Transmission lines carry green power

By Flora Flygt

Recent headlines on renewable sources of electricity include:

- WPL buys huge wind farm
- WPS seeks hydro power
- Wind farms proposed on Lake Michigan
- Wind turbines start generating power in Fond du Lac
- US leads world in wind power growth

Demand for renewable electricity is soaring, driven by an awareness of climate change and the resulting state mandates on utilities to produce clean power. To meet this demand, new large-scale renewable generators must often be built in remote locations with site-specific resources, far away from population centers that would use the energy. Electric transmission lines provide a vital link in bringing renewable power into communities and realizing environmental objectives.

Connecting renewable energy projects to the long-distance transmission grid is one significant part of states' strategies to reduce carbon emissions and fossil fuel use across the electric system. Yet the current interstate transmission network was not sized, sited or designed to accommodate large new injections of intermittent energy from wind, solar or other resources.

Renewable power as a major source of electricity is in its infancy relative to demand. Here in Wisconsin, renewable sources of power produce about four percent of the electricity we consume. Nationally, wind power, one of the more heavily developed renewable resources, supplies one percent of the nation's electricity. More than 25 states have new renewable energy mandates, and they represent exponential increases in the amount of electricity utilities must produce (or purchase) from renewable sources: from 4 percent of electricity consumed currently to as much as 30 percent in the next 15 years.

To meet these mandates, this power must be deliverable to consumers. And yet the transmission grid does not have the capability, regionally or nationally, to deliver this energy. Transmission bottlenecks are among the largest barriers to wind power and other large-scale renewable energy development. The non-profit group Wind on the Wires, together with the American Wind Energy Association, is advocating the study and elimination of transmission constraints that inhibit or delay wind projects. Although Wisconsin generally has less robust wind resources (with the exception of Lake Michigan) the Upper Midwest as a region is relatively rich: it has five of the top ten states in the country in terms of wind energy potential,

according to Wind on the Wires. Tapping this resource requires regional transmission grid building and investment.

Wisconsin has made progress in increasing its renewable power portfolio. New projects have been proposed, approved, built and connected to the transmission grid over the last few years. Despite the lower-quality wind regime in the state, new technologies have enabled developers to better harness Wisconsin's wind. In fact, American Transmission Co., owner and operator of the transmission grid in the region, is connecting more than 340 megawatts of wind power to the grid this year, enough to power more than 90,000 homes. The 220-mile Arrowhead-Weston transmission line, energized earlier this year, is well situated to help bring in hydro resources from Canada and future wind power from the Dakotas. Yet the goals are high and our progress must continue. If wind is the predominant resource for meeting renewable energy requirements, Wisconsin utilities will need up to 1,800 megawatts of additional capacity, according to Public Service Commission information.

Raising renewable energy from 5 to 10 (or more) percent of the region's electricity generating portfolio requires large volumes of renewable electricity to be produced, which is accomplished where wind, solar, biomass or hydro resources are abundant. Hydro and wind sources can't be moved closer to population centers. Good wind areas cover only 6 percent of the lower 48 states' land mass, and solar costs are lowest in remote areas where local power needs are minimal. Interstate, high-voltage transmission lines can take up to 10 years to plan, permit and construct. Achieving green power objectives in the near term will require a collective acceptance that transmission lines are an integral part of supplying our homes and businesses with renewable electricity.

Flora Flygt is director of planning for American Transmission Company. Pewaukee-based ATC owns, operates and maintains 9,350 miles of transmission lines and 500 substations with a total investment in facilities of $1.7 billion in portions of Wisconsin, Michigan, Minnesota and Illinois. For more information, visit our Web site at www.atcllc.com

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Note to editors: Other information and resources are provided below.

Sidebar: History of wind development in Wisconsin

Year	Developer	Location	Size	Energy to power:
1998	WPS/Glenmore	Glenmore wind farm, Brown County	2 megawatts	450 homes
1999	WPS	Lincoln wind farm Kewaunee County	9 megawatts	3,600 homes
1999	MGE	Rosier Wind Farm Kewaunee County	11 megawatts	4,400 homes*
2001	Badger Wind	Iowa County	30 megawatts	7,500 homes*
2008	Forward Energy	Dodge/Fond du Lac counties	129 megawatts	40,000 homes

2008	We Energies	Fond du Lac County	145 megawatts	36,000 homes
2008	Alliant Energy	Fond du Lac County	68 megawatts	17,000 homes
2008	Butler Ridge	Dodge County	54 megawatts	13,000 homes*

*(source: Wisconsin Public Service Commission, local utilities, wind developers. *estimated)*

Even with recent additions, Wisconsin utilities will need to bring up to 1,800 megawatts of renewable power on line (if wind is the predominant resource) to meet the state's required target of 10 percent of all electricity consumed by 2015.

A map of US wind resources is available from the American Wind Energy Association:
http://www.awea.org/pubs/documents/swslides/102-6.htm

A map of the US showing 25 states with new state renewable energy requirements is available from the US Department of Energy:
http://www.eere.energy.gov/states/maps/renewable_portfolio_states.cfm