



# Transmission Workgroup

## History and Accomplishments

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[www.nationalwind.org](http://www.nationalwind.org)

Through the Transmission Workgroup, the NWCC was a leading facilitator and resource to stakeholders and worked to ensure that wind power receives fair – though not preferential – treatment with respect to transmission services.

### Summary

Between 1999 and 2010, the National Wind Coordinating Collaborative (NWCC) contributed significantly to enabling wind power's expansion by engaging industry, federal and state agencies, legislators, environmental organizations, and regulators in dialogues to examine issues that impact the integration of wind power onto the transmission grid and generate solutions that address the transmission challenges facing wind power development.

By providing a ***national model of collaboration*** and a ***forum for other stakeholders to participate in transmission planning processes***, the NWCC Transmission Workgroup made a contribution to transforming the transmission planning landscape from an isolated, expert-driven decision-making process to an increasingly open and collaborative process accommodating a larger group of stakeholders and their interests. This model was ratified by Congress and applied to the entire country in the American Recovery and Reinvestment Act (ARRA), which required the U.S. Department of Energy (DOE) to engage the three national grids in planning that included stakeholder participation.

Over the course of 12 years, NWCC's studies, education, outreach, and meetings resulted in many achievements by:

- stimulating dialogue;
- providing education that enabled hundreds of people to take part knowledgeably in transmission discussions;
- increasing the wind community's awareness of the complexities of reliable power system operation and the technical issues arising from wind integration;
- informing policy and regulatory decisions across the country; and
- prompting increased consideration of wind power's value.



Photo courtesy of NREL, PIX 16694.



Photo courtesy of NREL, PIX 19500.

Notably, NWCC has contributed to the following initiatives, studies, and goals:

- Western Governors' Association's (WGA) Clean and Diversified Energy Analysis project and Western Renewable Energy Zones (WREZ) Initiative
- Western Electricity Coordinating Council's Regional Transmission Expansion Planning project
- Midwestern Independent System Operator's (MISO) 20% wind study plans
- CAPX2020 initiative in Minnesota
- Joint Coordinated System Plan study
- Midwestern Governors Association (MGA) Renewables and Transmission Goals

This paper outlines the outcomes, approach, history, and successes of the NWCC Transmission Workgroup since its inception.

*"NWCC has been able to convene forums, reach consensus, and catalyze action on very difficult topics dealing with transmission planning and cost recovery, which at times have seemed intractable. There is no other organization with the objectivity and credibility necessary to bring together the very diverse group of stakeholders involved in the transmission planning process. I attribute much of the progress on transmission planning in MISO, SPP, and WECC to the catalyzing actions which grew out of the NWCC forums held in their regions."*

J. Charles Smith

Executive Director, Utility Wind Integration Group

## NWCC Approach Applied to Transmission Issues

Throughout its lifetime, the NWCC has used an approach of education, issue identification, and action to address the most pressing issues affecting wind power development in the U.S. This approach was applied to address issues related to integrating wind onto the transmission grid as follows:

- Educate NWCC participants about topics of concern related to transmission of wind power;
- By learning more, identify specific issues and regions of immediate concern that NWCC transmission activities have the capacity to address; and
- Develop and implement an action plan (which included meetings, studies, targeted education efforts, publications, and outreach) to address the issues.

## Outcomes and Products of the Transmission Workgroup

The NWCC Transmission Workgroup generated many valuable outcomes and products during its 12 years of activity, including:

- developing Regional Transmission Organizations (RTO) Transmission Principles;
- solving problems at the regional level;
- bringing wildlife considerations into transmission planning; and
- discussing all renewables and transmission planning processes.

The NWCC worked on defining transmission issues for wind before the Workgroup was formed. Members studied, wrote, and published issue papers that set out the broad definitions of wind-transmission issues. Over time, focus on these issues sharpened and work in the upper Midwest and West identified the need to associate the best wind resource areas with loads and engage transmission planners to plan lines to connect these resources with loads. The Transmission Workgroup formed to support both transmission planning efforts for wind and to address how the wind included in the electric system could be integrated into utility operations.

These latter discussions helped to define the program of the Utility Wind Integration Group (UWIG), as well as related work by a dedicated team of integration experts at the National Renewable Energy Laboratory (NREL). The Workgroup had the salutary effect of providing close coordination between DOE's transmission planning and wind integration efforts.



Photo courtesy of NREL, PIX 19498.



Photo courtesy of NREL, PIX 16702.

## Regional Transmission Organizations Transmission Principles

The Transmission Workgroup's first major accomplishment was a set of RTO Transmission Principles, which outlined keys to maintaining open, competitive markets to the equal benefit of wind and all other fuel sources.

