



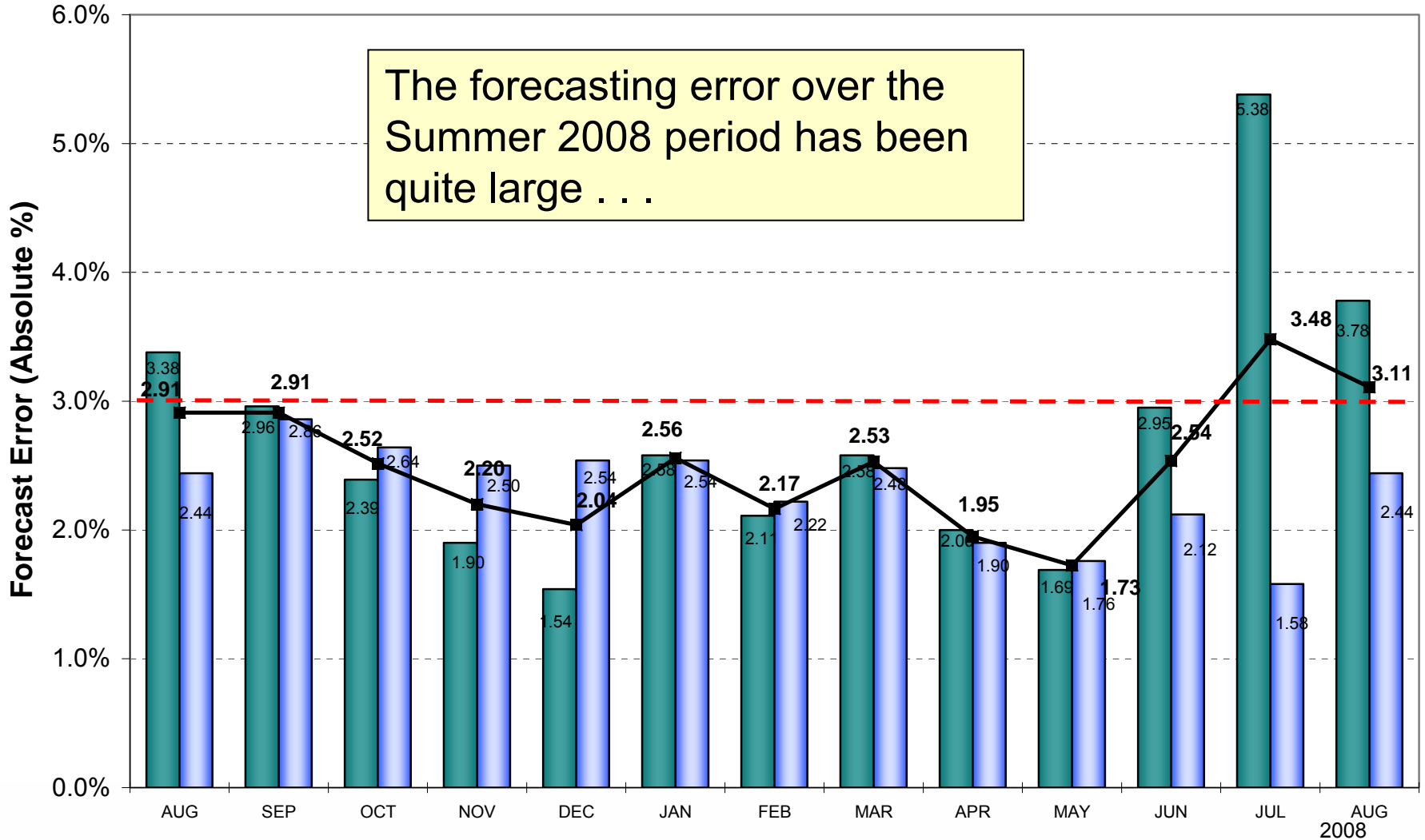
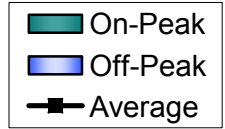
Load Forecasting Review Summer 2008

Scott Benner
Performance Compliance

- Load Forecasting Operations Goal
- Load Forecasting, Summer 2008
- DSR Impact on Prediction
- Weather Impact on Prediction

