Grid Operations and Planning Report

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Board of Directors Meeting
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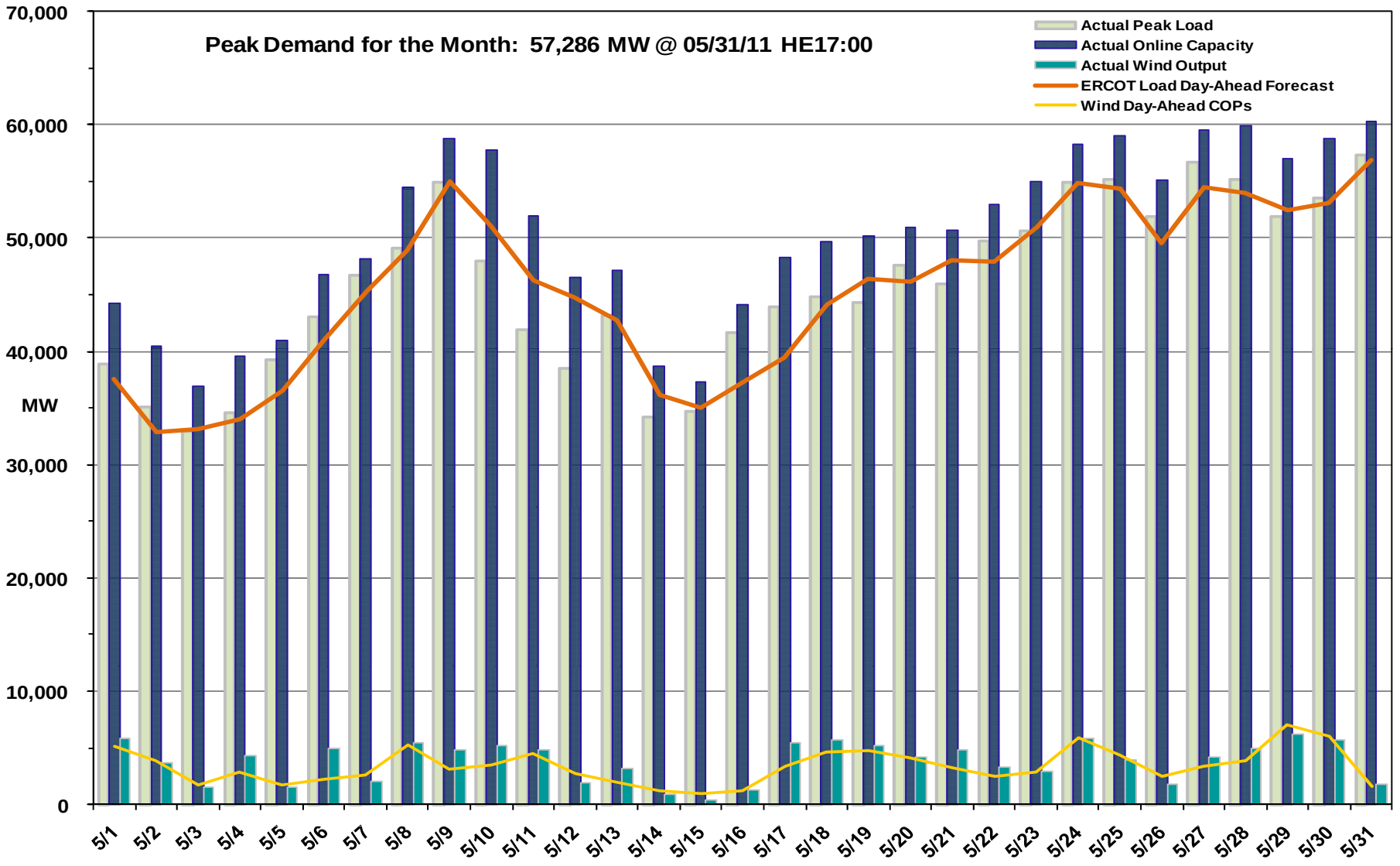
Summary

- **May 2011 Operations**
  - The peak demand of 57,286 MW on May 31 was more than the mid-term forecast peak of 56,828 MW and more than the May 2010 actual peak demand of 54,725 MW
  - Day-ahead load forecast error for May was 3.27%
  - Advisory for Physical Responsive Capability (PRC) below 3000 MW issued 13 days
  - Watch for PRC under 2500 MW issued four days
  - No Energy Emergency Alert (EEA) events
  - Transmission Watch issued one day for North to Houston limit

- **199 active generation interconnect requests totaling over 62,000 MW as of May 31, 2011. Two fewer requests but the same amount of MW than April 30, 2011.**

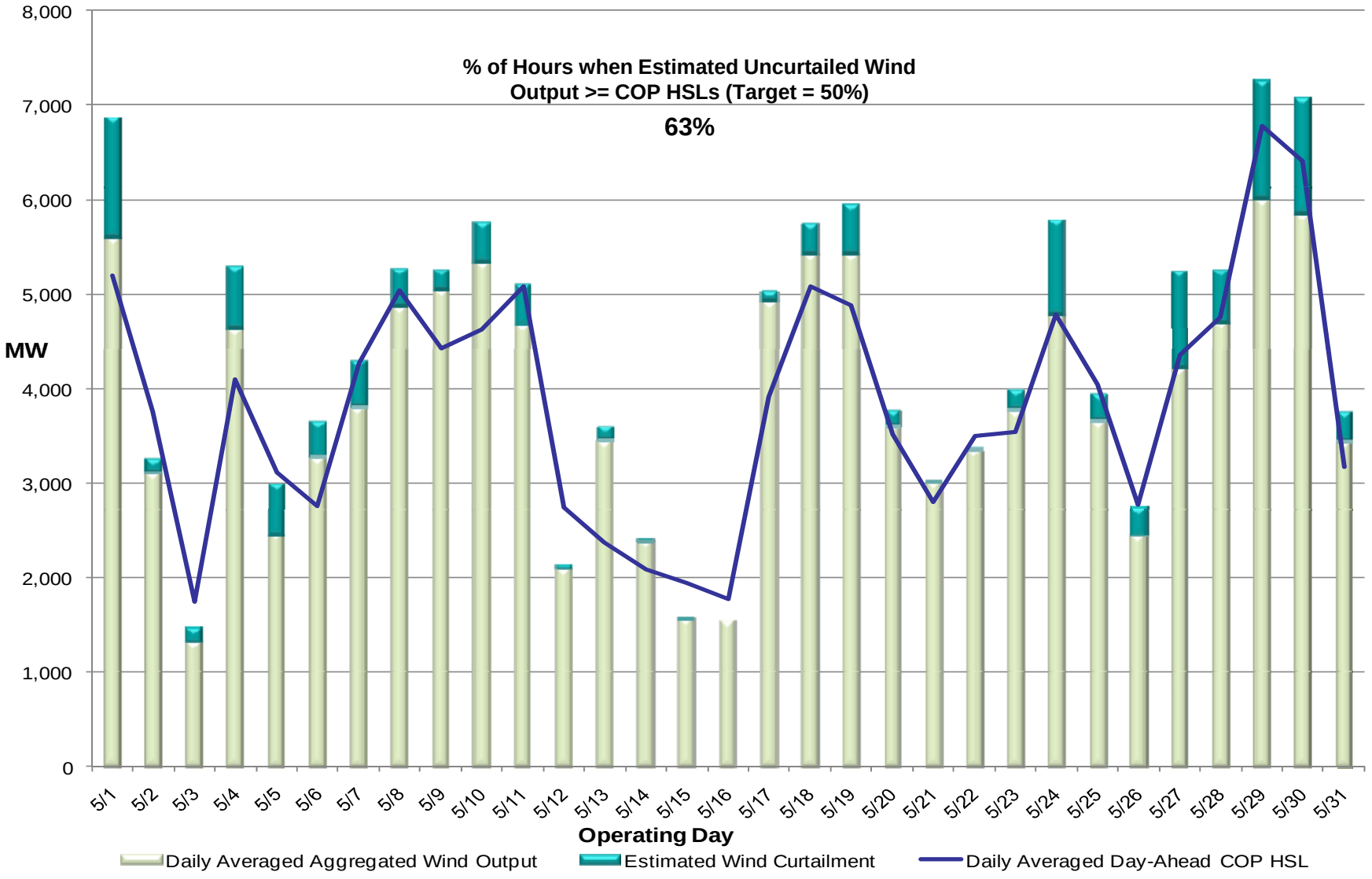
- **9,400 MW wind capacity on line May 31, 2011. No change from April 30, 2011.**