These principles were developed during the NWCC's second Transmission Workgroup meeting in March of 2000, during which participants worked to refine a set of transmission issues that if successfully resolved, could help reduce barriers to the future expansion of wind power. As a result of two days of in-depth discussion and debate, the diverse group of participants arrived at a set of draft principles, and after further discussion and negotiation, the following final consensus-based NWCC RTO Principles were released in September 2000:

- While recognizing regional differences and needs, RTOs should cover large contiguous areas and coordinate with each other to widen trading areas and ensure transmission system reliability.
- RTOs should eliminate pancaking of transmission rates within and between RTOs.
- RTO decision-making should provide for non-transmission owner participation in accordance with FERC Order 2000.
- RTOs should mitigate seams issues between RTOs and have sufficient authority to resolve seams problems.
- RTOs should adopt interconnection requirements that are fair, non-discriminatory, and standardized.
- RTOs should accommodate the presence of and need for real-time markets as well as forward markets.
- Ancillary services should be based on competitive market prices.
- RTO pricing policies should support efficient competitive markets that treat intermittent resources fairly.
- RTO transmission planning processes should be transparent and open to all resource options.

The publication of these principles helped to put wind power on the transmission map, encouraging the RTO's to provide a balanced playing field for wind and other renewable resources dependent on access to the grid.

## Solving Problems at the Regional Level

In response to the Federal Energy Regulatory Commission’s (FERC) delegation of the implementation of open-access transmission policy to the regions, the Workgroup focused outreach efforts at the regional level early in its lifetime. Between 1999 and 2008, the NWCC held workshops in key regions to foster dialogue about proactive transmission planning that recognizes longer term trends and wind development. These workshops provided a bridge between transmission experts and key decision makers who were not familiar with the rules, terms, and structure of transmission planning. The goals of these workshops were to increase understanding by all and begin the discussion on how to move from planning to implementation.

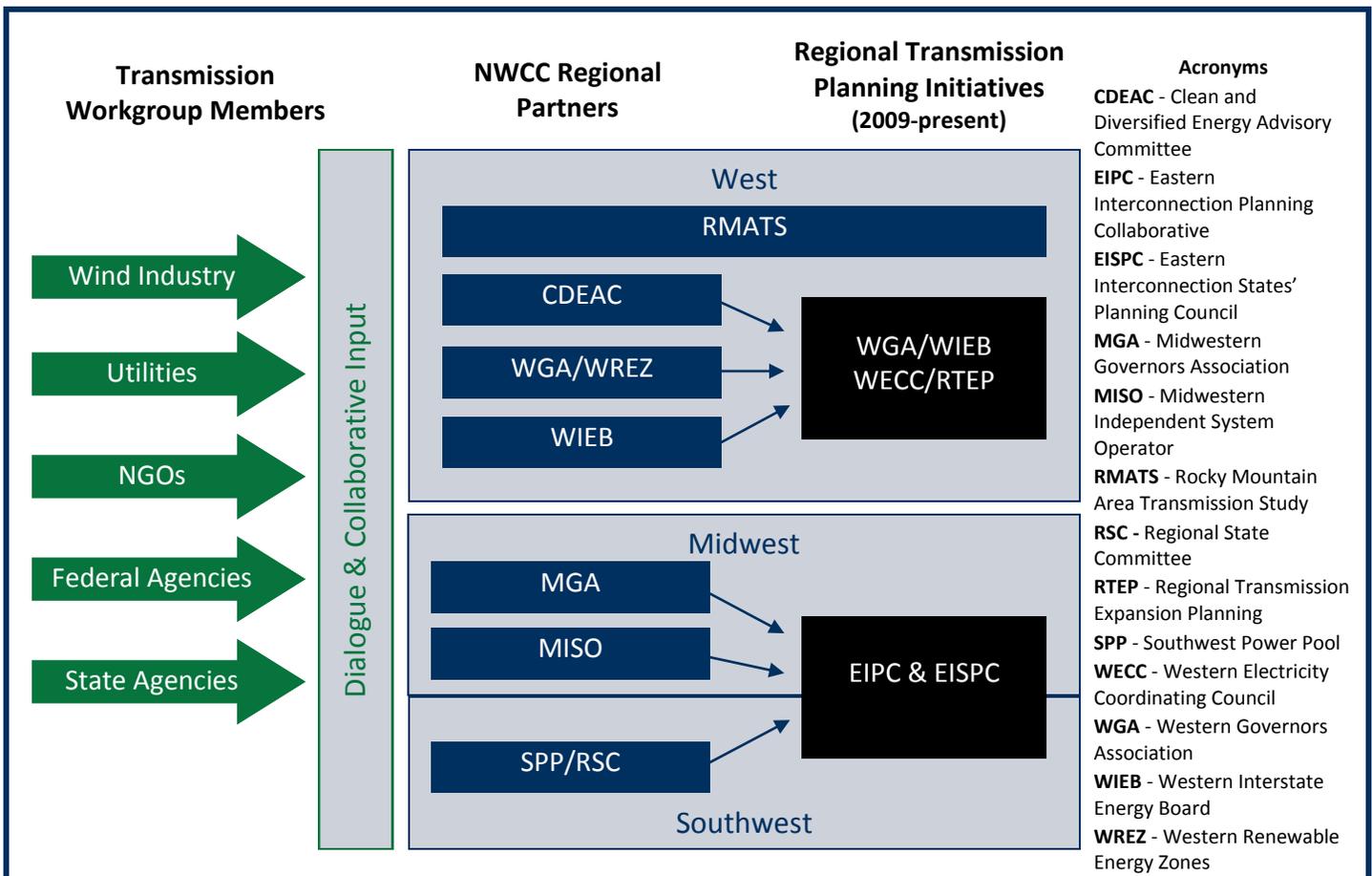
“NWCC provided the opportunity for cross pollination and the sharing of best practices across the region and between RTOs. NWCC was instrumental in convening groups that would never normally talk, allowing for the creation of new ideas and new approaches.”

