



# Wind energy hung up in the queue

Photos (2): Bonneville Power Administration

An overabundance of renewable energy should be good news in the US. However, in many renewable-rich areas, the clean energy cannot be integrated into the grid – due to long transmission queues. The solution will likely come from many fronts.

In many ways, the Southwest Power Pool in Arkansas, which manages transmission in parts of Arkansas, Missouri, Kansas, Texas, Oklahoma and New Mexico, finds itself in an enviable position: It has more than enough renewable energy for its own needs. In fact, it has enough to transmit it to other parts of the country – if only that were possible. “We have about 48,000 MW of wind and a little bit of solar in the queue, with an annual peak load of 43,000 MW of wind resources. Just looking at the numbers it is easy to see that the supply could far exceed the demand”, says Les Dillahunt, Vice President of regulatory policy at the Southwest Power Pool. However, without transmission, the clean power will go unused. “Wind has developed in these remote areas and we don’t have sufficient transmission to move it to areas where it’s needed. We don’t have a national energy policy, so where is this power going to go?”, asks Dillahunt.

An overabundance of renewable energy should be good news in the US. However, in many renewable-rich areas, the clean energy cannot be integrated into the transmission grid – due to long transmission queues and no avenues for moving power between regions. Nearly 270,000 MW of wind projects are hung up in transmission queues in the US, according to the American Wind Energy Association (AWEA), Washington, D.C.

“The problem is government underinvestment in transmission infrastructure for the past 25 years”, says Ray Wuslich, partner at the law firm Winston & Strawn in Washington D.C. With the US focus on fighting climate change and bringing cleaner forms of energy online, solving transmission challenges should be a top priority for the US government, industry members say. “Wind developers will say transmission capacity is the main constraint”, says Dwain Rogers, Deputy Commissioner for renewable energy at the Texas General Land Office in Austin, Texas.

## A chicken-and-egg situation

With Renewable Portfolio Standards (RPS) across the country mandating utilities to bring more renewable energy online, transmission constraints become even more pressing. In most areas of the country, there are not enough transmission lines to bring power from

rural areas – where the resources are most abundant – into populated areas.

“Fundamentally the transmission system isn’t designed to bring lots of power from areas where we have renewable power to the demand centers where we use power. It was designed in pieces to connect fossil-fuel power plants to load centers”, states Nathanael Greene, Director of renewable energy policy for the National Resources Defense Council (NRDC), Washington, D.C. “The main issue is that there aren’t power lines where renewable power is”, he adds.

In addition, utilities and transmission owners face a chicken-and-egg situation as they struggle to get new transmission built. Generally, developers will not build new wind plants unless they are guaranteed transmission, and transmission owners will not build new lines unless they are assured payment for the lines from developers. “Right now, the generation is waiting for the transmission and the transmission is waiting for the generation”, says Robert Gramlich, Policy Director at the American Wind Energy Association (AWEA). In response to these challenges, policymakers and environmentalists across the country have proposed many solutions. They include implementing proactive planning strategies, creating a national energy policy that addresses transmission, providing federal oversight of a transmission expansion, using distributive energy to relieve pressure on the grid, taking advantage of “smart grid” technologies and boosting energy efficiency.

## Proactive approaches

Because the federal government has not addressed the need for new transmission, regional groups and states are taking action. Texas, California, and the Northwest are among the leaders of this proactive planning process.

Texas has established Competitive Renewable Energy Zones (CREZ), a proactive approach designed to move renewable energy from rural areas to population centers. With CREZ, planners identify the best resource zones, create a transmission master plan, and then take steps to begin building the transmission needed to move the power, according to the Wind Coalition, based in Texas. In Texas, 25 potential wind zones were identified, and then four were selected as potential zones. Finally, planners chose one zone with the ability to bring 18,000 MW online, but the Texas Public Utility Commission (PUC) has not yet approved the move.

“The Competitive Renewable Energy Zone in Texas is an effort to build new transmission capacity to bring power to the east, where the people are, from the wind farms in the west”, says Rogers. “Texas has far more renewable energy integrated into its grid than other parts of the country. We will have more than 6,000 MW in renewable energy by the end of 2008”, he adds.

Texas jumped ahead of the game with an early state Renewable Portfolio Standard (RPS) enacted in 1999. It required utilities to bring online 2,000 MW of renewable energy by 2009. “One of the main reasons for how quickly wind power has developed is the RPS”, Rogers points out. Once you require utilities to get energy from



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For wind developers transmission capacity is the main constraint. Generally developers will not build new wind plants unless they are guaranteed transmission.

Photo: Wind Energy Corporation

renewable energy sources, there is investment. Also, the federal industry tax credit helped and the fact that we are a business-friendly, low-tax-rate state compared to most. "It's far simpler to get projects approved through the regulatory process in Texas because it is essentially a grid of its own, operated by one entity", he says.