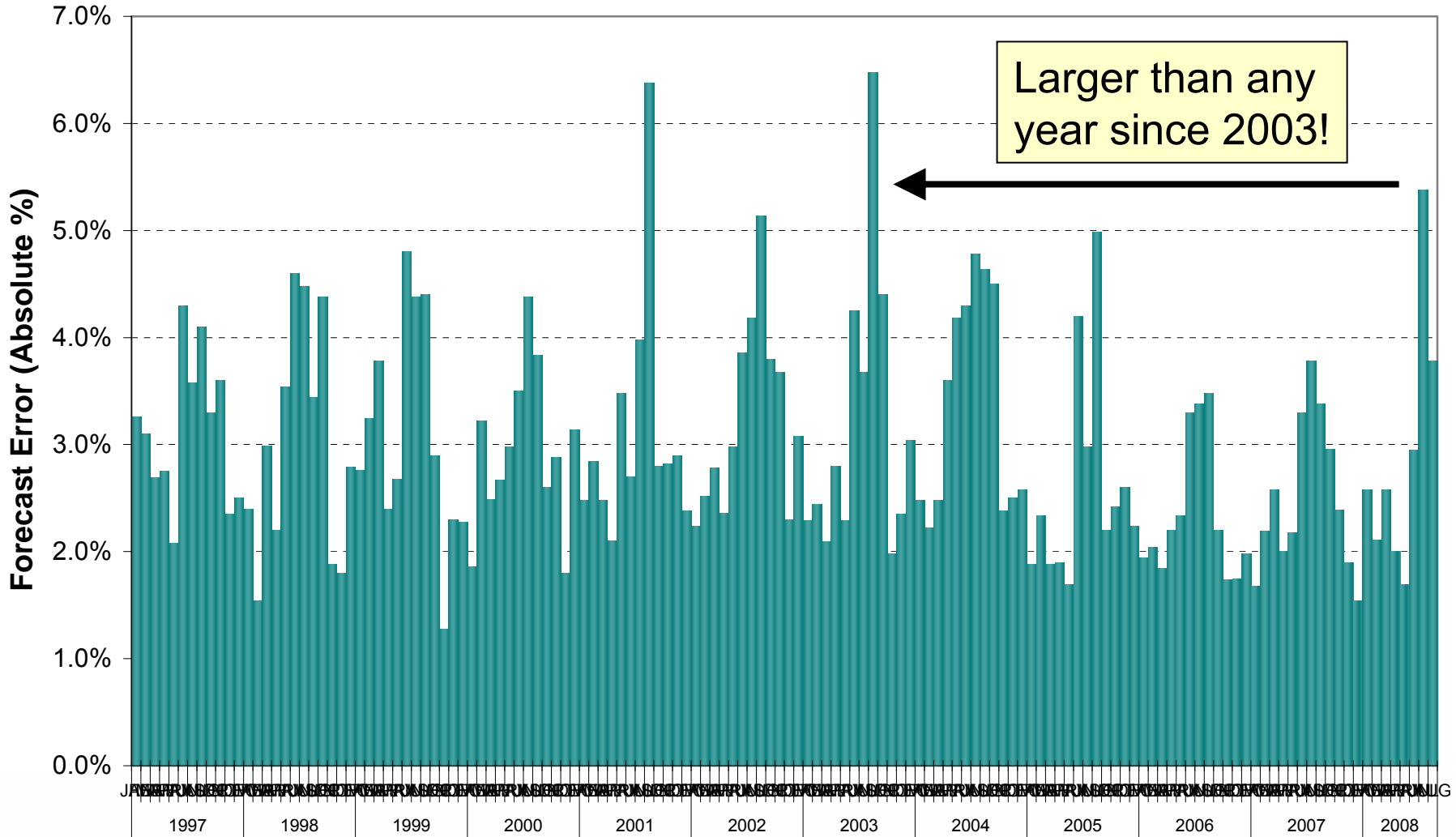
- For a Given Day,
 - Peak Actual = Maximum Load MWh @ Peak Hour
 - Valley Actual = Minimum Load MWh @ Valley Hour
 - Peak Forecast = Maximum Load MWh from the forecast created 8 hours before the actual Peak Hour
 - Valley Forecast = Minimum Load MWh from the forecast created 4 hours before the actual Peak Hour
- Daily Score = $\text{Abs}(\text{Actual} - \text{Forecast}) / \text{Forecast}$
- Monthly Score = Sort Daily Scores Ascending over month, use value at 80% mark
- Goal = $\text{Avg}(\text{Peak}, \text{Valley}) \leq 3\%$

LOAD FORECASTING ERROR (Achieved 80% of the Time)

