

In cooperation with the  
Western Governors'  
Association

# Implementing Wind Energy & Transmission in the West

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*The National Wind Coordinating Collaborative (NWCC), through its Western Transmission Leadership Group (WTLG), ensures wind stakeholder engagement in transmission activities and develops and shares information about integrating wind into the Western grid through institutional, regulatory, and operational changes. These quarterly newsletters highlight transmission-related wind energy happenings in the Western Governors' Association (WGA) territory with updates on corresponding NWCC WTLG activities. This is our fifth newsletter; the previous volumes available [here](#).*

*Feel free to pass this newsletter along to other individuals and groups who may be interested. Please [contact us](#) to be added to or removed from the newsletter distribution list. We welcome your [feedback](#) on the newsletter and [suggestions](#) for improving it. Also, if you have updates for the next edition, please [tell us!](#)*

## SPP Approves new "Postage Stamp Rate" and Transmission Expansion Plan

In January 2008, the Southwest Power Pool (SPP) Regional State Committee approved developing a new rate structure for capital projects that spreads the costs over a large region, or a "postage stamp rate." The SPP also approved its 2008-2017 Transmission Expansion Plan, which includes several new transmission projects.

Read the 2008-2017 Plan at [http://www.spp.org/publications/2007%20SPP%20Transmission%20Expansion%20Plan%2020080131\\_BOD\\_Public.pdf](http://www.spp.org/publications/2007%20SPP%20Transmission%20Expansion%20Plan%2020080131_BOD_Public.pdf).

### NWCC Activities

NWCC's SPP Transmission Planning Committee is developing an agenda for a leadership forum highlighting renewable energy integration achievements and future opportunities. Cost allocation for economic upgrades and transmission expansion planning are both expected to be covered at the forum. Planning is in the early stages, but more details will be available in the coming months.

- Wind Power Surpasses 1,000 MW in the Northwest
- Rehearing Requests for Mid-Atlantic and Southwest Transmission Corridors Denied
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- WECC TEPPC Approves WIRAB Study Request
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- Otter Tail and Minnkota Plan Line to Accommodate Wind Projects
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- New Colorado Transmission Line Approved

***What Does That Mean?***  
**Not sure what one of the terms here refers to?**  
**Try consulting our transmission glossary!**

**Contact Us!**  
**Please send updates or suggestions for future editions to:**

Katie Kalinowski, NWCC Outreach Coordinator

kkalinowski@resolv.org

**We welcome your feedback!**

## Construction Starts on US's Largest Wind Transmission Project in California

Southern California Edison (SCE) announced on March 7, 2008, that it has broken ground on Tehachapi Renewable Transmission Project in Northern Los Angeles and Eastern Kern counties, California. The project represents the first major transmission project in California built specifically to access wind energy. When complete, the project will be capable of delivering 4,500 megawatts of electricity. The new lines of the project's first three segments are expected to be operational in early 2009. The project's proposed completion date is 2013.

For more information on the Tehachapi Renewable Transmission Project, visit <http://www.sce.com/powerandenvironment/goalsandimprovements/tehachapi?from=redirect>.

### NWCC Activities

Representatives from the California ISO and Midwest ISO will discuss their burgeoning interconnection queues and the ISOs' plans to reform and improve their interconnection queue processes on an upcoming NWCC Transmission Update call. The Transmission Update call is scheduled for Monday, April 28, 2008 at 2 pm ET. Contact Katie Kalinowski, [kkalinowski@resolv.org](mailto:kkalinowski@resolv.org), to be added to the Transmission Update mailing list and receive the call-in info.

## 3TIER Chosen by NREL to Conduct Western Wind and Solar Integration Study

In February 2008, the National Renewable Energy Laboratory (NREL) chose independent consultant 3TIER to conduct the largest wind integration study to date. The results of the [Western Wind and Solar Integration Study](#) will help utilities understand the costs and impacts of wind and solar power integration on their operations. The study will be completed in late Spring 2009 and the results will be posted publicly online.

### NWCC Activities

The National Conference of State Legislatures (NCSL) and the NWCC are partnering to write a layperson's guide to wind integration. The publication is intended to help legislators, NGO representatives, PUC staff, and other "laypeople" better understand what wind integration means and how it can be accomplished. An advisory group of NWCC members is overseeing this process. The publication is expected to be completed in Summer 2008 and will be available through the NWCC website, [www.nationalwind.org](http://www.nationalwind.org).