Beth Sohlt  
Executive Director, Wind on the Wires

NWCC meetings, hosted in partnership with other organizations, led to the creation of state and regional initiatives to continue the dialogue and helped bring the regional discussion on wind energy and transmission to its current level. By bringing stakeholders who had the ability to support or oppose lines into the planning process early, NWCC’s regional meetings opened the possibility that stakeholder support could be “earned” in the planning process. This required that stakeholder concerns be respected, listened to, and integrated into the planning process.

The NWCC’s focus at the regional level helped establish wind as a consideration at all levels of public decision making during transmission planning processes. It also helped justify transmission for wind to private decision makers trying to decide whether to risk their capital on building lines for wind. The entry of independent transmission companies into the markets for new lines—as well as the success of these firms in starting to build lines for wind—shows the achievements of this planning process.

Figure 1 summarizes how the regional approach adopted by the Workgroup fed into today’s transmission planning landscape.



**Figure 1:** Foundational work at NWCC meetings promoted dialogue among experts that resulted in official forums where broad stakeholder groups are now discussing how to balance various interests (including markets, operations and reliability, economic, environmental, energy security) when incorporating renewables into transmission.



Photo courtesy of NREL, PIX 00001.



Photo courtesy of NREL, PIX 16442.

## Key Accomplishments Achieved In the Midwest, West, and Southwest Regions

This section describes the key goals and accomplishments in the three regions where the NWCC focused its efforts. The choice of these regions is a direct result of wind resource availability and need to get the resource to market, which can often require building new transmission.

### Midwest

While the Midwest has some of the country’s greatest wind resources, transmission facilities connecting windy areas to load centers are minimal. Where lines exist, they are contracted to remote coal and hydro facilities, and they typically have no or very little contract capacity to add new wind projects.

The Workgroup began its work in the Midwest by examining the needs in the Upper Midwest and Great Plains through a case study (see box to the right) and organizing issue-based forums in the region between 2001 and 2008. These meetings convened stakeholders who presented differing views on the need for new transmission in the region to explore the situation in the Midwest and work towards addressing the major issues identified for the region.

During this time, MISO was becoming established as an Independent System Operator (ISO) to govern transmission of electricity throughout the Midwest, and in 2001, FERC established MISO as the first RTO under Order 2000. At a March 2002 workshop, MISO staff informed stakeholders about its five-year transmission planning process and invited the wind community to provide input to develop a wind scenario for the region. This opened the door for ongoing dialogue between transmission planners and stakeholders representing wind interests and resulted in MISO’s process for reliability-based planning that considers the integration of large amounts of wind power—one of the first of its kind in the nation. At subsequent NWCC workshops in the Midwest, MISO transmission plans, which included increasing amounts of wind power, were presented and discussed among members of the electric-power and wind communities.

In 2008, along with the MGA, NWCC convened key stakeholders from throughout the Midwest and around the country to discuss options for implementing the transmission goals of the MGA’s Energy Security and Climate Stewardship Platform for the Midwest, as well as the potential for the Midwest to contribute to 20% wind power in the region and nationwide. The ideas generated at the conference informed the work and the recommendations of the MGA renewables and transmission subgroup. Then Michigan Governor Jennifer Granholm participated in the event and highlighted wind’s potential in the Midwest as well as the supply chain and manufacturing opportunities available in the region. Bringing in policy leaders assisted in getting region-wide recognition of the issues and policy changes needed to support development of transmission.

