



NATIONAL CONFERENCE  
of STATE LEGISLATURES  
*The Forum for America's Ideas*



## Transmission Policy Institute

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**Hosted By:**

National Conference of State Legislatures and National Wind Coordinating Collaborative

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## Acronym List

<b>AEP:</b> American Electric Power	<b>NERC:</b> North American Electric Reliability Corporation
<b>ARRA:</b> American Recovery and Reinvestment Act	<b>NWCC:</b> National Wind Coordinating Collaborative
<b>AWEA:</b> American Wind Energy Association	<b>OE:</b> Office of Electricity (DOE)
<b>BLM:</b> Bureau of Land Management	<b>PEIS:</b> Programmatic Environmental Impact Statement
<b>CREZ:</b> Competitive Renewable Energy Zone	<b>PJM:</b> PJM Interconnection
<b>DOE:</b> Department of Energy	<b>PUC:</b> Public Utility Commission
<b>EI:</b> Edison Electric Institute	<b>RETI:</b> Renewable Energy Transmission Initiative
<b>EICP:</b> Eastern Interconnection Planning Collaborative	<b>RFP:</b> Request for Proposal
<b>EISPC:</b> Eastern Interconnection States Planning Council	<b>RPS:</b> Renewable Portfolio Standard
<b>ERCOT:</b> Electric Reliability Council of Texas	<b>RTEP:</b> Regional Transmission Expansion Project
<b>EWITS:</b> Eastern Wind Integration and Transmission Study	<b>RTO:</b> Regional Transmission Organization
<b>FERC:</b> Federal Energy Regulatory Commission	<b>SERC:</b> SERC Reliability Corporation
<b>GDA:</b> Generation Development Area	<b>SPP:</b> Southwest Power Pool
<b>IOU:</b> Investor Owned Utility	<b>TEPCC:</b> Transmission Expansion Planning Policy Committee
<b>ISO:</b> Independent System Operator	<b>UWIG:</b> Utility Wind Integration Group
<b>MISO:</b> Midwest Independent System Operator	<b>WECC:</b> Western Electric Coordinating Council
<b>NCSL:</b> National Conference of State Legislatures	<b>WGA:</b> Western Governors Association
	<b>WOW:</b> Wind on the Wires

# Meeting Summary

## I. Meeting Objectives

- Address the critical transmission development issues facing states as they expand renewable energy production
- Provide state lawmakers with a foundational understanding of the issues involved in connecting transmission lines from renewable resources to regions with high electricity demand, including:
  - coordination between states and jurisdictions
  - cost allocation and recovery
  - siting and permitting
- Explore ways to promote:
  - collaboration between states and jurisdictions
  - methods of allocating costs for transmission lines
  - policies that will assist states in planning and building new transmission lines to access valuable renewable energy resources

## II. Introduction

Over thirty-five leaders participated in the *Transmission Policy Institute*, co-hosted by the National Conference of State Legislatures (NCSL) and the National Wind Coordinating Collaborative (NWCC). The meeting featured sixteen state legislators/legislative representatives and presentations by federal and state government regulatory and legislative officials, industry representatives, and other transmission experts.

### **Glen Andersen, National Conference of State Legislatures**

As an organizer and moderator for the meeting, Glen Andersen extended a welcome to meeting participants. Mr. Andersen iterated the purpose of the meeting was to translate technical information on transmission issues – engineering and economic fundamentals and current challenges – into terms that would assist state legislators in developing comprehensive transmission policy.

### **Representative Tom Sloan, Kansas House of Representatives**

Representative Sloan, a NWCC Steering Committee member, served as a moderator for the meeting. He introduced the NWCC, highlighting its mission to identify the issues that affect windpower, establish dialogue among stakeholders, and catalize activities to support development.

Stakeholder groups represented in the NWCC include the public, legislators, regulators, environmental groups, the wind industry, and state and federal agencies. It serves as a unique resource for legislators, providing non-partisan and scientifically valid information.

The NWCC has two main workgroups, Transmission and Wildlife, with additional sub-workgroups and committees that focus on timely issues, such as the Grassland and Shrub Steppe Species Collaborative. NWCC currently:

- Addresses transmission planning, siting, and cost recovery issues in the Electric Reliability Council of Texas (the Texas Interconnection), Eastern, and Western Interconnects;
- Disseminates state-of-the-art technical information on wind siting;
- Convenes researchers conducting cutting-edge studies on wind and wildlife/habitat interactions; and
- Provides opportunities to engage and collaborate with peers from multiple stakeholder groups.

### **III. Transmission Planning for the Future**

Representatives from the Western Electricity Coordinating Council (WECC), Wisconsin Public Service Commission, and American Electric Power (AEP) explored the current state of the U.S. electric grid and the changes needed to ensure reliable and affordable electricity delivery. Additionally, presenters enumerated the transmission plans in the Eastern and Western U.S., including the successes and challenges of meeting the transmission needs of these regions.

#### **Byron Woertz, Western Electricity Coordinating Council**

Mr. Woertz provided an overview of the fundamentals of the electrical system, the Western Interconnection, transmission planning, and the Regional Transmission Expansion Project.

Mr. Woertz introduced the electrical power system, explaining that power flows from generation plants to consumers via transmission and distribution lines. Between each stage, power flows through transformers, which reduce voltage to the appropriate level that the lines can accommodate. Regional Independent System Operators (ISOs) ensure reliability by coordinating generation to meet the load.

The bulk power system in the United States is divided into three interconnections: the Western Interconnection, the Eastern Interconnection, and ERCOT (the Texas Interconnection). WECC covers the Western Interconnection footprint, which includes the Mountain West states to the Pacific Coast and from British Columbia and Alberta to the Southwest U.S. states. WECC's Transmission Expansion Planning Policy Committee (TEPPC) leads transmission expansion studies for the region. TEPPC also conducts annual congestion studies using load and resource modeling.

The Department of Energy (DOE) provided \$14.5 million over four years of American Recovery and Reinvestment Act (ARRA) funding for the Regional Transmission Expansion Project (RTEP) to increase transmission planning in the Western Interconnection. The project's objectives are to expand regional transmission planning, coordinate existing sub-regional transmission planning projects, create 10- and 20-year transmission plans, and conduct scenario planning to facilitate stakeholder involvement. Mr. Woertz noted that siting is not a part of WECC's planning activities. Stakeholder groups in RTEP represent a broad range of sectors, including:

- Non-governmental Organizations

- Tribal representatives
- Coordinated state and provincial representatives
- Coordinated involvement of industry representatives (“Sub-regional Planning Groups”)
- TEPPC representatives

Stakeholders will provide input for creating ten- and twenty-year transmission plans based on various scenarios. In many cases, these plans assume significant renewables development, as well as grid enhancements required to accommodate those renewables.

In response to questions, participants also made the following points:

- WECC’s members, transmission owners, and other stakeholders typically fund TEPPC. Until this year’s funding from DOE, WECC was entirely funded by its members.
- In terms of scale, the typical house consumes approximately one kilowatt of energy per hour and a power plant may operate on a scale of 1000 megawatts of production per hour. In terms of units, watts are a measure of the volume of power and voltage is a measure of the potential capacity to move power. More power, in terms of watts, requires higher voltage transmission lines to move it. It is analogous to cars (watts) and roads (voltage). With more cars (watts) on the road, the highway (voltage) needs to increase in size too.
- Higher voltage transmission lines lose less power. The more a transmission line sags, increasing amounts of power will be lost due to the distance the electrons must travel to reach the load.
- Homeland Security, ISOs, and other regulatory bodies set standards for transmission line protection from cyber and weather threats, and these standards are evolving. Building redundant transmission lines adds back-up to the system, but transmission development often receives pushback from local interests. Public outreach and education early in the process will improve collaboration and streamline development.
- With the construction of large transmission lines in the near future and the high expense of installing lines underground, technological improvements of transmission systems may create cost-effective alternatives in a timely manner.