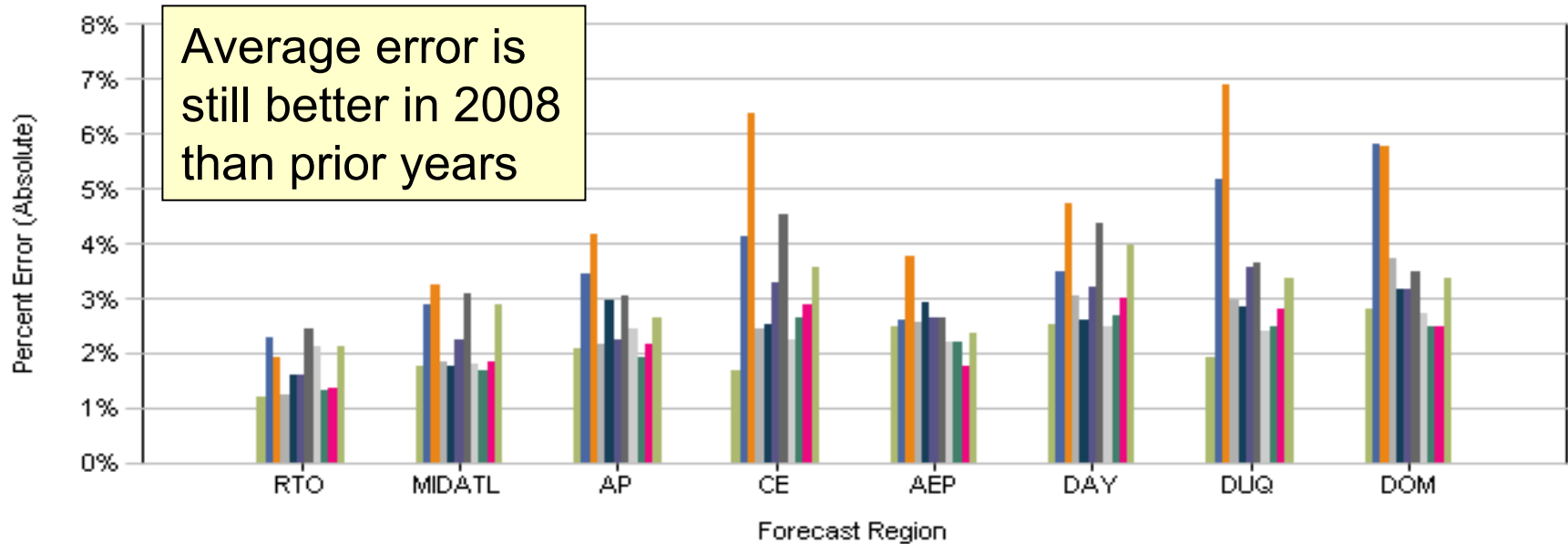


LOAD FORECASTING ERROR (Achieved 80% of the Time) 1997-2008

■ On-Peak

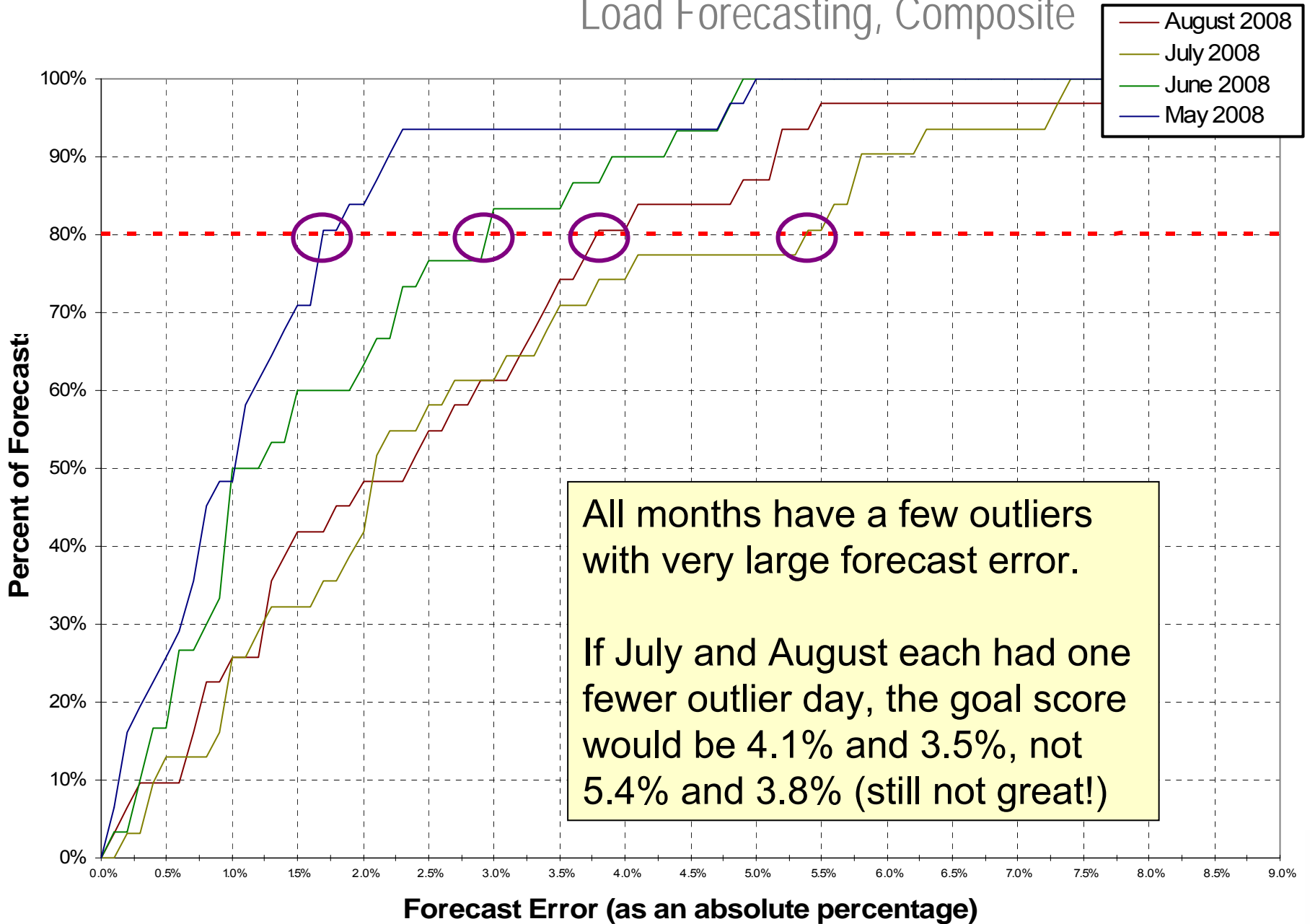


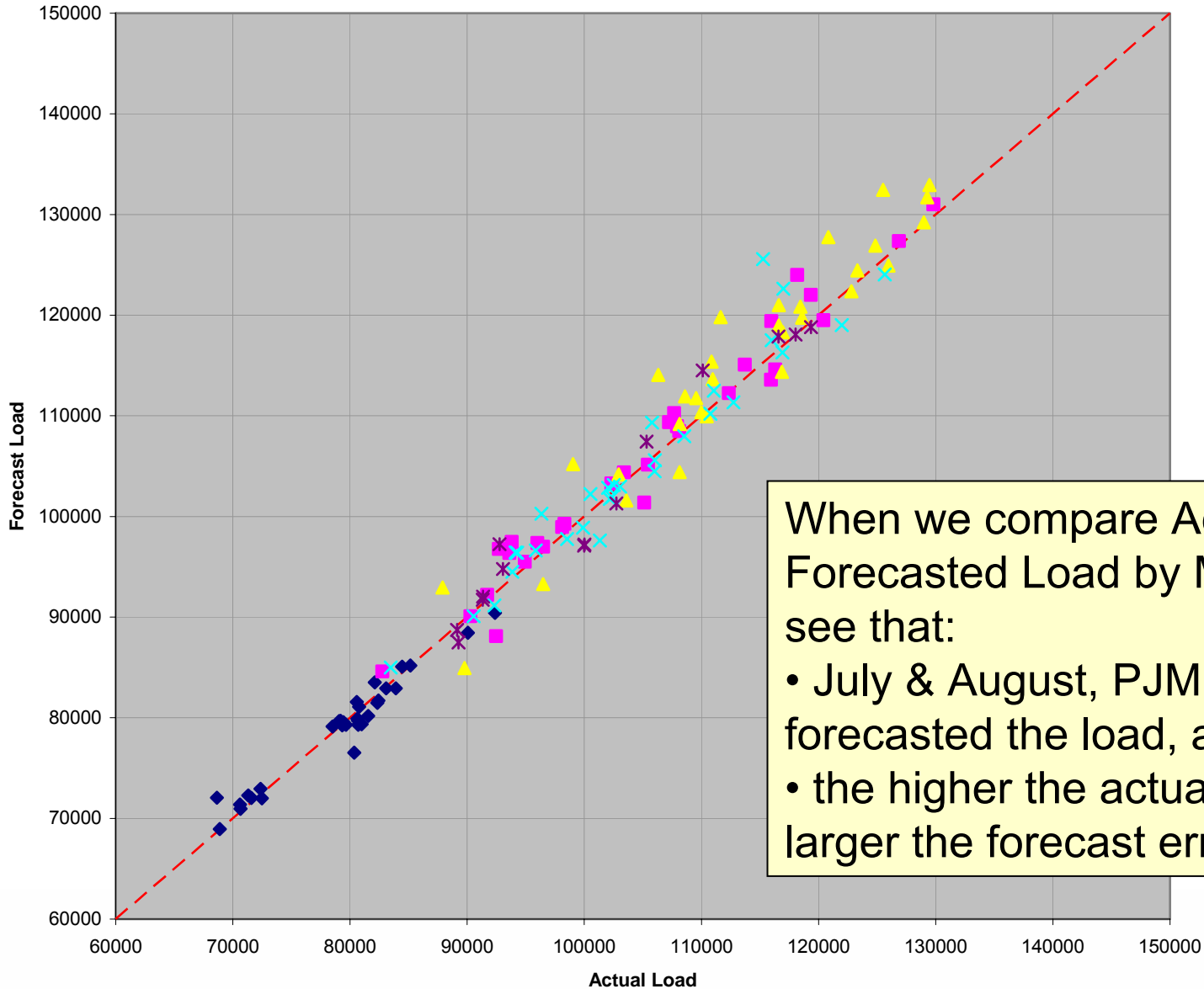
Peak Load Average Forecast Error

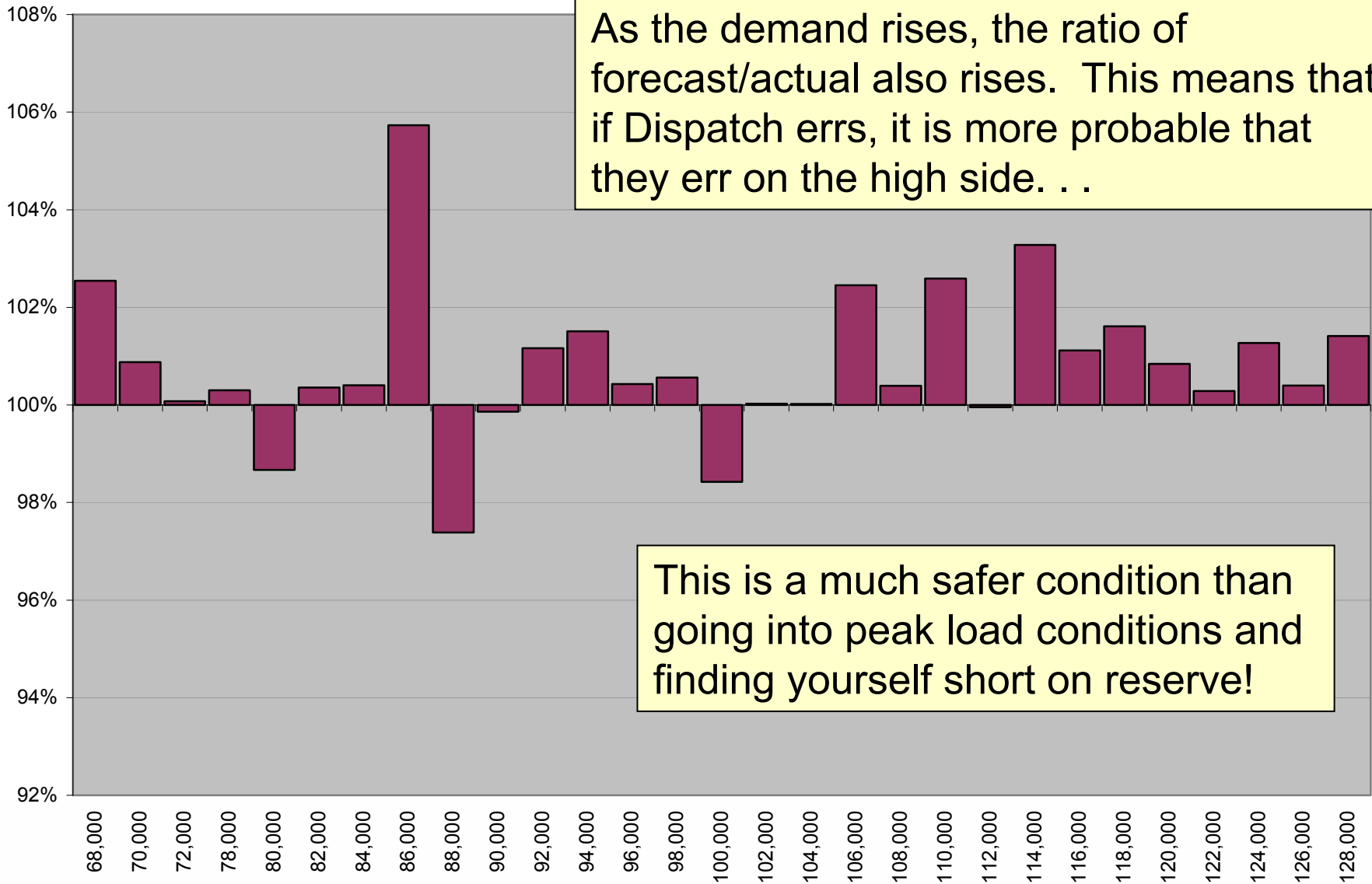


Quarter	RTO	MIDATL	AP	CE	AEP	DAY	DUQ	DOM
2006 Q1	1.2%	1.8%	2.1%	1.7%	2.5%	2.5%	1.9%	2.8%
2006 Q2	2.3%	2.9%	3.4%	4.1%	2.6%	3.5%	5.2%	5.8%
2006 Q3	1.9%	3.2%	4.2%	6.4%	3.8%	4.7%	6.9%	5.8%
2006 Q4	1.2%	1.8%	2.2%	2.4%	2.6%	3.0%	3.0%	3.7%
2007 Q1	1.6%	1.8%	3.0%	2.5%	2.9%	2.6%	2.8%	3.2%
2007 Q2	1.6%	2.2%	2.2%	3.3%	2.6%	3.2%	3.6%	3.2%
2007 Q3	2.4%	3.1%	3.1%	4.5%	2.7%	4.3%	3.6%	3.5%
