



ERCOT – A Strategic View of the Future

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President & CEO
ERCOT

GCPA Fall Annual Conference
October 2, 2013

A Strategic View

ERCOT's Vision from the latest draft of the Strategic Plan is:

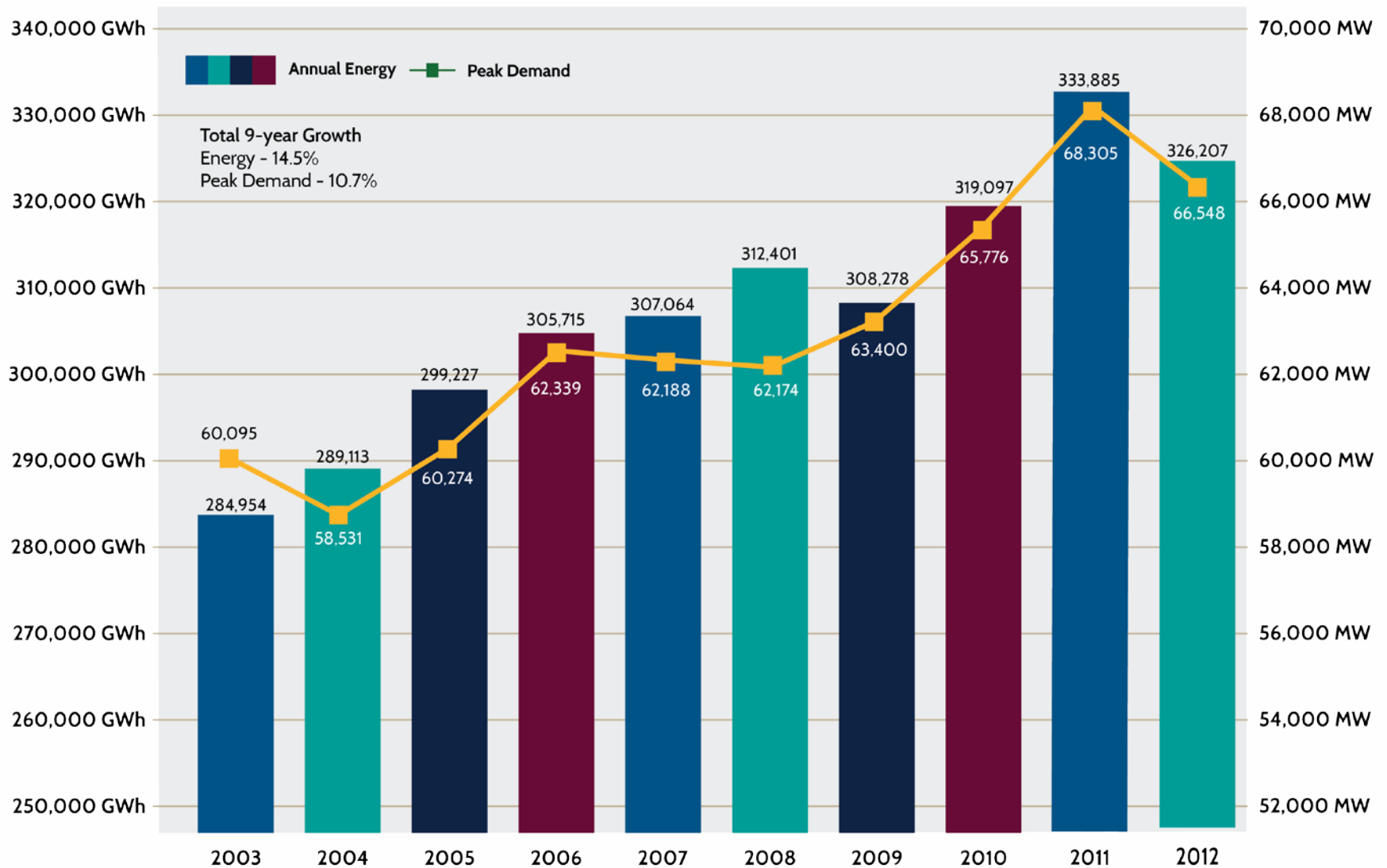
“Lead with independent insight on the future of electricity reliability, markets and technology in Texas in order to facilitate grid and market change for the benefit of all stakeholders”

In the last year, we have been focused on:

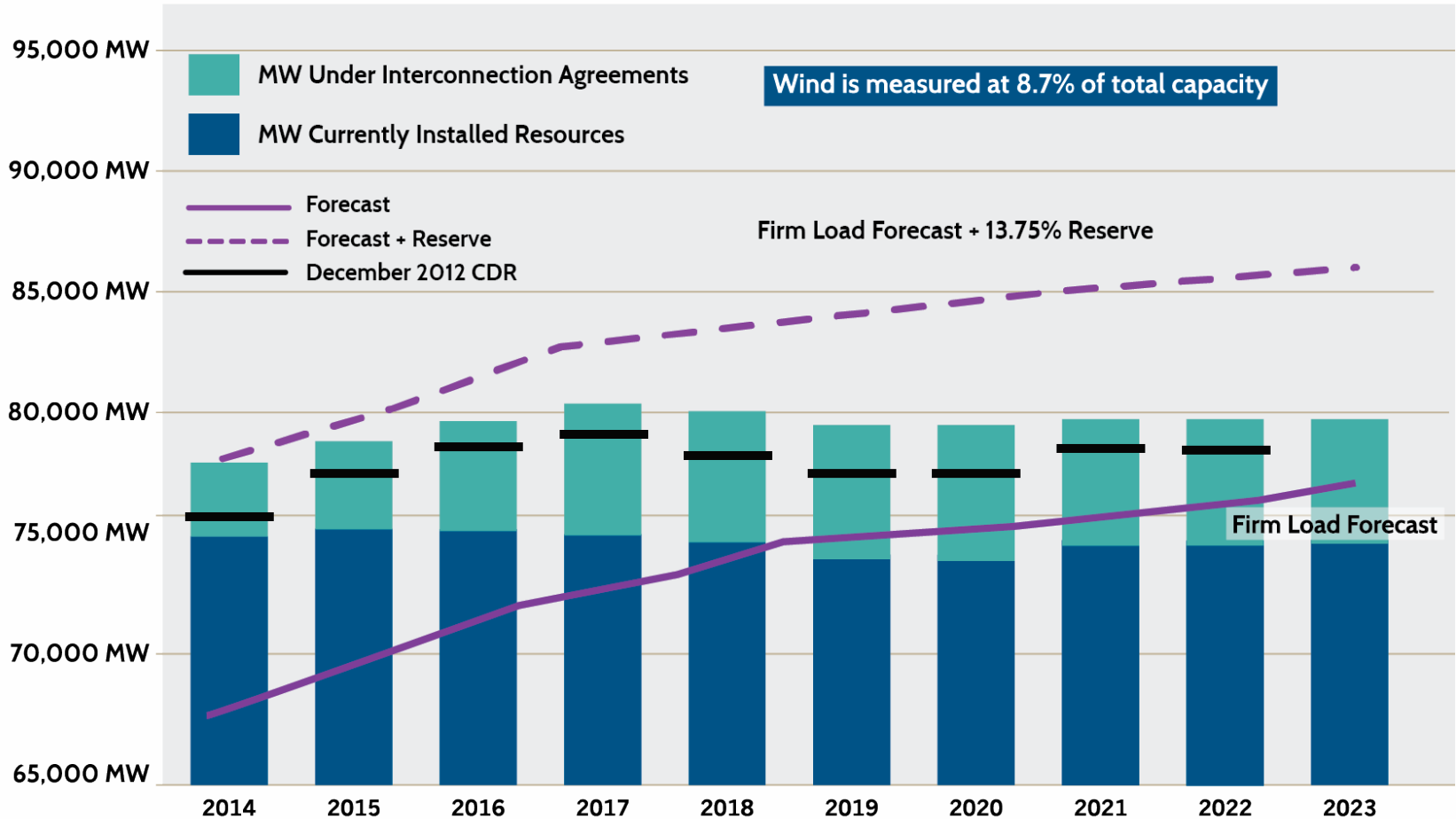
- Resource Adequacy
 - Both new generation & Demand Response
- Monitoring Drought Conditions
- Preparing for CREZ Implementation
- Continuing to provide useful conservation and grid information