## Xcel to Test the Next Generation of Wind Power Storage Batteries

### For More Information

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

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

[www.westgov.org/wieb/](http://www.westgov.org/wieb/)

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

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

In the fall, Xcel Energy will begin testing batteries designed by Japanese company NGK Insulators as potential storage batteries for energy generated from wind farms. The sodium-sulfur batteries are used commercially in Japan and the United States, but not for wind storage. Xcel will test 20 50 kilowatt batteries, each weighing approximately 8 tons and with a storage capacity of 7.2 megawatt hours. Once fully charged, they can produce electricity for up to 7 hours.

Xcel is expecting to begin testing the batteries at Luverne, MN next to a windfarm owned by Minwind Energy LLC. The project will last one to two years.

### NWCC Activities

The NWCC is hosting a webcast on how storage technologies can complement wind power development. Brad Nickell with the U.S. Department of Energy and Paul Denholm from the National Renewable Energy Laboratory will be the featured speakers. The webcast will be on April 8<sup>th</sup> at 1 pm ET; details are available on the NWCC website, [www.nationalwind.org](http://www.nationalwind.org).

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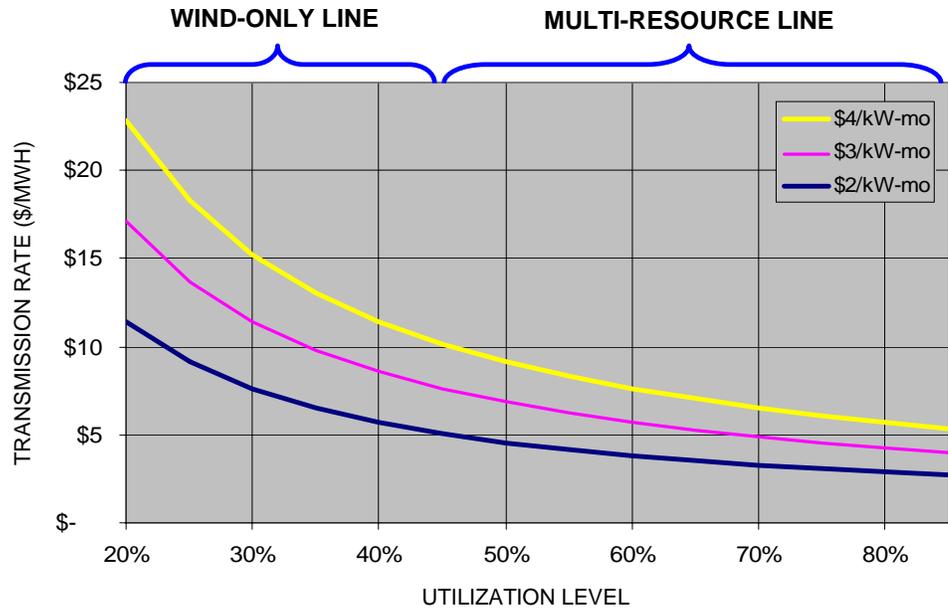
## Guest Feature: Transmission Models for Wind Development

*By Jerry Vaninetti, Vice President, Trans-Elect Development Company LLC*

Rapid commercialization of wind energy has placed a premium on transmission capacity to move remotely-located wind to load centers, as most of the low-hanging fruit (in the form of available capacity and transmission upgrades) has been picked. What stands in the way of future wind development is installation of new transmission lines – a topic of major concern within the industry and recently reported on in the popular press.

The wind industry has been vocal about the need for new transmission and, in some quarters, there is an emerging view that new transmission lines could be used primarily or exclusively for wind. The extent that transmission for wind can be achieved will depend on operational, economic, and situational factors for two major categories of transmission: generator leads and integrated or networked transmission.

Since generator leads are required to connect generation to the grid, they are well suited to wind-only situations. However, integrated network lines are designed to reliably accommodate the full suite of regional power flows in order to meet load requirements, regardless of source or resource. In addition, transmission economics favor lines that are highly utilized, a relationship which places wind-only lines at an economic disadvantage relative to lines that are more fully utilized, particularly for the longer distance, higher cost lines (see diagram).



Given the foregoing, wind-only transmission is likely to be restricted to generator leads and unique situations involving unusually high-quality wind resources that take advantage of wind overbuilding, geographic diversity, wind trunk lines, and public policy initiatives. Imposing restrictions on resources handled by integrated network lines defies the laws of physics and is contrary to FERC non-discrimination policy, system reliability, and fundamental economics. As such, wind-only lines are not suited to integrated networked situations.

