

Wind Technologies' Coming of Age



Regulator's Perspective

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Wind Integration

- In May of 2005 the MN Legislature adopted a requirement for a Wind Integration Study of the impacts on reliability and costs associated with increasing wind capacity to 20% of MN retail electric energy sales by 2020.
- PUC directed all MN utilities to participate in the study; to use the results to estimate impacts on rates; and to incorporate the findings in resource plans and renewable energy objective reports.
- Reliability Administrator assembled a broad stakeholder group (MN Utilities, MISO, MAPP, Chamber of Commerce, Environmental Orgs, AWEA, UWIG, NREL, etc) to develop the study scope based upon an extensive literature

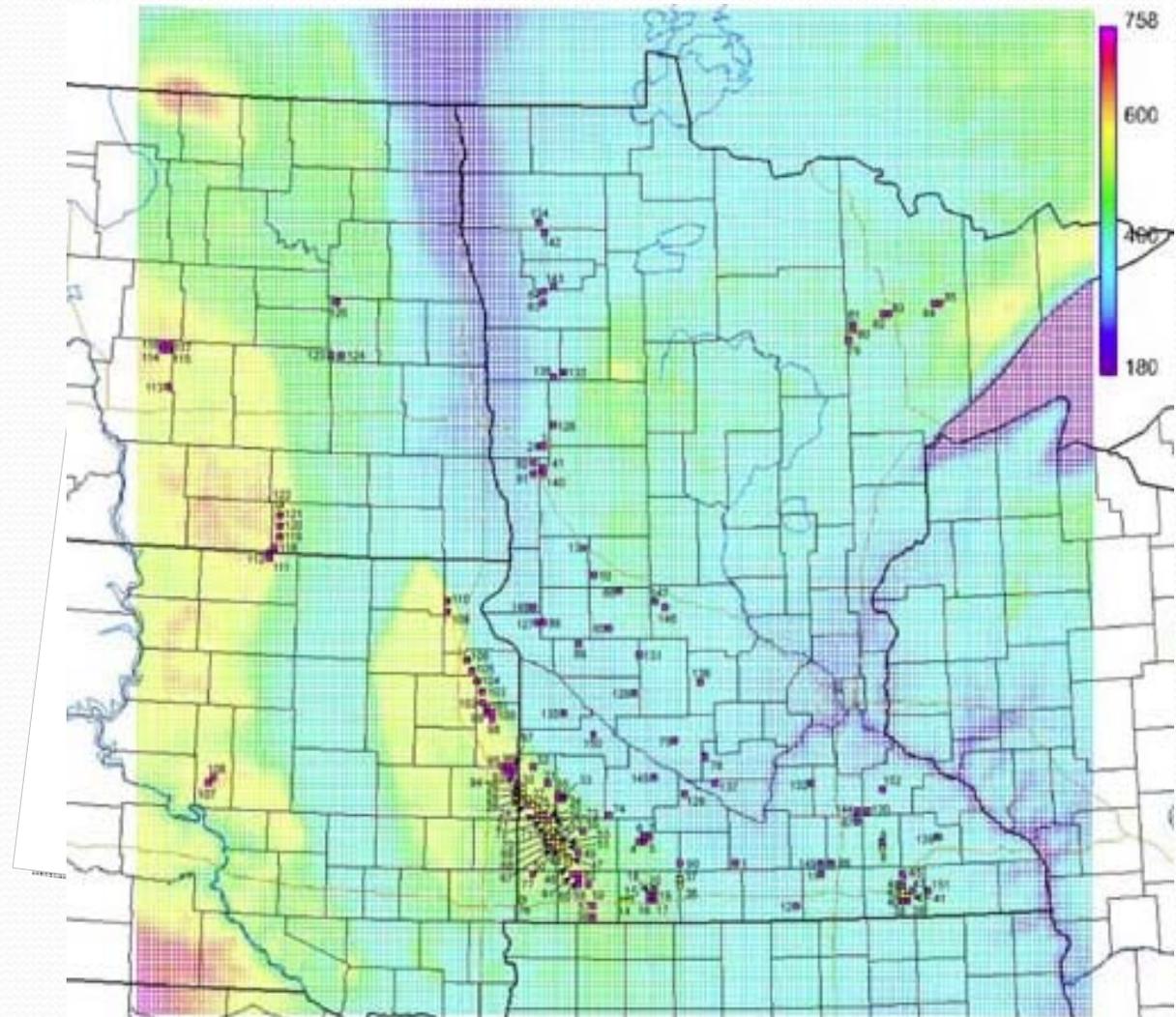


Objectives of the Study

- Evaluate impacts on reliability and costs associated with increasing wind capacity to 15%, 20%, and 25% of Minnesota retail electric energy sales by 2020;
- Identify and develop options to manage the impacts of the wind resources;
- Build upon prior wind integration studies and related technical work;
- Coordinate with recent and current regional power system study work;
- Produce meaningful, broadly supported results through a technically rigorous, inclusive study process.

The Study Characterized the Wind Power Resource

- 152 proxy wind plant locations
- Modeled results included wind speed, air density, power density, energy production
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Summary of Study

- The addition of wind generation to supply 15, 20, & 25% of Minnesota retail electric energy sales can be reliably accommodated by the electric power system.

- The total integration operating cost for up to 25% wind energy delivered to Minnesota customers is less than \$4.50 per MWh of wind generation.

Key drivers include:

- A geographically diverse wind scenario;
- The large MISO energy market;
- Functional consolidation of balancing authorities;
- Sufficient transmission.