May 2011 Daily Peak Demand: Hourly Average Actual vs. Forecast, Wind Day-Ahead COPs & On-line Capacity at Peak



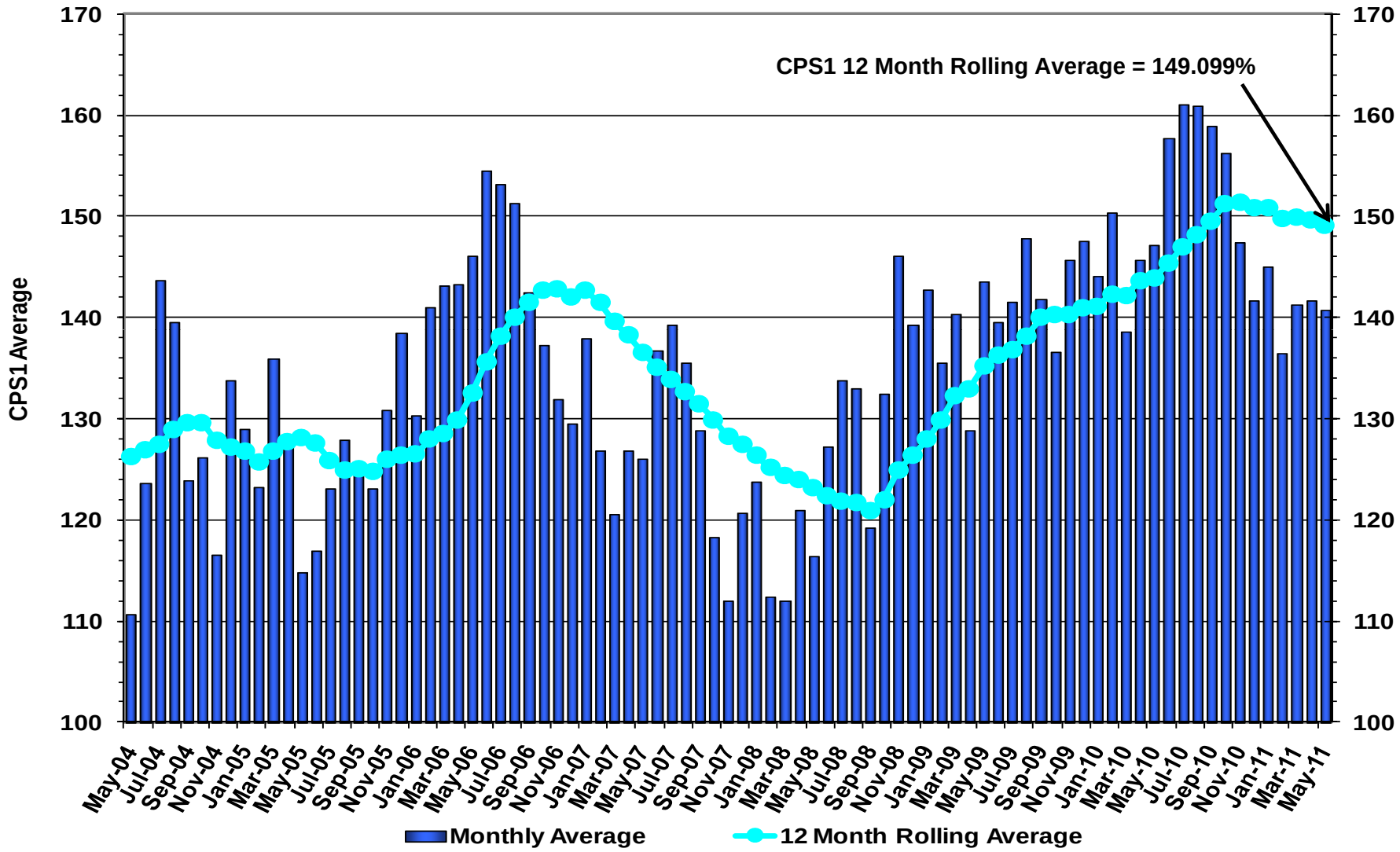
Note: All data are hourly averages during the peak load hour obtained from COPs, and EMMS.