2007 Q4	2.1%	1.8%	2.4%	2.3%	2.2%	2.5%	2.4%	2.7%
2008 Q1	1.3%	1.7%	1.9%	2.6%	2.2%	2.7%	2.5%	2.5%
2008 Q2	1.3%	1.8%	2.2%	2.9%	1.8%	3.0%	2.8%	2.5%
2008 Q3	2.1%	2.9%	2.6%	3.6%	2.4%	4.0%	3.4%	3.3%

Load Forecasting, Composite





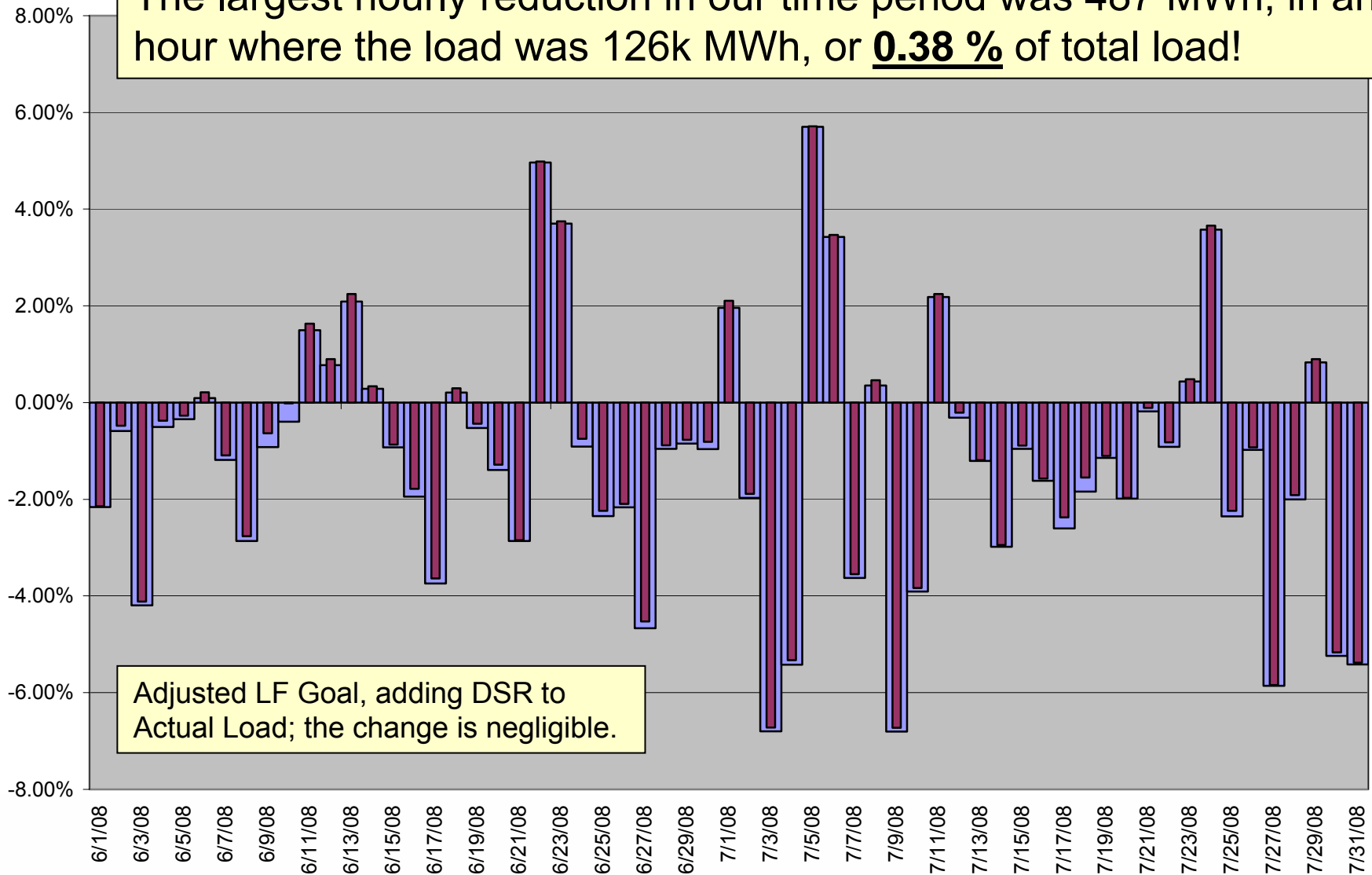


- Accuracy of Similar Day lookups in Load Forecasting is dependent on historical telemetry
 - Manually scrubbed and fed to the Neural Network
 - How similar are the network configuration, generation, load, and demand side programs?
- How good is the weather forecast data?
 - PJM receives weather data at D-1 9PM & D 6AM
 - If PJM experiences a morning peak, then the morning forecast update is too late (as far as the metric is concerned), so weather forecast error plays a part

- In September, we received Demand Side Response load adjustment data for June, July
- Load Forecasting uses a prior year's load for Similar Day matching; in the previous year, DSR was not as developed ...
- In 2008, DSR was more active, so RT load would come in lower than a 2007 similar day, so we would expect more over-forecast days

... but how much impact is this quantitatively?

The largest hourly reduction in our time period was 487 MWh, in an hour where the load was 126k MWh, or **0.38 %** of total load!