Where We Are Today

Annual Energy & Peak Demand (2003-2012)



Capacity, Demand and Reserves – May 2013 Outlook



Loss of Load Expectation (LOLE) Study Findings

- **Recent LOLE Study Results:**
 - Using a 1-event-in-10-years loss-of-load criteria leads to a target reserve margin of ~13.8 % to ~18.9% depending on assumed likelihood of 2011 weather conditions
 - Model output indicates an Effective Load Carrying Capability (ELCC) of 14.2% for non-coastal wind resources, and 32.9% for coastal wind resources
- **TAC has recommended that the ERCOT Board approve 16.1% as the Planning Reserve Margin, along with an ELCC of 14.2% for non-coastal wind resources and 32.9% for coastal wind resources.**

LOLE Study Next Steps

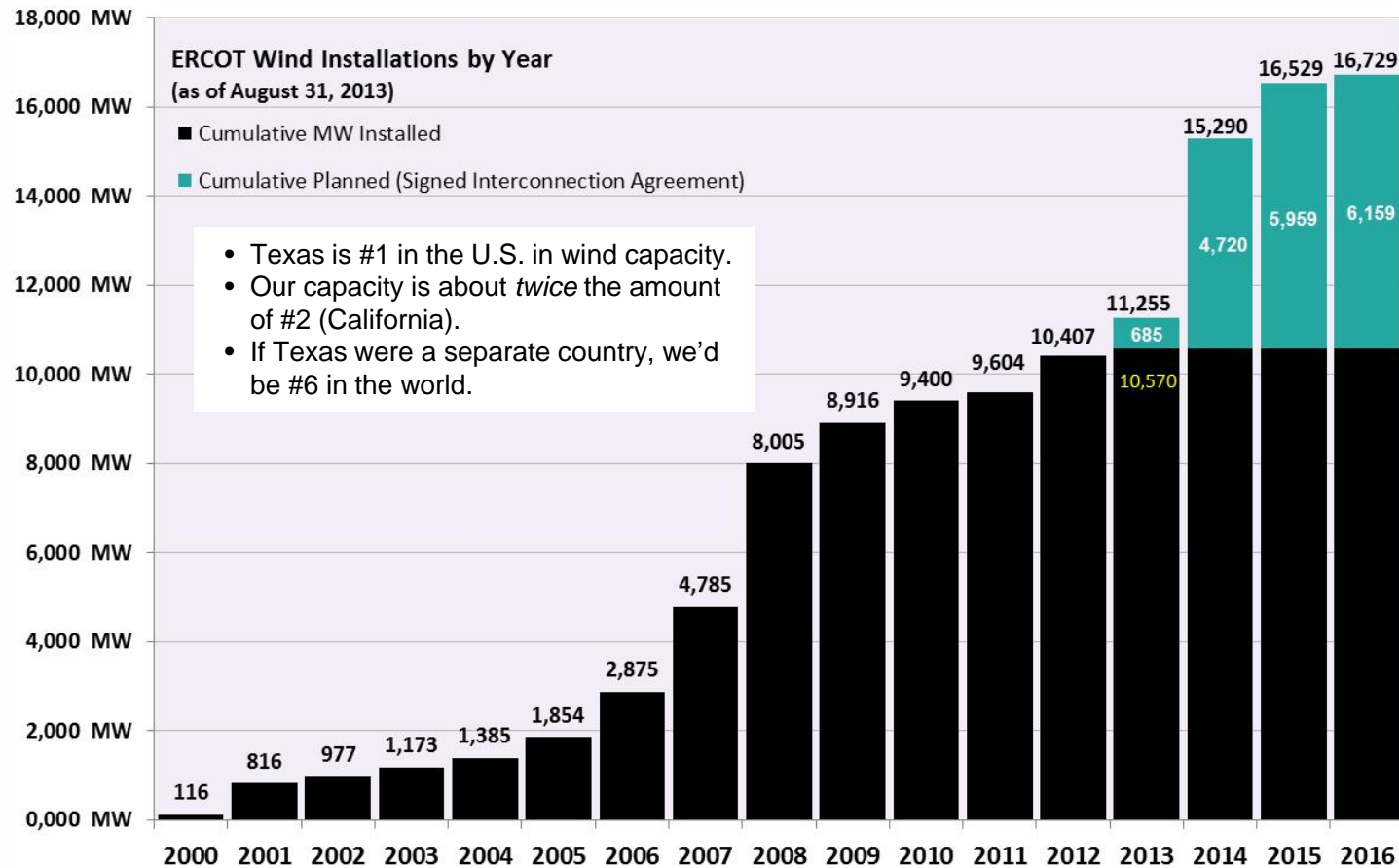
- **Stakeholder Comments:**

1. Seasonal Outage Rates: Available unit outage data is currently not adequate to assess seasonal forced outage rates.
2. Price-responsive loads: The impact of price-responsive loads and other demand response was not captured in the completed analysis. Incorporating these impacts using updated load models could have a material impact on study results.
3. Wind ELCC: ERCOT believes the current wind ELCC recommendations are appropriate, but recent stakeholder recommendations for a solar ELCC may indicate a better approach for a system with multiple variable generation resources.