May 2011: Actual Wind Output plus Curtailments vs. Wind Day-Ahead COPs for All Hours

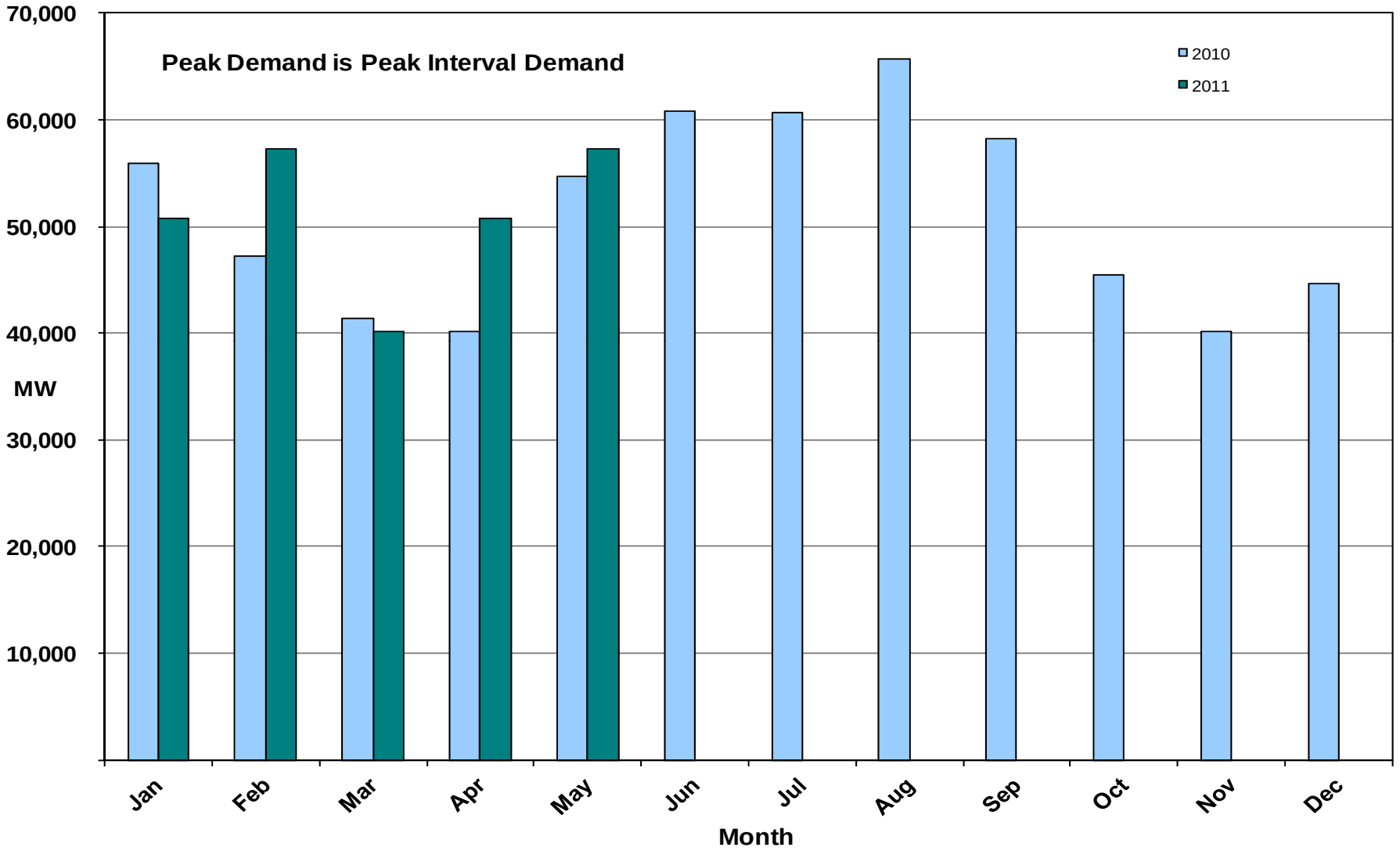


Note: QSEs must use the AWST 50% probability of exceedance forecast as the HSL in their COPs

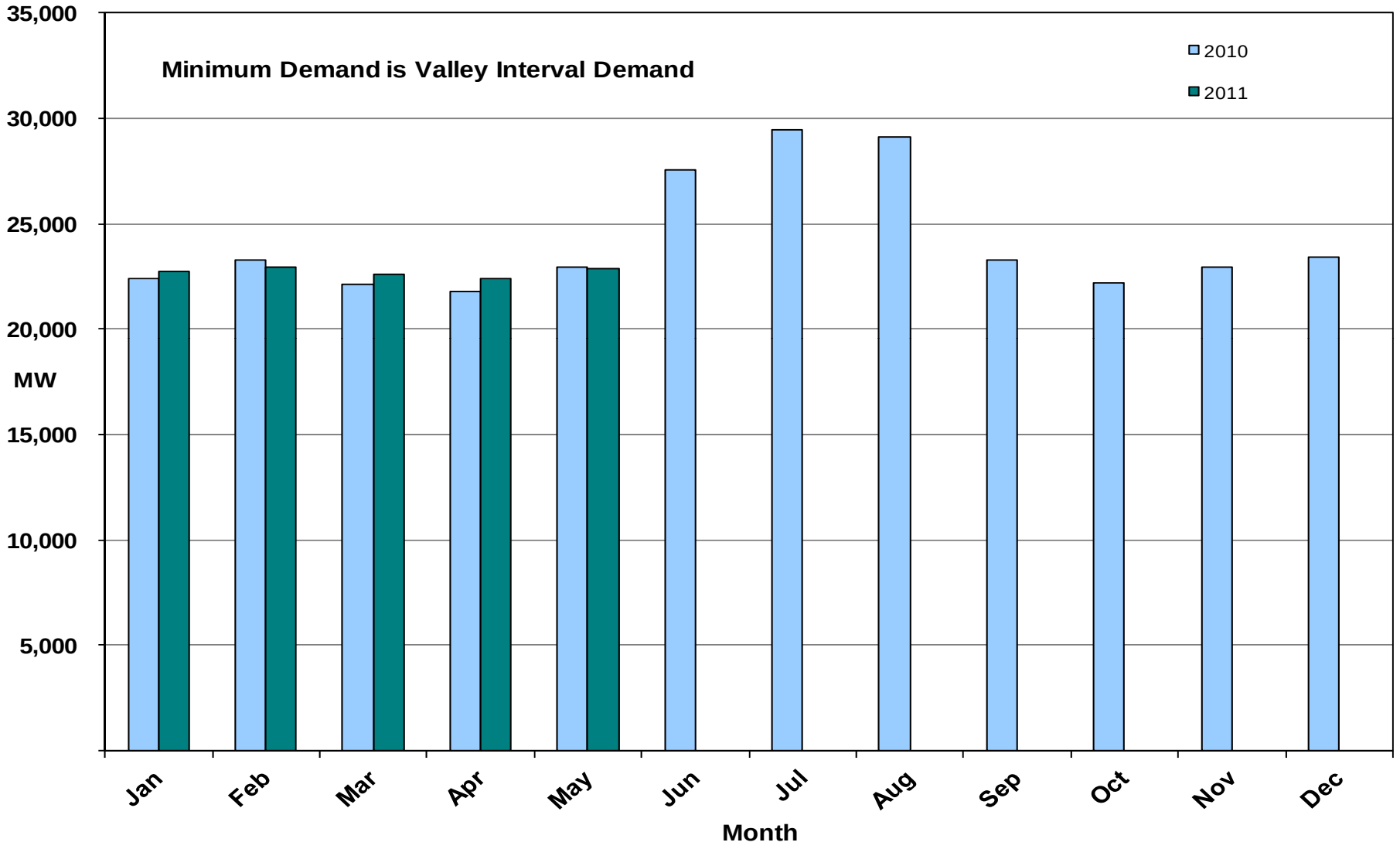
May 2011 ERCOT's CPS1 Monthly Performance



