



Advancing Wind Power in Illinois Conference 2011

Glen Skarbakka

Iberdrola Renewables

Curtailment of Wind Farms Output

Breakout Session

Friday, July 22, 2011, 1:30 PM

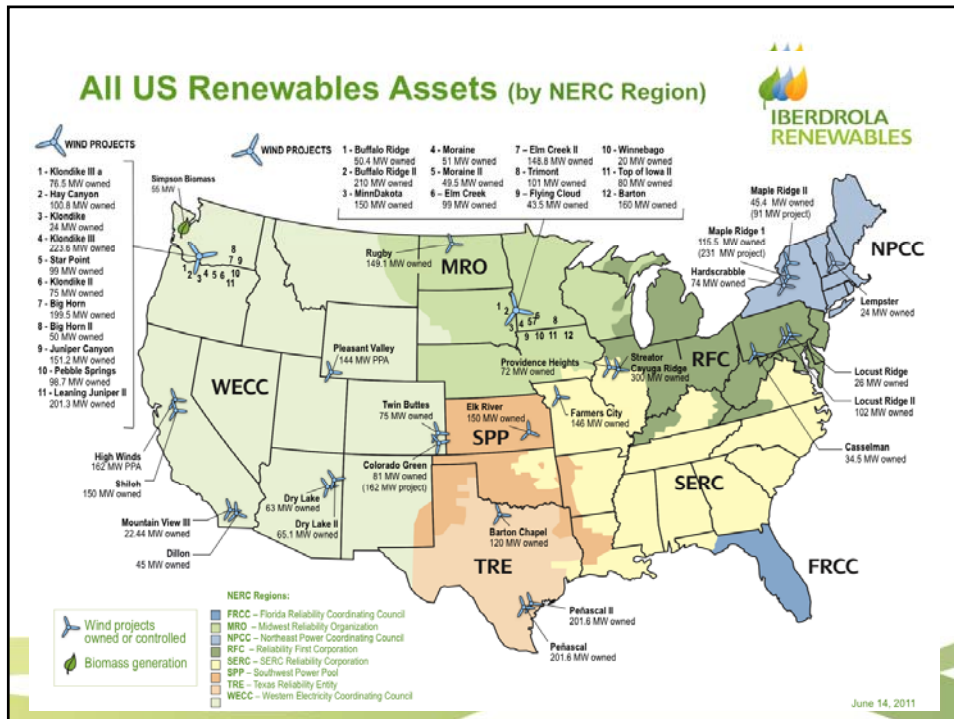


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Curtailments – Windfarm Perspective

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Illinois Wind Working Group 5th Annual Conference
Curtailment Panel
July 22, 2011



Reasons for wind curtailment



- Generation-Load Imbalance
 - Within local balancing area
 - Within constrained groups of balancing areas
 - Market-wide
- Transmission Overloads
 - Actual overload
 - Next-contingency overloads

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Reasons for transmission congestion



- “Overselling” of transmission service
 - Actual conditions \neq studied conditions
 - Generation
 - Load
 - Through flows
 - Transmission network
 - Forced outages
 - Scheduled outages

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Congestion management tools



- Manual intervention, considering:
 - Last in, first out
 - Distribution factors
 - Operator responsiveness
 - Level of service
 - Transmission Service
 - Firm / nonfirm
 - Duration
 - Interconnection Service
 - Network Resource
 - Energy Resource
- Market signals
 - LMP

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Implications for wind projects



- Market / Congestion impacts
 - Low/negative LMPs
 - Operate / Self-curtail?
 - Curtailments
- Affects
 - Siting
 - Financing
 - Revenue
 - Incentives
 - PPA negotiations
 - Operations
 - Market positioning
 - Hedging
 - Physical operations

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Transparency



- Need to understand history to forecast future
 - Short -term issues, e.g.,
 - Construction-related
 - Equipment failure
 - Long-term issues, e.g.,
 - Constrained flowgates
 - Expansion plans
- Barriers to transparency
 - CEII
 - Market-sensitive info

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Forecasting challenges



- Future congestion depends on:
 - specific location, amounts, and timing of
 - new transmission capacity
 - new and retiring generators
 - generation dispatch patterns
 - Load
 - Fuel
 - Regulatory policy (e.g., CO2)
 - Operating practices
- Modeling is only as good as assumptions

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Risk Allocation (in PPA)



- Negotiated
- Classification of risks
 - Low LMPs
 - Market-driven
 - Congestion-driven
 - Curtailments
 - Causes
- Who can best manage / mitigate each risk?
- Regulatory considerations
- Market considerations

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Distributed Intermittent Resources



- Renewables should be treated equitably with respect to
 - Integration
 - Access to market mechanisms
- Cautiously optimistic about MISO DIR implementation
- Concern that renewables can't revert back to intermittent status
- Some start up glitches
- Need several months experience to judge success

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