

Community Wind Projects: Transmission & Economics

WC CERT Meeting Summary

September 27, 2006, 1:00 pm – 3:30 pm

Clinton Memorial Building, Clinton, MN

Note: The last page of these notes includes the select wind resources highlighted on the back of the meeting agenda. Brent's and Arne's presentations will be on the CERT website within the next week: www.cleanenergyresourceteams.org

Progress Report on Big Stone Wind – Brent Olsen, Chairman, Big Stone Wind

Wind Development

- Why develop the wind resource here? Cause it's the best undeveloped resources left that close to transmission and close to demand
- Why do we want turbines?
 1. Money—if it's done right with community ownership, we can bring dollars into our community
 2. Jobs: not tons of local jobs during operation, but some
 3. Environment
 4. Independence
- Numbers to Know:
 - 2 mph faster average wind speed means 2 times as much electricity
 - Bigger is better - 5 times bigger blade yields 50 times more power
 - Togetherness is good – clusters of turbines along projects to spread out/share costs
- Hurdles?
 - Power Purchase Agreement
 - Changing costs and structures – turbines were \$1 million/MW, now they're around \$1.3 million/MW
 - Easements
 - Transmission issues
 - Gov't programs and regulations. PTC and incentives
- Learn this Phrase: MISO Queue – MISO stands for Midwest Independent System Operator. These are the folks that study your transmission. Transmission is kind of like irrigating through ditches. Want folks to get enough water, but don't want to draw down river or have ditches flood. MISO analyses cost about \$50,000.
- Big Stone Winds Accomplishments
 - On February 24, 2006 Big Stone Wind received \$50,000 from Big Stone County for seed money, which they'll pay back if it works out.
 - Commissioned a wind study to see if they had enough wind – it covered items like a transmission study, fetch & wildlife concerns. Costs \$1,000/day an engineers time.
 - Formed on LLC to aid in development—legal entity
 - Obtained easements in desirable area (must have this before MISO queue)
 - Contracted with developer—most complicated thing
 - Got spot on MISO queue
 - Helped establish a zoning ordinance for county wind projects
 - Have about \$26,000 left
 - *Big Stone Wind's Goal = profitable, community-based wind power*

Distributed Wind Transmission Study for West Central Minnesota and Opportunities in Big Stone County – George Crocker, North American Water Office

George set the stage about Community Based Energy Development (C-BED) with the following: If we're going to get enough wind in place fast enough to make an environmental difference, we'll need a lot. C-BED would allow rural landowners to have a stake in development, and therefore be more supportive of greater wind development.

He also gave a quick disclaimer that he'd made a deal with Big Stone coal transmission to not intervene if they did a C-BED transmission study. The C-BED Transmission Study hoped to identify transmission issues, constraints, and opportunities for distributed energy production and interconnection.

- Dominant paradigm is central station power (remote) piped over high voltage to big load. Current Capital Expenditures 2020 (CAPX2020) is the major Minnesota transmission owners plan for new transmission infrastructure. The first phase of their proposal seeks to add three high voltage 345 kV lines to allow 6,000 MW of new generation. They estimate this transmission will cost about \$1.5 billion, with substations and other enhancements another \$1.5 billion.
- Problem: how to get enough infrastructure in place fast enough to get new generators on line, often takes 5-10 years to get something on line because of opposition. The C-BED alternative analysis is trying to figure out how to get more generation online more quickly via distributed wind production.
- C-BED Alternative Study for WC Minnesota looks at existing infrastructure opportunities for wind. C-BED transmission has potential to increase grid efficiency (currently around 50-55% capacity factor) while bringing in smaller blocks of power @ 5-20 MW.
 - 1st cut analysis is WC transmission planning zone: where can we improve substations to get more power into grid?
 - Only generating preliminary numbers based on thermal limits of system (called a TLTG analysis). They essentially put power into the system (via modeling) until they reach the thermal limit (thus breaking the system) and then assess how much money it will take to increase substation size until they break it again.
 - 800 MW level (1st break point) and 1400 MW level (2nd break point)
 - Preliminary analysis indicated that 6,000 MW could be injected for \$36 million

Break

After George's presentation we invited Senator Gary Kubly and Representative Aaron Peterson to say a quick hello. Both emphasized the importance of renewable energy, environmentally and economically. Then we took a quick break.