- **Action Items:**

- Obtaining improved unit outage data will be a focus of future LOLE studies.
- ERCOT is working with the study consultant to incorporate updated load models into the study results. ERCOT will bring revised study recommendations to the November Board of Directors meeting.
- ERCOT will revisit the methodology for determining the capacity value of wind with stakeholders.

Wind Generation – August 2013



The data presented here is based upon the latest registration data provided to ERCOT by the resource owners and can change without notice. Any capacity changes will be reflected in current and subsequent years' totals. Scheduling delays will also be reflected in the planned projects as that information is received.

This chart reflects planned units in the calendar year of submission rather than installations by peak of year shown.



What We Have Been Doing

Recent Resource Adequacy Actions

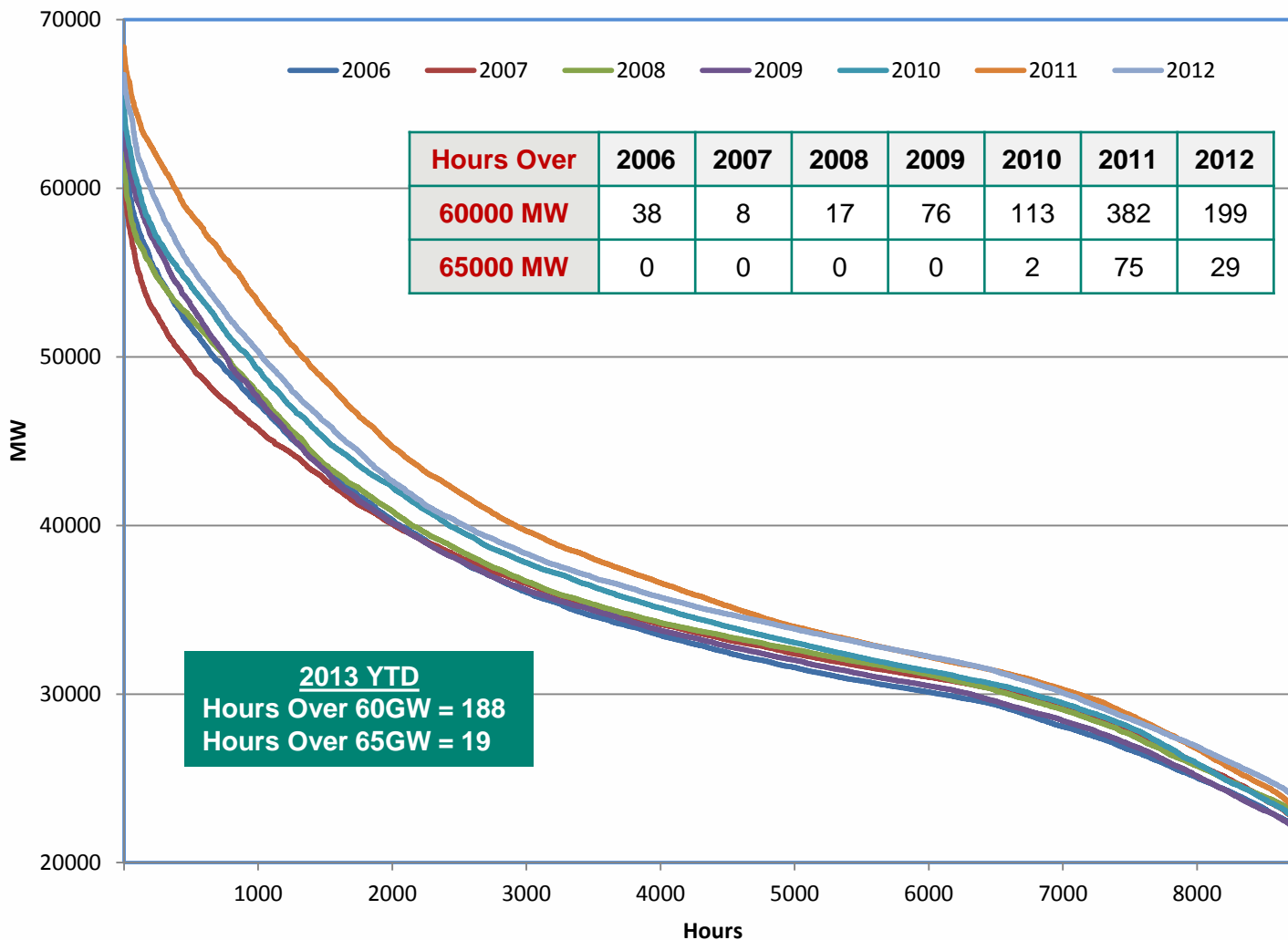
- **ERCOT submitted NPPR 568 to implement Operating Reserve Demand Curve (ORDC) B+**
- **30 Minute ERS Pilot**
 - NPPR 564 being evaluated through the stakeholder process
- **ERS Weather Sensitive Load Pilot**
 - Scheduled to end 9-30-13
 - Report to be provided at the November Board Meeting
- **Voltage Reduction Testing**
 - Testing completed this summer
 - Data is being analyzed and a report is targeted for end of 2013
- **Implementation of NPPR 520 to address SCED “over-mitigation” issues**

ORDC B+ Implementation Status

- **PUCT directed ERCOT to file an NPRR that would implement ORDC B+ with the following**
 - **Value of Lost Load (VOLL)= 9000 \$/MWh,**
 - **Minimum Contingency Reserve = 2000 MW**
 - **Remove Price floors on submitted Energy Offers for the portion of capacity reserved for AS**
 - **Use the exponential form of the cumulative distribution function in calculating the LOLP**

- **ERCOT filed NPRR 568 on September 19th, 2013 to the Protocol Revisions Subcommittee (PRS)**