Study Conclusion

Higher percentages of wind power can be incorporated reliably into the electric power system, assuming transmission is built to accommodate the increase.

Minnesota's Next Generation Energy Act

Minnesota's Renewable Energy Standard sets mandatory standards for renewable energy for all utilities

YEAR	XCEL	OTHER
2010	15	--
2012	18	12
2016	25	17
2020	30	20
2025	--	25

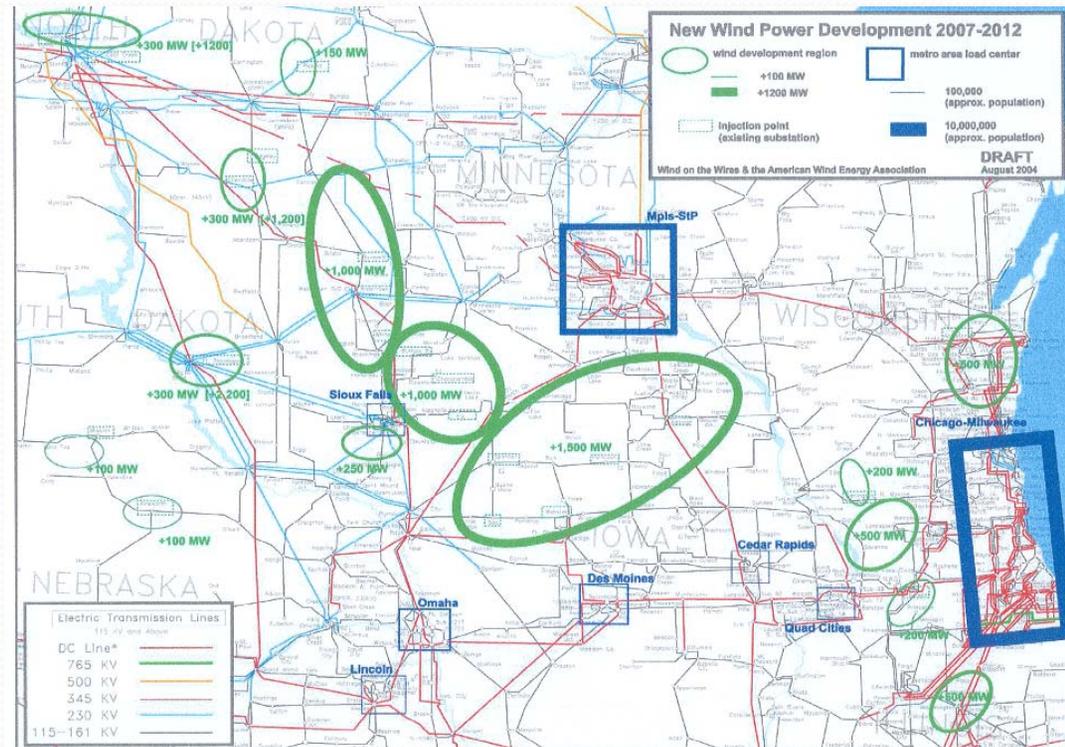
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- Reduce GHG emissions 30% by 2025

The Next Generation Energy Efficiency Act also set one of the most far-reaching greenhouse gas reduction goals in the nation.

Ten Midwestern Leaders signed a Greenhouse Gas Reduction Accord that established regional goals and initiatives to achieve energy security and promote renewable energy

Transmission Infrastructure is Important

- Policy makers must support the development of transmission to successfully implement the aggressive Renewable Energy Standard.
- Minnesota's major electric utilities—a coalition of IOU's, cooperatives, and municipals—have undertaken a voluntary, statewide effort to plan the next generation of high voltage transmission development. (CapX 2020)
- These plans are intended to accommodate 2400 MW of wind generation to support Minnesota's RES



Economic Incentives

- Community-Based Energy Development (D-BED)
- USDA has annual solicitations for energy efficiency and renewable energy project grants and loans under the Farm Bill.
- Renewable Energy Fund Research and Development grants . These are competitive in nature.
- All real and personal property of a wind energy system is exempt (Statute 272.02, Sub. 22)
- A small production tax was implemented in lieu of property tax
- State Production Incentive of between 1 and 1.5 cents/kWh for 10 years for qualified wind energy project of less than 2 MW
- Business tax credit of 1.9Cents/kWh for projects installed by December 31, 2008 for 10 years (IRS Tax Form 8835)
- Wind energy systems less than 40 kW in size are eligible for net metering (Statute 216B.164)
- Minnesota Sales Tax exemption for wind power (Statute 297A.25)
- For Solar- Rebate program between \$100-\$20,000 for grid-connected solar electric systems ; sales tax exemption for all solar components; Property tax exemption for photovoltaic systems (Statute 272.02; Federal production Tax Credits

Minnesota Encourages a Diversity of Approaches to Renewable Electricity Development

- Community Based Wind Development
- Combined Heat and Power
- Biomass
- Waste to Energy
- C-Bed tariffs offer “front-ended loaded rate to overcome financing barriers for small wind
- Efficient Use of locally produced power
- Municipal Waste, Turkey Litter, Forest Wastes, etc.

Midwest Renewable Energy Tracking System

- Region-wide system for tracking renewable energy
- Helps insure that renewable energy is being produced and avoids double counting
- Will facilitate trading renewable credits to encourage renewable development
- System is underway and administered by independent vendor under state policy oversight (APX)

Conclusion

We encourage a
multifaceted approach to
renewable development

We are ready for prime-
time !