May 2011: Monthly Peak Actual Demand



May 2011: Monthly Minimum Actual Demand



Day-Ahead Load Forecast Performance in May 2011

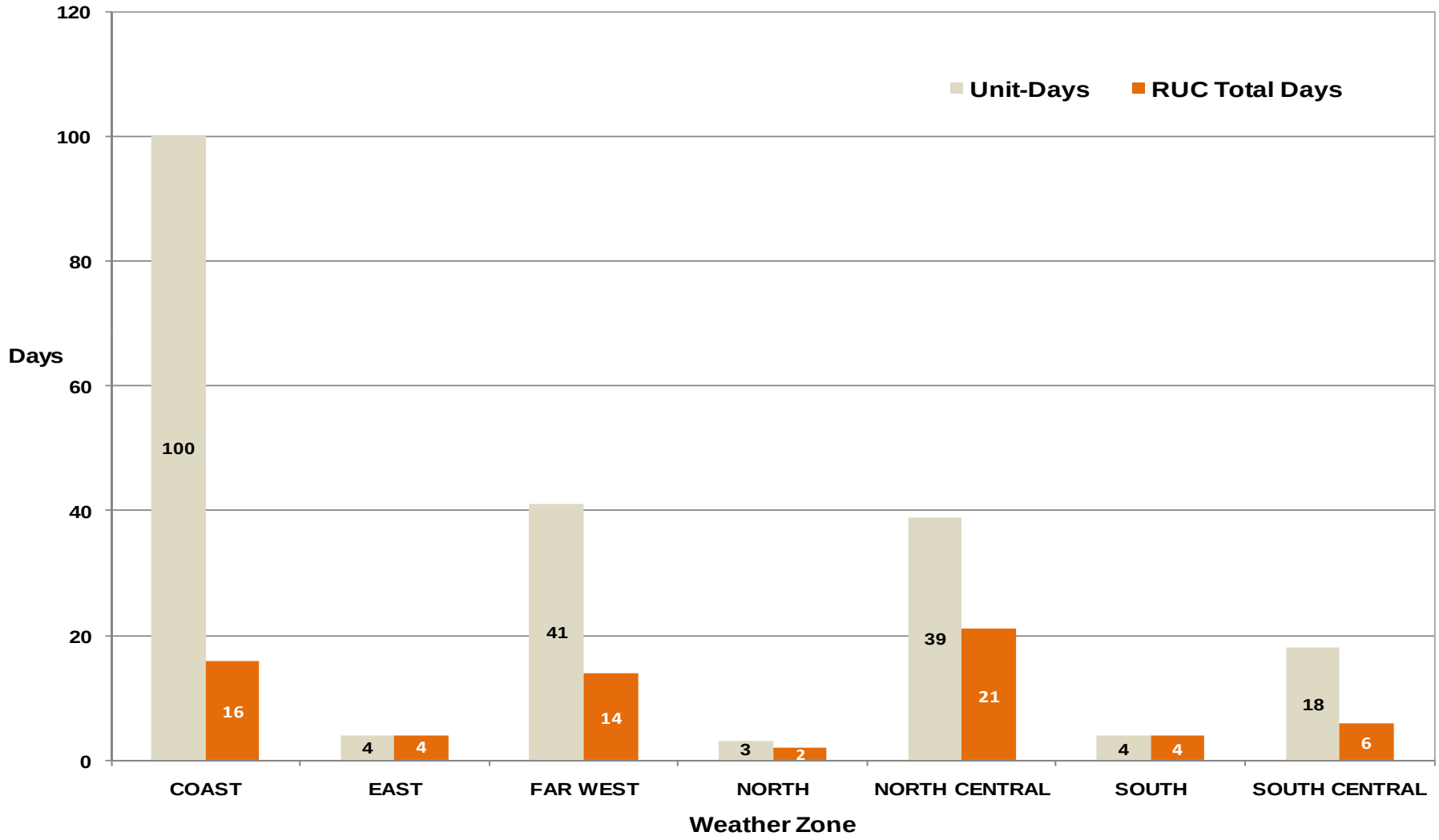
Mean Absolute Percent Error (MAPE) for ERCOT Mid-Term Load Forecast (MTLF) Run at 16:00 Day Ahead						
	2008 MAPE	2009 MAPE	2010 MAPE	2011 MAPE	May 2011 MAPE	
Average Annual MAPE	3.30	3.11	2.83	3.04	3.27	
Lowest Monthly MAPE	2.45	1.93	2.24	2.02	**Lowest Daily MAPE**	1.04 May– 25
Highest Monthly MAPE	4.99	4.11	3.79	3.55	**Highest Daily MAPE**	10.91 May– 12

Day-Ahead Load Forecast Accuracy of other ISOs *

- **CAISO, MISO, ISO-NE, NYISO, PJM:**
  - Annual average MAPE's averaging around 1.5 – 2%
- **SPP**
  - Annual average MAPE averaging around 3%
- **CAISO and SPP:**
  - Peak MAPE averaging around 4%
  - ERCOT's peak MAPE for CY2010 was 3.79%
- **Accuracy is affected by ISO footprint size, climate and time when day-ahead load forecast is published**

*Source: FERC RTO/ISO Performance Metrics reports
http://www.ferc.gov/industries/electric/indus-act/rto/rto-iso-performance.asp

Reliability Unit Commitment (RUC) Capacity by weather zone in May 2011



May 2011: Generic Transmission Limits (GTLs)

GTLs	May 10 Days CSC	Mar 11 Days GTLs	Apr 11 Days GTLs	May 11 Days GTLs	Last 12 Months Total Days (May 10 – May 11)
North – Houston	10	0	0	1 May–(2)	59
West – North	19	26	27	28 May–(1-11, 13, 14, 16-21, 23-31)	273
Valley Import		3	0	0	15

GTL: A transmission flow limit more constraining than a Transmission Element's normal limit established to constrain flow between geographic areas of the ERCOT Transmission System that is used to enforce stability and voltage constraints that cannot be modeled directly in ERCOT's transmission security analysis applications.