### **Commissioner Lauren Azar, Wisconsin Public Service Commission**

Commissioner Azar, co-founder and current president of the Eastern Interconnection States’ Planning Council (EISPC), offered practical insight on the present and future of transmission planning. She specifically focused on the current needs and the future roles and opportunities for collaboration among state and federal agencies.

Historically, utilities assessed customer needs to determine transmission build out, with the single goal of system reliability. Beginning in the 1990’s, in response to an increase in renewables production, utilities began transferring power over increasingly long distances, necessitating a corresponding increase in regional planning. In 2000, regional planning succeeded utility-level planning in the form of Regional Transmission Organizations (RTOs) and ISOs. They determine which generators should be dispatched and when, and, in applicable cases, operate centralized energy markets. RTOs provide great opportunities for integrating variable renewable generation because of their ability to balance variability over their entire footprint.

Commissioner Azar stressed that transmission planning should operate on the interconnection level, and consider economic efficiency and policy goals in addition to reliability. Because building long transmission is time and resource intensive, the market may fail to make these investments even though it is the best long-term strategy.

Currently, states have the authority to make these transmission development decisions and collaborate in regional and interconnection wide organizations. The federal government has a more general role in transmission planning: namely setting a price for carbon, establishing timeframes, and acting as a backstop. States are better equipped to make more detail-oriented decisions efficiently and effectively.

EISPC is an example of an interconnection-wide organization aimed at expanding the scope of transmission planning. Comprised of thirty-nine states and eight Canadian provinces in the Eastern Interconnection, EISPC defines inputs and assumptions for modeling efforts; conducts studies to refine inputs and assumptions for future iterations; and produces white papers to educate decision-makers.

Lastly, Commissioner Azar encouraged legislators to press their federal counterparts to move quickly on climate and energy legislation and to empower state utility commissioners to cooperate regionally with each other and industry to plan long-term.

In response to questions, participants also made the following points:

- Policy decisions on the price of carbon will affect the price of energy sources. Those utilities with long-term plans will adapt best to the changing energy landscape.
- The West has more federal land, thus more federal regulatory involvement in transmission planning and siting. Western states should coalesce to ensure efficient approval processes.
- Decision-making at the state level involves balancing the interests of long transmission and distributed systems. Decision-making at the regional level consists of collaborative decision-making between state regulatory agencies. However, state legislature must pass their decisions. While RTOs make transmission planning and siting decisions, transmission owners can leave the RTO to pursue short-term profit. If the efficiency and effectiveness of these processes are not improved, federal agencies may step in as a backstop.

### **John Flynn, American Electric Power**

Mr. Flynn opened with an email explaining that the right of first refusal will be eliminated from FERC tariffs. This means an incumbent utility will not necessarily be given the first opportunity to bid on a proposed transmission expansion. He explained the rulemaking does not intend to preempt states' rules on incumbent requirements, but utilities will want to push for transmission development. Thus, it is important for state lawmakers to engage in debate and collaboration.

Mr. Flynn emphasized the significant amount of transmission development needed to accommodate new generation. The most efficient way to build transmission is to focus on lines that garner the most support. He encouraged the expansion of transmission planning, such as EISPC has done, to the regional, super-regional, and national levels. For instance, The Midwest Independent System Operator's (MISO) Renewable Generator Outlet Study, and the similar Strategic Midwest Area Transmission study conducted by utilities, recognized that despite arbitrary RTO borders, new transmission will cascade

beyond MISO into neighboring RTOs, such as PJM. He also commended Kansas and the Southwest Power Pool (SPP) for building transmission that is pragmatic and rational.

In response to questions, participants also made the following points:

- More productive generation that is further from load centers, coupled with higher voltage lines (on 765kv line, average loss regardless of distance is less than one percent), is a better investment in longer-term scenarios even with higher installation costs. Thus, far-sighted, interconnection-wide planning is needed.
- FERC rulings created RTOs and ISOs in order to organize local interests and create a national energy market that efficiently moves energy from source to load.

#### **IV. Transmission Siting**

Representatives from the Bureau of Land Management (BLM) and Edison Electric Institute (EEI) spoke on the process of siting transmission lines. This complex process includes many stakeholder groups and often faces local opposition. Presenters addressed these concerns and explained how policies have streamlined the siting process.

##### **Ashley Conrad-Saydah, US Department of Interior, Bureau of Land Management**

Ms. Conrad-Saydah spoke about her experience at the California BLM Field office, the fundamentals of transmission siting, and the California Renewable Energy Transmission Initiative.

Transmission corridor designation in California began in the 1980's with the California Desert Plan. In 2009, a Western region Programmatic Environmental Impact Statement (PEIS) created eleven transmission corridors, most on BLM land. PEIS complies with the National Environmental Policy Act and the California Environmental Quality Act. Rights-of-way are particularly complex; the process of determining rights of way includes environmental and cultural impact reviews and often confronts NIMBYism<sup>1</sup>. In order to incorporate stakeholder interests early in the process, the Renewable Energy Action Team was created to improve collaboration and streamline the siting process. The team consists of all relevant federal agencies, such as BLM, Fish and Wildlife, and the Department of Defense.

California's Renewable Energy Transmission Initiative (RETI) identifies the transmission projects needed to accommodate renewable energy goals, support future energy policy, and facilitate transmission corridor designation and transmission and generation siting and permitting. Participants in RETI include investor-owned utilities, municipal utilities, California Public Utilities Commission (PUC), California Energy Commission, California ISO, developers, environmental advocates, and other interested parties. RETI is committed to a three-phase open, inclusive, and transparent process, of which the first two phases have been completed. Phase 1 included the identification and ranking of Competitive Renewable Energy Zones (CREZs). CREZs are geographic areas particularly rich in renewable energy generation potential. Phase 2 refined CREZ analysis for priority zones and development of a statewide conceptual

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<sup>1</sup> NIMBYism, or Not In My Backyard, is a term used negatively to characterize opposition by residents to a proposal for new development within the proximity of their homes or places of work.

transmission plan, which was completed in December 2008. In Phase 3, a detailed transmission plan for CREZs will be developed.

Several collaborative components of RETI have been particularly successful: stakeholders looked forward to working with each other; it created common ground for diverse interests; and posting minutes, documents, etc. on a website promoted transparency. Best management practices include identifying participants *and* decisions-makers and ensuring thorough communication.

In response to questions, participants also noted that engaging stakeholders early in the process and being willing to compromise are the best ways to speed up the transmission siting process. It is essential to have decision-makers in the room and pressure from state and national leaders to come to consensus. While it is impossible to ensure consistent stakeholder cooperation, these are the best methods for positive engagement.

### **Sarah Ball, Edison Electric Institute**

Ms. Ball provided an overview of the fundamentals of transmission siting. EEI is a trade association for investor-owned utilities (IOUs), and its constituents represent 70% of the electric power industry. Based in Washington, DC, they provide lobbying, education, and data on behalf of their constituency.

Ms. Ball explained the difference of scale between transmission and distribution lines is analogous to the difference between a freeway and residential street. Siting these lines tends to be expensive and time consuming because of the complex process that takes into account numerous factors described below. Burying transmission and distribution lines amplifies these factors, which limits the use of this often proposed installation method.

The siting process has become increasingly important. After the Northeast blackout of 2003, NERC's reliability standards created the need for new transmission lines and the emergence of new markets to handle load. EEI's website catalogues new transmission development, with information about the company, territory, and transmission line of each project. Ms. Ball explained that properly sited transmission lines will maintain reliability while including the following other important interests:

- Environmental impacts, such as endangered species and native plants;
- Cultural impact, such as historic parks and monuments; and
- Socioeconomic impacts, such as property values and rights-of-way.

Regulatory constraints will further change a proposed transmission route. For example, in the Forest Service, land use decisions of a particular forest reside with its own manager. The transmission line developers will work with each forest manager to design an appropriate route. Likewise, tribes negotiate in the siting process for routes across their land. The aggregation of all these factors results in the final options for transmission routes.

