



ERCOT

**CEE – UT ANNUAL MEETING
DECEMBER 8, 2011**

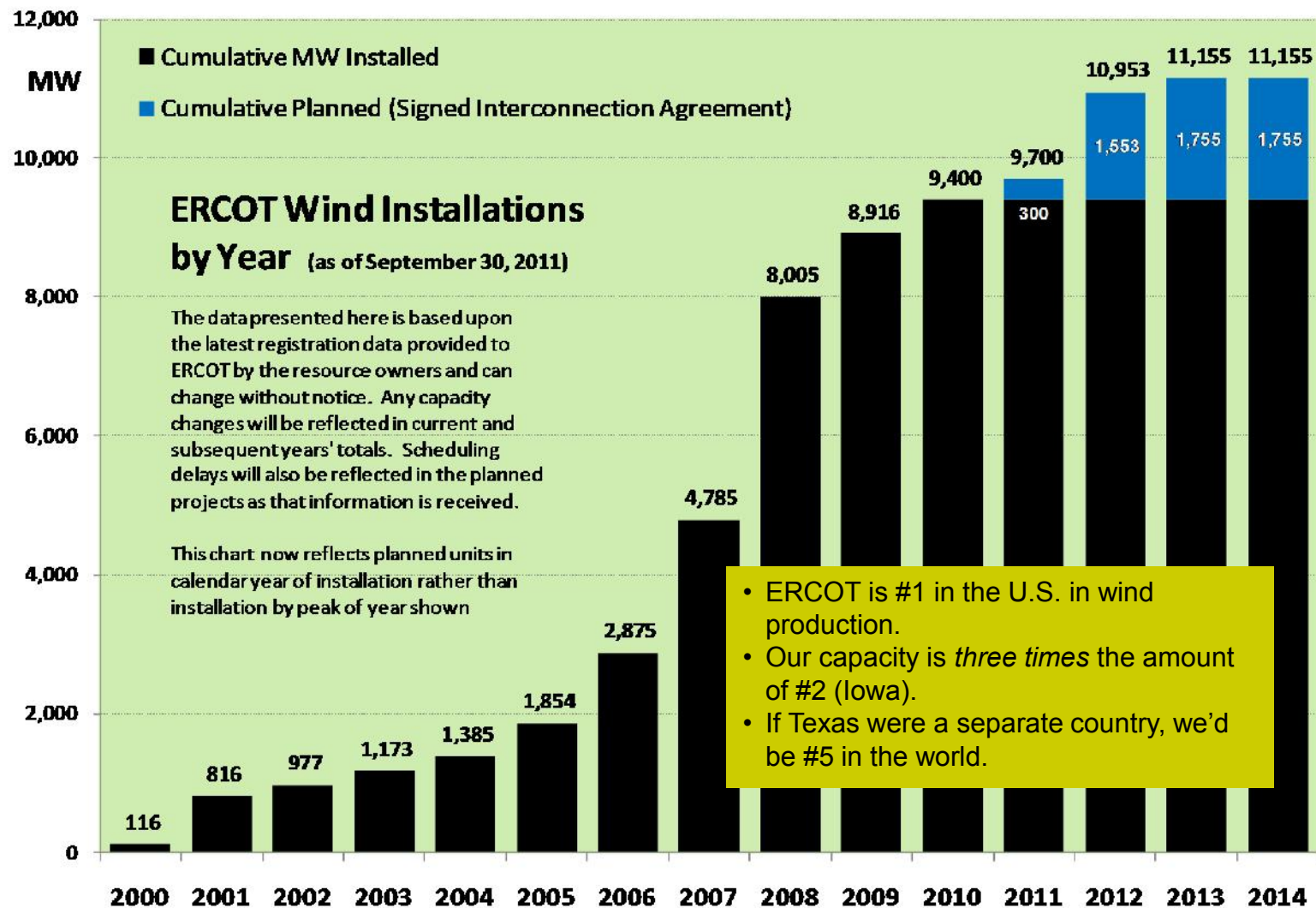
**Mike Gent
Vice Chair, ERCOT Board of Directors**

