High Electric Demand Day Trigger - Final
June 18, 2007

A call of the High Electric Demand Day (HEDD) Workgroup was held on May 3, 2007. The purpose of the call was to discuss an analysis and recommendation for a HEDD trigger prepared by staff at the New Jersey Department of Environmental Protection (Attachment 1). The trigger will be used by some states to define the condition under which owners/operators of HEDD units must reduce NO_x emissions to meet their 2009 reduction requirements.

Results:
The final definition of a High Electric Demand Day means, the day following a day in which the next day forecast load is estimated to have a peak value of 52,000 MW (52 GW) or higher as predicted by the PJM Interconnection 0815 update to its Mid-Atlantic Region Hour Ending Integrated Forecast Load[1], or as defined in an approved HEDD emission reduction plan.

[1] http://www.pjm.com/markets/energy-market/7-day-load-forecast.html

Attachment 1

HEDD Trigger Analysis & Recommendation

One of the remaining items we need to come to closure on for the HEDD initiative is setting a trigger. The trigger will establish the days on which HEDD unit controls must be operating. Whether or not a state utilizes the trigger will depend on how each state structures its HEDD program.

The following discussion explains the analysis process that was followed to arrive at a recommendation for a trigger. The analysis is contained in the excel file, Attachment 2.

Data

It was decided to concentrate the trigger analysis on the PJM 0815 day ahead Mid- Atlantic Region Hour Ending Integrated peak hourly load forecast data. This decision was made in order to keep the trigger simple and easy to use and because the PJM Mid-Atlantic Region encompasses NJ, DE and most of MD and PA, and is upwind of NY and CT.

The **Comparison Chart tab** is a graph of Actual Useage vs Peak Hourly Day Ahead Load Forecast vs Average Hourly Day Ahead Bid-In Forecast for 2006 for the PJM Mid-Atlantic Region. As was learned during this process, the data that Pechan collected and presented at the February 2007, CT meeting was Bid-In forecast data (orange). As can be seen, this data greatly under estimates the actual useage. PJM does have day ahead load forecast data, unfortunately the data is not readily available. However, we were able to get the data for June 2-Aug 31, 2006 (blue). As can be seen, this data is much more representative of the actual useage (red). A graph of the Peak Hourly Day Ahead Load Forecast vs Actual Useage can be found at the **Load vs Actual Chart tab**.

Next, the peak hourly day ahead load forecast data was paired with the Ozone Exceedance data from Northern Virginia (NVA) to Massachusetts. The **Forecast Loads Thresholds tab** is a graph of the days from June 2-Aug 31, 2006 binned by peak hourly forecast load. Two types of days are plotted, total number of days in the summer season and ozone exceedance days. The ratio of these days per bin is also plotted. Based on the ratios, it was decided to take a closer look at the bins from 47 to 52 GW.

The **Summary tab** presents some negatives (what are we missing) and positives (what are we capturing) for peak hourly day ahead forecast loads of 47-52 GW. Looking at the 47 GW bin, upper left hand side of sheet, if a trigger of 47 GW had been set in 2006, 3 ozone days in NVA would have been missed; the maximum ozone level missed would have been 90 ppb. However, at a trigger of 47 GW, 7 ozone exceedance days in NVA would have been captured, i.e. high electric demand days.

Regionally, in 2006 with a trigger of 47 GW, there would have been 49 HEDD days that would capture 26 ozone exceedance days, therefore, 23 of the HEDD days would be false positives, and 6 ozone exceedance days would have been missed. **The O3Ex-CapVsMiss-State Chart tab**

presents a graph of the ozone exceedances captures and missed by state at the different peak hourly day ahead GW thresholds.

The next **tab, ExcByLoad Chart** is a graph of all the monitored exceedances by date, color coded by GW. **ExcByLoad Chart (2)** includes bars to designate the false positive dates color coded by GW. The **tab O3ExcByState** provides a different visualization of this data. It contains a list of all the 8-hour exceedances by state, color coded by GW.

Analysis

Please go to the **Summary tab**. If we look at this information with an eye toward capturing the best balance of ozone exceedance days, there seems to be a break at 49-50 GW. For discussion purposes, if we look at this information from a NJ centric position, at 50 GW we are capturing 11 of 17 ozone exceedance days. But at 49 GW we capture 14 of 17 ozone exceedance days. A trigger of 49 GW would have designated 37 days, about every third day of the summer, as HEDD days. While 20 ozone exceedance days would be captured, there would be 17 false positive days.

Looking at a trigger of 52 GW, for NJ, we capture 9 or 17 ozone exceedance days. A trigger of 52 GW would have designated 17 days as HEDD days, would have captured 12 ozone exceedance days and therefore there would have been 5 false positives. Going down to a 51 GW trigger increases the HEDD days to 26, increases the captured ozone exceedance days to 14 and but more than doubles the false positives to 12 days.

Recommendation

While it is desirable to capture more ozone exceedance days, given the existing legal and data constraints, a trigger of 52 GW based on the PJM Mid-Atlantic day ahead load forecast, is recommended. This trigger would have captured 53% of all the monitored exceedances from Jun 2- Aug 31, 2006 from NVA-MA.