The newly approved CREZ transmission projects will boost the amount of renewable energy on the grid significantly. The grid holds 72,500 MW of total energy in Texas right now, and the CREZ plan will add the 18,000 MW, mostly renewable energy. "That is a big percentage and will have a significant impact", says Rogers. Renewable energy developers will gain access to the lines before developers of other types of generation.

Like Texas, the Pacific Northwest has embraced proactive transmission planning. The Bonneville Power Administration (BPA) recently created an "open season" process, which cleared the queue of generation projects that would have otherwise slowed or stalled renewable energy developers' access to new lines.

"We developed a precedent service contract and gave it to everyone who had requested transmission

and were waiting in the queue", reports Elliot Mainzer, Executive Vice President of corporate strategy for the BPA in Oregon. This separated out the serious buyers who signed contracts and put up some money in order to be placed in the queue.

The process also allowed the BPA to analyse the individual projects as an entire group. Before, the Federal Energy Regulatory Commission (FERC) required BPA to employ a time-wasting project-by-project analysis. During the process, developers signed contracts for 6,900 MW of energy, and 5,000 MW came from renewable energy developers. Creating an open season and clearing the queue has allowed the Northwest to integrate more renewable energy into its system, Mainzer says.

Along with Texas and the Northwest, California, Wyoming, Colorado, and the Southwest are also trying to embrace a proactive approach. However, in these states – unlike Texas – transmission is often fragmented, which presents one of the biggest hurdles to developing new transmission projects.

California created the Renewable Energy Transmission Initiative (RETI) a year ago to overcome transmission barriers. "California has conservation groups like the Sierra Club, NRDC, people from the renewable industry, the utilities and the regulators all at the table", says NRDC's Greene. "They are sitting down and talking about where their resources are, where they need power, what are ecologically sensitive areas and critical areas to protect. They are doing a planning process that will eventually give them a clear sense of where they need more transmission and where it should and shouldn't go from an ecological and economic perspective."

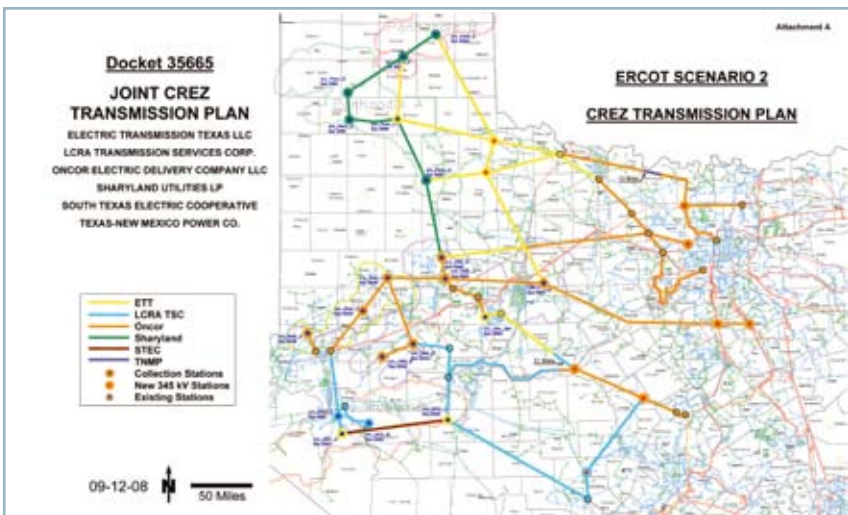
### National transmission corridors

In addition to proactive planning strategies like those in Texas and the Northwest, industry members see a strong national energy policy as a solution to transmission challenges. National oversight of transmission would allow for regulation across regions. This is especially important given that the regions with the most potential to yield renewable energy are located all over the US, including the wind-rich Midwest and solar-kissed Southwest.

"If we are really going to get to energy independence, what we need are national transmission corridors like our national highway system", claims Jacob Susman, founder and CEO of OwnEnergy Inc. in New York City. "It's the same idea for energy-connecting areas of renewable resources to load centers by making significant federal investment in transmission." National transmission corridors could connect wind-rich Montana with customers in California – and even save Californians money, says Wuslich. "The cost of producing wind in Montana is probably about 5 cents per kWh. The market price in California is 10 to 12 cents", he says. That leaves a lot of room to add on the price of transmission.

Giving more control to the federal government could standardise the electric grid across the country,

Texas has established Competitive Renewable Energy Zones (CREZ). With CREZ, planners identify the best resource zones and create a transmission master plan.



