EPA State Climate and Energy Technical Forum
States' Role in Eastern Interconnection Planning Collaborative
Background Document

I. Background on Eastern Interconnection Transmission Planning

In 2009, the U.S. Department of Energy (DOE) announced an opportunity for the three regions of the U.S. power grid[1] to launch a new effort to strengthen transmission planning capabilities that support federal and state energy policy goals. According to DOE, national goals relating to clean electricity "cannot be achieved without an adequate electricity delivery system. Robust transmission and distribution networks are essential to enable the development, integration, and delivery of new renewable and other low-carbon resources, and the use of low-carbon electricity to displace petroleum-based fuels from the transportation sector."[2] The Eastern Interconnection Planning Collaborative (EIPC) and the Eastern States Planning Council (EISPC) received funding from DOE to work together and with other stakeholders to develop these first-of-a-kind planning efforts across the Eastern U.S., as well as long-range resource and transmission studies. This background document describes the EIPC and EISPC partnership in more detail, its importance to state policy makers, and the relationship between electricity transmission planning and the environment.

Topics Covered in This Document

- Why is there increased interest in Interconnection-wide planning?
- What are EIPC and EISPC?
- Why should transmission planning take into account state and federal clean energy policies?
- How will this transmission planning effort help state policy makers?

II. What are EIPC and EISPC?

The Eastern Interconnection Planning Collaborative (EIPC) is a partnership between 27 transmission planning authorities in the Eastern U.S. EIPC successfully competed for and received $16 million in funding to conduct Eastern Interconnection-wide transmission studies and to develop a stakeholder process to guide the analyses. The modeling and analyses are designed to build on existing regional planning processes and to identify potential opportunities for efficiencies between regional transmission plans. A Stakeholder Steering Committee (SSC), comprised of state and federal policy makers, industry, and non-governmental stakeholders, is working to develop a range of future scenarios reflecting an array of diverse economic and policy conditions that would have significant implications for the transmission system.[3] For instance, the SSC is considering scenarios that describe a future with an aggressive federal carbon constraint and others where no federal carbon policy is adopted. Other scenarios under consideration are a future with a national Renewal Energy Standard (RES), one reflecting more aggressive energy efficiency

Electricity Interconnections

The term "Interconnection" means a geographic area in which the operation of bulk-power system components is synchronized such that the failure of one or more of those components may adversely affect the entire region. The three interconnections in the lower 48 states are:

The Eastern Interconnection, which covers the 39 states from the Atlantic to the foothills of the Rocky Mountains.
The Texas Interconnection, which includes most of Texas.
The Western Interconnection, which extends from the Rocky Mountains to the west coast. (See map on pg. 2)

[1] Eastern Interconnect, Western Interconnect and Electric Reliability Council of Texas (ERCOT)
[2] DOE, Financial Assistance Funding Opportunity, DE-FOA0000068. pg. 5
[3] http://eipconline.com/About_EIPC.html

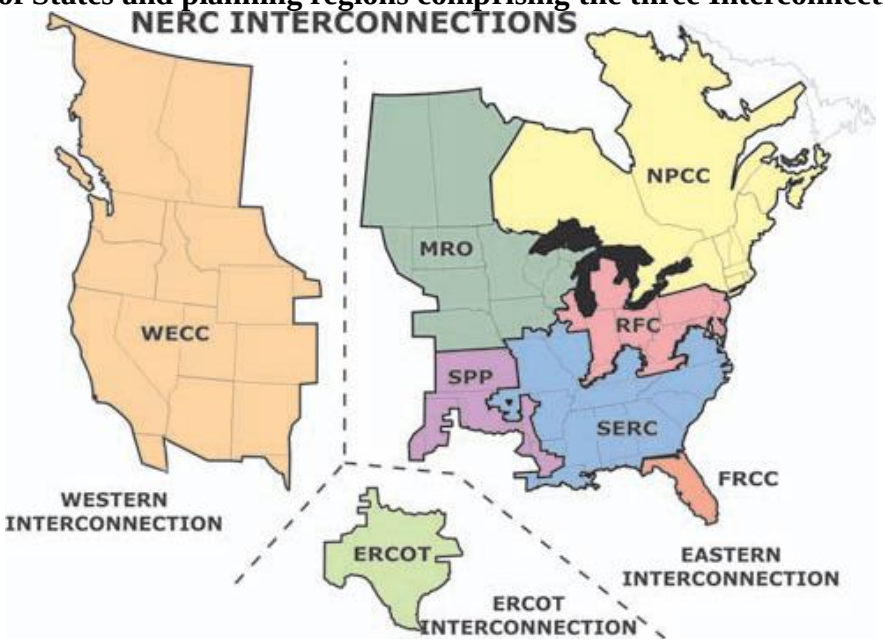
policies, one with an expansion of nuclear generation, and a business-as-usual future that anticipates little change from today's policy framework. Each scenario will be modeled to determine the transmission, emissions and cost implications, and ultimately the SSC will select three scenarios for more detailed transmission expansion plans. The new Eastern Interconnection-wide modeling tools and the information from the analyses will be shared with state and federal policy makers and regional planning authorities to help inform future energy and environmental policy and transmission planning and decision making.