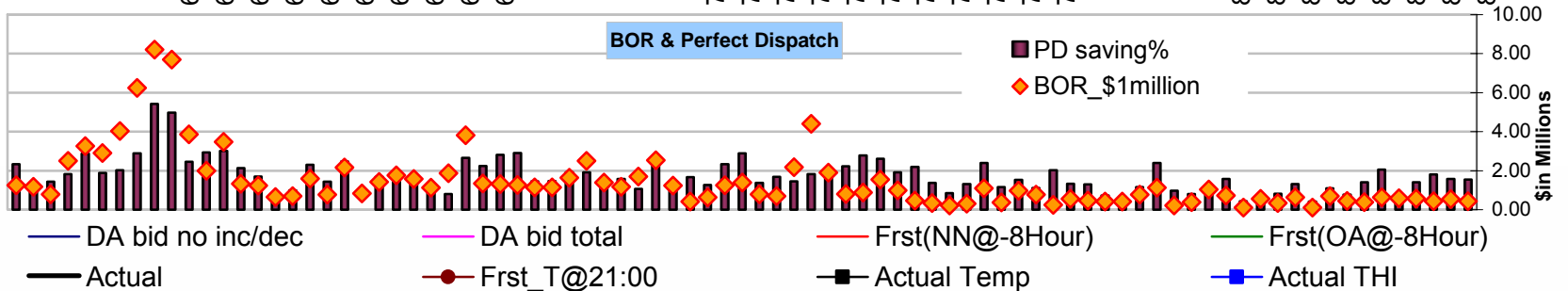
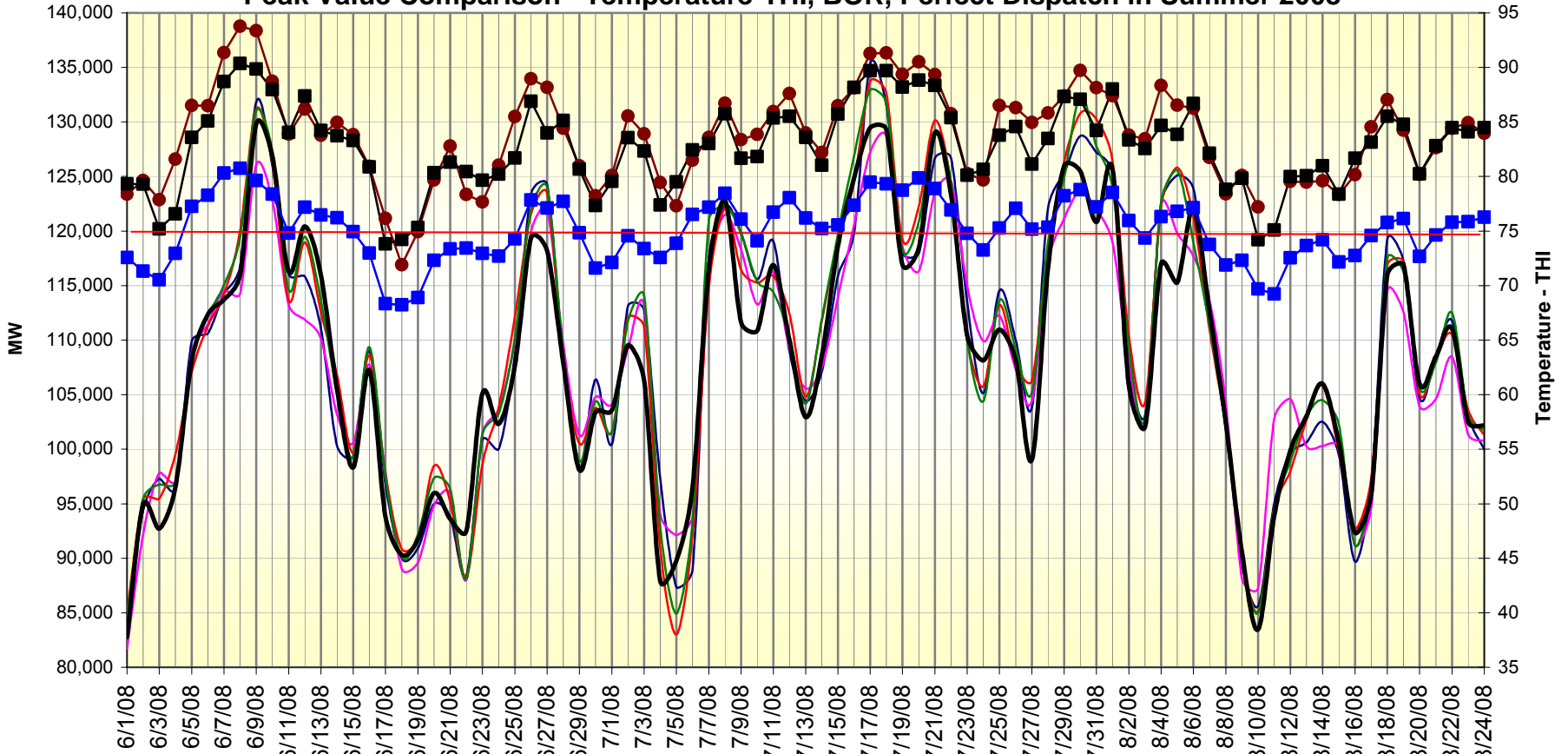


Adjusted LF Goal, adding DSR to Actual Load; the change is negligible.

