



PROMOD Overview

Transmission Planning



Introduction

- PROMOD is a Security Constrained Optimal Dispatch (SCOD) and Locational Marginal Price (LMP) model (similar to GE-MAPS).
- Combines a production cost model (like ENPRO or PROSYM) with a power flow model (like PSS/E or PowerWorld). Huge amount of input data.
- Minimizes production costs while respecting all of the defined transmission constraints for the entire Eastern Interconnection—the huge interconnected transmission system covering almost everything east of the Rockies in North America.



PROMOD Example

- Run the Base Case for a given year. Add a transmission expansion alternative, like the Byron to North Madison (NMA) 345 kV line and see how much the production costs decrease relative to the Base Case.
- Compare production cost savings for each alternative to their capital costs to see which one provides the biggest bang for the buck. Example.



Good Economic Decisions

- PROMOD helps ensure that our projects provide good value to our ratepayers.
- PROMOD required a significant investment in personnel and resources.
 - Four people on the PROMOD team-Various backgrounds.
 - ~38 hours of CPU time for a one year simulation.



Steep Learning Curve

- ATC has had PROMOD for a few months.
 - Learning how to use the model.
 - Reviewing the input data.
 - Developing tools to help evaluate the large amount of output data coming from the model.



Input Assumptions & Data

- Analysis year: 2012 (All 8760 hours simulated)
- PROMOD comes with a huge database that includes production cost input data (like generator capacities, heat rates, forced outage rates, etc.) for all plants in the Eastern Interconnection--mostly from Platts/RDI.
- Fuel cost values and forecasts also from Platts/RDI.
- Automatic maintenance scheduling.
- ATC updated the load, interruptible and DSM forecasts for the ATC footprint--latest EIA 411.
 - Total ATC load for 2012: 16,151 MW.
 - Hourly load profiles from 2001.



Input Assumptions & Data

- ATC reviewed and corrected mapping errors between generators in the production cost and the transmission models. Focused our review efforts on Wisconsin and surrounding states.
- ATC added/retired generation to correspond to 2012.
 - Total generation in ATC: 16,805 MW.
 - Net new generation: 3,700 MW (~2,000 MW Baseload)
 - Nuclear plant relicensing is assumed.
 - Reserve Margins-Gen. Only: 10%, With Firm TSRs: 21%.
- Started with the MISO's current transmission Flowgate list but made many changes, to reflect the transmission topology changes anticipated by 2012.



Input Assumptions & Data

- The transmission system is planned and operated such that it can withstand the outage of the most critical component--the “N-1” criterion.
- Significant effort involved in predicting what the critical contingencies (flowgates) will be in 2012 because the transmission topology and how power flows will be different from today.



Input Assumptions & Data

- The most active/constraining flowgates change during different times of the year as the dispatch changes to meet varying load and because winter ratings are typically higher than summer ratings.
- Large number of flowgates, approx. 800 covering the Eastern Interconnection.
 - 80 flowgates for the ATC Footprint.



Cost Differences

- We are calculating the cost difference between the base case and the alternatives.
- Using the cost difference tends to reduce the impact of inaccuracies in forecasts and other input data. Example.
- Diligent in reviewing the input data, but given the relatively short time we have had PROMOD we have focused our review efforts on Wisconsin and surrounding states.



Early Stages

- Have only had PROMOD for a short period of time.
- Still need to refine the input data, especially related to the flowgates.
- The other alternatives need to be evaluated.