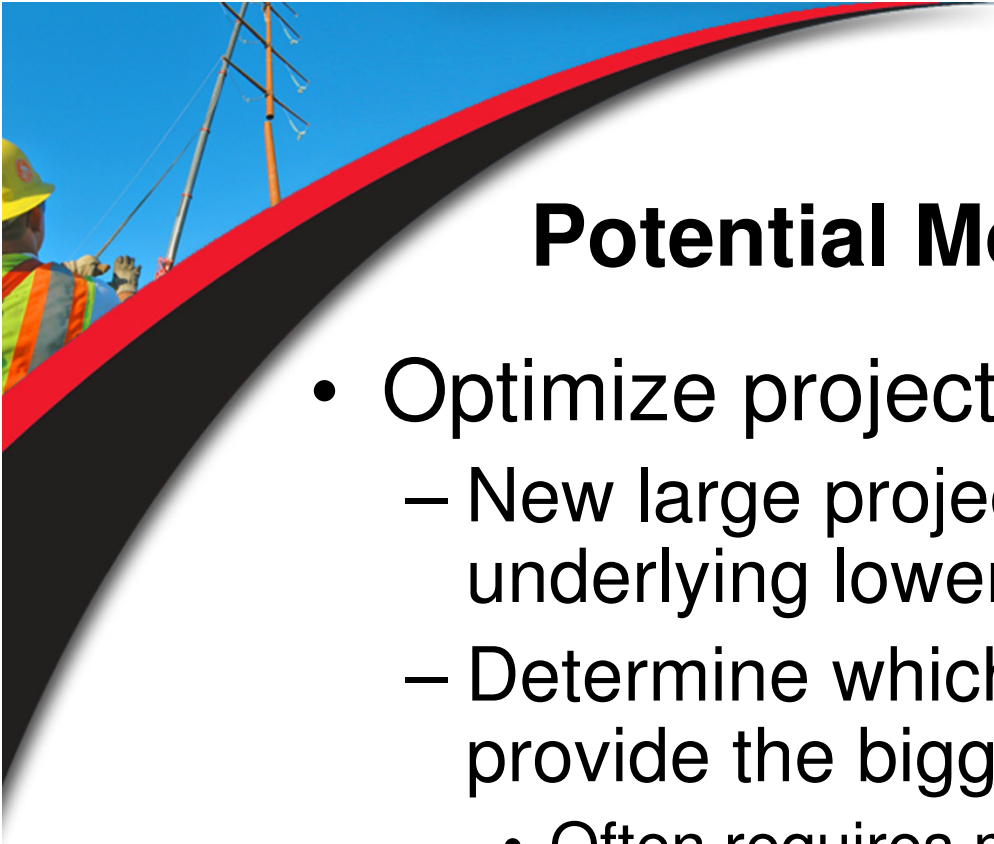




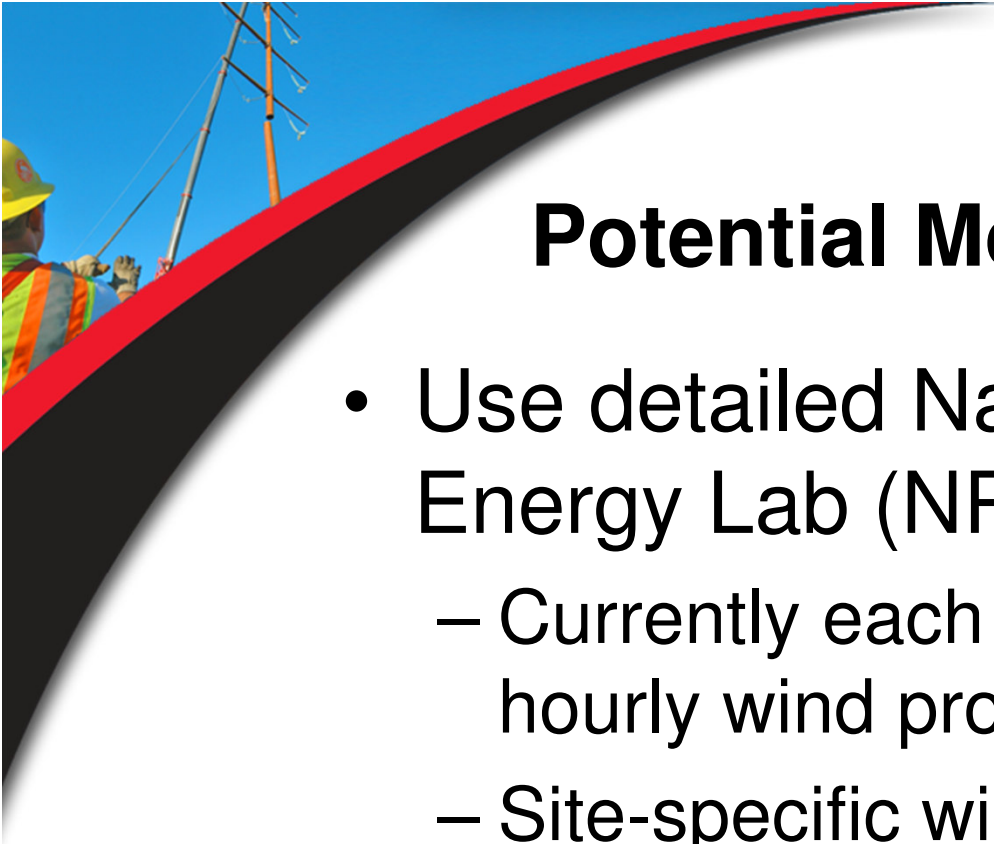
ATC Order 890 Stakeholder Update Potential Modeling Refinements