Public involvement is an essential component in the siting process, and utilities must identify key stakeholders early in the process. This is particularly important for questions such as the use of public land and other contentious issues. Utilities have begun to use open houses for their ability to foster discussion and outreach. Altogether, the permitting, planning and siting processes are the most time

consuming and expensive phases of transmission development; installation moves relatively quickly once permitting agencies grant approval.

## **V. Energy Integration and Transmission Alternatives**

Representatives from Renewable Energy Consulting Services, Inc., the Utility Wind Integration Group (UWIG), the National Renewable Energy Laboratory (NREL), and the University of Colorado presented the fundamentals of integrating renewable generation into the electric grid. Presenters discussed the status and future needs of transmission in order to integrate the renewable energy required by state renewable energy goals.

### **Ed DeMeo, Renewable Energy Consulting Services, Inc.**

Mr. DeMeo described the costs, benefits, and transmission needs for the *20% Wind Energy by 2030* (20% wind) DOE initiative. The 20% wind vision is an exploration of a scenario and feasibility studies of what is required to realize that goal. Primary assumptions were based on conservative estimates for electricity demand and technological improvement and no policy supports. The primary findings are:

- The grid needs about three hundred gigawatts of wind power to meet the goal.
- Affordable, abundant, accessible wind resources are available across the nation.
- It requires modest integration cost with operational cooperation over large regions.
- It would provide substantial net benefits.
- Transmission is a challenge.

Of the approximately three hundred gigawatts of wind power needed, about fifty gigawatts will be offshore, mostly on the East Coast. Using a sophisticated NREL model, the study found that forty-six states have wind power development potential.

Considering the costs, benefits, and impacts of the scenario, Mr. DeMeo observed that a 2% increase in investment, as opposed to no new wind investment, would significantly decrease natural gas and coal consumption while providing numerous benefits to consumers. At only fifty cents per month per household, 20% wind would be a major step towards reducing carbon emissions to 80% of present levels by 2050. If the federal government regulates carbon, this initiative would save approximately \$98 billion in carbon regulation costs.

In addition to this data, wind power avoids other costs associated with natural gas and coal generation that the study did not attempt to quantify, including:

- Air emissions of mercury and other heavy metals;
- Emissions from extracting and transporting fuels;
- Lake and streambed acidification;
- Mountaintop removal; and
- The production of toxic waste, ash, or slurry.

There are numerous benefits from 20% wind outside the scope of the study. The National Academy of Science's 2009 study on energy externalities, the first authoritative study of its kind, found that the externalized health-related cost of coal is 3.2 cents per kilowatt. This cost does not include climate

change effects. Mr. DeMeo noted that the electric power generation industry is a major source of water consumption, and while much is recycled, there would be a significant overall reduction in water withdrawal.

Concerning jobs, the scenario estimates 180,000 individuals would be directly employed, with about a half million total net jobs. Regions that would particularly benefit include the Great Lakes and the Southeast, two areas which have been impacted greatly by the recession. While these regions do not have wind as powerful as the Great Plains, the opportunity for manufacturing wind components allows them to share in the overall economic development stemming from renewable energy.

A key challenge to implementing 20% wind is the status of future transmission infrastructure development. Even without any new wind power, future energy demand will need new transmission. However, 20% wind will require about 12,000 miles of new transmission lines. If communities want to take advantage of the significant benefits of wind, expansion of transmission is necessary.

In response to questions, participants also made the following points:

- If solar power generation were developed to the same penetration levels, it would have similar benefits in terms of emissions and pollution reduction, job creation, and health effects.
- The benefits of 20% wind are significant enough that despite the question of baseload, it is in communities' best interest to pursue this goal
- An increase in wind power to this penetration level will decrease natural gas consumption by half, causing the price to decrease. More wind equates to consumer savings on natural gas.
- The cost of transmission is included in the costs portion of the study.

### **Charlie Smith, Utility Wind Integration Group**

Mr. Smith spoke on characteristics and methods of wind integration and current policy issues in relation to the 20% wind vision. UWIG, a non-profit with membership primarily comprised of utilities, identifies and resolves technical issues related to wind integration.

Mr. Smith explained the rapid ascension of wind power integration. Before 2000, most wind power was in California. In the last decade, generation has increased significantly throughout the nation and now there is widespread recognition that wind plants could provide ancillary services like conventional plants do. FERC and NERC are working to ensure wind plants adopt this role.

The main differences between wind and conventional types of generation are (i) increased uncertainty, (ii) a lack of knowledge about expected power output, and (iii) variability or the inconsistent nature of wind. System operators can use forecasting to mitigate uncertainty, which can be reliable for up to three days. To moderate variability, there are several methods to match generation to load. Markets are highly flexible and low cost, and they contain mechanisms that coordinate supply and demand pricing. Another efficient method, in terms of cost and flexibility, is flexible generation, such as gas turbines. Other methods, in order of increasing costs and inflexibility, are traditional storage (e.g. hydro and gas storage), wind curtailment, and new types of storage that are beginning to be integrated into markets such as flywheels and batteries.

Regulation (in this context) is the service that keeps the load and generation in balance on a time scale of a few seconds to a few minutes. Load following (tens of minutes to hours) and scheduling (day) are longer periods that are forecasted and consistently re-calculated. Variability increases the need for regulation, thus the cost is higher to integrate generation types that are more variable. Coordinating the use of flexible methods (markets, flexible generation, storage, etc.) with wind generation requires more regulation than a conventional coal power plant. While purchasing power in increments of day, hour, or five-minutes has relatively the same cost, within hour flexibility is significantly more expensive.

In forecasting and balancing, longer time-frames directly relate to increasing uncertainty because of a lack of precise modeling. Current weather models are finely tuned for temperature and precipitation but not for wind. For good forecasting, measurements need to be within the mile-per-hour. Within a day, the forecast has relatively little uncertainty, but even expanding the time frame by a day or two greatly increase uncertainty.

Mr. Smith discussed some of the current policy issues. Wind integration charges – the cost to transmission providers to integrate wind – is a pressing topic. Balancing area cooperation is increasingly important as a larger footprint allows increased total power output, which eases out the variability effect of wind power. The North American Electric Reliability Corporation (NERC) created a Variability Integration Task Force to update NERC standards to maintain reliability with the increase of wind integration. The Federal Energy Regulatory Commission (FERC) has issued a Notice of Inquiry to investigate the impact of integrating variable energy resources into market and non-market areas that will probably result in a rulemaking.

In response to questions, participants also made the following points:

- Balancing areas used to be the footprint of a utility, but now they have consolidated to a sub-regional scale.
- Wind is not a good capacity resource; it is a zero-carbon energy resource. Utility planners must use tools to incorporate it properly into the electrical system.

### **David Corbus, National Renewable Energy Laboratory**

Mr. Corbus discussed the Eastern Wind Integration and Transmission Study (EWITS). The study evaluates the power system operating impacts and transmission associated with increased wind energy to 20% and 30% scenarios. The study's technical review committee consisted of state and federal regulators, utilities, academia, and ISOs and RTOs. In an effort to develop inter-regional collaboration, they built on prior regional studies and coordinated with current work on regional power systems.

The EWITS analysis provides *conceptual* information for 20% and 30% wind energy penetration scenarios. Topics include the wind generation required, transmission concepts for economic delivery, and economic simulations for hourly operation. There were three key tasks: (i) wind plant modeling, data development, and siting; (ii) transmission concept studies for wind scenarios; and (iii) wind integration studies evaluating operating impacts, resource adequacy, and costs.