A new “wind-first” transmission model has emerged to maximize wind’s role in which wind would be dispatched before other resources. This theoretical approach would maximize use of wind resources (potentially as much as 50% on an energy basis), while supporting grid reliability and meeting load requirements. Imposition of carbon penalties would limit the extent to which coal is part of the resource mix and improve economics of wind-only transmission. In contrast to the traditional model of utility ownership of transmission capacity rights, the wind-first model would also apply to wind developers owning transmission capacity – positioning them to influence the resource mix delivered by the line.

In conclusion, while getting more wind to market is highly desirable, there are factors that must be considered when planning needed transmission lines. A wind-only line has technical, operational, and economic challenges that go beyond meeting renewable policy goals. There are unique situations involving short lines, generator leads, unusually high-quality resources from geographically diverse regions that might be able to achieve high transmission utilization levels, or high carbon taxes where wind-only lines may be possible and should be pursued. However, in order to get the full benefit of transmission at cost-effective rates and operationally reliable standards, the wind-first integrated concept may offer the best solution to enabling more wind.

*Jerry Vaninetti is a member of the NWCC Western Transmission Leadership Group and is this newsletter’s first guest writer. Submissions for future volumes are invited. Please submit article ideas to Katie*

*Kalinowski, [kkalinowski@resolv.org](mailto:kkalinowski@resolv.org) by May 30, 2008 for consideration. Submissions selected for publication should be no more than 500 words and the newsletter review panel has editorial powers for all articles.*

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## Hawaii Sets Goal of 70% Renewables by 2030

On January 28, 2008, representatives from state and federal governments signed a long-term agreement to help Hawaii obtain 70% or more of its energy from renewables by 2030. Governor Linda Lingle and the U.S. DOE's Assistant Secretary for Energy Efficiency and Renewable Energy, Alexander Karsner, also signed a Memorandum of Understanding, establishing the Hawaii Clean Energy Initiative. These agreements are an effort to reduce Hawaii's dependence on oil, bring energy price stability to the state, and curb climate change.

Renewables will be integrated with the existing energy infrastructure. For the integration of variable generation like wind power, systems will be put in place to help ensure grid stability. For smaller islands, DOE will work with public and private partners to achieve 100% renewable energy use.

For more information on the Hawaii Clean Energy Initiative, visit [http://www1.eere.energy.gov/office\\_eere/hawaii\\_clean\\_energy.html](http://www1.eere.energy.gov/office_eere/hawaii_clean_energy.html).

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## FERC and NARUC Partner to Start Collaborative Dialogue on Smart Electric Grid Transition

On February 14, 2008, the [Federal Energy Regulatory Commission](#) (FERC) and the [National Association of Regulatory Utility Commissioners](#) (NARUC) announced the formation of a collaborative dialogue on how to transition to a "Smart Grid," an automated electric grid. The project will be co-chaired by FERC Commissioner Suedeem Kelly and Commissioner Frederic Butler of the New Jersey Board of Public Utilities, who is also the first vice president of NARUC.

Transitioning to a Smart Grid can potentially reduce power consumption by responding to demand, enabling energy storage, and improving grid reliability. The Smart Grid is expected to help variable power sources like wind energy connect to the grid.

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## NREL's WinDS Model Shows Wind Energy Potential by Region

The National Renewable Energy Laboratory (NREL) has developed a model for projecting wind power capacities and future energy deliveries. The Wind Deployment System, or WinDS, is considered one of the most credible models today. It started in 2001 in response to a request from NREL's Wind and Hydropower Technologies Program. WinDS uniquely has the capacity to model wind capacity by region by dividing the United States into 358 smaller parts. This allows for a better picture of actual transmission distances and the impact of wind installations throughout the country.

WinDS, with its success in modeling wind power capacity, is already being adapted by NREL to model for other energy sectors, like solar and hydrogen.

For more information on WinDS, visit <http://www.nrel.gov/analysis/winds/>.

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## Wind Power Surpasses 1,000 MW in the Northwest

The Bonneville Power Administration (BPA) reported at the beginning of 2008 that, for the first time ever, the amount of energy supplied by wind to the electric grid in the Northwest exceeded the 1,000 megawatt mark. While wind still remains a small fraction of BPA's total energy generation, the 20-year [Northwest Wind Integration Action Plan](#) would add at least 5,000 megawatts more of wind generated energy.