Graphic: CREZ

in much the same way President Eisenhower spurred federal interstate highway development in 1956 with the Federal-Aid Highway Act. "There are a lot of things the federal government can do to get things rolling. It can help plan and hold these regional grids together and can help tackle problems in a coordinated way", states Greene. Right now, too many parties are involved in planning and regulating interstate transmission lines, notes Kenneth Reich, partner at WolfBlock's Environmental and Land Use Practice Group in Boston, Massachusetts. "There is FERC, which has lots of say in national policy. There are ITOs that have control over a number of states under one jurisdiction, and also there are states that have a say as well." The government could step in and build transmission lines with funding from the general treasury, he says. However, it's difficult to believe there would be much support, given the nation's economic crisis and efforts to solve it. "It will be a while before the government can step in", he adds.

In many countries in Europe, renewable energy plays a more important role than in the US, largely due to strong national policies, says Gerardo Ruiz, CEO of freEner-G in Minnesota. Historically, states have controlled transmission – which creates a challenge to federal control of transmission. "States have always been in control of this and they will fight hard to protect that power", says Greene.

## Distributive energy

One way to overcome transmission challenges is to sidestep it altogether and employ distributive energy. This involves generating power at the site where it will be used. Solar panels on the roofs of houses and small windmills on the rooftops of larger buildings are two examples that relieve pressure on the transmission system. They also reduce transmission losses – unlike large wind farms.



Solving transmission problems should be a top priority: transmission lines in the remote Stevens Pass Ski Area, Skykomish, Washington, covered by the Bonneville Power Administration.



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Wind Turbines covered by the Southwest Power Pool: An overabundance of renewable energy should be good news in the US. However, without transmission, the clean power will go unused.

Photo: Southwest Power Pool

“The DOE proposed 20 % wind by 2030, but that is all macro-scale wind – big wind farms in remote locations. With that, you have energy losses in transmission. It doesn’t necessarily help with conservation. We think distributive energy is a much more meaningful scale for renewables”, explains James Fugitte, Chairman and CEO of Wind Energy Corp. in Kentucky, which manufactures turbines that can be used on-site. Fugitte would like to see government incentives for research and development and tax breaks for customers. “In Europe, on smaller farms, distributive energy has been around for years”, reports Susman. “Distributive energy projects may look more appetising to investors during hard economic times in the US”, he adds. “In times when financial markets are scarce, investors will likely take smaller bites and we could see a rise in financing for smaller energy projects, we need massive-scale transmission investment, but it will take lots of time for approval and regulatory structure changes. In the intervening period there is a great potential for distributive energy.”

Peter Allen, counsel at the law firm of Thelen LLP in New York, says: “Ultimately distributive energy is more robust. Right now if all your power comes in over two lines, if they go down, you are out of power. If half your power is distributed, then you still have it.”

### Smart microgrids

Another way to help reduce pressure on the transmission system is smart microgrid technology, which uses two-way communications, advanced sensors and distributed computers. “We are using our trans-

mission lines only to a fraction of their real capacity”, says Kurt Yeager, co-author of the new book “Perfect Power: How the Microgrid Revolution will Unleash Cleaner, Greener, More Abundant Energy.” “If we had smart technology – electronic control of the system instead of just mechanical control – we could have twice as much electricity on the lines than we have today. It doesn’t mean we won’t need new lines, but it would reduce that need significantly”, explains Yeager, the former CEO of The Electric Power Research Institute. “The microgrid works by using advanced technology that is applied to meet the individual needs of the consumer. For example, if consumers want solar power, they can generate it and sell energy back to the utility”, he adds. In addition, all consumers would be given time-of-use electricity rates, which vary with off-peak and on-peak hours. Consumers generally pay less to use electricity during off-peak hours. “With smart microgrids we can send up-to-date price signals to consumers”, Yeager points out, “once they know the prices, which vary during the day, consumers would then decide whether to turn certain appliances or lights on or off.”

“The system we have today is very unreliable and does not allow for this”, he adds. “The smart microgrid will fundamentally improve the efficiency of the grid, and eliminate much of the need for peak capacity. We would use negawatts instead of megawatts.”

Many of the benefits of renewable energy will be lost if the grid is not updated, he points out: “In today’s world if we are trying to connect renewable energy, wind and solar which are by nature intermittent, the electric grid isn’t ready to incorporate that power. When it does, it needs large amounts of back up power, which disturbs the economics and undermines much of the environmental advantage to renewables in the first place.”

“In effect today, the power system in the US costs every citizen about 150 billion dollars a year. For every dollar you think you are spending on your electric bill, you are spending an additional dollar for all the wasted energy and losses because of old technology”, Yeager says. The smart micro grid will bring the transmission system up to date and revolutionise how we think about energy. In order to implement solutions for transmission such as microgrid technologies, the government will have to invest more in research and development. “There is very little research overall. We spent more in Iraq yesterday than we did in renewable energy research all last year”, complains Fugitte.

The solution will likely come from many fronts. “We need to think in an integrated way, about all parts of relieving the system and really looking at what global warming will do and understanding what the alternatives are”, says Greene. “We can ultimately speed up the development by creating a consensus of a sustainable mix of efficiency, smart grid, demand side, and beefing up the infrastructure.”

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