

**Federal Energy Regulatory Commission  
Interconnection Queue Practices  
Technical Conference  
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Presented by:  
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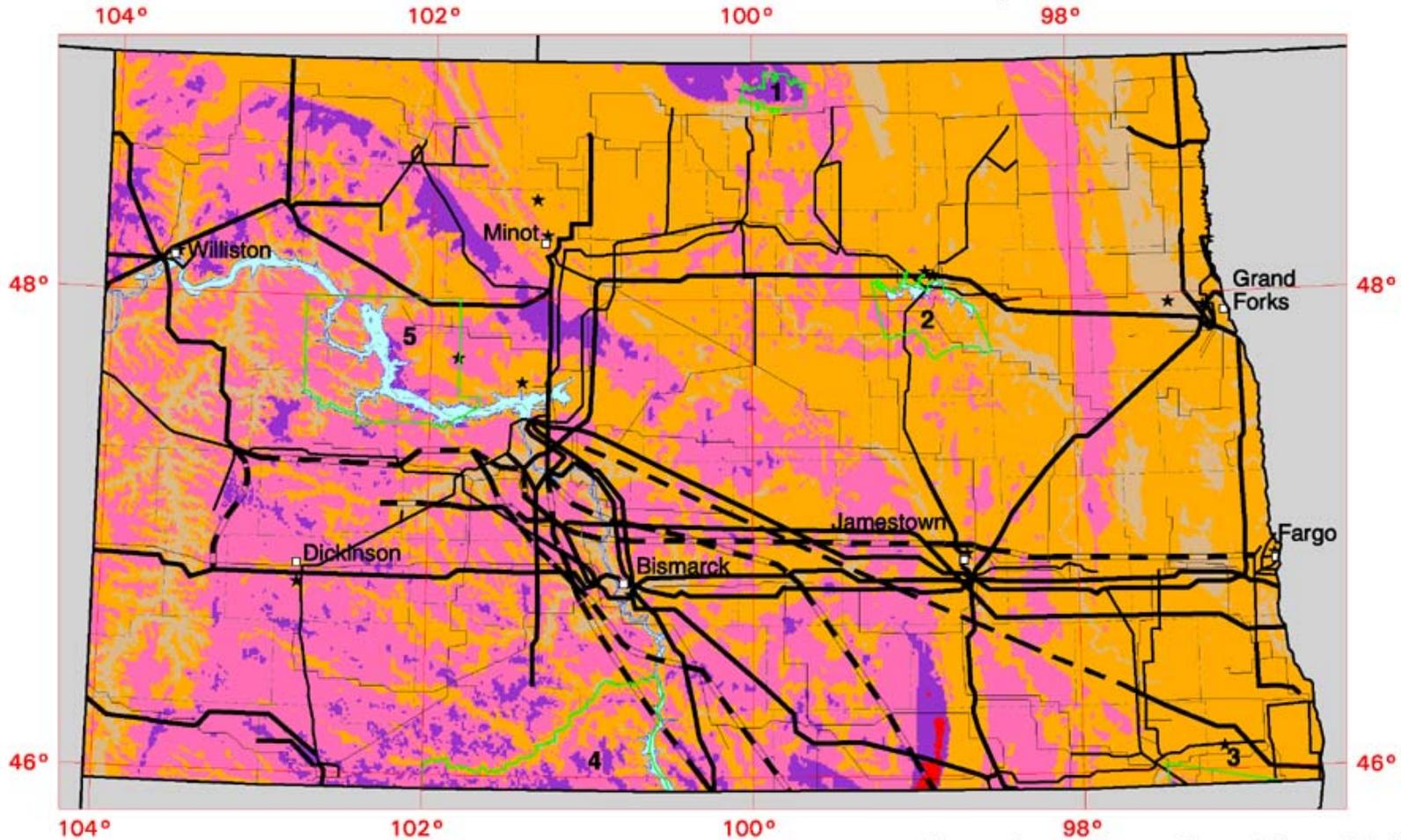
# Overview

- ND Electric Energy Resources
- Interconnection Difficulties
- Queue Process Improvement
- The Need for New Transmission

# ND Electric Energy Resources

- ND Ranked #1 in U.S. for Wind Energy Potential
  - 1991 Pacific Northwest Labs study found ND Wind could potentially supply 36% of U.S. electric energy consumption.
  - 185 MW installed wind capacity
  - 330 MW under construction
- Hydropower
  - 500 MW installed hydro capacity
- Lignite Coal
  - 4,000 MW installed capacity
  - Mine-mouth generation
  - 300 Year supply at present consumption rates
  - ND meets all federal ambient air quality standards.