The study considers four scenarios – three with twenty percent and one with thirty percent wind energy penetration. The common theme between all four scenarios is the need for increased transmission build

out. EWITS includes offshore wind, finding that despite the higher expense, it requires less transmission and produces when the load is highest. The scenarios were:

1. Twenty percent, high capacity and on shore – majority of wind coming from the Midwest, which has less land use constraints allowing for bigger generation plants
2. Twenty percent, hybrid with offshore – generation moves somewhat east towards load centers, with several large offshore wind farms
3. Twenty percent, local with aggressive offshore – majority of wind coming from the East Coast, with a large amount of offshore development and a robust federal program to support it
4. Thirty percent aggressive onshore and offshore – large amount of generation from both the Midwest and East Coast

Transmission concept studies found some elements common to all scenarios. The conceptual transmission overlays consist of multiple 800 kilovolt High-voltage Direct Current and Extra High-voltage Alternating Current lines between the East Coast and Midwest. Even Scenario three, where generation is nearest to load centers, requires significant development of heavy transmission lines between the Midwest and East Coast. Currently, a lack of adequate transmission causes utilities to curtail wind when there is congestion. While some curtailment is economically justified, it nonetheless affects the price of wind.

The study found that an increase in geographic diversity and the number of wind turbines eventually diminishes the variability in generation. This has implications for wind energy to assume an increased role as a baseload.

Mr. Corbus also made the following points:

- In order to make the twenty percent scenarios work, the study assumed that balancing areas would consolidate to seven in the Eastern Interconnect by 2024.
- In the total annualized costs for each scenario, transmission is about equal, accounting for approximately ten percent of total costs.
- The results of EWITS do not advocate for any particular scenario. The study only provides information and raise policy and technical questions.
- In order for any scenario to be realized, *both* renewable energy standards and transmission development are required.

#### **Dr. Rebecca Johnson, University of Colorado**

Whereas discussion up to this point had focused on increasing flexibility in supply, Dr. Johnson approached the subject from the other side: flexible demand. These two approaches complement one another to ensure reliability of energy availability.

Broadly, smart grid is an overlay of bi-directional communication and control mechanisms accomplished by combining information technology with the electricity grid. It includes demand response, energy efficiency, renewable integration, and Plug-in Hybrid Electric Vehicles (PHEVs). These features add much-needed flexibility to the grid for utility-scale renewable generation, distributed generating resources, and PHEVs.

Smart homes utilize demand management to respond to changing generation capacity. Bi-directional communication allows the utility to receive individual building energy use data and communicate consumption data and pricing to consumers. For example, if a neighborhood has many photovoltaic panels and PHEVs and it gets cloudy, this creates an enormous load on the system. Utilities collect this information and send it back to consumers who can reduce their energy usage. Specific technologies and methods include:

- smart meters
- in-home displays
- dynamic pricing
- programmable appliances/equipment
- price-sensitive appliances/equipment
- PHEVs

Dr. Johnson described several of these technologies. In-home displays are receiving attention because they provide information like price and quantity of energy-used so consumers can adjust usage accordingly. Dynamic pricing relates directly with load: using energy at peak times will cost more. Dr. Johnson noted that PHEVs need a smart grid because charging cars during peak demand would be problematic for the load it would create. Pricing mechanisms could help solve this problem. Using these technologies and methods, smart grid and demand management create ancillary markets and packaged capacity, thus creating additional value.

Dr. Johnson highlighted two studies demonstrating the effectiveness of these technologies and methods. One study produced significant results pairing dynamic pricing with in-home display technology. Used by a highly motivated population on the Olympic Peninsula, this combination resulted in an overall energy consumption decrease of twenty percent. Another study found that in-home displays and time-of-use pricing utilized by medium-motivated populations created reductions in the five percent range.

There are a number of transitional challenges to move from our conventional grid to a smart one. Notable among these is the risk of investing in unproven technology. Additionally, a complex regulatory landscape, comprised of numerous federal, regional, state, and local entities, can be daunting to interested investors.

In response to questions, participants also made the following points:

- Economic incentives are a mechanism for selling managed PHEV-charging. However, there needs to be a collaborative effort to educate consumers and voters so they understand the system is not penalizing them.
- Investment in a smart grid is expensive for the municipality and utility, although exact costs are uncertain. However, volume and magnitude can create net savings. Federal funding may be available too, like there was through ARRA grants.
- Concerning the cost to utilities, savings will need to be robust enough to overcome the thin margin of error. Revenue models need to allow utilities to share in the savings in order to make

it work. Studies showing consumers responding to benefits and incentives make the case to utilities for smart grid development.

- There has been debate on decoupling utility revenue from sales for two decades. The ability to measure the savings and build the business case has been difficult. Smart grid, carbon regulation, future demand growth, and the housing markets crash will contribute to movement on this topic.

## **VI. The Economics of Energy Distribution**

Representatives from the American Wind Energy Association (AWEA) and Colorado Public Utilities Commission spoke about the financing and recovery of transmission development costs. Specifically, they addressed what the costs are, how they are allocated and recovered, and what the coordinating and cost-recovery options are for inter-state and inter-jurisdiction transmission lines.

### **Ron Lehr, American Wind Energy Association**

Mr. Lehr began his remarks by informing participants that cost allocation is a relatively established system. Generally, because larger transmission is often multi-purpose and inter-state, there are “jurisdictional splits” for the states involved. Most allocations are “relative use,” so cost allocation corresponds to metered energy flows. Costs can be allocated according to state or federal jurisdictions, loads and generators, amounts of use, peak consumption and generation, flows, and monetary impacts.

Ultimately, transmission costs are passed onto consumers. Considering the public nature of transmission, Mr. Lehr urged policymakers to use the lowest cost capital to fund projects, namely public finance. Cost recovery options include: rolling costs into overall rates, charging one price for transmission throughout an area or zone, charging by distance, and charging beneficiaries who cause added cost. Depending on the RTO or ISO, consumers or generators pay up-front transmission costs. Location also determines whether costs follow mega watt-hour use or peak use. In flow-based methods, the beneficiary pays based on measured flows of power. In monetary methods, beneficiaries pay based on changes in production cost or relative marginal costs.

Mr. Lehr encouraged policymakers to think more broadly about cost recovery. The traditional priorities of cost recovery tend to be reliability and cost minimization. However, generation diversity, job creation, energy security, and environmental performance are important additional factors to consider. Planning venues are opportunities to broaden thinking and get more stakeholders involved. There are numerous interests in transmission, which is an opportunity for politicians to mobilize stakeholders and get them involved in the process.

In response to questions, participants also made the following points:

- Long transmission lines connecting Midwest generation to East Coast cities cross many states en route. There are, however, interests in those intermediate states. We need move away from a “zero-sum game” – should a farmer with transmission lines get a onetime payment while a farmer with a wind turbine receives royalties?

- In regards to the Cape Wind project in Massachusetts, stakeholders concerned about their viewshed had the effect of raising transmission prices. These types of debates need to move beyond NIMBY interests to consider the broad benefits, such as national security.

### **Commissioner Ron Binz, Colorado Public Utilities Commission**

Commissioner Binz spoke more broadly about the economics of transmission, highlighting how state commissioners and legislators can work together. Drawing on his experience in Colorado and knowledge of other states, he highlighted the following trends:

- States are increasing Renewable Portfolio Standards (RPSs) and Congress is considering a national RPS. Colorado increased theirs from twenty percent to thirty percent, a significant increase requiring much more wind generation and transmission.
- States are deciding whether to import wind or produce it locally. California, for example, has imported renewable energy from the western region, but is now beginning to consider how to generate that power in-state.
- States are refining the economics of transmission, as the need for transmission increases with renewables development. The number of bids for renewables development is surpassing expectations, and some are in more transmission rich areas than others are. This is leaving states with economic choices in the financing and approval processes.

Commissioner Binz spoke extensively about opportunities for commissioners and legislators to collaborate. As a commissioner, he stated that it is helpful for legislators, with their grasp on what is politically feasible, to set policy direction and broad legislation (e.g. how much renewable energy should be exported or used to satisfy native load). In turn, commissioners have the expertise to determine the details of legislation. He informed legislators that commissions are attempting, to the extent the institutional boundaries to their authority allows, to expedite transmission approval processes.

