout the region. Part of this process is to make upgrades to the system where needed and to address "seams" between transmission control areas and between transmission owners. In 2003, the working group completed *A Framework for Expansion of the Western Interconnection Transmission System*, a report that determined potential sites and costs for system additions and improvements. The study's results were based on assumptions resulting from a modeling of the future of the electric system, which power company PacifiCorp conducted for SSG-WI. PacifiCorp used a reference year of 2008 to model how the system might evolve by 2013, given a set of predictions about new coal and natural gas

plants. PacifiCorp will soon begin its second round of analysis of these needs and will incorporate assumptions about the effects of integrated resource planning (IRP)²⁵ policies in several western states.

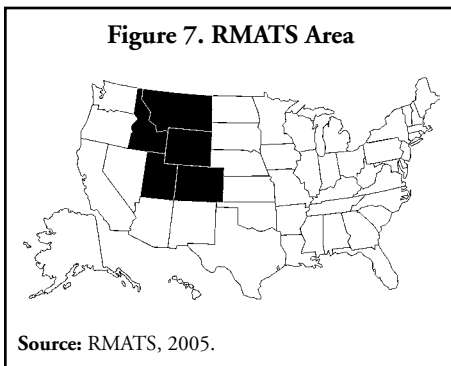
State Stakeholder and Inter-RTO Collaboration

In addition to working at the interconnection-wide level, SSG-WI also coordinates subregional planning groups. These include the Northwest Transmission Assessment Committee (NTAC), the Rocky Mountain Area Transmission Study (RMATS), the Southwest Transmission Expansion Plan (STEP), and the Southwest Area Transmission Planning Group (SWAT). Some of these groups are discussed further in this report.

For more information about SSG-WI, see:

- <http://www.ssg-wi.com/>
- <http://psc.state.wy.us/htdocs/subregional/RMATS%20Load%20Forecast%20Process.pdf>
- <http://www.azpower.org/swat/meetings/pdf/ssgwistudyresults0104.pdf>
- http://www.westgov.org/wieb/meetings/crepcsprg2002/briefing%20materials/ssg-wi_031902_scope.htm

Rocky Mountain Area Transmission Study (RMATS)



History

Wyoming Governor Dave Freudenthal and Utah Governor Mike Leavitt announced the formation of the Rocky Mountain Area Transmission Study (RMATS or “the study”) on August 22, 2003. States involved in RMATS are highlighted in figure 7. The study was created in response to a report, *Conceptual Plans for Electricity Transmission in the West*, which was

written in light of the electricity crisis plaguing the West at that

time. Many believed the crisis was being perpetuated by the reluctance of utilities in the Rocky Mountain region—specifically Idaho, Montana, Utah, and Wyoming—to make investments in much-needed electric transmission system infrastructure within the western interconnection. Such reluctance, in turn, was seen as increasing transmission congestion and bottlenecks. The goal of RMATS today is to 1) provide a planning process by which congested paths in the Rocky Mountain region could be identified, 2) highlight cost-effective transmission projects, and 3) ultimately facilitate coordinated transmission planning and expansion with the western interconnection.

RMATS developed a two-phase process. Phase I was to conduct the study that, in turn, would generate recommendations that would be actualized in Phase II, the project advocacy and construction phase. RMATS participants, which include all interested stakeholders from Colorado, Idaho, Montana, Utah and Wyoming, formed a number of working groups in which studies and recommendations for RMATS are formulated. The working groups are the Transmission Additions Work Group, the Resource Additions Work Group, the Load Forecasting Work Group, and the Report Writing Work Group.

Phase I

Phase I of the study took 12 months and produced an in-depth understanding of the effects of specific transmission projects, or investments, on system-wide production costs in the subregion. Further, Phase I laid the foundation for future work (i.e., Phase II) on siting, the need for regulatory approvals, and obstacles to moving forward. Specifically, Phase I produced two recommendations. The first was that three projects be constructed in the RMATS footprint: 1) the Montana System Upgrade, 2) the Bridger Expansion Project and 3) the Wyoming to Colorado Project. These three projects were recommended to improve the process for evaluating and financing transmission expansion projects, and to allow more efficient operation of the existing transmission system. Phase I also made recommendations for further regional coordinated planning and emphasized the need

for resource plans of generation-owning entities to be indicative of transmission expansion.

Phase II

In 2004, RMATS began Phase II, which continues today. In this phase, RMATS is considering the technical studies produced in Phase I that address such issues as right-of-way, cost recovery and financing. RMATS recommends that, for each recommended transmission project (from Phase I), the governor(s) of the state(s) involved hold a meeting with the public service commissioner(s) and the senior executives of the entities that will benefit most from the designated project to discuss next steps in project development. The progress of each designated project depends upon interested parties, relationships among private entities, regulators, and policymakers.

