Load Forecast Update

Planning Committee
July 9, 2015
Over the past several years, accuracy started showing noticeable degradation and forecasts were considered to be overly optimistic.

- Consistent lowering of the forecast
  - Recently, model re-estimation became a major cause of forecast change whereas in past years the clear majority of forecast change was attributable to revisions of the economic forecast.
  - Persistent negative residual pattern (i.e. model anticipating higher loads than what actually occurs)
Overview

• To address the degradation in accuracy, PJM has identified a new model specification that makes several significant changes. These are:
  – Inclusion of customer usage & efficiency variables
  – New weather specification
  – Introduction of an autoregressive error term
**Overview**

The graph titled "Percentage Impact to 2018 Forecast*" shows the impact of various proposed changes on the forecast. The chart includes the following scenarios:

- **Official 2015 Load Forecast**
- **Forecast incorporating all proposed changes**

*Point of comparison is the forecast that would have been produced had no intermediate action been taken with the introduction of the binary variable.*

Scenarios listed include:

- Binary
- New Weather Specification
- New Weather Specification w/ AR(1) Term
- Adding AR(1) Term
- New Weather Spec w/ Saturation/Efficiency Variables
- New Weather Spec w/ Saturation/Efficiency Variables and AR(1) Term
• New forecast specification affects the forecast in two major ways
  – Lowers the starting point of the forecast due to the model more accurately capturing recent historical trends
  – Lowers the growth rate as it takes into account usage & efficiency trends through the equipment indexes
    • PJM 10-Year Growth Rate: 0.7% using New Specification versus 1% using Current Specification
Forecast Accuracy

• Accuracy was tested by comparing actual unrestricted load on peak-type days (10 highest Summer load days) versus what the model would have projected for those days
  – Under knowledge available at the time of the formation of the forecast (Vintage Runs)
  – Under knowledge available today (Current Runs)
• Were the forecast model to have up-to-date information on economics and equipment/index trends, the new forecast model specification has an out-of-sample MAPE (mean absolute percent error) of 1.7% on the three-year out forecast versus 6.2% with the current specification.
Forecast Accuracy: Current Runs

PJM RTO Forecast MAPE on Summer 10 CPs Using Current Runs

- **Forecast Years Out**
  - 0
  - 1
  - 2
  - 3
  - 4
  - 5

- **New Specification**
- **Current Specification**

- MAPE values for Forecast Years Out:
  - 0: 2%
  - 1: 3%
  - 2: 4%
  - 3: 6%
  - 4: 7%
  - 5: 9%
• Additional information can be found on the Load Analysis Subcommittee website: http://www.pjm.com/committees-and-groups/subcommittees/las.aspx
  – March 25, 2015
  – April 30, 2015
  – May 27, 2015
Remaining Tasks

- Update zones with new metropolitan area mapping
- Update weather stations for zones
- Investigate Weather-Normalized load
- Investigate current practice of using 40+ years in weather simulation to construct 50/50 load forecast
- Develop M-19 language and review through stakeholder process