Community Wind Economics in Big Stone County – Does it matter who develops the wind? – Arne Kildegaard, University of Minnesota Morris

- What is *Community Wind*? local ownership, often smaller, purchase more inputs locally
- What is *Corporate Wind*? non-local owners- no local participation, save lease payments
- Who's doing community wind now?
 - In Germany community wind is 88% of wind development and they have 35% of world's installed capacity
 - In Denmark community wind is 84% of wind development (7% of world's installed capacity)
 - In US: 0.6% of wind development is community wind

- Community Wind Types:
 - Municipal – schools, cities, EDAs (require lower IRR), municipalities (folks who can issue municipal bonds)
 - Behind the meter – like Morris; offset retail purchases
 - Coops – but rural electric coops are bound by “all source contracts” that require distribution coops to purchase all of their electricity from their associated generation and transmission coop.
 - Multiple Local investor models – LLCs. Capitalized locally, but how to capture PTC? Issues with limited number of investors or problems with passive income requirements.
 - FLIP model – corporate partner buys PTC at discount and retains for first 10 years, then majority ownership flips back to local owners.
- How to measure economic impact of wind projects?
 - Input/Output model – dollars bounce around local economy but how much? Arne used a donut analogy to describe where a dollar spent on donuts really goes in a community.
 - IMPLAN: input/output tables for state and county
 - Kinds of impacts from wind development:
 - construction and development spending
 - income streams in operations phase
 - operations and maintenance (O&M) spending
- Previous Wind Economic Impact Studies:
 - Show between 1/7th to 1/3rd of a job/MW of wind development
 - These studies ignore land lease payments. They only look at (O&M) spending and generally see no difference between community and corporate cause not counting residuals (dollars that recirculate through the community)
 - Universally find: bigger impact during construction phase, most studies can't be replicated.
- Project Modeled for Study:
 - 10.5 MW project (5 Suzlon 2.1 MW turbines)
 - \$ 13.778 million turn-key cost
 - \$440,000 annual O&M
 - PPA @ \$33.60/MWh
 - Full equity financing (and PTC capture)
- Economic Study Results:
 - Community Wind @ 5% opportunity cost yields: 3.5x more jobs than a corporate project and value-added (income) = \$1,259,188
 - Community Wind @ 8% opportunity cost yields: 2.5x more jobs than a corporate project and value-added (income) = \$639,738
 - Corporate Wind yields: value-added (income) = \$249,388
 - Note: this assumes that all capital (\$13 million) is local and the PTC is fully captured
- What differentiates wind develop in the US from Europe?
 - Feed in tariffs in Europe- utilities must pay X. Anyone who can do it for that can plug in
 - US does mandates
 - DG tariff proceeding in MN - now ruled as a trade secret. Banks can only fund some projects because of payments from Xcel (1 and 2) and Same Entity (example)
 - Returns on wind projects are a bit more difficult to quantify.
 - Still hard to raise funds
 - Even ethanol is getting outside money

Wrap Up

Duane Ninneman of Clean Up the River Environment (CURE) and Kari Henneberg of Citizens for Big Stone Lake gave our closing remarks. We are grateful to Kari and Duane for doing so much work to pull the forum together. We couldn't have done it without you! Thanks!

Select Wind Resources for Additional Information

- Clean Energy Resource Teams website: www.cleanenergyresourceteams.org, our wind energy page <http://www.cleanenergyresourceteams.org/windenergy.html> has links to model county wind ordinances, economics studies, and all sorts of other wind development resources and presentations.
- Windustry's Website: <http://www.windustry.org/> is home to all sorts of wind information including a wind project calculator. Windustry's Distributed Wind Generation Page: <http://www.windustry.org/dg/default.htm> has links to all sorts of studies about the impacts of distributed wind.
- American Wind Energy Association: www.awea.org is "the" national wind promotion organization. They have all sorts of wind energy fact sheets <http://www.awea.org/pubs/factsheets.html> that can help answer common questions amongst numerous other resources.
- Minnesota Department of Commerce www.commerce.state.mn.us has a somewhat difficult to navigate site, but if you go to the "Energy Info Center" and then select "Wind", you can get to the new state wind maps (and even the GIS files), released on April 4, 2006, that are some of the best wind maps in the country. Try <http://www.state.mn.us/portal/mn/jsp/common/content/include/contentitem.jsp?contentid=536887066> to get to all of the available wind-related printable content.
- Community-based Energy Development is a policy as well as an organization: <http://www.c-bed.org/>. This website has all sorts of resources about C-BED projects including explanations of the Net Present Value (NPV) calculations and handy calculators.
- The National Wind Coordinating Committee: <http://www.nationalwind.org/> also has numerous publication and resources about wind energy permitting, transmission, and economic impact, among others.
- For the full text and maps from the CapX C-BED Interim Report, go to: <http://www.capx2020.com/about.html>, scroll down to "Studies". Click on CapX C-BED Interim Report or any of the three maps.
- For more information about Minnesota transmission planning in general, see: <http://minnelectrans.com> which includes links to the public meeting presentations, utility contact information, and web links & resources.
- Lawrence Berkeley Lab's Electricity Markets and Policy group has numerous publications that track the impact of renewable energy policies: <http://eetd.lbl.gov/EA/EMP/re-pubs.html>.