Regional Incremental Generation Outlet Transmission Study (RIGO)

Presentation to

MB group

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Outline:

- Purpose/Goal
- Scope of Study
- Assumptions/Methods
- Participants' Roles
- Schedule

Purpose/Goals:

Investigate feasibility of an "Interim Step" transmission plan for achieving several hundred MW of additional wind generation outlet capacity beyond the BRIGO series of projects.

Formulate & Evaluate transmission Options

- of reasonable $/kW cost
- focus outside of the Buffalo Ridge area
- of modest magnitude
- implementable in the 2010-2011 timeframe
- compatible with future CAPX projects

Keep wind development active while the CAPX lines are completed.

This is **not** a commitment to build the plans that are developed.

Scope of Study:

Perform technical analysis (powerflow)

- Analyze MISO Queue by county
  - Choose two additional geographic areas to increase wind generation
    - Based on the level of wind generation
    - Delivery to the Twin Cities
    - Each geographic area will be studied independently

- Identify "existing system" limitations (post BRIGO facilities)
  - Heron Lake-Storden-Searles Jct-Ft. Ridgley 161 kV is a presumed alternative for non Buffalo Ridge Minnesota and is not part of this analysis.

- Formulate transmission Options to increase greater Minnesota generation outlet capacity
  - no "Mega" Transmission Projects
  - anticipated to be mainly 115 kV improvements (reconductors, 69→115 kV conversions, possible 115 kV → 230 kV conversions, new 115 kV)

- Evaluate Options' Electrical Performance
    - system intact
    - first contingency ("n-1")
      (including double circuits & breaker failures)
    - Losses
    - Voltage Stability/Reactive requirements
    - Constrained Interface (flowgate) impacts

Perform economic analysis

- Develop cost estimates (± 30%)
- Calculate Present Worth of loss differences
- Show cost as function of outlet MWs achieved

Document analyses in Study Report

Assumptions/Methods:

Start with 2006 MAPP series model (2011 Summer peak and off-peak)

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Study peak and off-peak load/transfer conditions

	peak	off-peak
Local load:	100%	70-80%
NDEX:	moderate	high
MWSI:	moderate	high

New generation additions based on the MISO queue map.
-Western Minnesota (Waldon and Morris)
-Southeaster Minnesota (Pleasant Valley, Byron, Blue Earth)

Use PSS/E activity "TLTG" or MUST equivalent to identify thermal limiters

Perform ACCC & Q-V analyses to identify reactive needs

Participants' Roles:

Xcel Energy:

- Perform technical & economic analyses
- Coordinate progress meetings
- Present updates
- Develop draft & final reports

Others:

- Designate contact person for study
- Provide model review & comments
- Help formulate transmission options
- Review technical & economic analysis methods, results
- Help formulate conclusions & recommendations
- Review draft Study Report

Schedule (tentative):

Progress meeting	July 17, 2007
Progress meeting	????, 2007
Issue Draft Report	August 6, 2007
Issue Final Report	August 20, 2007

We will try and set these dates to coincide with other regional meetings.