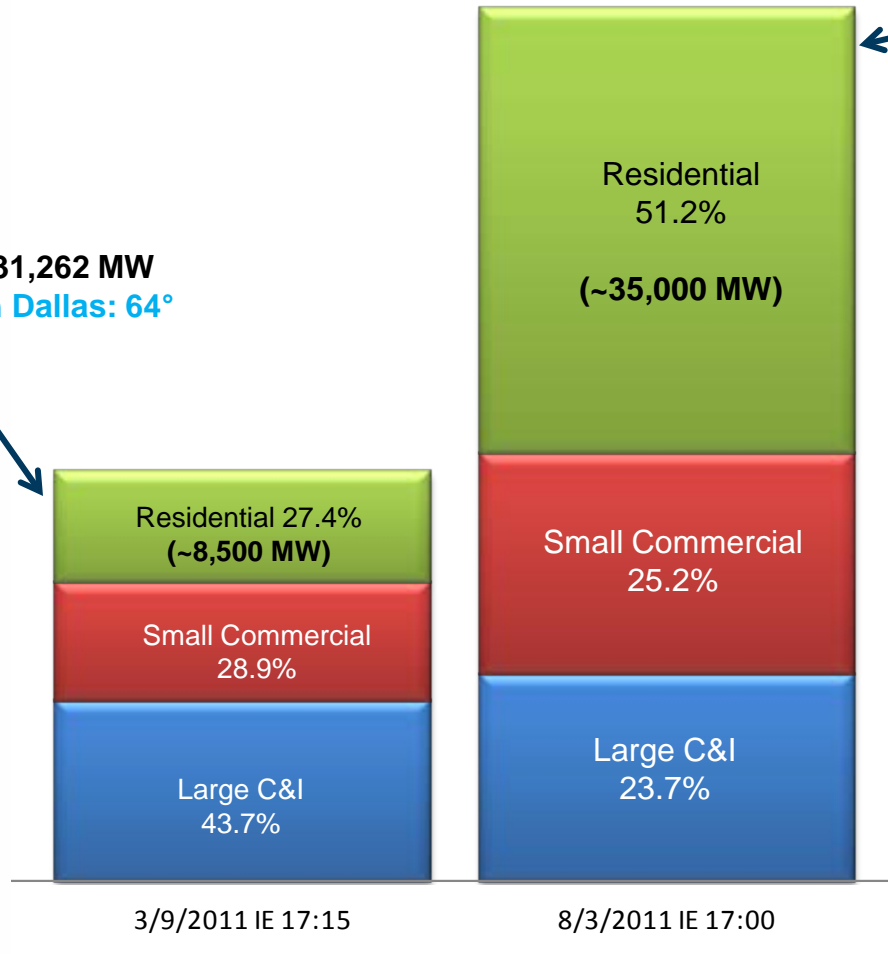
Actual Load Duration Curves – 2006 to 2012



On-peak DR Potential by Customer Type

Wednesday
March 9, 2011
5:15 PM
ERCOT Load: 31,262 MW
Temperature in Dallas: 64°

Wed., Aug. 3, 2011
5:00 PM
ERCOT Load: 68,416 MW
Temperature in Dallas: 109°



Approx. 37,000 MW of weather sensitive load (54% of peak)

- Based on customer class breakdown in competitive choice areas and extrapolated to ERCOT
- Large C&I are IDR Meter Required (>700kW)

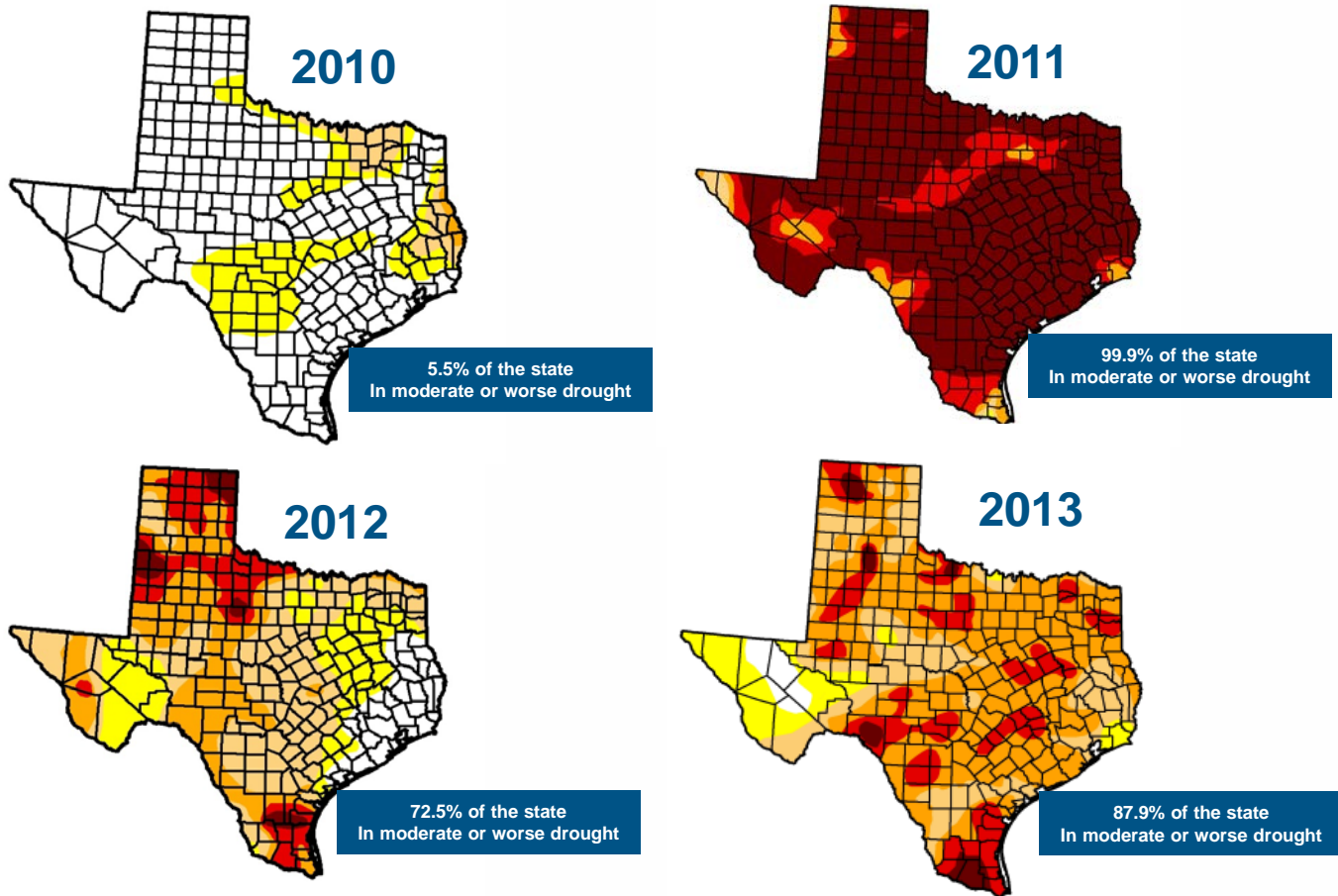
- ERCOT staff is working on Aggregated Load Response (ALR) enablement with market participants in both NOIE and competitive choice areas