#### Transmission System Improvements Case Study: Educating Workgroup Members and the Public on What Is Needed to Get More Wind on the Grid

To better understand the barriers to transmission access in the region, NWCC released the *Transmission System Improvements Case Study* in 1999, which examined transmission issues in the Upper Midwest and Great Plains and presented the following conclusions:

- Stakeholder groups have different perspectives that lead to conflicting conclusions on the need for new transmission. Additional education and dialogue on transmission issues would be beneficial to fostering common understanding among diverse interests about both the impacts of the transmission infrastructure to society and its benefits.
- Current transmission planning processes are insufficient for bringing new transmission projects to fruition. A broader consensus is needed on energy policy objectives, environmental impacts, and economic benefits to help resolve the standoff on the need for improvements to the transmission system. An improved regional approach to resolving transmission planning disputes ultimately must be found.
- Transmission system improvements that are needed in the Upper Midwest and Great Plains to serve the needs of wind development and other generation interests seem unlikely to occur without facing continued opposition from environmental and community advocate interests. A new approach that provides assurances that proposed transmission system improvements will produce renewable energy and environmental benefits, and will provide compensation for those along the transmission rights-of-way, may be required.

## Southwest

Directly following FERC's designation of the Southwest Power Pool (SPP) as an RTO October 2004, the NWCC convened the first of three workshops in the region to engage SPP stakeholders in a discussion of:

- regional electrical transmission planning and operating procedures,
- wind power's benefits and challenges, and
- relationships between wind and transmission.

During this meeting, which took place in Arkansas, participants developed a list of ten issues to take to the SPP Regional State Committee (RSC) (see box to the right).

Two additional workshops were held in 2005 and 2007 in Kansas and Texas to continue the discussion, engage new stakeholders, and discuss proposed wind-related actions and activities for the SPP region, including:

- Ensuring full consideration of any production cost savings or other economic benefits of wind integration, in the process of the SPP Regional State Committee's development of its new economic upgrade cost allocation methodology
- Increasing utilization of existing assets through transmission services like conditional firm and redispatch in the Southwest Power Pool and neighboring areas.
- Identifying how to collaborate across boundaries and disciplines on the Extra High Voltage Overlay Study, including suitable cost allocation methodologies.
- Completing a wind integration study for the SPP region.



Photos courtesy of NREL, PIX 18207, 10928, and 15990.

The Southwest Power Pool has made significant progress in building new transmission connecting wind resources to market. In part because of the dialogue initiated by these NWCC-sponsored workshops, the SPP region has evolved from one with very little activity in wind and transmission expansion to one that has conducted extensive studies of transmission needs and benefits. Key management and technical staff at SPP have picked up the ball and are now acting on the results of these studies and are building new transmission that will accommodate more wind power and provide a broad range of regional benefits to their customers.

*“Participation in the NWCC-sponsored workshops and conference calls has been extremely beneficial in enhancing the dialogue and understanding of diverse market participants regarding the complicated issues surrounding wind integration and market development.”*

Jay Caspary  
Executive Director of Transmission Development, SPP

## Key Issues for the SPP RSC

1. SPP has an exceptional wind resource that can produce energy for less than gas, but is severely constrained by inadequate information about available transmission capacity in locations where wind has the most potential, and rigid rules governing its use.
2. There is a current schedule disparity between new transmission lines and wind project schedules – the same problem exists for other energy resources as well as those who want to build transmission.
3. There is a need to develop a cost and benefit ratio necessary for public policy issues asking what the value of the public benefits are, relative to cost recovery.
4. There are fixes in the short-term that can address wind power and other energy needs and transmission capacity rating issues.
5. Wind power will achieve greater penetration in markets that recognize the uniqueness of wind as a resource.
6. The method for determining capacity value is an issue. A low wind capacity value results in a low transmission cost allocation to the base funded project, yet a transmission reservation is still required for the full nameplate value. There were concerns among the group that the methodology is flawed and differentiated from other methods used in other parts of the country.
7. Interstate commerce issues prevent easy permitting when projects extend across state boundaries. The process of permitting multi-state projects could be better accomplished by harnessing the RSC to this purpose, creating a common standard or one-stop resource for permitting.
8. Transparency remains a perceived problem for developers who need to understand transmission system opportunities, needs, and constraints, and while consultants exist who can provide this information, developers expressed concerns that there are often significant delays in providing timely services to developers in this area.
9. There remain questions about the cost benefit ratio of projects, in as much as there could be more clarity on the threshold for approving projects based on this ratio.
10. The size of transmission improvements should be put into perspective. For example, if there is \$500 million assigned to a reliability upgrade portfolio, and \$400 million assigned to Kansas / Panhandle economic upgrades, these overlap such that the costs will be in the range of \$600 – 700 million instead of \$900 million. In addition, the impact of the recommended additions on the average residential bill would be about 50¢ per month.