ATC Economic Planning
12-18-08



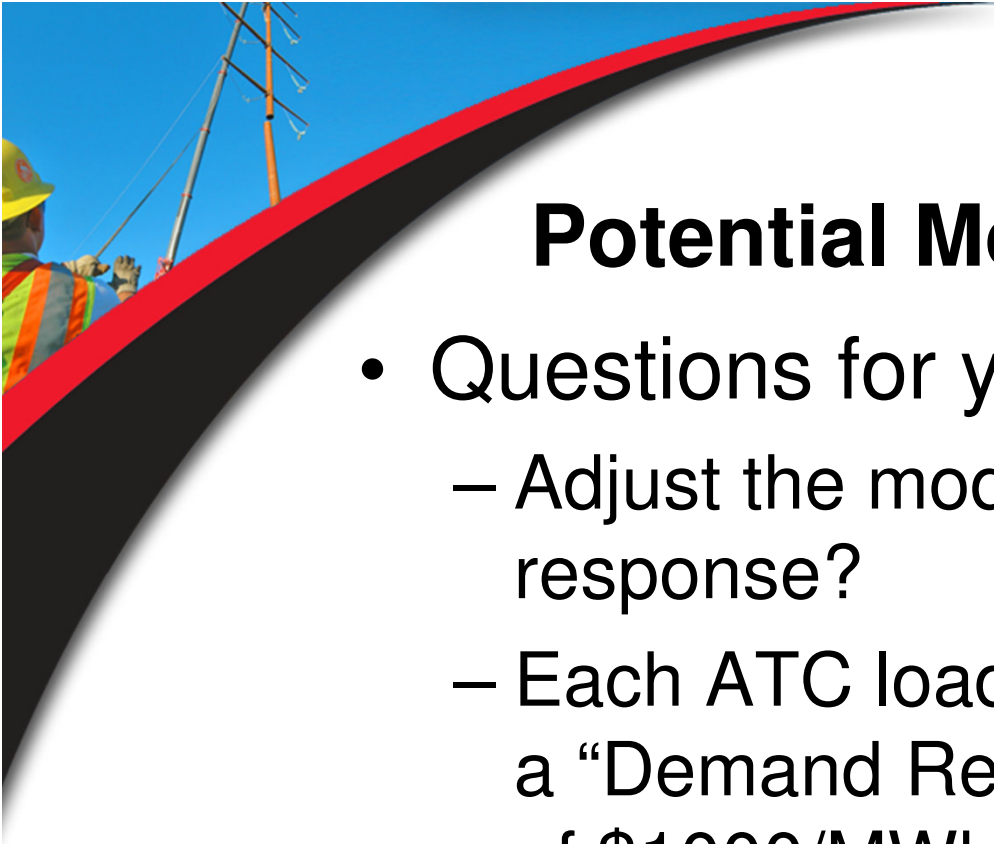
Potential Modeling Refinements

- Optimize project “packages”
 - New large projects can cause issues on underlying lower voltage facilities
 - Determine which lower voltage fixes provide the biggest bang for the buck
 - Often requires multiple model runs
- Example: For NLAX to Cardinal, the 69kV line out of Hilltop towards Wautoma has a \$2.3 million shadow price