The EIPC Stakeholder Steering Committee includes eight key stakeholder sectors:

- States
- Canadian Provinces
- Transmission Owners & Developers
- Generation Owners & Developers (including at least one renewable energy generator)
- Other Suppliers (Demand-side resources and distributed generation)
- Non-governmental organizations (including environmental and land preservation advocates)
- Public Power and Transmission-dependent Utilities
- End Users (including consumer advocates)

The Eastern Interconnection States' Planning Council (EISPC) represents the 39 states, District of Columbia, New Orleans and 8 Canadian Provinces located within the Eastern Interconnection.[4] Supported by $14 million from DOE, EISPC's goal is to "create an unprecedented collaborative among the states in the Eastern Interconnection comprised of Public Utility Commissions, Governors' offices, energy offices, and other key government representatives." The 81 members of EISPC have designated ten individuals to be part of the EIPC Stakeholder Steering Committee and represent the interests of states in this transmission planning exercise.[5]

Map of States and planning regions comprising the three Interconnections [6]



[4] http://communities.nrri.org/web/eispc/designees-and-proxies
[5] www.EISPC.org
[6](http://www.nerc.com/page.php?cid=1%7C9%7C119

EISPC plans to complete a number of studies and white papers to provide valuable information to states and stakeholders as they develop the scenarios for the transmission analyses. Through these studies, EISPC will explore the following:[7]

- Renewable/Alternative Energy Zones across the Eastern Interconnection.
- Potential locations for no and low-carbon generating resources.
- State-by-state potential for renewable or alternative energy (*e.g.*, wind, solar, biomass, landfill, hydro, etc.) as well as imports from Canada.
- The potential to develop additional demand-side resources in each state, based on work already completed by the Federal Energy Regulatory Commission (FERC).
- The potential for distributed generation in each state.
- The state-by-state potential for storage and waste-to-energy facilities.

EISPC white papers are expected to cover a range of topics relevant to defining the scenarios, including:

- Renewable Energy Credits
- Market structure impacts
- Power Purchase Agreements for Renewables
- Existing policies that could impact resource expansion plans
- Smart Grid
- Plug-in Hybrid Electric Vehicles
- Natural gas prices
- Economic Development

III. Why is transmission planning important to state energy, air and utility regulation offices?

Transmission is a key ingredient in providing reliable, clean electricity and meeting state policy goals, including:

Reliability

In 2006, DOE completed a study of the impact of congestion on the U.S. transmission system. A key finding was identification of critical congestion areas that pose a threat to meeting reliability standards and require investment in some combination of transmission, generation, and demand-side resources. Electric system reliability can be measured by the susceptibility and magnitude of potential disruptions in delivery of power to customers. DOE also found that there are "areas where large-scale congestion problems exist or may be emerging" that call for affirmative government and industry decisions to begin development of needed generation resources and associated transmission facilities.[8]

Congestion occurs when actual or scheduled flows of electricity on a transmission line or a related piece of equipment are restricted below desired levels— either by the physical or electrical capacity of the line, or by operational restrictions created and enforced to protect the security and reliability of the grid. The term ***transmission constraint*** may refer either to a piece of equipment that limits electricity flows in physical terms, or to an operational limit imposed to protect reliability. DOE, National Electricity Transmission Congestion Study. 2006.

[7] www.EISPC.org

[8] U.S. Department of Energy (DOE). 2006. *National Electric Transmission Congestion Study*, pp. vi –ix. http://nietc.anl.gov/documents/docs/Congestion_Study_2006-9MB.pdf.

State Renewable Energy Policies

Other studies have looked at the impact of transmission constraints on wind resources that can be developed in remote, high-wind regions offshore or on land.[9] [10] According to a recent National Renewable Energy Laboratory (NREL) report completed for DOE, substantial new transmission is needed to achieve a 20% wind generation target in 2024 in the Eastern U.S.[11] The information gathered through the EIPC and EISPC studies will be important for the development of location-constrained wind power, particularly considering the mismatch between the short lead time to build a new wind project and the longer lead time often needed to plan, permit, and construct transmission.