RMATS next steps are to find project sponsors, arrange project financing and secure regulatory approvals. RMATS has in place a cost recovery/cost allocation team to identify financing options for the projects recommended in Phase I and examined in Phase II.

For more information about RMATS, see:

- Rocky Mountain Sub Regional Transmission Planning Process Home Page: <http://psc.state.wy.us/htdocs/subregional/home.htm>.
- RMATS Final Report: <http://psc.state.wy.us/htdocs/subregional/FinalReport/rmatsfinalreport.htm>.

Northwest Transmission Assessment Committee (NTAC)

History

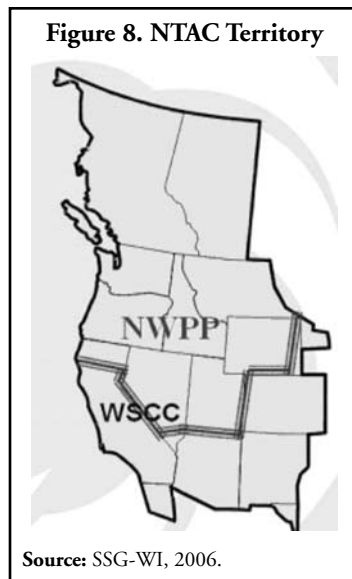
To fill the existing void in the geographic area of the Northwest Power Pool (NWPP) associated with the planning of a robust transmission system, the NWPP Transmission Planning Committee (TPC) has broadened its scope of activities to include

expansion planning dealing with economic and commercial issues. Under the guidance of the TPC, the Northwest Transmission Assessment Committee (NTAC) was formed in 2003 to provide the necessary forum for coordinated regional transmission planning. This committee encourages participation by all parties interested in the development of a robust transmission system for the Northwest region. It also will coordinate and work with the Seams Steering Group—Western Interconnection (SSG-WI). The shaded area in figure 7 highlights NTAC.

Responsibilities

The NTAC will:

1. Coordinate development of a consistent load and resource database (including transmission capacity) in cooperation with other, related groups such as the West-wide Resource Assessment Team of the Committee on Regional Electric Power Cooperation, Pacific Northwest Utilities Conference Committee, and the Northwest Power Planning Council.
2. Develop a list of committed transmission additions for use in its Transmission Expansion Assessment.
3. Coordinate the development of consistent databases and methods to support economic, production cost and resource adequacy studies. This will include data support for Northwest hydro modeling.
4. Refine Northwest data used in the SSG-WI path utilization report and suggest or develop improvements or enhancements to the report to ensure an accurate understanding of the uses of the Northwest transmission system.
5. Represent the Northwest subregional study effort at the SSG-WI Planning Work Group. Information submitted for support of the SSG-WI studies will be derived from NTAC's methods and database.



6. Perform regular assessments of the NWPP transmission system by performing studies to:
 - a. Estimate future transmission use and congestion patterns, taking into consideration the addition of new generation resources and load growth scenarios. A broad participant involvement process will be used to identify relevant scenarios.
 - b. Estimate the costs of proposed transmission expansion projects and assess the effects of proposed transmission expansion scenarios on future transmission use patterns and congestion (including economic effects).
 - c. Evaluate alternatives to such transmission expansion projects as are proposed by participants.
 - d. Uniformly assess congestion on Northwest paths (or flowgates) to identify and prioritize locations where upgrades may be advisable for reasons of reliability, efficiency or market power mitigation and thus require further study.

For more information about NTAC, see:

- Home page: <http://www.nwpp.org/ntac/>.
- Recommended Improvements to the Northwest Transmission System, sponsored by the Transmission Issues Group September 2004 (includes recommendations for NTAC). http://www.ppcpdx.org/Tx/TIG_Pack.pdf

NOTES

1. See appendix A: The Basics of the Transmission System.
2. See http://www.icfconsulting.com/Markets/Energy/doc_files/Transmission_Grid_Frailty.pdf.
3. A term to describe a condition of the transmission system when the system is being used at a higher capacity than it was originally constructed to handle, resulting in the need to use system controls to avoid exceeding system limits, which would cause outages.
4. See appendix B: What Is an RTO?
5. See http://www.icfconsulting.com/Markets/Energy/doc_files/Transmission_Grid_Frailty.pdf.
6. In 1935, the U.S. Congress enacted Title II of the Federal Power Act, which created the Federal Energy Regulatory Commission (FERC)—then called the Federal Power Commission. Congress' intent was to establish a body that could regulate certain interstate activities of utilities that the Supreme Court had suggested in the *Public Utilities Commission v. Attleboro Steam & Co.* case were beyond the reach of state regulators. Accordingly, FERC was given authority over wholesale power sales and the transmission of electricity in interstate commerce.
7. See <http://www.pi.energy.gov/pdf/library/TransmissionGrid.pdf>.
8. See http://www.icfconsulting.com/Markets/Energy/doc_files/Transmission_Grid_Frailty.pdf.
9. See http://www.eia.doe.gov/oiaf/aeo/pdf/trend_3.pdf.
10. See http://frwebgate.access.gpo.gov/cgi-bin/getdoc.cgi?dbname=109_cong_bills&docid=f:h6enr.txt.pdf
11. It is interesting to note, however, that EPACT encourages states to work together through interstate compacts. In Section 216, the law states, “The consent of Congress is given for 3 or more contiguous States to enter into an interstate compact, subject to approval by Congress, establishing regional transmission siting agencies to (A) facilitate siting of future electric energy