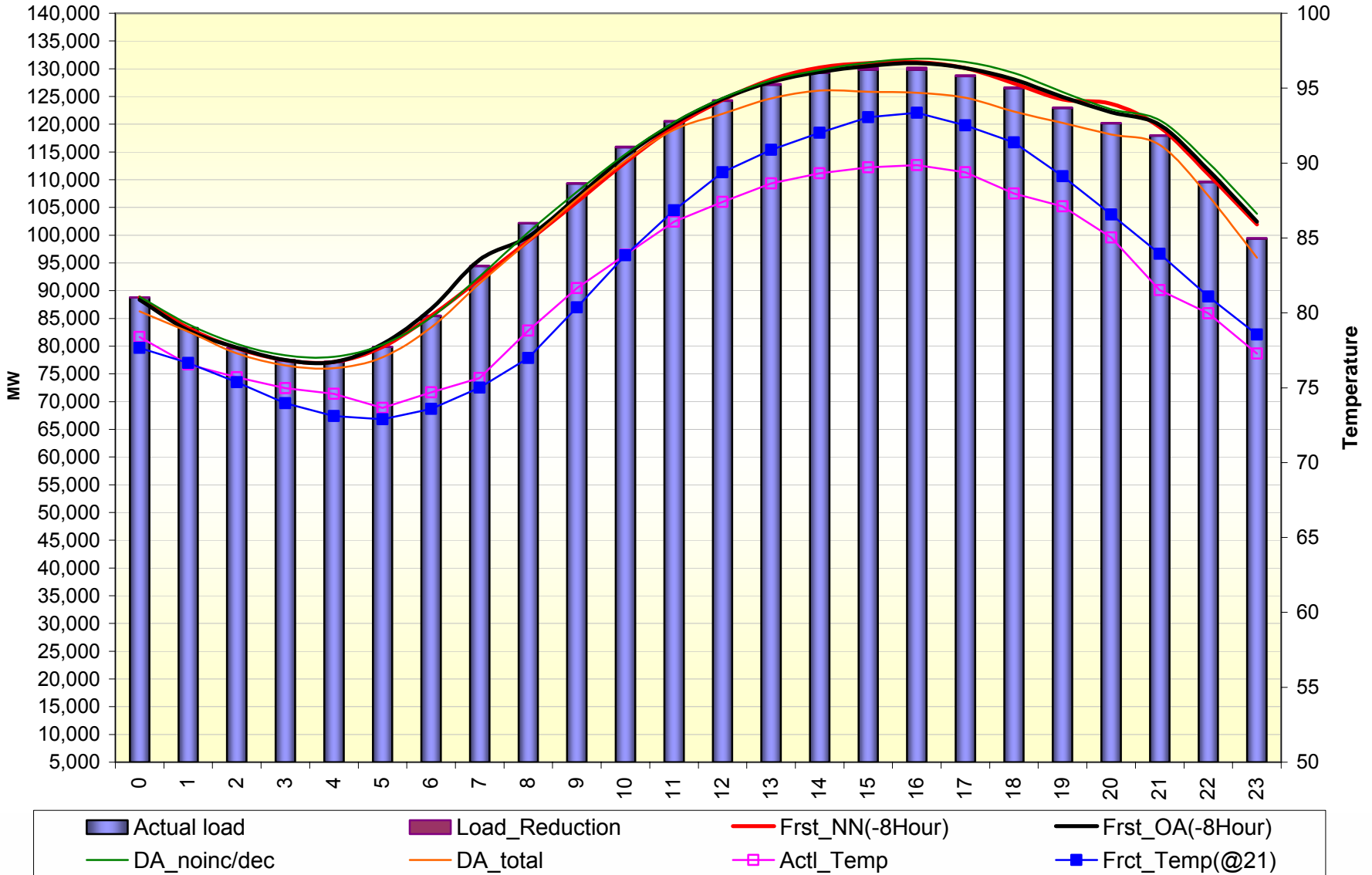
■ Load Forecast Error ■ LFE w/ DSR

- The Day-Ahead Demand Forecast (plus Incs/Decs) sets the LMP for market activity
 - Reliability Assessment uses D-1 18:00 load forecast to calculate constraint control
- PJM has been focused on reducing Balancing Operating Reserves by monitoring the economics of online resources
 - High/Low Forecast Error = Too many / few online resources, resulting in larger Balancing Charges
 - Perfect Dispatch armchair-quarterbacks with total knowledge of load for every interval, and exposes potential economic savings

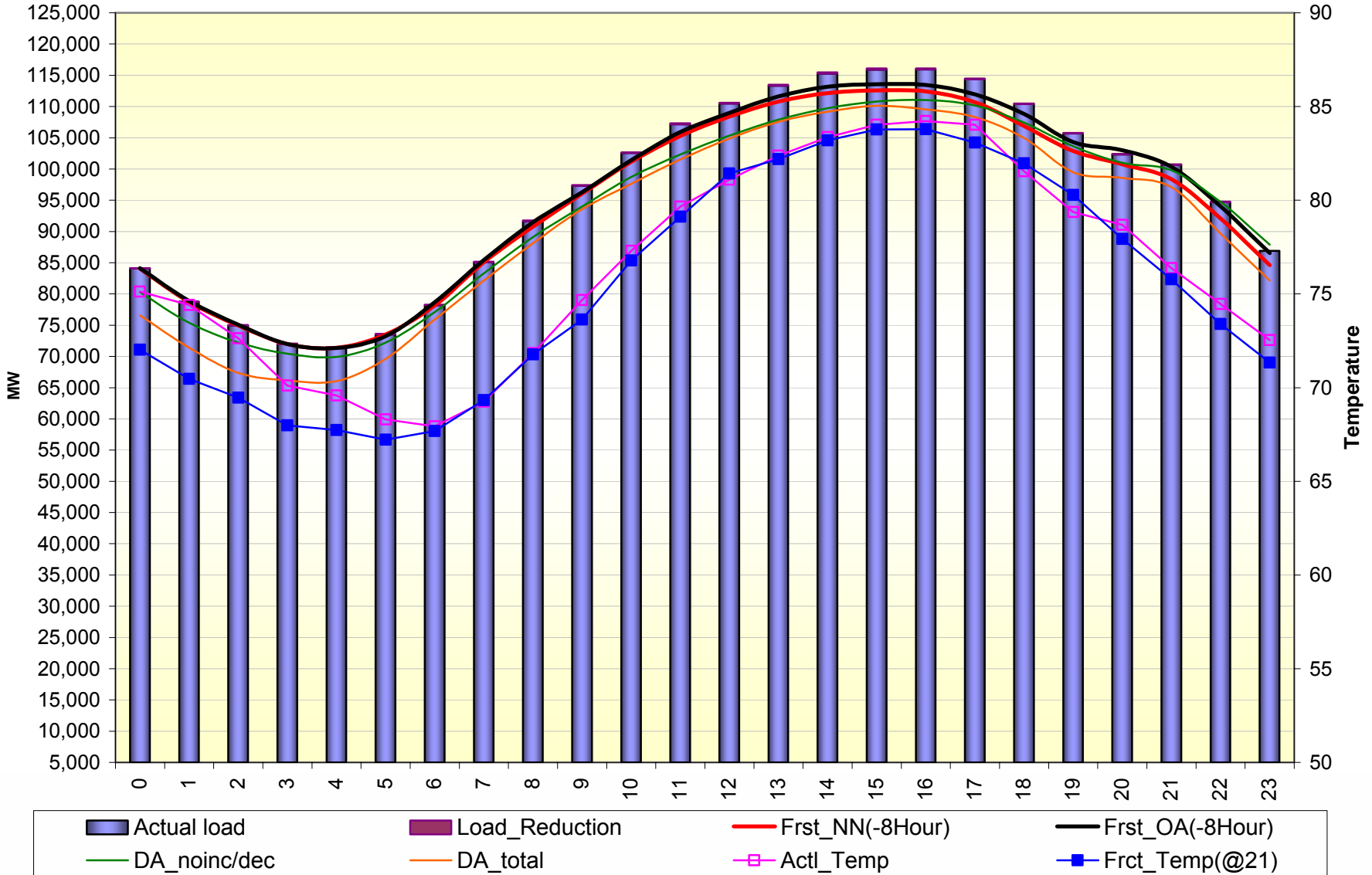
Peak Value Comparison Temperature-THI, BOR, Perfect Dispatch in Summer 2008