Clean Air

Where and when new transmission is built will also influence the type of generation that will be built and retired, the choice of fuel, and importantly, the associated air emissions. In the past, the link between transmission and the environment was primarily the environmental impacts of siting transmission facilities. More recently, attention is turning to the costs of air emissions (their health impacts and the cost of reducing emissions) under different transmission scenarios. For instance, one researcher looked at the difference in total emissions and costs, including transmission expansion costs, associated with two different resource and transmission scenarios for the Western Interconnection -- building gas-fired generation close to load centers or building remote wind, hydro and new coal generation requiring significant transmission expansion. [12] These two resource and transmission scenarios yielded significantly different total costs, including the cost to society of the adverse health effects from associated emissions, giving policymakers valuable information about the tradeoffs.

Accounting for federal and state policy goals in transmission planning is important to building the most economic and efficient transmission system.

Federal Air Regulations and Transmission

A recent study by Synapse Energy Economics looked at the impact of a range of public policies on the transmission system in the U.S. Specifically, the authors highlighted the potential risks of ignoring the impact of upcoming U.S. Environmental Protection Agency (EPA) air regulations. Synapse concludes that EPA regulations are likely to lead to the retirement of some generation for economic reasons. According to the authors, transmission planning authorities should consider the prospect of these retirements in their plans to account for reliability impacts and avoid uneconomic investments. [13]

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[9] Xcel Energy, *Wind Integration Study Report of Existing and Potenial 2003 Least Cost Resource Plan Wind Generation,* 2006.

[10] Lawrence Berkeley National Laboratory, The Cost of Transmission for Wind Energy: A Review of Transmission Planning Studies, Andrew Mills, Ryan Wiser, and Kevin Porter, 2009. http://eetd.lbl.gov/EA/EMP

[11] DOE/NREL, Eastern Wind Integration and Transmission Study, Oct. 2009, NREL/CP-550-46505.

[12] Bloyd,Cary and Ranjit Bharvirkar, and Dallas Burtraw, Resources for the Future, "Investment in Electricity Transmission and Ancillary Environmental Benefits**,"** March 2002 • Discussion Paper 02–14

[13] Paul Peterson, Vladlena Sabodash, Rachel Wilson, and Doug Hurley, Synapse Energy Economics, *Public Policy Impacts on Transmission Planning,* Dec. 2010.

State Energy Policies and Transmission

State policies such as energy efficiency goals, renewable and low-carbon energy standards, and adoption of GHG emission standards for vehicles will have an impact on how the transmission system develops. For instance, State Renewable Portfolio Standards are increasing the demand for more remote, resource-constrained generation like wind and solar. Whether the state goals are met with more local resources or distant renewable generation, an evaluation of transmission options in the Eastern Interconnect will help identify the capital investment needed to reach the RPS targets.

The Synapse study also looked at the transmission implications of policies such as the Midwest states' energy efficiency goals. State and utility efficiency programs in the Midwest, for example, could reduce peak load by as much as 20% by 2030, which could significantly reduce the need for new generation and transmission resources.

IV. How will the outcomes of the EIPC and EISPC projects help state policy makers?

- **New interconnection-wide transmission planning tools**

One of the early outcomes from EIPC's efforts is to develop a power flow model that integrates all the sub-regional transmission plans and evaluates gaps and synergies between the plans. This so-called "Roll-up Case" is the first step in finding greater efficiencies in inter-regional transmission expansion and identifying differences between planning processes, terms, and criteria for generation and transmission facilities in regional plans.

Long-range scenario planning is also a new tool in some regions. Most regional transmission plans extend five to ten years in the future. This effort will evaluate transmission needs for 20 years into the future, under a range of scenarios. Each scenario or "future" is based on a selection of different driving forces such as state and federal policies, economic factors, technology assumptions and consumer behaviors that could significantly influence the generation and transmission portfolio 10 and 20 years from now. Scenario planning provides the opportunity for stakeholders to collaboratively craft a vision of the future electricity transmission system that takes into account the range of uncertainties associated with these key drivers.

- **New knowledge to inform states' input on transmission planning**

The scope of information available to policymakers and transmission planners will be greatly expanded:

FERC Proposed Rules on Transmission Planning

In June 2010, the Federal Energy Regulatory Commission (FERC) issued a Notice of Proposed Rulemaking, (www.ferc.gov/whats-new/comm-meet/2010/061710/E-9.pdf) on transmission planning and cost allocation.