# North Dakota - Wind Resource Map



Wind Power Classification				
Wind Power Class	Resource Potential	Wind Power Density at 50 m W/m <sup>2</sup>	Wind Speed <sup>a</sup> at 50 m m/s	Wind Speed <sup>a</sup> at 50 m mph
2	Marginal	200 - 300	5.6 - 6.4	12.5 - 14.3
3	Fair	300 - 400	6.4 - 7.0	14.3 - 15.7
4	Good	400 - 500	7.0 - 7.5	15.7 - 16.8
5	Excellent	500 - 600	7.5 - 8.0	16.8 - 17.9
6	Outstanding	600 - 800	8.0 - 8.8	17.9 - 19.7

<sup>a</sup>Wind speeds are based on a Weibull k value of 2.0

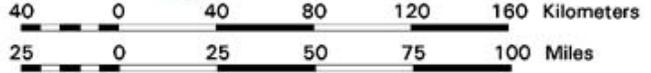
★ Meteorological Station with Wind Data  
 □ City or Town

**Transmission Line Voltage**

- ∧ 69 Kilovolts
- ∨ 115 Kilovolts
- ≡ 230 Kilovolts
- ≡≡ 345 Kilovolts
- ≡≡≡ Under Construction

**Indian Reservations**

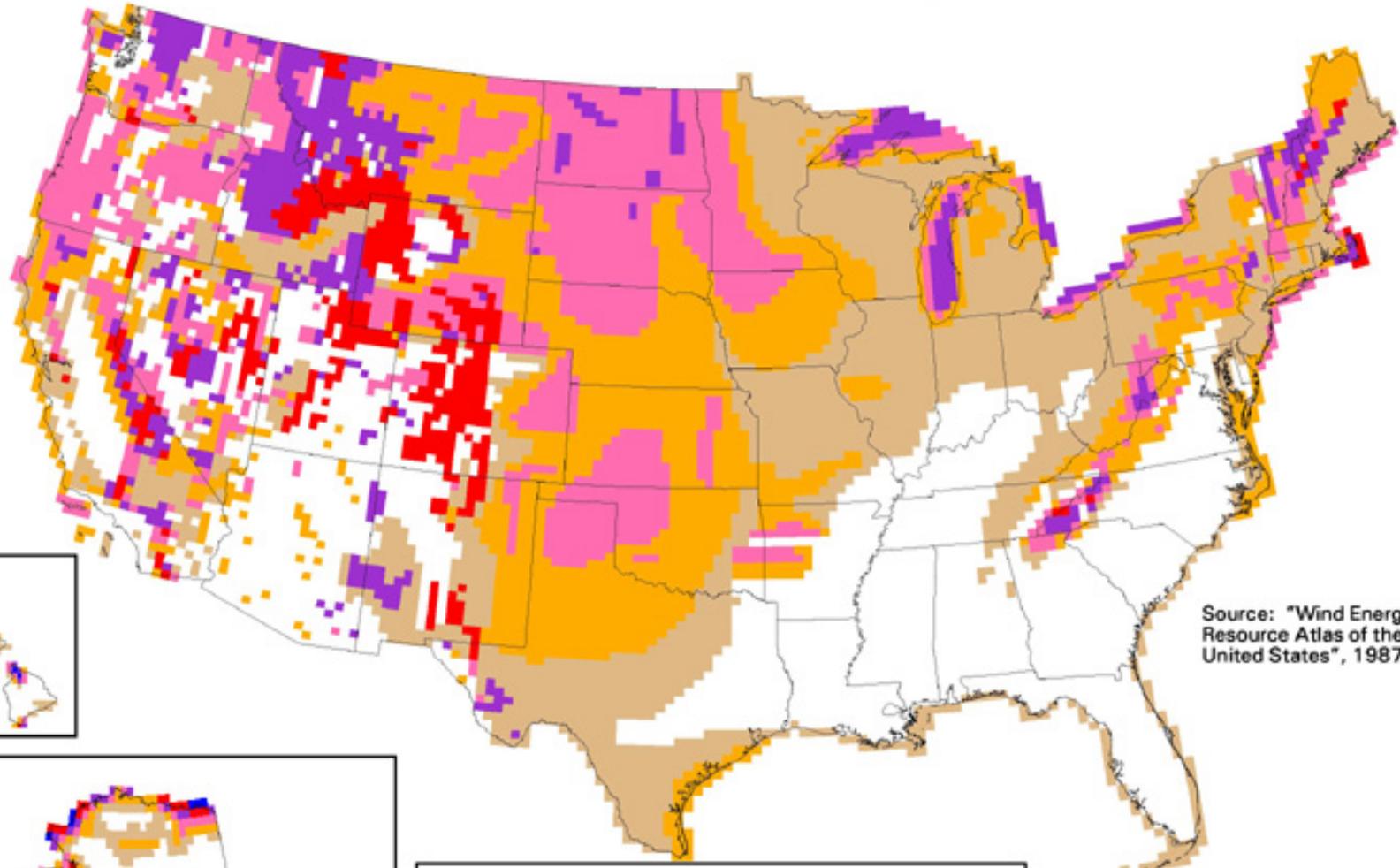
- 1 Turtle Mountain
- 2 Devil's Lake Sioux
- 3 Lake Traverse
- 4 Standing Rock
- 5 Fort Berthold