## West

The NWCC's efforts in the West began with the 2003 *Western Transmission Workshop*. The purpose of the workshop was to educate participants about efforts underway to address transmission planning in the Western U.S. and to enhance transmission planning coordination in the region.

Later that year, NWCC co-sponsored a second Western Transmission Workshop with Portland General Electric Company (PGE) in Oregon, during which participants discussed and deliberated *Transmission Planning Principles* (listed in the box).

In 2006, the NWCC and WGA co-hosted the *Leadership Forum: Implementing Transmission Recommendations in the West* in Denver to jump-start the implementation of WGA's Clean and Diversified Energy Initiative.<sup>1</sup> This meeting was co-hosted by Bonneville Power Administration (BPA), Energy and Environmental Research Center (EERC), Interwest Energy Alliance, Horizon Wind Energy, National Grid, National Association of Regulatory Utility Commissioners (NARUC), National Association of State Energy Officials (NASEO), National Conference of State Legislatures (NCSL), Trans-Elect, and WestConnect.

The forum was attended by over 150 participants including two governors, legislators, wind developers, environmentalists, utilities, independent transmission operators, and many other stakeholder groups. Then WGA Vice Chair and Governor of Wyoming Dave Freudenthal delivered the keynote address, remarks from Senator Pete Domenici were delivered electronically, and Steve Dayney, then Manager of Policy Development for Xcel Energy (and current CEO of REpower USA, an international manufacturer of onshore and offshore wind turbines), reported on the activities of the Clean and Diversified Energy Advisory Committee (CDEAC) Transmission Task Force. Additionally, Colorado Governor Bill Ritter and Wyoming Governor Freudenthal participated in a panel discussion on key issues and needs.

During the meeting, participants committed to the following objectives:

- Encourage state leaders to develop action plans for implementing the CDEAC and Western Governors' wind and transmission recommendations; and
- Obtain commitments from regional and national leaders to implement the action plans.

<sup>1</sup> The Initiative was created by WGA in response to a 2004 resolution that established the following three goals: develop an additional 30,000 megawatts of clean energy by 2015 from both traditional and renewable sources; achieve a 20% increase in energy efficiency by 2020; and ensure a reliable and secure transmission grid for the next 25 years. It is overseen by the Clean and Diversified Energy Advisory Committee (CDEAC). Source: [http://www.westgov.org/component/joomdoc/doc\\_download/90-clean-energy-a-strong-economy-and-a-healthy-environment](http://www.westgov.org/component/joomdoc/doc_download/90-clean-energy-a-strong-economy-and-a-healthy-environment)

As a follow up, the NWCC and WGA hosted a second meeting in 2007, *Increasing Renewable Energy in the Western Grid*. This meeting, along with discussion that occurred at the pre-meeting workshop, Western Transmission and Wildlife Needs at a Crossroads (discussed below), led to the creation of the Western Renewable Energy Zone planning process, was the basis for Senator Reid's transmission planning bill (S. 539), and helped lay the foundation for the \$60 million DOE interconnection transmission planning projects in the West, the East, and Texas (funded through Section 24 of ARRA).

### Transmission Planning Principles

These principles, which were released by the Workgroup in 2004, were designed to help maintain a reliable, efficient, and environmentally friendly electric power system and to suggest standards and criteria to transmission planning entities that will attract widespread public and regulatory support for their transmission expansion and upgrade proposals.

#### Authority

- Transmission planning entities should be independent and publicly accountable.
- The transmission planning entity should have the responsibility to identify needs and the authority to provide incentives for or directly implement solutions that may or may not be available to the market.

#### Scope

- Transmission planning should be integrated with resource planning.
- Transmission planning should be done on a broad, regional basis.
- Transmission plans should fully integrate planning for reliability with planning for competitive markets.

#### Process

- Transmission planning processes should be transparent and facilitate the input of all stakeholders in the region.
- Transmission planning should be based on an appropriate planning horizon and be proactive and responsive to needs of market participants.
- Transmission planning should consider on an equal basis all types of resources available to meet planning goals and to address system resource needs and problems.
- Electric system plans should be based on a life-cycle least-cost standard including external costs such as environmental and societal impacts.
- Transmission planners should use explicit, standardized methods and assumptions for evaluating all resources, including demand-side and intermittent generation technologies.
- Planning results should clearly identify system needs, benefits, and resource options so that market participants have the opportunity to propose and implement viable solutions.