PRIMARY ISSUES OF INTEREST

- **Wind Integration & Related Operational Challenges**
- **Resource Adequacy & Regulatory Uncertainties**
 - Cross State Air Pollution Rule (CSAPR)
- **Advanced Metering & Demand Response – Growing Opportunities**

Wind Integration & Related Operational Challenges

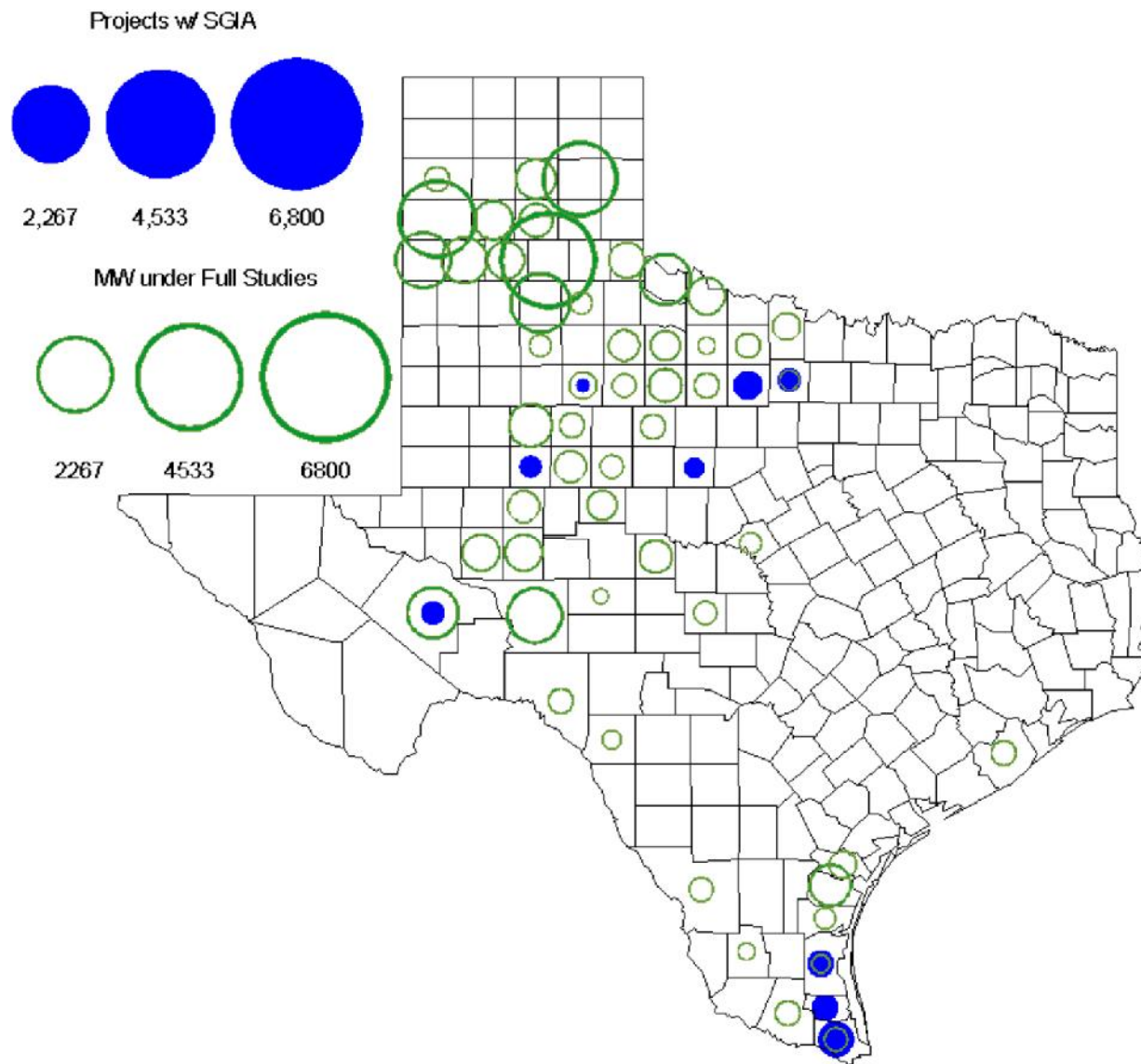
WIND GENERATION



CHALLENGES RELATED TO INCREASED WIND RESOURCES IN ERCOT

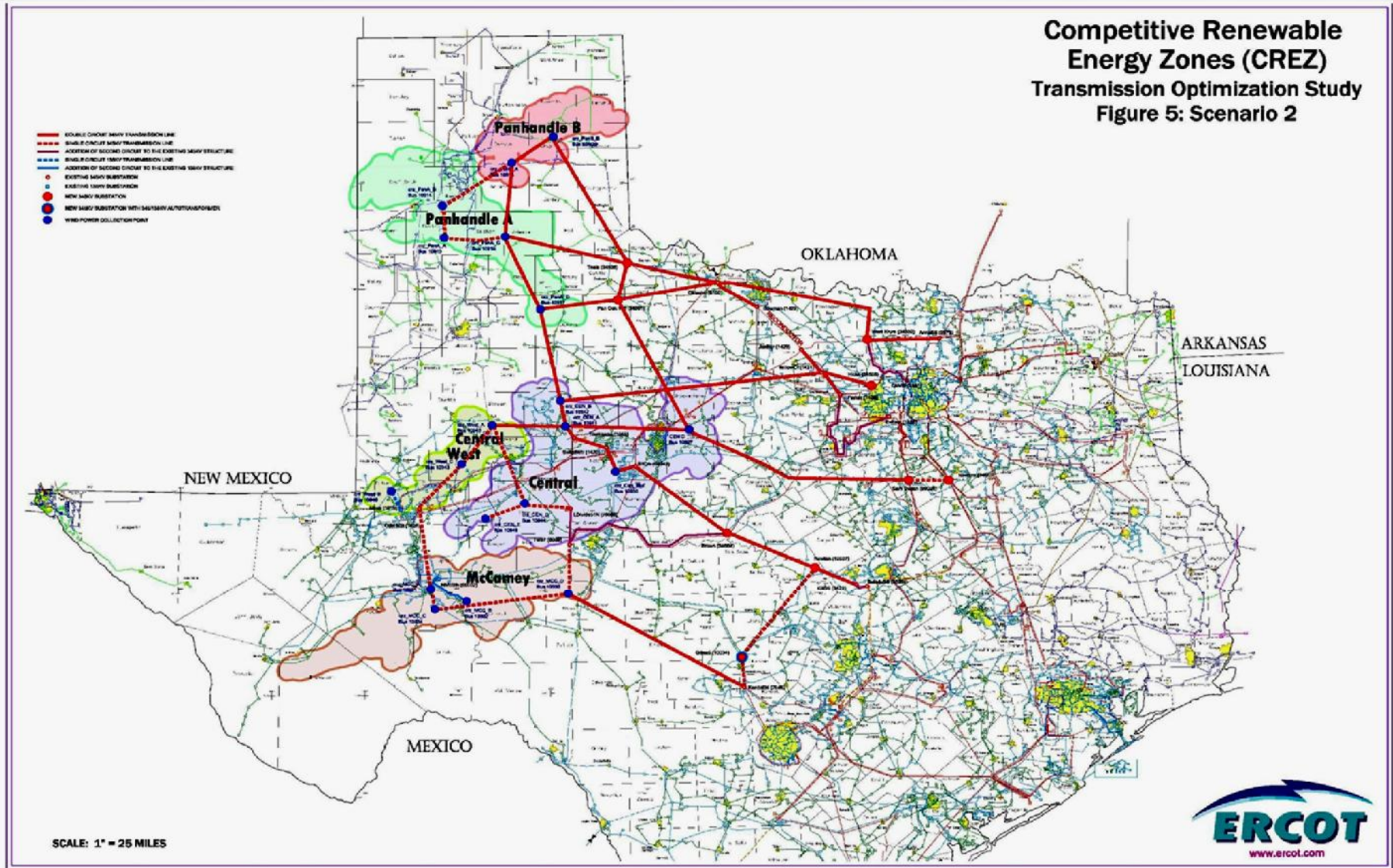
- **Wind is not as controllable or predictable as traditional generation**
 - Highly dependent on weather conditions
 - Cannot be dispatched (with exceptions)
 - Voltage control and reactive coordination are difficult
- **Works best in conjunction with other generation in same area**
 - Conventional resources available to provide regulation & responsive reserve services
 - Possible ancillary service impacts
- **Creates new challenges in system design & operation**
 - Difficulty in coordination of transmission outages and construction, *i.e.*, system off peak = wind peak production
 - Development of standard software stability models for operations & planning environment

