Load Forecasting

*presented to*
Midwest ISO
Advisory Committee
March 18, 2009

*presented by*
Doug Gotham
State Utility Forecasting Group
Forecasting & the Midwest ISO

• Some of the same issues that prompted the creation of the SUFG are still relevant 25 years later
• MISO and its stakeholders should examine a similar set of options for load forecasting
• Each has its own advantages and disadvantages
Regional Planning Benefits

• More optimal decisions regarding new construction, retrofits, and environmental upgrades
• Integration of renewable resources
• Better transmission planning
• Integration of demand response, energy efficiency, and smart grid
Load Forecasting

- There are a number of viable approaches to load forecasting
  - They all have their own relative advantages and disadvantages
  - It would be inappropriate to mandate one method over the others
Forecasting – an Inexact Science

- Even the best forecasts have errors
  - Exogenous assumptions (forecast drivers)
  - Stochastic model error (cannot fit relationships of explanatory variables to output variable perfectly)
  - Non-stochastic model error

- Uncertainty costs money
  - Even though we cannot eliminate uncertainty, we need to minimize it
Forecasting Requirements

• Based on consistent assumptions/data
• Avoid over/under counting of loads
• Load data must be of high quality
  – Load research efforts have relaxed in recent years
• Fair and consistent treatment of demand response and efficiency
  – Objective verification of programs
• Unbiased
Option 1 - LSE Forecasts

• LSEs produce their own forecasts individually and use the sum of them
  – Lacks consistency
  – Potential for under/over counting
  – Utilities may have a financial incentive to project low demand growth and high demand response
  – Appearance of bias is a serious problem even when the intent is not there
Option 1 -continued

• Need to develop a system that discourages gaming the system
  – Should not adversely affect other market participants
  – Should avoid penalizing legitimate errors in forecast

• Stick and/or carrot approach based on established standards
  – Financial consequences for repeating, systematic errors
Option 1 -continued

• If the financial consequence is not large enough, reliability may be compromised
  – This may lead to higher reserve requirements for everyone
• If the penalty is large enough and the potential for penalizing honest errors exists, LSEs may intentionally overforecast
Option 2 – MISO Forecast

- MISO produces forecast
  - Solves consistency and appearance of bias issues
  - There has been opposition/criticism of MISO going beyond transmission planning
  - This option costs money
Option 3 – Independent Forecast

• An independent group produces forecast
  – Solves consistency and appearance of bias issues
  – Needs access to sensitive information
  – Must maintain independence
  – This option costs money
Option 4 - Consortium Forecast

- A consortium of entities representing individual states or groups of states produces forecast
  - State commissions
  - Universities
  - Private companies
Option 4 - continued

• Consortium must work together to ensure consistency of assumptions
• All members must be independent
• States are not immune from appearance of bias
• Must be structured to avoid pre-judgment issues
• Some states may lack regulatory authority
• This option costs money
Further Information

• Doug Gotham
  – 765-494-0851
  – gotham@purdue.edu

• http://www.purdue.edu/dp/energy/SUFG/