## Bringing Wildlife Considerations into Transmission Planning

Traditional transmission planning processes were focused solely on reliability and did not consider other factors such as markets, operations, and environmental impacts. However, many lines are blocked because transmission planning processes do not adequately address wildlife and lands conflicts during the planning stage. With support from DOE, transmission planning processes have evolved and are now accounting for a wider range of considerations, including environmental impacts and impacts on wildlife. NWCC efforts described here helped educate stakeholders on why incorporating more than economics and reliability is needed and offered educational opportunities and support for stakeholders who had not been involved in transmission planning in the past.



Photo courtesy of South Dakota Department of Tourism.

Photo courtesy of US Fish and Wildlife Service.

In advance of the Increasing Renewable Energy in the Western Grid meeting in 2007, Western Resource Advocates (WRA), with support from the Energy Foundation and the NWCC, hosted *Western Transmission and Wildlife Needs at a Crossroads: A Topical Workshop*. The meeting was organized at the request of stakeholders to bring wildlife and land interests into the transmission planning process. During the workshop, transmission developers, land and wildlife conservationists, renewable energy advocates, and other stakeholders discussed how to optimally develop the transmission lines that access wind power and other renewable energy while protecting land and wildlife resources in the Western U.S. The stakeholders who participated in these meetings became leaders in the Western Electric Coordinating Council (WECC) Environmental Data Task Force, which was established “to develop recommendations on the type, quality, and sources of data on wild lands, wildlife, and potential water resources that can immediately be used in the scenario development and transmission study case planning process for” WECC’s Scenario Planning Steering Group.<sup>2</sup>

During this meeting, the discussion focused on:

- Electricity demands and transmission requirements to support new energy (particularly renewables) in the West.
- The process transmission developers use and factors they assess when siting transmission lines.
- Lands and wildlife concerns and interests regarding new transmission in the West.
- Lands and wildlife criteria to consider in order to build a broad coalition of support for new transmission.
- Kinds of dialogue, exchange, partnerships needed to address lands/wildlife interests in planning new transmission.



Photo courtesy of NREL, PIX 17592.

To build on the discussion at the 2007 meeting, the NWCC hosted a *Renewable Energy Zone Planning Webinar Series* in 2009, which was focused on western transmission planning projects that incorporated renewable, wildlife, and land-use concerns into traditional transmission planning. The webinars included:

- *State Renewable Energy Zone Planning: Arizona & Colorado*: To understand the purpose and goals of planning processes in Arizona and Colorado, the challenges associated with data collection, and the technical tools used to identify and classify zones.
- *California Renewable Energy Transmission Initiative (RETI)*: To learn about RETI, a statewide initiative to help identify 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. To understand how wildlife and habitat data are incorporated into the zone identification process and share wind industry perspectives on the process.
- *Western Renewable Energy Zone Initiative and Renewable Energy Transmission Access Advisory Committee*: To learn from WREZ’s Technical Committee and work groups about Phase 1 of WGA’s WREZ planning process and hear about the Phase II report of Nevada’s Renewable Energy Transmission Access Advisory Committee (RETAAC).

<sup>2</sup> Source: <http://www.wecc.biz/committees/BOD/TEPPC/SPSG/EDTF/default.aspx>

## Discussing All Renewables and Transmission Planning Processes

By 2009, the NWCC dialogue around renewable energy integration issues had expanded to other forms of renewable energy, including hydro, solar, and geothermal power. Recognizing the success the NWCC had over the years in convening non-traditional stakeholders in productive dialogues on sometimes difficult issues, the National Hydropower Association, Solar Energy Industries Association (SEIA), American Wind Energy Association (AWEA), and Geothermal Energy Association requested that the NWCC organize forums to bring together representatives from their respective industries and technologies.



Photo courtesy of NREL PIX 19794.

The March 2009 *Renewable Initiatives Forum: Dialogue on Implementation Issues for Renewables and Transmission* was one of the first national opportunities for stakeholders and decision makers to gain further insight into the collaboration and coordination that is necessary to meet the goals of the aggressive national renewable energy agenda. The two-day forum was well attended by senior DOE and North American Electric Reliability Corporation (NERC) officials and those representing each of the major renewable technologies, among others. The agenda featured FERC Chairman Jon Wellinghoff, who outlined FERC's priority renewables and transmission initiatives, and included presentations and discussions among representatives from AWEA, Governors Wind Energy Coalition, MISO, NARUC, NCSL, NERC, public utility commissions, SEIA, SPP, state legislatures, Union of Concerned Scientists, DOE, WIEB, and The Wilderness Society.