FERC outlined a number of proposed changes including the following requirements:

- Participation by public utility transmission providers in regional transmission planning processes that produce plans that meet specific principles.
- Consideration of public policy requirements in transmission planning processes.
- Interregional transmission planning agreements between public utility transmission providers in neighboring regions.
- The development of intraregional and interregional cost allocation methods for the costs associated with new transmission facilities.

FERC is reviewing comments before issuing final rules.

- State policy makers will have new information about the implications of a range of future state and federal policies on the transmission and generation system. One future envisions

continued regional implementation of clean energy goals and standards, while another involves national implementation of a renewable energy standard. All the stakeholders agreed that it is important to analyze a future characterized by modest advances in federal environmental policy, as well as one that entails a very ambitious national environmental agenda. The states and stakeholders plan to evaluate an aggressive distributed generation and demand response scenario that is facilitated by accelerated deployment of smart grid technologies. The generation and transmission roadmaps from these scenarios will help identify the levels and types of investment needed and will provide better information to plan for these uncertainties.

- The macroeconomic analyses will provide five-year snapshots of the criteria pollutant and greenhouse gas emissions under each future. Each scenario will have a unique mix of generation and demand-side resources with a unique environmental footprint.

- State policy makers and transmission planners will also be able to see the importance of variations among a range of economic and technology assumptions. For instance, the scenarios will be analyzed under a range of load growth assumptions and natural gas prices.

- **Interregional coordination of transmission development**

Improved interregional coordination and information sharing between states, transmission planning authorities and other stakeholders could facilitate the timely development of additional low-carbon generation, with its associated transmission requirements. The results of the collaboration may also lead to broader awareness of the need for the key interstate facilities and enable more timely resolution of issues related to cost allocation and siting of these facilities. States that need to develop strategies in coordination with their neighbors will be able to draw on a shared and transparent body of analyses.

- **Increased state and stakeholder involvement**

The EIPC project is supported by an extensive stakeholder process. Transmission and generation owners and developers are working with state consumer advocates and utility regulators. Environmental and land preservation advocates are collaborating with public power entities and demand-side resource providers. This broad range of stakeholders guarantees that the perspectives of interest groups and regions impacted by the development of transmission can have input into the planning process. Although stakeholders participate in sub-regional planning efforts, this new consensus-based process is structured to provide intensive stakeholder education about the transmission planning process and analytical tools available. It will also get broader input, and ultimately greater buy-in, to the results of the process.

- **Foundation for an on-going Eastern Interconnect stakeholder-driven transmission planning process**

DOE notes in the Funding Opportunity that this project is intended to jumpstart inter-regional transmission planning, leading to new coordinating entities and a plan for continuing the process. What takes place over the next two years will likely contribute to a more robust Eastern Interconnect planning process in the future.

V. Resources

Eastern Interconnection States Planning Council website. www.eispc.org

Eastern Interconnection Planning Collaborative website. http://eipconline.com

FERC NOPR on Transmission Planning and Cost Allocation. http://www.ferc.gov/whats-new/comm-meet/2010/061710/E-9.pdf

National Council on Electricity Policy, *Coordinating Interstate Electric Transmission Siting: An Introduction to the Debate*, 2009. http://www.ncouncil.org/Documents/Transmission_Siting_FINAL_41.pdf

Resources for the Future, "Investment in Electricity Transmission and Ancillary Environmental Benefits**,"** Cary Bloyd, Ranjit Bharvirkar, and Dallas Burtraw; March 2002; Discussion Paper 02–14. http://www.rff.org/Documents/RFF-DP-02-14.pdf

Synapse Energy Economics, *Public Policy Impacts on Transmission Planning*, Paul Peterson, Vladlena Sabodash, Rachel Wilson, and Doug Hurley, Dec. 2010. http://www.synapse-energy.com/Downloads/SynapseReport.2010-12.EJ.Public-Policy-Impacts-on-Transmission.10-064.pdf

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U.S. DOE/NREL, *Eastern Wind Integration and Transmission Study*, Jan. 2010, NREL/CP-550-46505. http://www.nrel.gov/wind/systemsintegration/pdfs/2010/ewits_final_report.pdf

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Wasserstrom, Robert and Susan Reider, TERRA Group, "Electric Transmission and Carbon Reduction: A Survey of Environmental Leaders and State Regulators," Jan. 2010. http://www.beg.utexas.edu/energyecon/transmission_forum/TG_Electric_Transmission_and_Carbon_Reduction.pdf