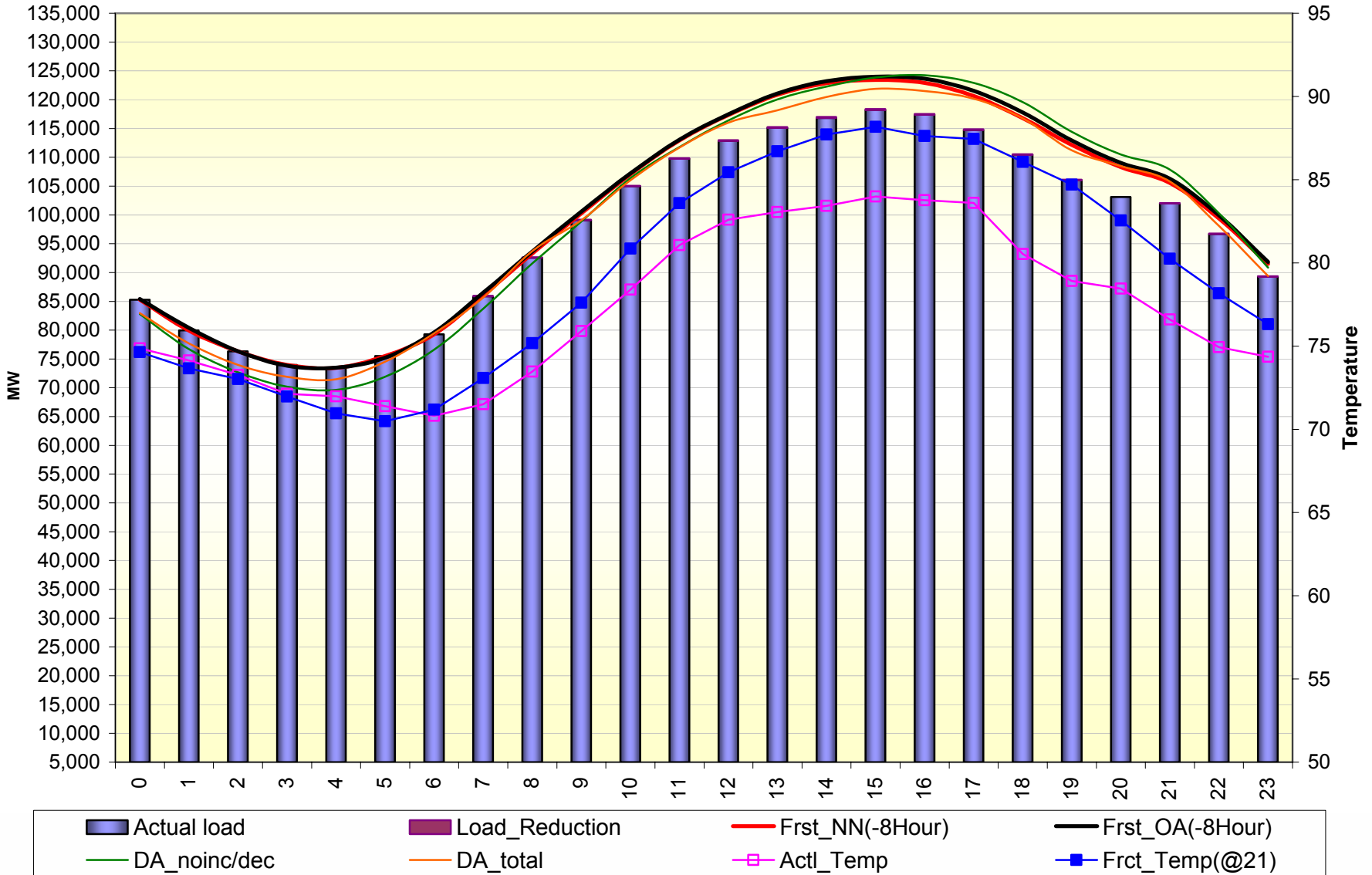
Load/Temperature -- Actual Vs. Forecast on 6/9/2008



Load/Temperature -- Actual Vs. Forecast on 6/13/2008



Load/Temperature -- Actual Vs. Forecast on 6/27/2008



Load/Temperature -- Actual Vs. Forecast on 7/17/2008