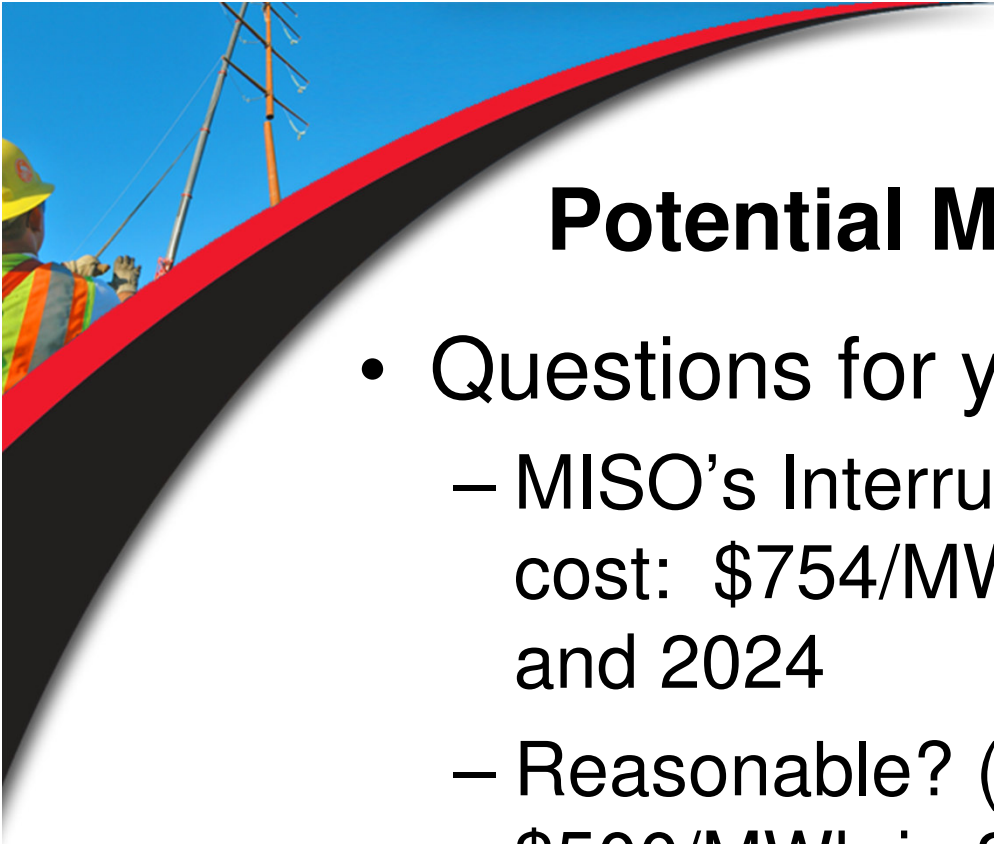
Potential Modeling Refinements

- Use detailed National Renewable Energy Lab (NREL) wind profiles
 - Currently each state has a single hourly wind profile (2 for MN)
 - Site-specific wind profiles have more diversity
 - Fewer wind generation spikes
- Latest PROMOD version can reduce wind output to reduce dump energy



Potential Modeling Refinements

- Questions for your input:
 - Adjust the modeling of demand response?
 - Each ATC load greater than 5 MW has a “Demand Response” unit with a cost of \$1000/MWh (in 2008\$ escalated at inflation)
 - Increase cost?
 - Minimum dispatch of 1 MW?



Potential Modeling Refinements

- Questions for your input, cont.:
 - MISO's Interruptible and DLC dispatch cost: \$754/MWh & \$954/MWh in 2018 and 2024
 - Reasonable? (MISO starts at \$500/MWh in 2007 and escalates at 4%/year)



PROMOD Server

- New PROMOD Server
 - Individual runs are twice as fast.
 - Server can handle up to 12 runs simultaneously.
 - Queued runs kick off automatically—No downtime.
 - Server queuing software (Digipede) is Windows based and easier for most IT departments to support (relative to the Sun based system)



PROMOD Server

- New Challenges
 - MISO's PROMOD models include virtually the entire Eastern Interconnect
 - Run times are very long
- Future Enhancement Opportunity
 - Develop reduced footprint PROMOD models that simulate MISO and PJM
 - Considerable effort—huge time saver