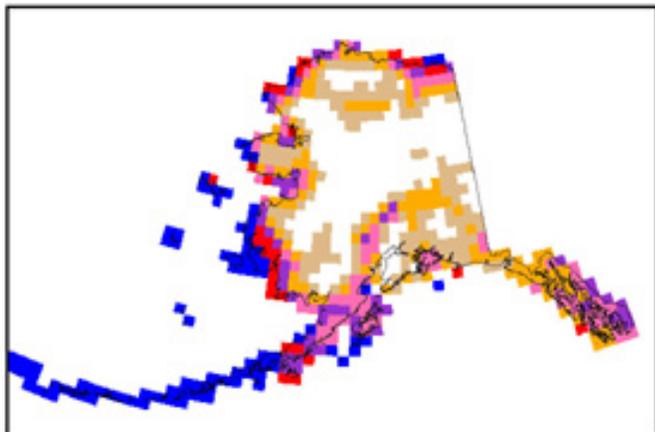
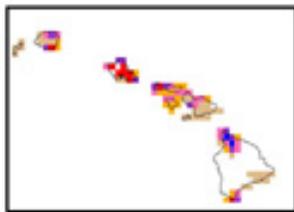
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# United States - Wind Resource Map



Source: "Wind Energy Resource Atlas of the United States", 1987



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5	Excellent	500 - 600	7.5 - 8.0	16.8 - 17.9
6	Outstanding	600 - 800	8.0 - 8.8	17.9 - 19.7
7	Superb	800 - 1600	8.8 - 11.1	19.7 - 24.8

<sup>a</sup> Wind speeds are based on a Weibull k value of 2.0

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# Interconnection Difficulties

- Wind developers ready to invest now, but inability to interconnect is hindering investment.
- MISO estimates many years to obtain interconnection.
  - Regional transmission constraints
  - Failed interconnection queue process
- Most new and existing ND wind interconnections are with non-MISO participants.
  - WAPA/Basin and Minnkota Interconnections
  - Opportunities for further non-MISO interconnection are limited

# Need for New Transmission

- MISO Queue overwhelmed with wind interconnection requests from upper great plains region.
  - MN requests total 26,827 MW
  - SD requests total 11,184 MW
  - ND requests total 8,001 MW
- Not enough regional load or transmission export capability to accommodate interconnection requests.
  - NDEX stability constraint between Dakotas and MN
  - Further constraints between MN and loads east
  - Need to maintain minimum base load generation levels