Note: This table lists how many times a constraint has been activated to avoid exceeding a GTL limit, it does not imply an exceedance of the GTL occurred.

Advisories and Watches in May 2011

- **Advisories issued for Physical Responsive Capability (PRC) below 3000 MW.**
  - Issued 13 Days

- **Watches issued for Physical Responsive Capability (PRC) below 2500 MW.**
  - Issued 4 Days

- **Transmission Watches**
  - May 2nd ERCOT issued a Transmission Watch for North – Houston due to an issue with the VSAT results.

- **Energy Emergency Alerts**
  - None

Significant System Incidents in May 2011

- **May 1st**
  - At 20:04, ERCOT experienced the simultaneous loss of three generating units and two units ran-back (resulting in the loss of approximately 503 MW within the first minute of the event), when a 345KV line tripped along the coast in South Texas. The cause was insulator flashover due to contamination.
- **May 8th**
  - At 15:53, ERCOT experienced multiple forced transmission outages (one 345KV Bus, one 345/138KV Autotransformer, and six 345KV lines) and two unit outages (resulting in the loss of approximately 425 MW tripped within the first minute of the event) due to a vacuum bottle interrupter on a capacitor bank switch failure. The failed interrupter placed a sustained phase to ground fault on the low side breaker of a 345/138 KV autotransformer. This initiated the operation of the autotransformer lockout relays which cleared the 345 KV bus.
- **May 11th**
  - At 12:46, ERCOT experienced the simultaneous loss of one 345KV line and five generating units (resulting in the loss of approximately 210 MW within the first minute of the event) due to inclement weather in the area at the time of the fault. This inclement weather was characterized by heavy rain, thunderstorms, severe hail and lightning.
- **May 12th**
  - At 15:38, ERCOT experienced the simultaneous loss of three generating units (resulting in the loss of approximately 147 MW within the first minute of the event), when the 345KV line tripped (C-phase-to-ground fault) due to a storm in the area.

Significant System Incidents in May 2011

- **May 19th**
  - At 14:07, ERCOT experienced a NERC Reportable Disturbance Control Standard (DCS) Event for loss of 1,163 MW of generation. System frequency recovered to 60 Hz in approximately 5 minutes and 45 seconds.
- **May 20th**
  - At 06:29, ERCOT experienced the simultaneous loss of one 345KV line and five generating units (resulting in the loss of approximately 156 MW within the first minute of the event) due to severe weather and lightning.
- **May 27th**
  - At approximately 01:48, there was a fault of the Amoco-Apache 138KV transmission line due to contamination and tracking over the insulator. 13,751 distribution customers and 13 industrial customers in the Texas City and La Marque area were affected due to a mis-operation of the protective devices at Greenbelt Switching Station. Power was restored to all customers by 3:11 AM.

Texas City Event on April 26, 2011

- At approximately 04:34, the Amoco to Comanche 138KV line, Comanche to Tejas 138KV line, and Amoco to Cherokee 138KV line tripped.
- The initial cause of the fault was tracking and flashover of an insulator in the Amoco substation. The tracking was caused by a buildup of salt spray, dust and other contaminates on insulators in combination with high humidity. There has been no appreciable rainfall in Texas City in over two months. Rainfall normally received keeps the insulators washed off and tracking and flashover is not normally an issue.
- Relay mis-operations contributed to the impact of the event
- No generation was affected.
- Loss of load – 97 MW
- Transmission Outages – Four 138 KV lines, Three 138 KV busses

Actions taken on the April 26, 2011 Event

The following actions have been taken to correct identified problems:

- A retrofit panel replacement project is in effect to replace the existing protection relays at Amoco and Comanche. This will include a dual primary system.
- Although there did not appear to be slow breaker action, breaker timing tests will be performed on breakers at Comanche Substation and Amoco Substation.
- Some logic that contributed to the event has been disabled from the relaying at Comanche (138KV line from Comanche to Greenbelt). This setting is not necessary for this line.
- Relaying on the 138KV loop in the industrial area will be re-coordinated
- Identified10 substations for silicone coating to reduce build up of contaminates on insulators. Application of the coating is in progress.

Texas City/La Marque Event on May 27, 2011

- At approximately 01:48, there was a fault on the Amoco-Apache 138KV transmission line due to contamination and tracking over the insulator.
- There was a mis-operation of the protective devices at Greenbelt Switching Station.
- Power was restored to all customers by 3:11 AM.
- **Affected Industrial Loads:** Approx 207 MW
- **Affected Distribution Stations:** Approx 246 MW
- **Transmission Outages**
  - Three138KV lines confirmed
  - Three 138KV lines still under investigation.
  - Approx. twenty seven 69KV lines

Actions Taken on the May 27, 2011 Event

The following actions have been taken to correct identified problems:

- Power washing insulators and applying a silicone coating to deter flashovers in the substations and on transmission lines in the Texas City industrial area has been in progress since mid-April. This effort will continue until all substations and transmission lines in the Texas City industrial area have been cleaned.

- TSP personnel are using a UV camera to inspect the transmission lines and prioritize the lines for scheduling to be washed. After the washing has been completed, the substations and transmission lines will be periodically inspected with the UV camera to monitor insulator contamination and schedule additional cleaning as necessary.