Commissioner Binz highlighted several policies of the Colorado commission:

- They are aggressively attempting to speed up the approval process. They are forming a rulemaking to create a fast track for factors like noise, size of conductors, corridors, etc.
- They act as a backstop to local authority.
- Once a line is approved, the cost is spread to all rate-payers so bidders are not assessed additional cost.

In response to questions, participants also made the following points:

- The standards for fast-tracking approval were determined in a joint process. They conducted many workshops, and FERC's process for pipelines served as a model.
- For projects that involve corridors through private land and/or NIMBY interests, the practical option is to offer compensation for the value of using land. This is similar to farmers who allow turbines on their land receiving royalties. The question is whether the process can move quickly enough to avoid squandering opportunity.

- Cost planning is becoming more complex with import/export scenarios. For example, in the Eastern Interconnect, the Midwest exports power to East coast population centers, indicating the cost burden for transmission should fall on Eastern beneficiaries. However, Eastern demand creates jobs in the Midwest. Public Utility Commissions do not traditionally look at these economic development factors, but in Colorado, and increasingly in other states, statutes are requiring them to do so.

## VII. Current Regional Landscapes

Speakers addressed the issues and status of transmission development in regionally focused presentations, providing lawmakers with a foundational understanding of the current transmission landscape in their respective regions. Representatives from Wind on the Wires (WOW) spoke on the Midwest, the Utility Integration Group (UWIG) on the East, and the Colorado Public Utilities Commission on the West.

### Midwest: Beth Soholt, Wind on the Wires

Ms. Soholt spoke on the current transmission landscape in the Midwest Independent System Operator (MISO) footprint. MISO is an RTO comprised of thirteen U.S. states and Manitoba. Much of the high quality wind power comes from the western half of the footprint – the Dakotas, Iowa, and Minnesota – while much the load is in the eastern half. There is, however, movement to develop wind power in each state as the abundance of wind in the Midwest gives it an essential role in the 20% wind vision. Furthermore, many scenarios anticipate export opportunities to the east and south.

Of the active interconnection requests in the queue, 363 of them, or 86.5%, are wind power. Request for Proposals (RFPs) by utilities are receiving robust responses. Every state in the MISO footprint has an RPS, except for Indiana and Kentucky, but there is significant movement in these states towards that goal.

Current issues include cost allocation, wind integration, transmission planning, and siting/routing. On cost allocation, MISO will make a filing with FERC on July 15, 2010 to broaden the cost of new transmission, similar to SPP's recently approved filing. The hope is to limit the cost to generators to five to ten percent in order to accommodate the current influx of projects in the queue.

Regional transmission planning processes, such as the Eastern Interconnect Planning Collaborative (EICP) provide opportunities to create solutions to complex planning and siting issues involved in generation and transmission build out. One of these closely watched issues is wildlife impacts, and the current studies on bird and bat interactions have not raised serious concerns.

In response to questions, participants also made the following points:

- FERC has 60 days to act on the July 15 filing, which they can reset for 120 days. The cost to generators is likely to be litigated so the earliest estimate for a decision is within a year. Investors and developers could use clarity on this as soon as possible, and MISO would like to satisfy its footprint's demand with its own power.

### **West: Commissioner Rob Binz, Colorado Public Utilities Commission**

Commissioner Binz explained current regional initiatives in the West, particularly concerning Colorado. Most of the West does not have RTOs. Instead, they rely on relationships utilities have maintained for years. This system continues to work but new generation shipped over longer distances has added stress. There are attempts at regional transmission planning, which could yield greater collaboration.

Colorado is participating in several regional forums. One example initiative is the identification of Renewable Energy Zones. Additionally, the Intermountain West has several large transmission projects under consideration: West Connect, Trans West Express, and Rocky Mountain Express. These are conceptual amalgamation lines, and the economics are under development.

In response to questions, participants also made the following points:

- Wyoming is currently studying the economics of exporting wind to southwest load centers versus profiting from their coal, oil, and uranium deposits. Whoever owns the land containing energy resources receives royalties, including state or federal government holdings. Solar can get longer-term tax credits or cash grants. Additionally, Wyoming has a severance tax for coal and is considering the same for wind.
- California is considering prohibiting the purchase of out-of-state renewable energy. Some states have laws preferring in-state renewable energy. These laws tend to be challenged in court on interstate commerce grounds.

### **East: Charlie Smith, Utility Wind Integration Group**

Mr. Smith discussed the status of transmission in the East and made recommendations for planning. First, Mr. Smith addressed some current issues in light of a future that will undoubtedly see increased demand and renewables development. The current system is providing the minimum for reliability, and energy resources like wind and inter-regional energy transfer are adding stress to the system. The result is low- and high-cost energy pockets. Mr. Smith observed that the system needs more transmission and sufficient volume of low-cost energy. There were three transmission bills introduced in the Senate in 2009 that address some of these issues. The bills shared three common elements: interconnection-wide transmission planning, a high-voltage backbone with broad cost allocation, and federal backstop siting authority.

Mr. Smith explained that the dispute on the East Coast between wind power from the Midwest and local offshore wind power in the 20% wind vision is unnecessary, as concerns exist for both scenarios. The main questions for Midwest power are about economic development and potential for the delivery of power from coal on new transmission lines. The alternative, offshore wind power along the East Coast, is expensive. Mr. Smith highlighted that both scenarios need new transmission, as recommended by the 20% wind study. Even if Midwest power were moving east, Eastern offshore wind would be moving west and south.

Considering Canada's role as an important trading partner with the U.S., the possibility of the New England ISO building lines into Canada, the, and Canadian provinces' inclusion in the Western

Interconnect, they should be included in future discussions about transmission build out in the Eastern Interconnection.

Mr. Smith concluded that there are no technical barriers to achieving twenty percent wind. However, he listed three needs: (i) a large amount of new transmission, (ii) to fill the policy vacuum, and (iii) large balancing areas and sub-hourly markets.

In response to questions, participants also made the following points:

- New England has a close relationship with the Maritime Provinces, creating good opportunity for siting transmission lines even considering the pressure from environmentalists. There already exists a one-megawatt line through New Hampshire.
- Transmission enables inter-state energy commerce, like a gubernatorial candidate's proposal to allow Quebec energy for the Massachusetts Energy Portfolio. It also changes the economics of the state's power industry, which policymakers must consider.
- The SERC Reliability Corporation, whose footprint is the Southeast region, is an important element to the 20% wind vision. A portion of DOE ARRA funding went to SPP and SERC to consider SERC's participation in transmission issues for moving wind from SPP to SERC. SERC uses a large amount of natural gas, and that price will drop as more wind is integrated. There is also great opportunity for manufacturing wind components in the Southeast.

## Day Two

### **VIII. Federal Transmission: Projects and Policy**

A representative from the DOE Office of Electricity (OE) discussed federal policies and activities concerning transmission development. The session considered how federal transmission activities could assist states in reaching their transmission and renewables goals.

#### **Larry Mansueti, US Department of Energy, Office of Electricity**

Mr. Mansueti explained the national transmission landscape and the positions and activities of the White House, Congress, regulatory agencies, and the U.S. Department of Energy.

Most of the recently built transmission lines have been local or regional, which tend not to serve wind and geothermal resources that are far from load centers. To attract buyers and sellers to longer distance lines, proposals called "trial balloons" are announced, most of which are in the West. The economic downturn has slowed demand, and therefore slowed the construction of these long lines.

Two relevant transmission issues are siting and cost allocation. Traditionally, local business deals determined cost allocation, but that decision has shifted to the regional scale. Siting has consistently been time-consuming and resource-intensive, with the exception of SPP. That region is culturally cohesive, and their overlay build-out plan provides benefits to each state.

The Obama administration's energy policy is guided by four principles:

- Invest in energy efficiency in a range of sectors;
- Increase the responsible production of domestic energy, including renewables;
- Immediately address carbon pollution that threatens our climate and sustains our dependence on fossil fuel; and
- Government investment in clean energy is essential for its development (e.g. \$80 billion in funding from the ARRA).