# Queue Improvements

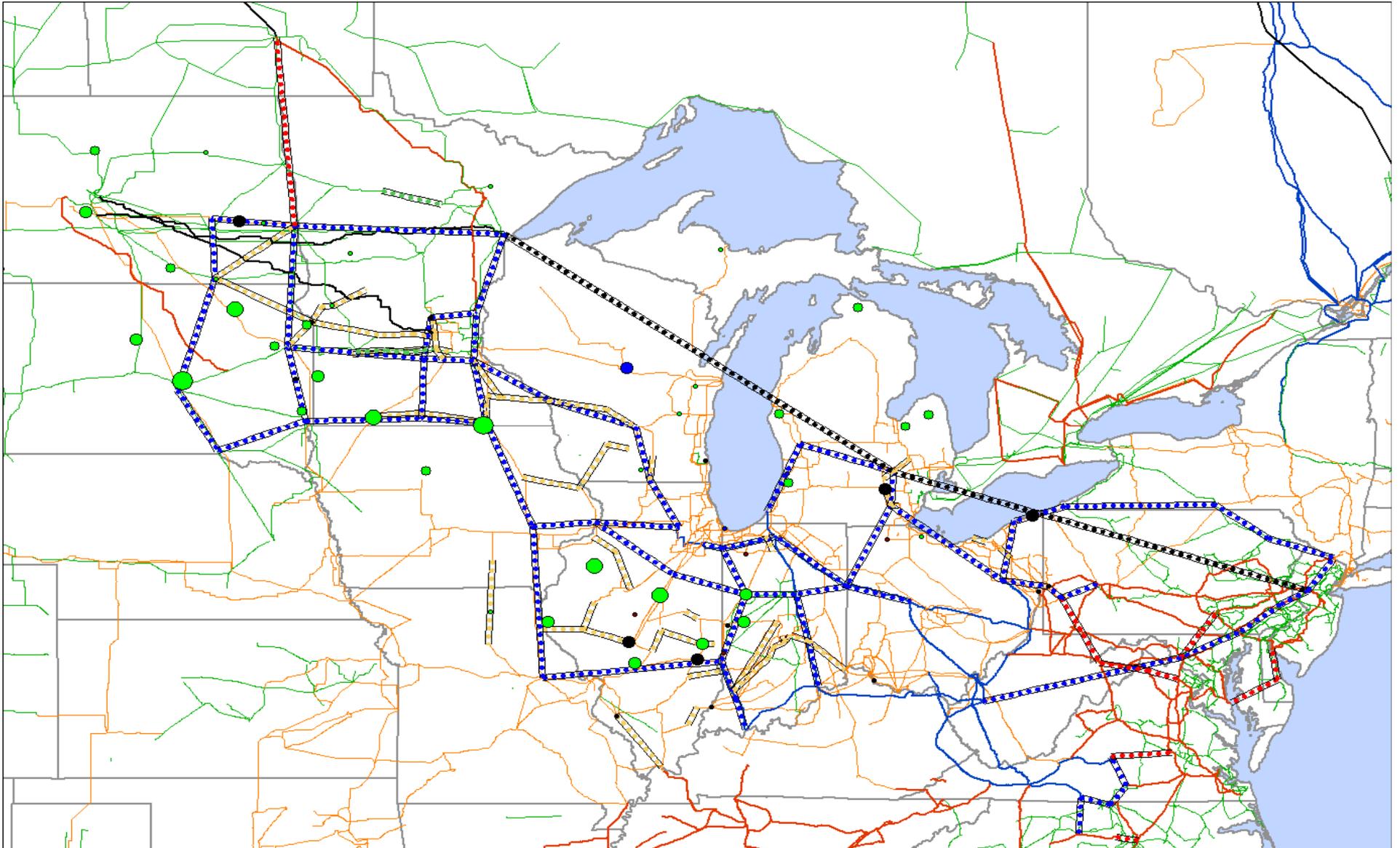
- Support for Midwest ISO Queue Process Working Group
  - Primarily, FIFO needs to change to a milestone based process where projects ready to move forward can do so.
- Support for “Open Season” RPGIP proposal
  - Recognizes underlying need for transmission
  - Needs further work on cost allocations, subscription levels, etc.

# Possible Solution

- MTEP visionary study indicates a 765 kV Transmission system from the great plains to east coast population centers is economically feasible based on existing energy price differentials.
- Funding and siting such a large interstate, inter-RTO project may not be possible without federal assistance.
  - Path 15 example of WAPA working with private industry to construct transmission in California

MTEP08  
October 5, 2007  
Overlay for  
Step 4 Analysis

# Final Skeleton – EI Overlay



# Conclusion

- The Midwest ISO stakeholder process is the appropriate forum for addressing Midwest ISO queue process improvement.
- Significant new transmission is needed for the upper great plains region to provide clean, long-term and low-cost domestic energy sufficient to significantly contribute to national energy supply - thus decreasing our expensive and dangerous dependence on foreign oil and natural gas.