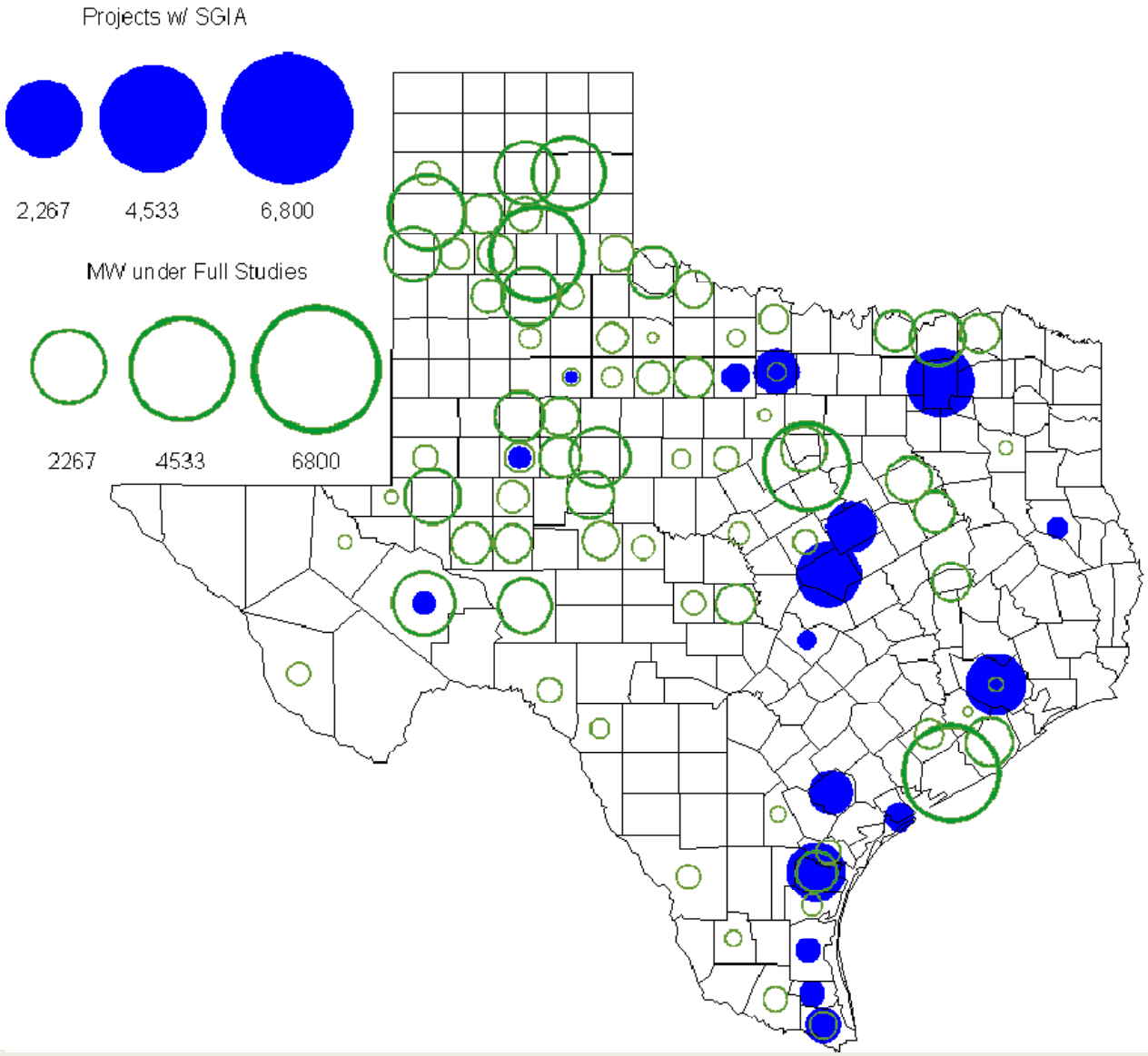
- The relay elements that caused the mis-operations have been removed or corrected. In addition directional instantaneous overcurrent elements are being replaced with ground resistance elements that respond better to changes in the transmission network.

- The TSP is in the process of obtaining the services of an independent engineering firm to review the protective relay scheme and settings for the entire Texas City transmission system.

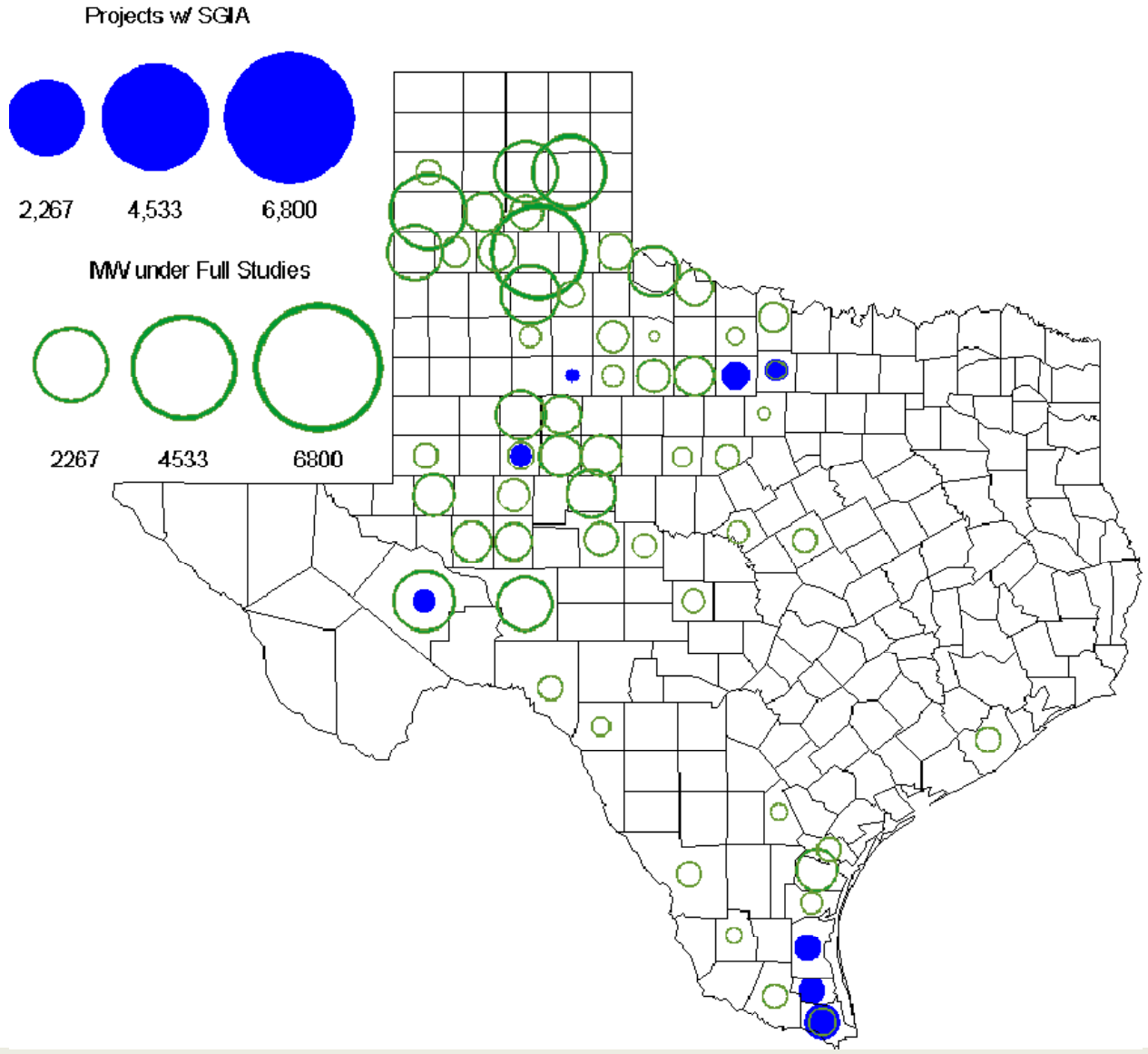
Planning Summary

- **ERCOT is currently tracking 199 active generation interconnection requests totaling over 62,000 MW. This includes over 36,000 MW of wind generation.**
- **ERCOT is currently reviewing proposed transmission improvements with a total cost of $622.4 Million**
- **Transmission Projects endorsed in 2011 total $23.6 Million**
- **All projects (in engineering, routing, licensing and construction) total approximately $9.5 Billion**
- **Transmission Projects energized in 2011 total about $174.0 million**