One year later, the NWCC invited the major renewables and transmission stakeholders back for a focused dialogue about inter- and intra-regional opportunities and challenges to integrate renewables onto the grid at the *Renewables and Transmission Forum: Transition to a Reduced Carbon Energy Economy*. Participants reflected on:

- How to engage other renewables in integration dialogue;
- How to encourage cooperation among renewables and wildlife and conservation interests;
- How the NWCC can advance the national dialogue in the absence of federal policy direction; and
- What new transmission planning paradigms serve evolving needs and interests.

Each of these forums provided the venue and opportunity for non-traditional stakeholders to have a strategic discussion that they would not normally be able to have.

"By serving as an important convener of various stakeholders, the NWCC has been on the front lines of resolving the transmission challenges facing even more widespread deployment of wind energy."

Rob Gramlich, Senior Vice President, Public Policy  
American Wind Energy Association

## Transmission Planning Today

In 2008, DOE published a report that presents a scenario of 20% wind power in the U.S. by 2030—a vision that was launched at the May 2006 NWCC forum, *Wind Energy Contributions in a National Energy Strategy*. In examining the feasibility of generating 20% of the national electricity demand from wind energy, DOE assessed the status and needs for key issues fundamental to wind power expansion, including:

- Wind technology advancement
- Manufacturing advancement
- Electric power integration and transmission
- Environmental impacts and benefits
- Market development

As highlighted in the DOE report, judicious expansion of the Nation's transmission network is necessary if the 20% wind power vision is to be achieved. Demonstrating this importance, Congress appropriated \$80 million in funding through the ARRA in 2009, requiring DOE to support transmission planning for the country's three interconnection transmission networks. According to DOE, the six awards "will develop an open, transparent, and collaborative process that will involve participants from industry, federal, state and local government agencies, universities, and non-governmental organizations."<sup>3</sup> The seeds of this high-level collaborative effort to collaborate with all stakeholder and consider economics, reliability, and environmental issues in the transmission planning process were cultivated in the forums and dialogue hosted by the NWCC over the years.



Photo courtesy of NREL PIX 19500.

<sup>3</sup> Source: <http://energy.gov/articles/secretary-chu-announces-efforts-strengthen-us-electric-transmission-networks>

# Appendix: History of the Transmission Workgroup

## Phase I: Scoping and Internal Education

Early in its lifetime, the NWCC Steering Committee commissioned **scoping papers and case studies** on transmission issues to understand the unique effects of new electric industry rules on wind power (due to its inherent characteristics such as location dependence, variability and uncertainty, and low capacity factor relative to baseload plants). Through the phase I and II scoping papers and case studies (see box below), Steering Committee members began the process of educating themselves about transmission issues that were affecting the development of wind power.

### Phase I: Scoping and Internal Education Products

#### Scoping Paper I: *Wind Energy System Operation and Transmission Issues Related to Restructuring*

To address system operation and transmission-related issues that may arise in various state and federal electric industry restructuring proceedings and that are of special importance to the operation of existing and the development of new wind energy resources.

#### Scoping Paper II: *Transmitting Wind Energy: Issues and Options in Competitive Electric Markets*

To expand on the five transmission issues identified and prioritized for additional study in the conclusions and recommendations section of the first scoping paper.

#### Case Studies: *Transmission Policy and Pricing in Texas; Virtual Wheeling; Transmission System Improvements*

To help the NWCC and wind energy constituents focus on transmission issues, initiate involvement and discussion about wind energy and transmission issues in the wind industry, serve as an information tool for non-transmission experts, and educate NWCC stakeholders about wind transmission barriers and opportunities.

As part of federal efforts to restructure the electricity industry, FERC released a notice of proposed rulemaking on RTOs in May 1999, which later resulted in Order 2000 (see box below). This new structure being proposed by FERC offered a forum that many wind energy advocates believed could increase their opportunities to participate in the development of transmission system policies. To ensure visibility to key decision makers, the NWCC submitted to FERC the Scoping Paper II as comments on the Notice of Proposed Rulemaking.

**Order 2000** required all public utilities that own, operate, or control interstate electric transmission to file a proposal addressing the utility's participation in an RTO, formalizing the RTO structure.

## Phase II: Workgroup Formation

To continue the education process and prioritize issues to ensure that wind power considerations were treated equally during the implementation of Order 2000, the NWCC formed a Transmission Workgroup, which convened its first meeting in November of 1999. During this meeting, participants reviewed the case studies, discussed potential outreach activities to share their learning with a wider audience, and established goals for the Workgroup.

### Mission of the Transmission Workgroup

- Ensure stakeholder engagement in transmission planning activities.
- Focus on high wind regions with significant transmission needs; engage in national arena as well.
- Encourage proactive, long-term planning that anticipates future transmission needs.
- Encourage full utilization of existing transmission capacity and identify opportunities for new transmission.
- Ensure that wind power has fair and balanced access to the transmission grid.