The variable nature of wind power, where wind generation has been known to drop to very low numbers, means that BPA looks to other power sources to provide capacity to meet peak loads. Also, BPA is working with utilities and others to find operational and technology solutions to better deal with wind power variability. Although integrating wind power requires considerations for variability, hitting the 1,000 megawatt-mark illustrates that wind energy can play a significant role in a diversified energy portfolio.

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## Rehearing Requests for Mid-Atlantic and Southwest Transmission Corridors Denied

As announced in our [December newsletter](#), the U.S. Department of Energy (DOE) approved two Transmission Corridors, one in the Mid-Atlantic and one in the Southwest. In early March 2008, the DOE formally denied requests for a rehearing regarding the Transmission Corridors, which had been objected to by local and state officials in several jurisdictions. DOE officials suggested that the congestion in the two corridor regions is well established through data analysis and that there was considerable opportunity for public review and comment.

Under the federal Energy Policy Act of 2005, transmission lines within the corridors may be approved by the Federal Energy Regulatory Commission (FERC) if the state regulators do not approve new lines within a year of their filing.

For more information on the two Transmission Corridors, visit <http://nietc.anl.gov/nationalcorridor/index.cfm>.

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## EEI Releases Updated "Transmission Projects: At A Glance" Report

On January 11, the Edison Electric Institute (EEI) released an updated version of their "Transmission Projects: At A Glance" report. The report

highlights selected projects of EEI members, including projects designed to access renewable energy. Overall the report highlights significant new transmission investments by the electric industry.

For a copy of the report, visit

[http://www.eei.org/industry\\_issues/energy\\_infrastructure/transmission/projects.htm](http://www.eei.org/industry_issues/energy_infrastructure/transmission/projects.htm).

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## WECC TEPPC Approves WIRAB Study Request

The Western Interstate Regional Advisory Board (WIRAB) was created by the Western Governors and advises the Western Electricity Coordinating Council (WECC), among other roles. Responding to WECC's Transmission Expansion Planning and Policy Committee (TEPPC), which held an open solicitation for transmission study requests, WIRAB submitted a request to study a 15% carbon reduction below 2005 levels by 2020, the Western Climate Initiative's target.

At its March 13<sup>th</sup> meeting TEPPC approved a study plan that includes high solar and wind scenarios and the carbon reduction scenario sought by WIRAB. For more information, see

<http://www.wecc.biz/modules.php?op=modload&name=Downloads&file=index&req=viewsdownload&sid=172>.

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## BPA Seeks Within-Hour Balancing Service Rate for Wind Integration

The Bonneville Power Administration (BPA) initiated a hearing to adopt a Wind Integration - Within-Hour Balancing Service rate. BPA proposes that as wind power grows in its balancing authority, costs increase due to the variability and uncertainty of wind generation. BPA has had to obtain additional reserve capacity, with most of the cost borne by its customers. The proposed rate would allocate costs for additional reserve capacity and other incremental costs caused by wind power variability to wind generators.

For the 2009 BPA Wind Integration Rate Case website, go to

[http://www.transmission.bpa.gov/Business/Rates\\_and\\_Tariff/2009WindIntegrRateCase.cfm](http://www.transmission.bpa.gov/Business/Rates_and_Tariff/2009WindIntegrRateCase.cfm).

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## Otter Tail and Minnkota Plan Line to Accommodate Wind Projects

On January 31, 2008, Otter Tail Power Company and the Minnkota Power Cooperative informed the North Dakota Public Service Commission (PSC) of their intent to jointly apply for a permit to build a 60 mile long, 230 kV line from Luverne, ND to the Maple River Substation near West Fargo. They are also investigating constructing a generation outlet, which is needed to accommodate the energy generation from proposed wind projects in three North Dakota counties. The generation outlet and wind projects require

North Dakota PSC approval. Otter Tail and Minnkota have expressed interest in purchasing the wind power or owning the projects, if they are approved.

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## Nevada Renewable Transmission Advisory Committee Release Phase 1 Report

The Nevada Renewable Energy Transmission Access Advisory Committee (RETAAC) released their Phase 1 report in January. The Committee was formed by Governor Jim Gibbons in May 2007 to identify developable locations for renewable energy, assess transmission access to them, and make recommendations for additional transmission lines.