Load Resources in Security Constrained Economic Dispatch (SCED)

- **PUC and stakeholders have expressed a goal for DR to contribute to price formation**
- **NPRR 555 – Load Resource Participation in Security Constrained Economic Dispatch – approved at the September Board Meeting**
- **Load Resources in SCED**
 - Would allow DR to set LMPs by submitting ‘up-to bids to buy’
 - Benefits
 - Price-certain avoided cost of power at Load’s strike price (being dispatched by ERCOT avoids need to guess at next LMP)
 - Day-Ahead capacity payment if providing Non-Spin
 - Challenges
 - Direct participation limited to Load-Serving Entities (excludes third-party DR QSEs except as technology partners)
 - Only a subset of DR resources are capable of responding to five-minute SCED base point instructions

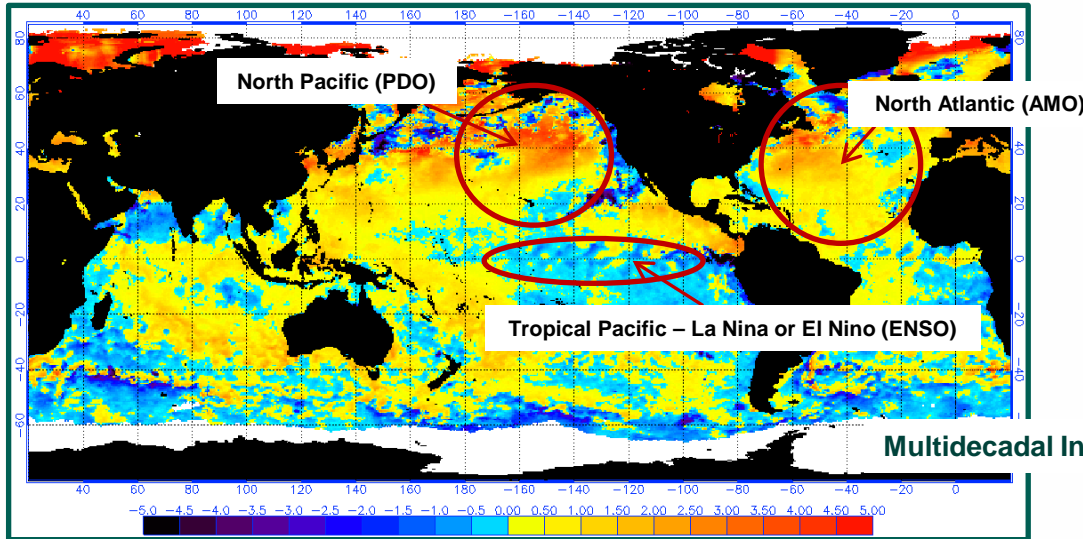
Drought

Comparing Late-August Drought Conditions



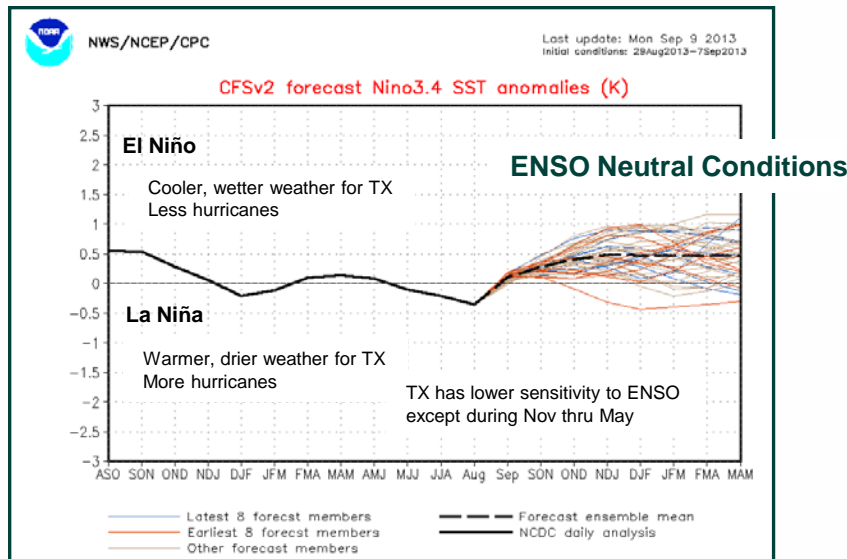
- Drought conditions will likely not improve for most regions in Texas
- Some regions (especially South, Central, and East) will likely experience worsening conditions
- The drought will have completed a third full year in October. It's currently worse than at this point last year
- Lack of El Nino combined with AMO+/PDO- continues to support this trend

Long Term Climate – Influencing Factors

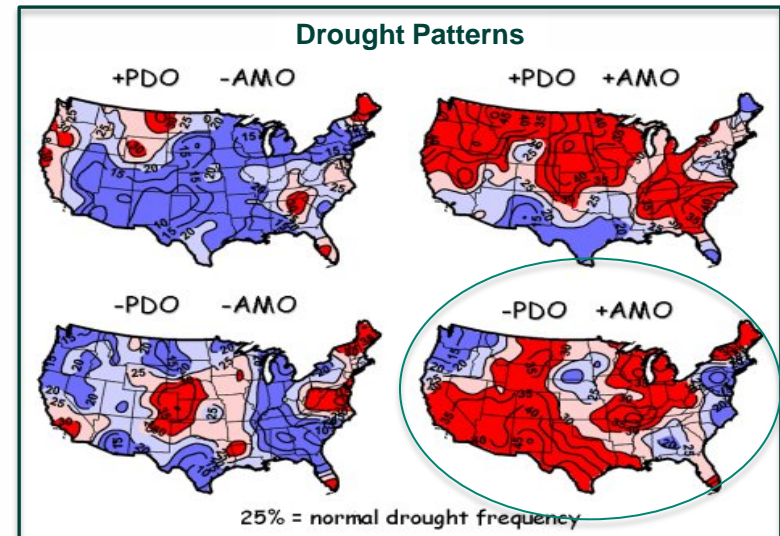


Long Term Forecast – Contributing Factors

- Variations in SST (Sea Surface Temps)
 - El Niño (+) & La Niña (-) (ENSO)
 - Pacific Decadal Oscillation (PDO)
 - Atlantic Multidecadal Oscillation (AMO)
- Certain shorter term phenomena (e.g. North Atlantic Ocean Blocking) can only be forecasted 10-14 days out – such effects are not included in longer term forecasts