COUNTY LOCATION OF PLANNED GENERATION WITH INTERCONNECTION REQUESTS (WIND) SEPTEMBER 2011

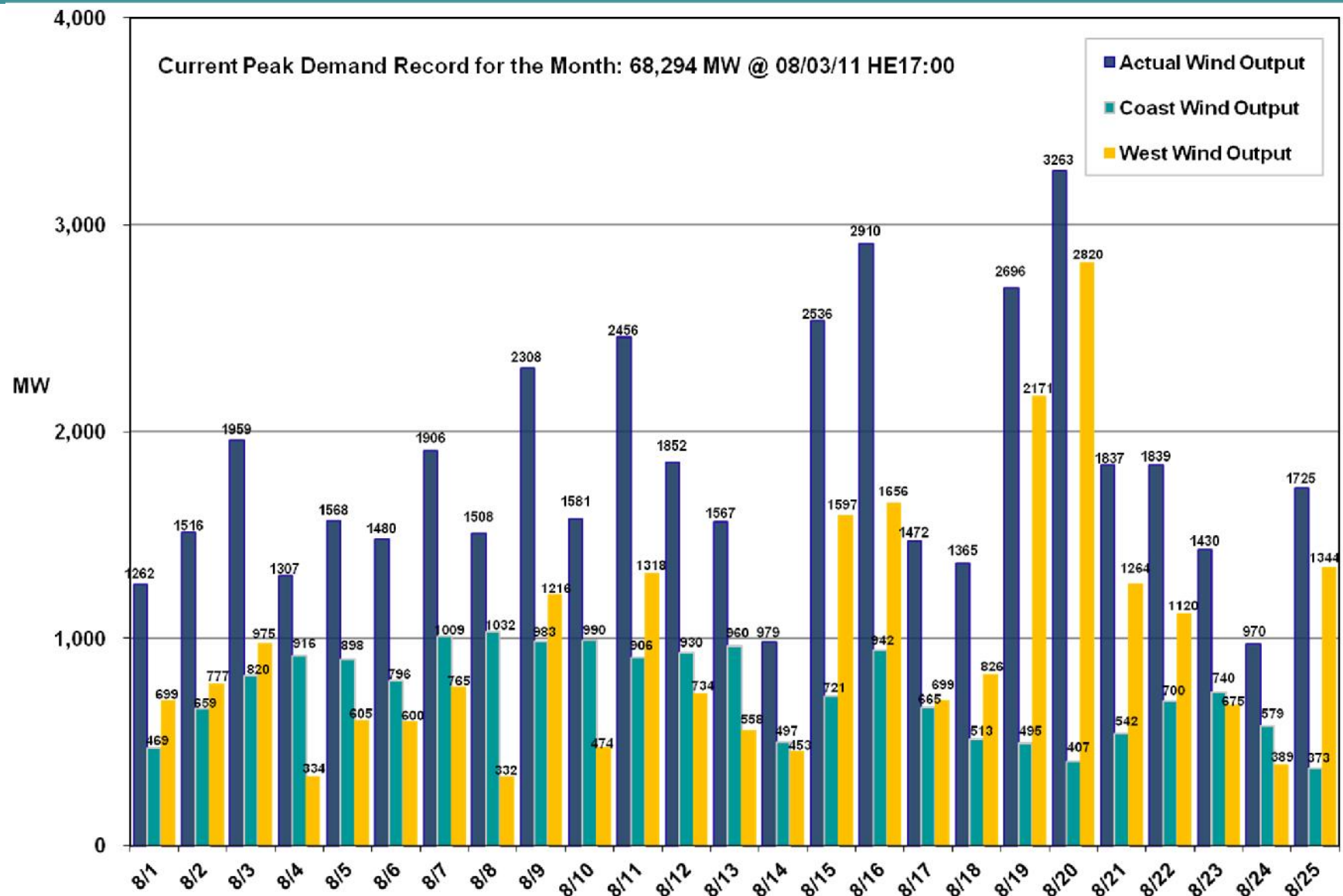


SCENARIO 2 TRANSMISSION PLAN (18GW)