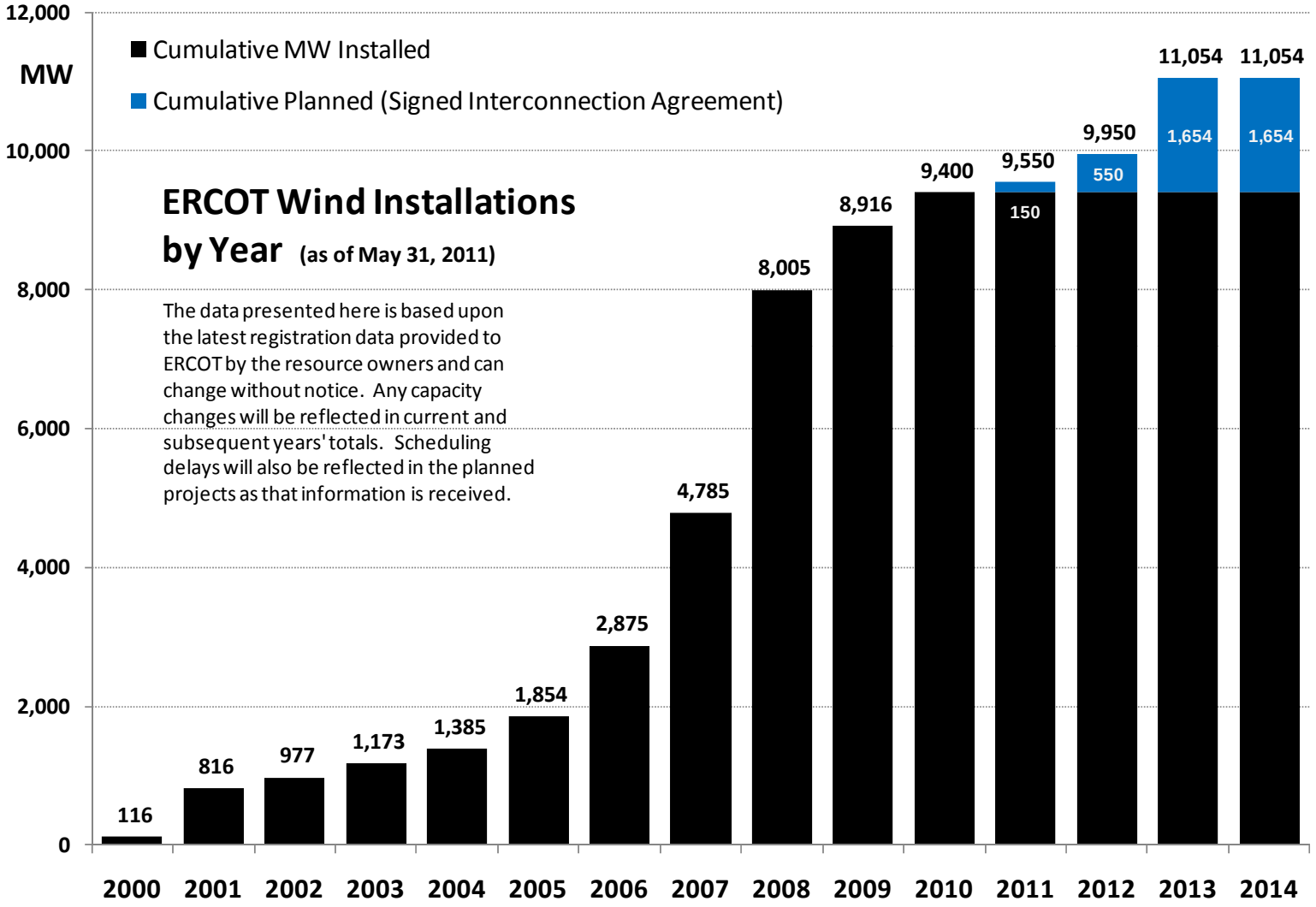
County Location of Planned Generation with Interconnection Requests (all fuels) May 2011