DOE, through ARRA funds, has provided \$12 billion total for transmission activities. Bonneville Power Administration (BPA) and the Western Area Power Authority (WAPA) received money for transmission projects, and DOE awarded \$80 million for the development of regional transmission/resource analysis plans, as previously mentioned. Non-ARRA activities include funding for transmission analysis and wind integration, joint siting law meetings, analytical support to western organizations, a Transmission Congestion Study, and others.

The 2009 DOE Transmission Congestion Study identifies transmission congestion and renewable energy development impeded by lack of transmission. After receiving public comment on these findings, DOE may designate a National Interest Electricity Transmission Corridor. Beyond building transmission, states can employ any means to alleviate congestion, such as efficiency measures or installing photovoltaics. If a state in that corridor cannot alleviate the problem, the process may go to FERC. The 2010 DOE report identified:

- Southern California and the Mid-Atlantic Critical Congestion Areas;
- Constraints in MISO, PJM, and NY ISO; and
- Conditional constraint areas where renewables development is impeded by lack of transmission.

In the legislative branch, there is significant movement on transmission and climate/energy bills. There are four to five bills addressing transmission in some way, though they differ in purpose. Nearly all call for interconnection-wide planning. On the issue of authority, some would give FERC backstop siting authority, and some (such as the Waxman-Markey Bill<sup>2</sup>) would defer to states.

In response to questions, participants also made the following points:

- DOE distributed two AARA grants, \$50 million each, to state public utility commissions to address energy assurance and national security. Specifically, one grant was for staffing, the other for energy assurance creation plans. NERC and FERC enforce regulations on transmission system security. To learn more, legislators can ask their governor's office how they are using these funds.
- It is unclear whether an energy and climate bill will come to fruition this calendar year. Although regulatory bodies and investors need answers quickly, this is a matter of politics and policymaking with great deal of uncertainty.

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<sup>2</sup> American Clean Energy and Security Act of 2009, HR 2454, 111<sup>th</sup> Cong., 1<sup>st</sup> Sess. (2009).

## IX. Regional Transmission Case Studies

Representatives from Wind on the Wires, the State of Colorado Governor’s Energy Office, and the Kansas House of Representatives presented case studies of developing and implementing transmission plans. Specific topics included financing, planning, siting, and multi-jurisdictional coordination.

### Beth Soholt, Wind on the Wires

Ms. Soholt highlighted several transmission projects, studies, and planning collaborative in the Midwest. MISO states RESs are creating demand for renewable energy that requires new transmission. Over 10,000 megawatts of wind generation is currently produced in MISO and PJM, and there is approximately nine times that amount in their interconnection queues combined.

Ms. Soholt explained several SW and SE Minnesota transmission projects for wind generation, including:

- 825 megawatts – study was completed in 2001 and fully operational by 2008
- Incremental 400 megawatt project at Buffalo Ridge – gained regulatory approval in 2007 and operational by 2009
- “CapX,” approximately 1000 megawatts – based on 345 kilovolt lines, approved 2009 with estimated operation date of 2015
- Regional Incremental Generation Outlet – incremental transmission lines for achieving 700 megawatts of additional outlet capacity in Southeast Minnesota

The CapX project considered three transmission line scenarios and selected their overlaps. These lines will serve as a backbone for Minnesota’s reach into wind-rich areas in North and South Dakota. While CapX had to overcome the normal litigation obstacles, two years of public education preempted these cases, which improved collaboration in the approval process.

MISO’s Regional Incremental Generation Outlet Study considered the transmission needed to implement RPSs at the lowest cost to consumers while preserving reliability. Phase 1 focused on the western portion of MISO and Phase 2 on the eastern portion. Beyond the technical pieces for transmission build up, it presented the business and broader stakeholder cases for the expansion plan.

In response to questions, participants also made the following points:

- While Minnesota has been successful with transmission build outs, they represent a decade of hard work, education, and large amounts of collaboration between regulators, utilities, environmental groups, developers, and legislators. An aggressive RPS has been the primary driver.
- In the SPP, industry and regulators were not as interested in proposals for 765 kV lines because demand did not immediately necessitate them. Naturally, building lines derived from long-term planning has uncertainty. It is unclear if MISO will conduct fifteen- to twenty-year planning. One strategy is to establish the corridor: allow for a 756 kV line, but only build a 345 kV line for now. Navigating the process, the right of ways, etc. is difficult enough that a small rate hike now makes it worthwhile to not undergo the process again in five years.

- The 30% renewable goal from the Midwestern Governors' Association includes wind, solar, and big and small hydro. It excludes nuclear and clean coal.

### **Morey Wolfson, State of Colorado Governor's Energy Office**

Mr. Wolfson discussed the development of abundant renewable energy resources and their required transmission in Colorado. The 2006 legislature created a Transmission Infrastructure Task Force, consisting of diverse stakeholders, to formulate key recommendations. One of the recommendations was to map Colorado renewable energy resources, resulting in the SB 91 report. This was the impetus behind the current renewables development in the state.

In conjunction with NREL, the report identifies ten Generation Development Areas (GDAs) with 110 gigawatts of capacity. The GDAs, however, do not have sufficient high-voltage transmission to deliver power to load centers. Wind GDAs are in the eastern half of the state, and solar GDAs exist in the southeastern quadrant. The wind GDAs have the potential to produce over 96 gigawatts of capacity, roughly eight times the state's current peak electricity use. With newer data and higher tower heights, the new calculation is approximately 300 gigawatts.

The Interwest Energy Alliance reports that 1,246 megawatts of wind was installed in Colorado at the end of 2009. Mr. Wolfson highlighted several examples of the state's wind development progression:

- NextEra Energy's 174 megawatts in Logan County, CO
- RES America's 252 megawatts is expected to be completed by the middle of 2011
- Tri-state's 51 megawatts in Eastern CO

The two solar GDAs, in the San Luis Valley and South and Southwest Pueblo, are particularly rich in solar resources. If all the land were developed it would produce 1,300 gigawatts, which is more than all the current installed capacity in the U.S. If two percent of the land were developed, it would provide twenty-six gigawatts, which is more than twice the peak load on the hottest day in the state.

The legislation also changed policies that might act as barriers to renewables development. For example, for a utility to build transmission lines, they had to install the lines and begin service before seeking cost recovery. The bill eliminated this disincentive by allowing Investor-owned Utilities (IOUs) to charge for every increment (mile and month), equating to a small surcharge on customer bills.

The major piece of the legislation was to require IOUs to identify transmission lines to energy resource zones. Mainly applying to Xcel Energy (serving 95% of Colorado), this means there must be a transmission build-out plan to the GDAs.

Currently, there are \$670 million of transmission projects planned through 2018 in Colorado. With other coordinated regional projects, there is \$1.2 billion through 2018. This is mostly the result of the legislature's and governor's office's bipartisan interest in economic development.

Colorado participated in an RFP on central power, renewable energy, and transmission development. The result was the Renewable Energy Development Infrastructure Project (REDI). There were two directives from the governor's office:

- Develop a new energy economy, including environmental and high-tech clean-tech jobs.
- Advance a climate initiative (not proposed in legislature) of 20% reduction of CO2 by 2020, from 2005 levels.

The REDI Report concludes that the following measures be taken:

- Greatly increase investment in demand-side resources (e.g. energy efficiency, demand-side management, demand response, and conservation).
- Greatly increase investment in renewable energy development, particularly utility-scale wind and solar generation.
- Accelerate construction of high-voltage electric power transmission to deliver renewable energy from Colorado's renewable resource generation development areas to the state's major load centers.
- Strategically use natural gas-fired power generation to provide needed power to the grid and to integrate naturally variable renewable resources.
- Consider decreasing the utilization factor of coal-fired generation and/or consider early retirement of the oldest and least efficient coal-fired units.