transmission facilities within those States; and (B) carry out the electric energy transmission siting responsibilities of those States. See http://en.wikipedia.org/wiki/Energy_Policy_Act_of_2005.

12. In Iowa, for example, legislation passed in 2001 that was intended to attract development of electric power generating and transmission facilities within the state in sufficient quantity to ensure reliable electric service to Iowa consumers and to provide economic benefits to the state. Specifically, if a rate-regulated public utility files an application to construct or lease a 300 MW or larger electric generator in Iowa, the Iowa Utilities Board can approve advance ratemaking principles that will apply when the costs of the facility are included in regulated electric rates.

13. See http://www.icfconsulting.com/Markets/Energy/doc_files/Transmission_Grid_Frilty.pdf.

14. See http://en.wikipedia.org/wiki/Energy_Policy_Act_of_2005.

15. See press release, September 22, 2004, <http://www.hoenvengovernor.com/news/detailsnew.asp?newsID=145>.

16. Nev. Rev. Stat. §704.900 (Added to NRS by 1971, 558; A 2001, 2990).

17. See Wash. Rev. Code §80.50.040.11.

18. To view the NGA Center report *Interstate Strategies for Transmission Planning and Expansion*, see: <http://www.nga.org/Files/pdf/INTERSTATESTRATEGIESPLANNING.pdf>

19. See letter from Pat Wood, former chairman, Federal Energy Regulatory Commission, to Laura Chappelle, Chair, Michigan Public Service Commission, and Annette Dupont-Ewing, Chair and Executive Director, Kentucky State Energy Policy Advisory Board, (July 12, 2002); on file with Kara Colton, National Governors Association Center for Best Practices.

20. The commissions involved in OPSI are from Delaware, Illinois, Indiana, Kentucky, Maryland, Michigan, New Jersey, North Carolina, Ohio, Pennsylvania, Tennessee, Virginia, West Virginia and the District of Columbia.

21. To view the NCSL report *Electric Transmission Planning and Siting: Sample Legislation*, see <http://www.ncsl.org/legis/energy/transbrochure.pdf>.

22. The primer is available via the Council's Web site, at <http://www.ncouncil.org> or can be ordered by contacting NCSL.

23. See *Promoting Wholesale Competition Through Open Access Non-Discriminatory Transmission Services by Public Utilities; Recovery of Stranded Costs by Public Utilities and Transmitting Utilities*, Order No. 888, 61 Fed. Reg. 21,540 (1996), FERC Stats. & Regs. ¶ 31,036 (1996), *order on reh'g*, Order No. 888-A, 62 Fed. Reg. 12,274 (1997), FERC Stats. & Regs. ¶ 31,048 (1997), *order on reh'g*, Order 888-B, 62 Fed. Reg. 64,688, 81 FERC ¶ 61,248 (1997), *order on reh'g*, Order 888-C, 82 FERC ¶ 61,046 (1998), *aff'd in pertinent part*, *Transmission Access Policy Study Group, et al. v. FERC*, 225 F.3d 667 (D.C. Cir. 2000); *aff'd sub nom. New York v. FERC*, 535 U.S. 1 (2002) ("Order No. 888" or "Order No. 888-A" or "Order No. 888-B" or "Order No. 888-C").

24. This is not a comprehensive list.

25. Integrated resource plan (IRP)—A planning process used to determine the need for new energy resources. Such a process evaluates the full range of alternatives to building new resources, including new generating capacity, power purchases, energy conservation and efficiency measures, co-generation, district heating and cooling applications, and renewable energy resources. The aim of the process is to provide adequate and reliable service to customers at the lowest system cost.

CONNECTING THE GRID

A REVIEW OF STATE AND REGIONAL TRANSMISSION PRACTICES

The U.S. electric transmission grid is an interstate system that enables transmission of electricity within and among states and, increasingly, allows for trading electricity across states in various regional wholesale markets. The growth of this grid is lagging significantly behind the addition of new generation, however. This lag will contribute to transmission congestion, a precursor to reliability problems, and, in extreme cases, blackouts in areas where new lines are not built. Congestion in one region may result in problems for others.

This report examines the significant challenges for states that are associated with planning and constructing new electric transmission facilities. It also identifies the opportunities available to governors, state legislatures and state utility commissions to establish new transmission policies and to facilitate grid expansion.



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