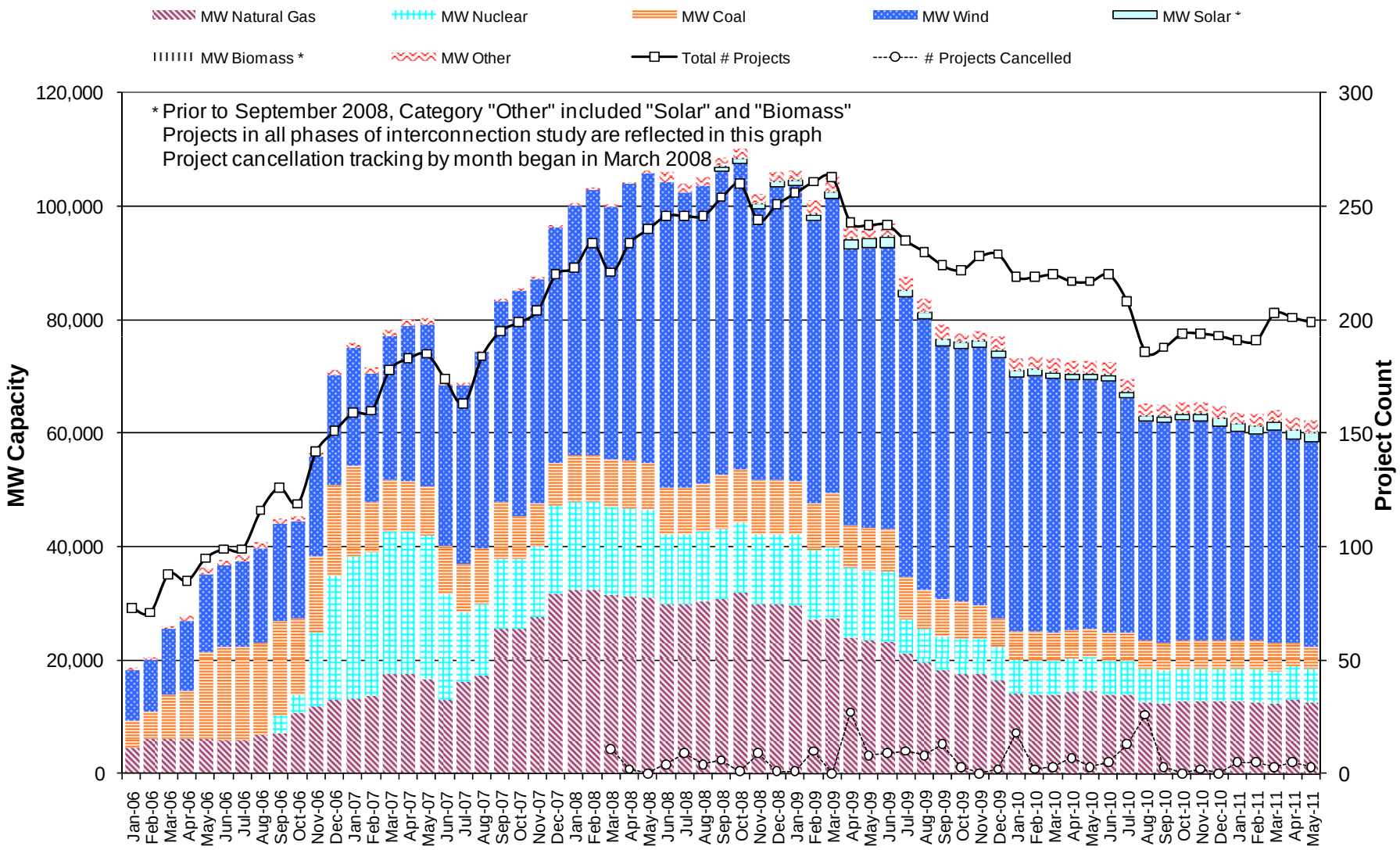
County Location of Planned Generation with Interconnection Requests (Wind) May 2011



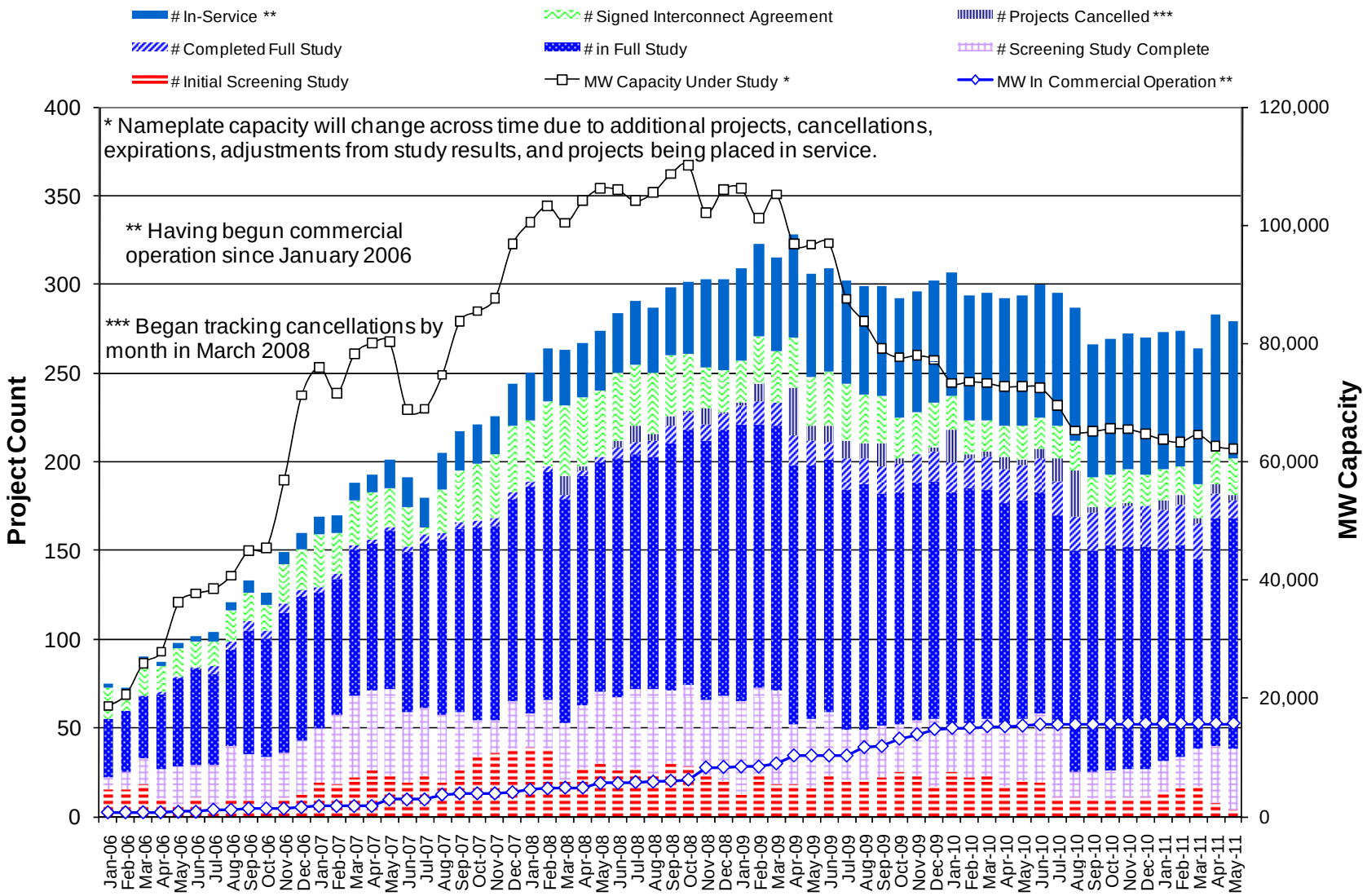
Wind Generation



Generation Interconnection Activity by Fuel



Generation Interconnection Activity by Project Phase



Risk Analysis of Natural Gas Curtailment

- **ERCOT will be conducting a study analyzing the risk of natural gas curtailment to electrical generation under extreme weather conditions.**
  - ERCOT has investigated vendor capabilities to assist this type of study
  - A draft RFP has been developed.
  - ERCOT is reviewing the content of this RFP with PUCT and Railroad Commission staffs.
  - ERCOT will be reviewing proposals in July

- **ERCOT is also conducting seasonal surveys of generators and will perform internal assessment of severe cases based on responses.**
- **Initial results targeted for December 2011**