In response to questions, participants also made the following points:

- The impact of 30% variable generation penetration is relatively safe, but higher percentages have not been studied. Xcel and Black Hills, the two utilities operating in Colorado, backed the 30% initiative, indicating they were comfortable managing those penetrations.
- While a new study from the governor's office is not in the context of WECC, it uses a great deal of WECC information and interfaces closely with larger-context studies.

### **Representative Tom Sloan, Kansas House of Representatives**

Representative Sloan highlighted two projects in the SPP. He began by noting laws that enable transmission develop in Kansas:

- The Public Utility Commission (PUC) can meet with the PUCs of other states to coordinate transmission development.
- Transmission can be built on existing rights-of-way without additional approval. This law was used to quickly upgrade a thirty-mile line that was a major congestion point for SPP. Installation gained approval in November and was in service by April.

Kansas transmission authorities allow utilities to have the right of first refusal. For a line from Spearville, Kansas up to Nebraska, the utility refused the opportunity to bid in order to preserve market power. An independent transmission company, ITC Holdings, will construct the line. This is the first time a non-incumbent utility will build a project in Kansas or the SPP.

Representative Sloan highlighted a second transmission project, from Spearville, Kansas down to the Oklahoma line. This significant line is part of the new transmission backbone planned for the region. The transmission authority has become an integral player with the SPP in that they attend meetings and

spoke, but they do not have a vote. They have requested the SPP to conduct economic studies and others.

Currently, they are looking at two other lines the transmission authority might sponsor. The first is a feeding line to the backbone system. The second is a low-level system connecting municipal electric systems. Many of the small municipalities are paying market price for electricity because they do not have access to the wholesale market. They connect to one transmission line owned by a big generator. This project is giving smaller systems access to the marketplace. Even the potential construction of these low-level systems is driving renegotiation of electricity prices.

Reflecting on his experience, Representative Sloan commented that their success has created positive movement in the private sector, though it was not easy accommodating all stakeholder interests. The state is exploring ways to limit the time for appeals in regulatory and judicial systems. He also commented that a lack of education makes it difficult to mandate that utilities do long-range planning. Furthermore, energy needs, capacity, state of the system, expansion and generation needs are proprietary information, but will enable legislatures to set policy direction.

## **X. Opportunities for State Policymakers – Roundtable Discussion**

In the meeting's final session, State policymakers had the opportunity to address three questions: (1) What options do legislators have and what further information do they need to create effective transmission policy? (2) What collaborative efforts do legislators view as critical to the success of improving and expanding transmission? (3) How can regional collaboration address state interests?

Participants made the following comments on options for legislators and further information required:

- Regardless of renewables integration, transmission development is needed to ensure reliability as demand grows.
- Depending on location, wind may already be cheaper and we need to consider cost comparability and viability.
- State policymakers can put pressure on their federal counterparts to pass a climate and energy bill. There are billions of dollars for investment, waiting for a mandate. Clear policy signals will allow the market to naturally make investment and spur economic development.
- Clean energy will play an essential role in creating leaders in the new global energy economy. The U.S has lost on the implementation of some technologies we invented (i.e. solar power) even though it has great capability for boosting the economy.
- State policymakers need information on how much they can integrate variable energy without affecting reliability.
- As long as wind is competitive in the market, the Midwest should support enough wind for a baseload.
- Once society recognizes the subsidies and externalized costs of fossil fuels, renewable energy will become more attractive.

- Domestically, we are making progress with manufacturing jobs. For example, Pueblo, CO is the new site for Vestas, the world's largest wind turbine manufacturer, adding 2,500 jobs. A German inverter company is bringing another 1,500 jobs.

Participants made the following recommendations for collaboration:

- Address how to evaluate the economics of building native resources even if they are inferior to other regions. Bring together vendors and manufacturers with state officials to catalyze economic development.
- Engage federal policymakers to impress on Washington the need for clear policy signals in order to stimulate investment.

Participants made the following suggestions for NCSL and NWCC:

- Study wind as a potential baseload.
- Provide assistance for generation siting, particularly in the East where viewshed concerns are paramount.
- Study the costs of transmission lines and compare the costs of renewable and non-renewable generation plants over their entire lifetime. Communicate to legislators how this affects their constituencies.
- Host a forum that includes state legislators, DOE, FERC, Congress, the White House, and PUCs. Encourage dialogue and brainstorm on how to accommodate the various interests represented in energy development.
- Provide risk management tools to legislatures to minimize the risk of crises. Topics include energy storage and redundancy of electrical transmission and distribution system. How should policy address technological changes? How much should people pay to back-up the power system in the case of natural disasters? What is required for wind to be a baseload?
- Proactively address the issue of Midwest transmission to East Coast population centers. Specifically address economic development.

Participants also made the following comments:

- With renewables, energy production is shifting from east to west. The West is very market-based, while the East has smaller RTO's and jobs are a more important issue.
- High-level conversations about many of these issues are already taking place at NREL and other laboratories. Support for reliability, issues at the distribution level, etc. is available.

# Transmission Policy Institute

Magnolia Hotel — Denver, Colorado

June 17-18, 2010

## Thursday, June 17 (Larimer Room)

8:00-8:30 am

**Breakfast and Registration**

8:30-8:45 am

**Welcome and Introductions**

Glen Andersen, NCSL & Rep. Tom Sloan, Kansas House of Representatives

8:45-10:30 am

**Transmission Planning for the Future**

Many energy planners agree that the current transmission system needs significant upgrading, given the development of new energy technologies and projected growth in energy demand. This session will explore the current state of the U.S. electric grid and what changes will be needed to ensure a stable and affordable delivery of energy. Transmission plans in the Eastern and Western U.S., including the successes and challenges to meeting the transmission needs of these regions, will also be covered.

Moderator: *Glen Andersen, NCSL*

Speakers

*Byron Woertz, Western Electricity Coordinating Council*

*Lauren Azar, Commissioner, Wisconsin Public Service Commission*

*John Flynn, American Electric Power*

10:30-10:45 am

**Break**

10:45-12:00 pm

**Transmission Siting**

Getting transmission lines sited can be one of the largest challenges to getting them built. Those that may not perceive benefit from the lines tend to be averse lines being built on or near their property. The approach that is taken in siting lines, along with existing state policies, can have a dramatic effect on the ability to get needed transmission lines built. This session will look at the challenges of transmission siting and policies that have helped streamline the process and will also explore the roles state and federal wildlife agencies and NGOs have in respective regions.

Moderator: *Glen Andersen, NCSL*

Speakers

*Ashley Conrad-Saydah, Bureau of Land Management*

*Sarah Ball, Edison Electric Institute*

12:00-1:00 pm

**Lunch**

1:00-2:30 pm	<p><b>Energy Integration and Transmission Alternatives</b></p> <p>This session will explore the basics of how renewable energy is integrated into the electric grid and why new transmission will be needed in order to meet state renewable energy goals. The mechanics of renewable energy will also be discussed:</p> <ul style="list-style-type: none"> <li>• How are multi-variable output sources integrated into the grid?</li> <li>• What is the role of demand management and energy efficiency?</li> <li>• What is the role of smart grid technology and how can it improve demand management?</li> <li>• What role with smart grid technologies play?</li> </ul> <p>Moderator: <i>Rep. Tom Sloan, Kansas House of Representatives</i></p> <p>Speakers  <i>Charlie Smith, Utility Wind Integration Group</i>  <i>Ed DeMeo, Renewable Consulting Services</i>  <i>David Corbus, National Renewable Energy Laboratory</i>  <i>Rebecca Johnson, University of Colorado</i></p>
2:30-3:30 pm	<p><b>The Economics of Energy Distribution</b></p> <ul style="list-style-type: none"> <li>• What are the costs associated with transmission projects and how are they allocated and recovered?</li> <li>• What are the coordination and cost-recovery options for funding transmission lines across multiple states or jurisdictions?</li> </ul> <p>Moderator: <i>Glen Andersen, NCSL</i></p> <p>Speakers  <i>Ron Lehr, American Wind Energy Association</i>  <i>Ron Binz, Colorado Public Utilities Commission</i></p>
3:30-3:45 pm	<p><b>Break</b></p>
3:45-4:45 pm	<p><b>Current Regional Landscapes</b></p> <p>Issues impacting transmission development and expansion vary by State and regions. Regional breakout sessions will provide lawmakers with a foundational understanding of the current transmission landscape for their respective region.</p> <p>Moderator: <i>Charlie Smith, Utility Wind Integration Group</i></p> <p>Speakers  <i>Midwest: Beth Sobolt, Wind on the Wires</i>  <i>East: Charlie Smith, Utility Wind Integration Group</i>  <i>West: Ron Binz, Colorado Public Utilities Commission</i></p>
5:00-6:30 pm	<p><b>Reception (Glenarm Room)</b></p>