Current –PDO/+AMO supports Texas drought



ERCOT Actions on Drought Effects

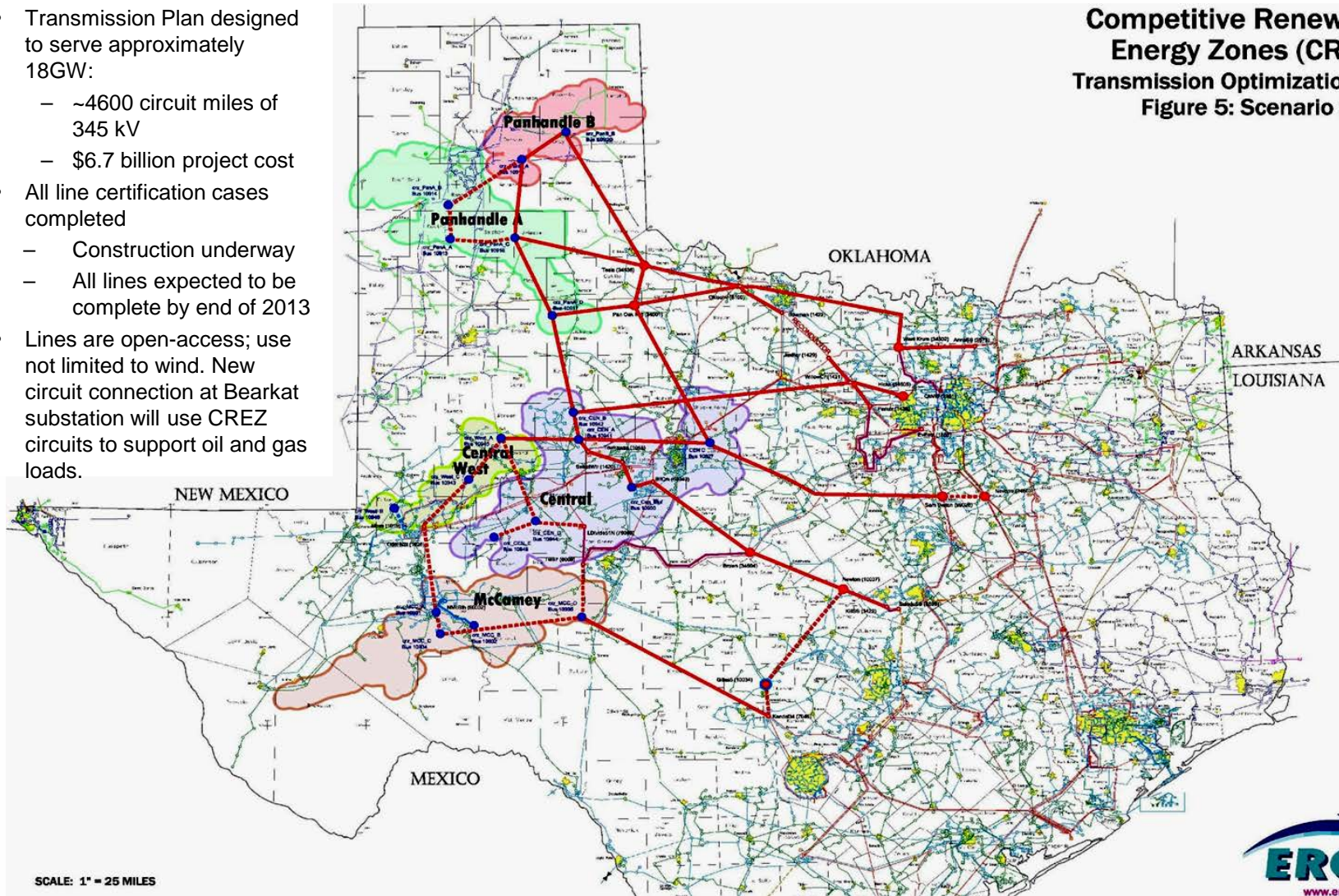
- Meteorologist on staff that monitors/forecasts drought levels
- Monitor generator cooling reservoir water levels
- Communicate with and survey affected generators on their
 - assessment of impact on their plants
 - planned mitigation actions
- Engaged a drought consultant that is
 - developing a long term drought impact analysis
 - developing a model that will be used to assign levels of risk for individual generating plants going forward
- Share information with the Texas Commission on Environmental Quality (TCEQ) in support of their administration of water rights
 - Provided testimony in Texas Farm Bureau v. TCEQ hearing
- Incorporate drought limitations in Seasonal Assessments of Resource Adequacy (SARA)
- Have a representative on the state Drought Preparedness Council

CREZ Implementation

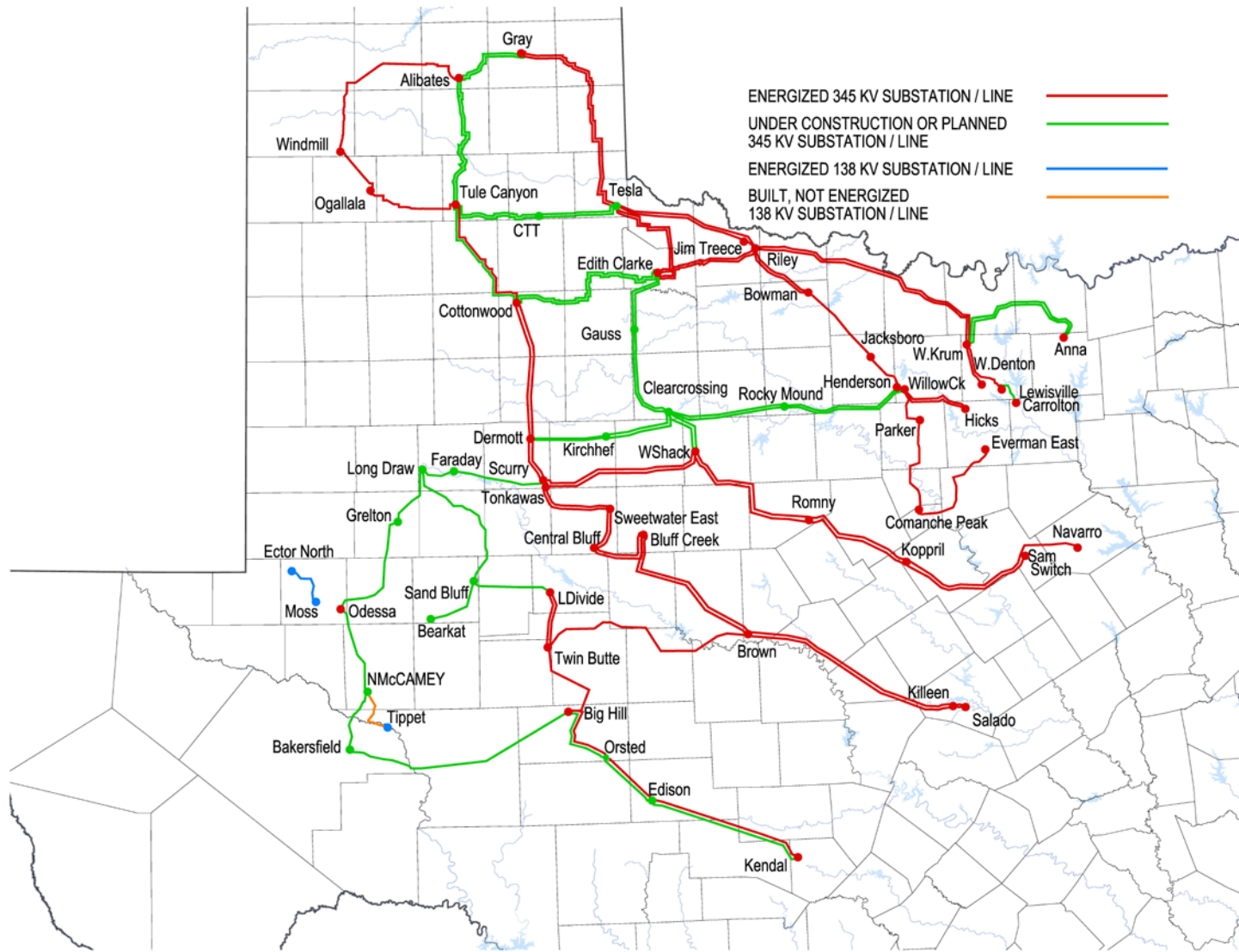
CREZ Scenario 2 Transmission Plan (18GW)