In its Phase 1 report, the RETAAC identifies renewable energy zones for potential commercial development, including 12 for wind energy.

The RETAAC Phase 1 report can be accessed at <http://www.gov.state.nv.us/Energy/FinalReport.htm>.

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## New Colorado Transmission Line Approved

Xcel Energy reached a settlement with intervening parties in its docket before the Colorado Public Utilities Commission on its proposal to invest \$120 million in a new 345 kV line between its Pawnee and Smoky Hill substations. Xcel and the parties agreed that the line should be approved. The new line supports Xcel's resource plan filing that proposes 800 MW of new wind by 2015.

The new transmission was planned by Xcel under SB07-100, the Colorado legislation that identifies resource development zones and requires transmission plans and applications. An additional report under SB07-91 also indicates Colorado renewable resource locations and provides cost and supply curves for "generation development areas." The new Xcel line, to be ready in May 2013, will provide about 500 MW of new transfer capability and relieve a bottleneck in the Xcel system that has prevented additional wind from reaching Denver from the wind resources in Northeastern Colorado.

Pawnee is also the point of interconnection for the Wyoming Colorado Intertie project, a new 345 kV line from Wyoming wind resources to Denver loads that the Wyoming Infrastructure Authority, Trans Elect, and Western Area Power Administration have developed which will be ready for an open season subscription process in early summer 2008. The settlement also addressed noise and EMF issues and is pending decision by the Colorado PUC.

To access Xcel Energy's SB-100 report, visit <http://www.rmao.com/wtpp/SB100.html> and its resource plan website is [http://www.xcelenergy.com/XLWEB/CDA/0,3080,1-1-1\\_41994\\_45385-42116-2\\_68\\_135-0,00.html](http://www.xcelenergy.com/XLWEB/CDA/0,3080,1-1-1_41994_45385-42116-2_68_135-0,00.html). The SB-91 report is accessible at <http://www.colorado.gov/energy/utilities/SB91-taskforce.asp>.

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## NWCC Western Transmission Leadership Group

Recognition and thanks to members of the NWCC Western Transmission Leadership Group (WTLG) for their guidance and action to make more transmission available for renewable energy:

Bob Anderson, Bob Anderson Consulting	Steve Lindenberg, U.S. Department of Energy
Hap Boyd, GE Wind Energy	Carl Linvill, Aspen Environmental Group
Tom Carr, Western Interstate Energy Board	John McCaull, Geothermal Energy Association
Lynn Coles, National Renewable Energy Laboratory	Natalie McIntire, Renewable Energy Consultant
Brian Connor, U.S. Department of Energy	Michael Milligan, National Renewable Energy Laboratory
Craig Cox, Interwest Energy Alliance	Fred Morse, Morse Associates
Tom Darin, Western Resource Advocates	Brad Nickell, U.S. Department of Energy
Ed DeMeo, Renewable Energy Consulting Services	John Nielsen, Western Resource Advocates
Steve Ellenbecker, Wyoming Governor's Office	David Olsen, Center for Energy Efficiency and Renewable Technologies
Ned Farquhar, Natural Resources Defense Council	Amanda Ormond, The Ormond Group
Larry Flowers, National Renewable Energy Laboratory	Brian Parsons, National Renewable Energy Laboratory
Karl Gawell, Geothermal Energy Association	Kevin Porter, Exeter Associates
Katherine Gensler, Solar Energy Industries Association	Rhone Resch, Solar Energy Industries Association
Bob Gough, Intertribal Council on Utility Policy	Robert Sims, AES Wind Generation
Rob Gramlich, American Wind Energy Association	Charlie Smith, Utility Wind Integration Group
Rich Halvey, Western Governors' Association	Brian Smith, National Renewable Energy Laboratory
Roger Hamilton, West Wind Wires	Beth Soholt, Wind on the Wires
Scott Hennessey, Solar Energy Industries Association	Lisa Szot, New Mexico Renewable Energy Transmission Authority
Denise Hill, Horizon Wind Energy	Jerry Vaninetti, Trans-Elect
Mike Jacobs, UPC Wind	Steve Wegman, South Dakota Public Utilities Commission
Doug Larson, Western Interstate Energy Board	John White, Center for Energy Efficiency and Renewable Technologies
Ron Lehr, American Wind Energy Association	Andrew Young, Horizon Wind Energy
Debra Lew, National Renewable Energy Laboratory	Cameron Yourkowski, Renewable Northwest Project