## Friday, June 18 (Larimer Room)

8:00-8:30 am	<b>Breakfast</b>
8:30-9:30 am	<p><b>Federal Transmission: Projects and Policy</b>            Federal policies and activities may have a significant impact on transmission development. This session will review the current transmission planning activities being conducted by the federal government and look at how federal action could assist states in reaching their transmission goals.</p> <p>Moderator: <i>Glen Andersen, NCSL</i></p> <p><i>Larry Mansueti, U.S. Department of Energy Office of Electricity</i></p>
9:30-10:45 am	<p><b>Regional Transmission Case Studies</b>            Many states are in the process of developing and implementing transmission plans. This session will review case studies from the Midwest, Colorado, and Kansas and explore how these regions are attempting to deal with issues of financing, planning, siting, and multi-jurisdictional coordination.</p> <p>Moderator: <i>Rep. Tom Sloan, Kansas House of Representatives</i></p> <p>Speakers  <i>Beth Sobolt, Wind on the Wires</i>  <i>Morey Wolfson, State of Colorado, Governor's Energy Office</i>  <i>Rep. Tom Sloan, Kansas House of Representatives</i></p>
10:45-11:00 am	<b>Break</b>
11:00-11:45 am	<p><b>Opportunities for State Policymakers - Roundtable Discussion</b></p> <ul style="list-style-type: none"> <li>• What options do legislators have and what further information do they need to create effective transmission policy?</li> <li>• What collaborative efforts does each legislator view as the most integral to the success of improving and expanding transmission?</li> <li>• How do you address state interests at the regional level in the Western and Eastern interconnects</li> </ul> <p>Moderator: <i>Glen Anderson, NCSL</i></p>
11:45-12:00 pm	<b>Wrap-Up and Adjourn</b>

## Participant List

**Glen Andersen**

Program Principal  
Environment Energy & Transportation  
National Conference of State Legislatures  
[glen.andersen@ncsl.org](mailto:glen.andersen@ncsl.org)

**Lauren Azar**

Commissioner  
Public Service Commission of Wisconsin  
[Krystal.Jones@wisconsin.gov](mailto:Krystal.Jones@wisconsin.gov)

**Sarah Ball**

Manager, Environmental Affairs  
Edison Electric Institute  
[sball@eei.org](mailto:sball@eei.org)

**Ron Binz**

Chairman  
Colorado Public Utilities Commission  
[ron.binz@dora.state.co.us](mailto:ron.binz@dora.state.co.us)

**Makisha T. Boothe**

Senior Advisor  
Colorado Senate Democrats  
Office of the Senate President  
[Makisha.Boothe@state.co.us](mailto:Makisha.Boothe@state.co.us)

**Honorable Marcus Conklin**

House Assistant Majority Floor Leader  
Nevada  
[mconklin@asm.state.nv.us](mailto:mconklin@asm.state.nv.us)

**Ashley Conrad-Saydah**

Renewable Energy Project Manager  
Renewable Energy Coordination Office  
Bureau of Land Management  
[Ashley\\_Conrad-Saydah@blm.gov](mailto:Ashley_Conrad-Saydah@blm.gov)

**Dave Corbus**

Senior Engineer  
National Renewable Energy Laboratory  
[David.Corbus@nrel.gov](mailto:David.Corbus@nrel.gov)

**James Damon**

Outreach Coordinator  
National Wind Coordinating Collaborative  
[JDamon@resolv.org](mailto:JDamon@resolv.org)

**Ed DeMeo**

President  
Renewable Energy Consulting Services  
[edemeo@earthlink.net](mailto:edemeo@earthlink.net)

**John J. Flynn**

Managing Director  
Transmission Strategy & Business Services  
American Electric Power  
[jflynn@aep.com](mailto:jflynn@aep.com)

**Jennifer E Gardner**

Intern  
Environment, Energy and Transportation  
National Conference of State Legislatures

**Honorable Chris Herrod**

State Representative  
Utah  
[cherrod@utah.gov](mailto:cherrod@utah.gov)

**Honorable Bill Hilty**

State Representative  
Minnesota  
[rep.bill.hilty@house.mn](mailto:rep.bill.hilty@house.mn)

**David Hurlbut**

Senior Analyst  
Strategic Energy Analysis Center  
National Renewable Energy Laboratory  
[David.Hurlbut@nrel.gov](mailto:David.Hurlbut@nrel.gov)

**Honorable Scott K. Jenkins**

Senate Majority Leader  
Utah  
[SJenkins@utahsenate.org](mailto:SJenkins@utahsenate.org)

**Rebecca Johnson**

Renewable and Sustainable Energy Institute  
University of Colorado  
[rebecca.johnson@colorado.edu](mailto:rebecca.johnson@colorado.edu)

**Ron Lehr**

Attorney, AWEA Western Representative  
American Wind Energy Association  
[rllehr@msn.com](mailto:rllehr@msn.com)

**Larry Mansueti**

Office of Electricity  
U.S. Department of Energy  
[lawrence.mansueti@hq.doe.gov](mailto:lawrence.mansueti@hq.doe.gov)

**Honorable James W. Merritt, Jr.**

Senate Majority Caucus Chair  
Indiana

**Honorable Donald W. Norcross**

State Senator  
New Jersey

**Honorable Frank Pratt**

State Representative  
Arizona

**Honorable Nathan K. Reichert**

State Representative  
Iowa  
[nathan@nathanreichert.com](mailto:nathan@nathanreichert.com)

**Honorable Dan Reitz**

State Representative  
Illinois General Assembly  
[repreitz@egyptian.net](mailto:repreitz@egyptian.net)

**Tim Sandusky**

Project Assistant  
RESOLVE  
[tsandusky@resolv.org](mailto:tsandusky@resolv.org)

**Honorable Ken Schilz**

State Senator  
Nebraska  
[kschilz@leg.ne.gov](mailto:kschilz@leg.ne.gov)

**Honorable Michael A. Schneider**

Senate President Pro Tempore  
Nevada  
[mschneider@sen.state.nv.us](mailto:mschneider@sen.state.nv.us)

**Honorable Brandon C. Shaffer**

Senate President  
Colorado General Assembly  
[brandon.shaffer.senate@state.co.us](mailto:brandon.shaffer.senate@state.co.us)

**Honorable Tom J. Sloan**

State Representative  
Kansas  
[sloan@house.state.ks.us](mailto:sloan@house.state.ks.us)

**Charlie Smith**

Executive Director  
Utility Wind Integration Group  
[info@uwig.org](mailto:info@uwig.org)

**Honorable Frank Israel Smizik**

State Representative  
Massachusetts  
[Rep.FrankSmizik@hou.state.ma.us](mailto:Rep.FrankSmizik@hou.state.ma.us)

**Beth Soholt**

Director  
Wind on the Wires  
[bsoholt@windonthewires.org](mailto:bsoholt@windonthewires.org)

**Honorable Max Tyler**

State Representative  
Colorado

**Byron Woertz**

Senior Project Manager  
Western Electricity Coordinating Council  
[bwoertz@wecc.biz](mailto:bwoertz@wecc.biz)

**Morey Wolfson**

Utilities Program Manager  
Colorado Governor's Energy Office  
[morey.wolfson@state.co.us](mailto:morey.wolfson@state.co.us)