- Transmission Plan designed to serve approximately 18GW:
 - ~4600 circuit miles of 345 kV
 - \$6.7 billion project cost
- All line certification cases completed
 - Construction underway
 - All lines expected to be complete by end of 2013
- Lines are open-access; use not limited to wind. New circuit connection at Bearkat substation will use CREZ circuits to support oil and gas loads.

Competitive Renewable Energy Zones (CREZ)
Transmission Optimization Study
Figure 5: Scenario 2

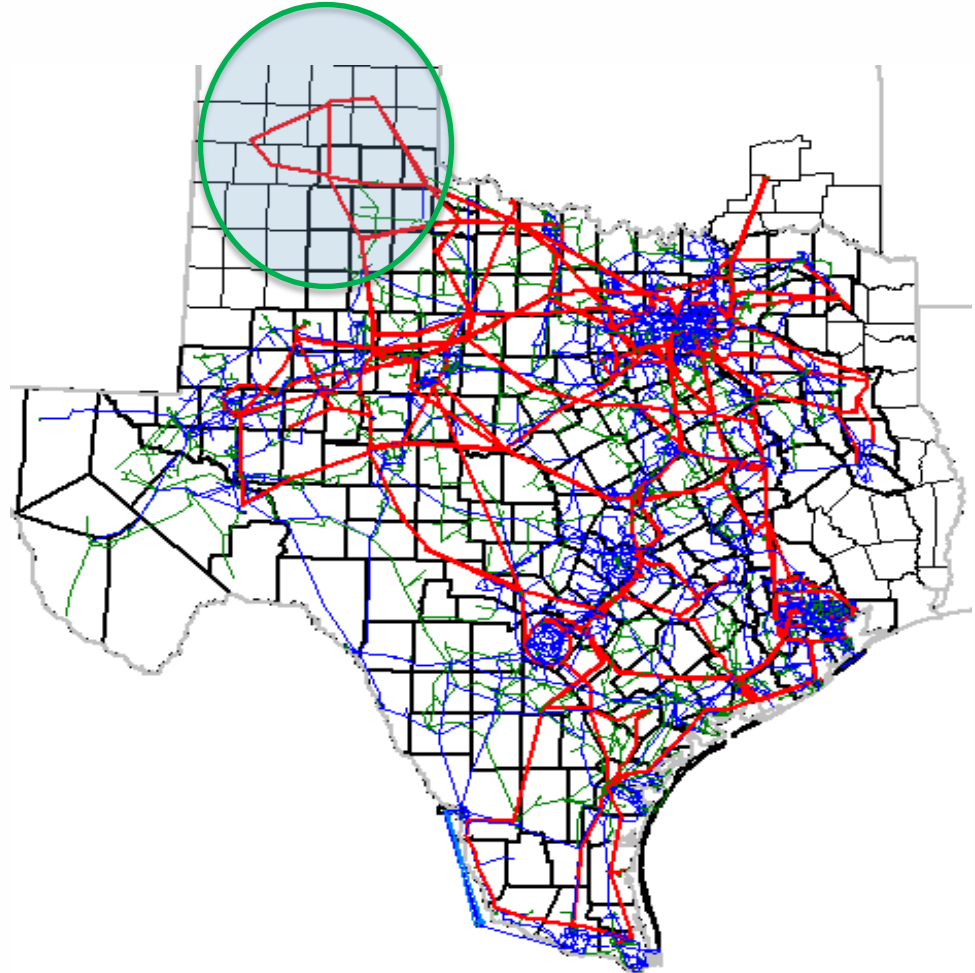


CREZ Construction Update – September 5, 2013

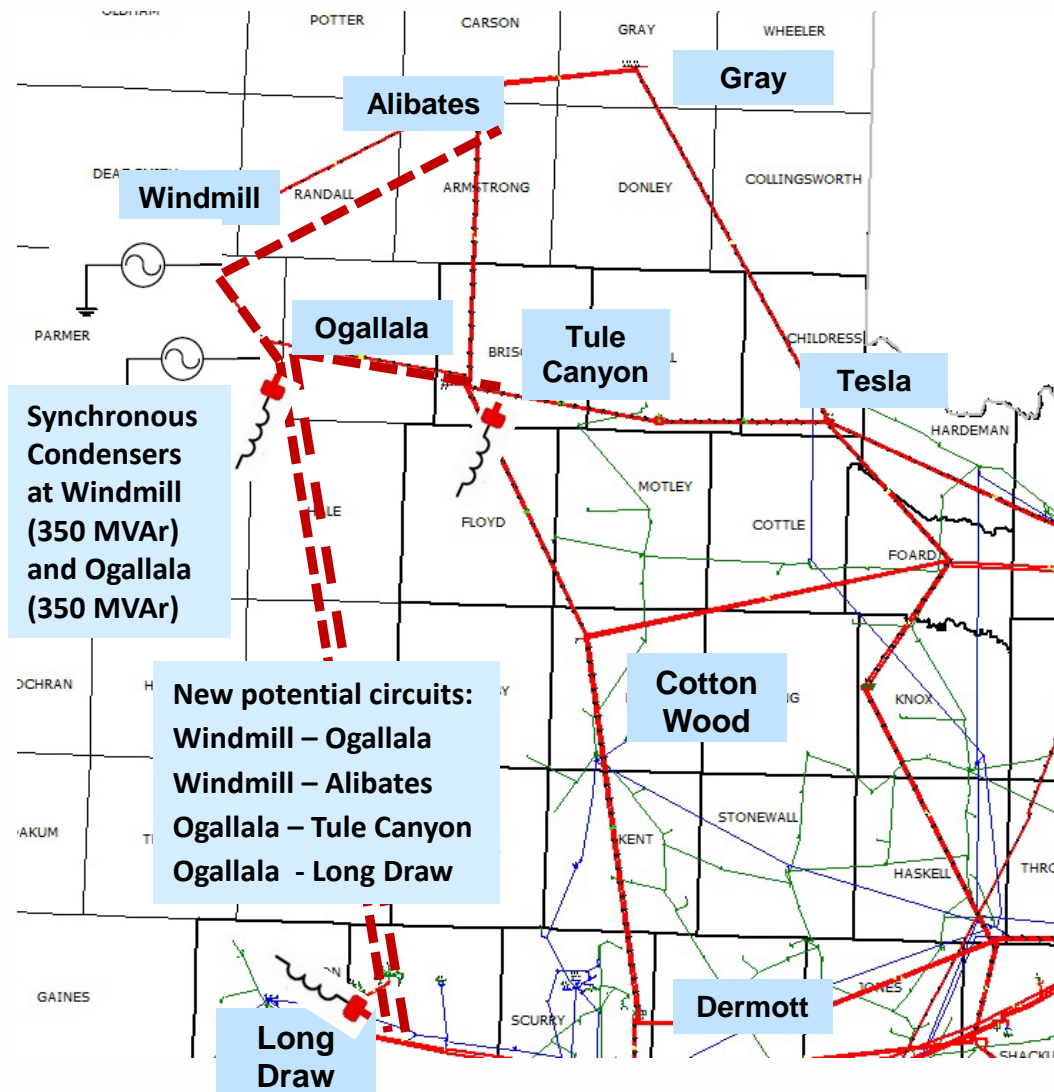


ERCOT Panhandle Grid Characteristics

- Minimal to no nearby synchronous generation
- No local load
- These conditions lead to voltage stability and grid strength challenges
- Current wind generation development:
 - >3.4 GW of wind capacity in the Panhandle with signed interconnection agreements
 - >7.7 GW of additional wind generation in the interconnection study process
- Long Term Studies show a continued expansion of wind resources in the Panhandle under a range of future outcomes.
- CREZ Reactive Study Recommendations were designed to accommodate 2,400 MW of wind generation in the Panhandle CREZ regions