## Phase III: Outreach and Education

While the NWCC was hosting meetings to bring wind stakeholders together with decision makers in the transmission planning arena, the Workgroup was also continually educating its members and sharing this knowledge to a growing group of interested parties. With developments occurring regionally and an array of stakeholders participating in all aspects of the RTO development process, the NWCC provided an invaluable source of information for all stakeholders to stay up-to-date and incorporate lessons learned from other regions into their own planning processes (see box to the right).

In addition to its regular outreach activities, in 2009, the Workgroup partnered with NCSL to produce the white paper, *Integrating Wind Power into the Electric Grid: Perspectives for Policymakers*. This paper explores how utilities, regulators, and policymakers are addressing wind power reliability and integration. Policymakers throughout the country have used the paper to make informed decisions on the issues that are essential to wind integration.

### Transmission Updates

These webcasts covered a breadth of topics including FERC Order 890: What Does It Mean for the West?; Transmission Financing; and Renewable Energy Zones.

### Transmission Issue Briefs

These written briefs helped educate stakeholders on the most relevant transmission issues for wind power development.

### Transmission Workgroup Calls

These bimonthly conference calls for interested parties featured the most recent, cutting-edge information on transmission siting, planning, and cost allocation activities throughout the country.

## Summary

The Transmission Workgroup provided services to DOE and its engaged stakeholders for 12 years. It evolved over time and helped establish the need for fair and balanced rules to integrate wind plants into the transmission grid and encouraged open dialogue among a non-traditional

set of stakeholders in the transmission planning process. The NWCC was a unique collaborative model for education and outreach. The strategic vision of the parties who dedicated many volunteer hours are what made the NWCC transmission work successful. This collaborative model is now being used to address many other issues around the country, signifying its power to lead to sustainable change.

## Acknowledgements

The staff at RESOLVE and Kearns & West, who guided the NWCC Transmission Workgroup through its entire history, are indebted to the leaders of the Workgroup. Their commitment, vision, and willingness to collaborate on often technically challenging and difficult issues are to be commended. Below are the core leaders of the Transmission Workgroup and important collaborating organizations:

### Federal Agencies

Bonneville Power Administration  
Federal Energy Regulatory Commission  
National Renewable Energy Laboratory  
U.S. Department of Energy  
Western Area Power Administration

### Independent System Operators

Midwest ISO  
PJM Interconnection  
Southwest Power Pool

### NGOs

Energy & Environmental Research Center  
The Wind Coalition  
Utility Wind Integration Group  
Western Resource Advocates  
Wind on the Wires

### Other Collaboratives and International Partners

Clean Energy States Alliance  
Eastern Interconnection Planning Collaborative  
Eastern Interconnection States' Planning Council  
Edison Electric Institute  
Exeter Associates  
Interwest Energy Alliance  
Midwestern Governors Association  
National Association of Regulatory Utility Commissioners  
National Association of State Energy Officials

National Association of State Utility Consumer Advocates  
National Conference of State Legislatures  
North American Electric Reliability Corporation  
Renewable Energy Consulting Services, Inc.  
Western Electricity Coordinating Council  
Western Governors' Association  
Western Grid Group  
Western Interstate Energy Board

### State Representatives

Minnesota Dept. of Commerce  
Minnesota Public Utilities Commission  
New York State Dept. of Environmental Conservation  
North Carolina State Energy Office  
North Dakota Public Service Commission  
Oregon Office of Energy  
Public Utility Commission of Texas  
South Dakota Public Utilities Commission  
Vermont Public Service Board  
Wyoming Governor's Office

### Utilities

American Electric Power  
Great River Energy  
Minnesota Power  
Next Era Energy  
PacifiCorp  
We Energies  
Xcel Energy

### Wind Industry

AES Wind Generation  
American Wind Energy Association  
BP Wind Energy  
Clipper Windpower  
EDP Renewables  
enXco, Inc.  
Gamesa Energy USA  
GE Wind Energy  
Iberdrola Renewables  
Invenergy

## About the National Wind Coordinating Collaborative

The National Wind Coordinating Collaborative provides a neutral forum for a wide range of stakeholders to pursue the shared objective of developing environmentally, economically, and politically sustainable commercial markets for wind power in the United States. Formed in 1994, this partnership of experts and interested parties identifies issues that affect the use of wind power. By establishing dialogue on current key topics and catalyzing activities that build consensus among its stakeholders, the NWCC has successfully addressed critical challenges in the areas of transmission, wildlife and habitat impacts, siting, power markets, and other aspects of wind development.

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