Panhandle Renewable Energy Zones (PREZ) Study

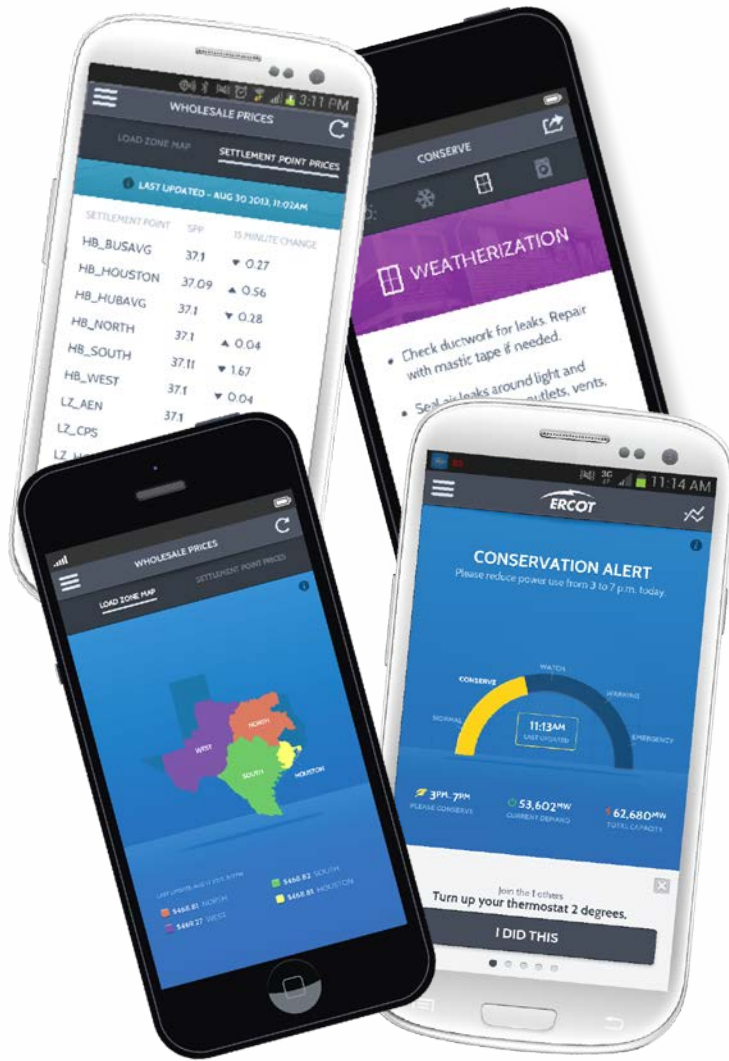


The PREZ study will:

- Identify system constraints and potential upgrades to accommodate future wind generation projects (one potential set of projects is depicted here)
- Provide a project roadmap for ERCOT and TSPs to accommodate additional generation resources in the study area (both a list of potential system upgrades and triggers for when those projects will be recommended)
- Be completed by the end of 2013

Conservation & Outreach

ERCOT Energy Saver app: The Next Generation



System operations

- Chart showing hourly demand and generation (Today's Outlook on landing page)
- Alternate chart with real-time demand and generation data (5-minute refresh)

Wholesale pricing

- Hub and load zone settlement point prices
- Map with four main load zone prices

Conservation tips

- Tips for appliance use, hot- and cold-weather practices and overall weatherization

Helpful information

- Quick Facts and Q&A, with links to Transmission Providers' websites
- Options for news releases, updates and sharing

Emergency alerts

- Continued push notifications, with interactive components (access to system conditions, reporting on conservation actions)