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

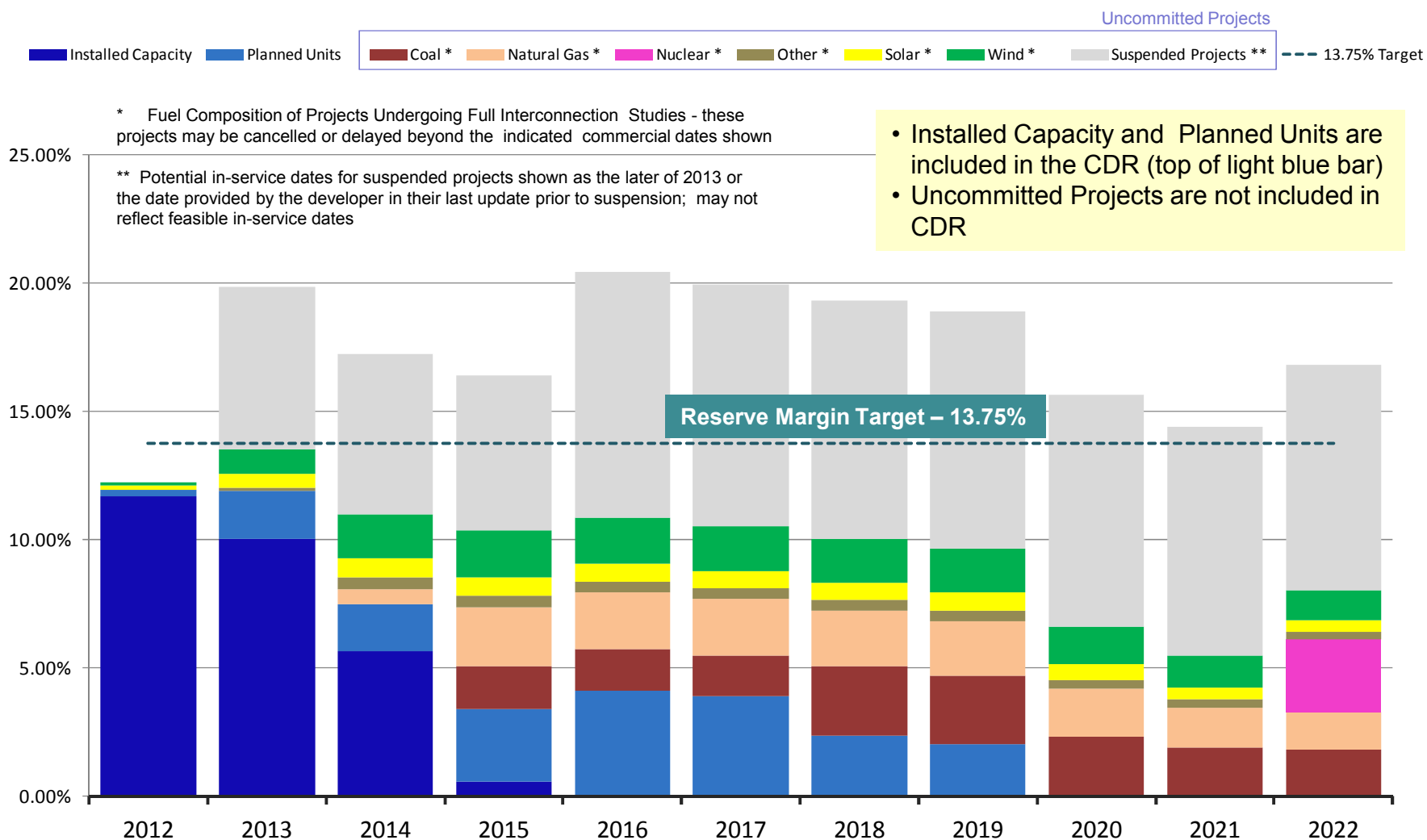


DAILY WIND GRAPH AT PEAK

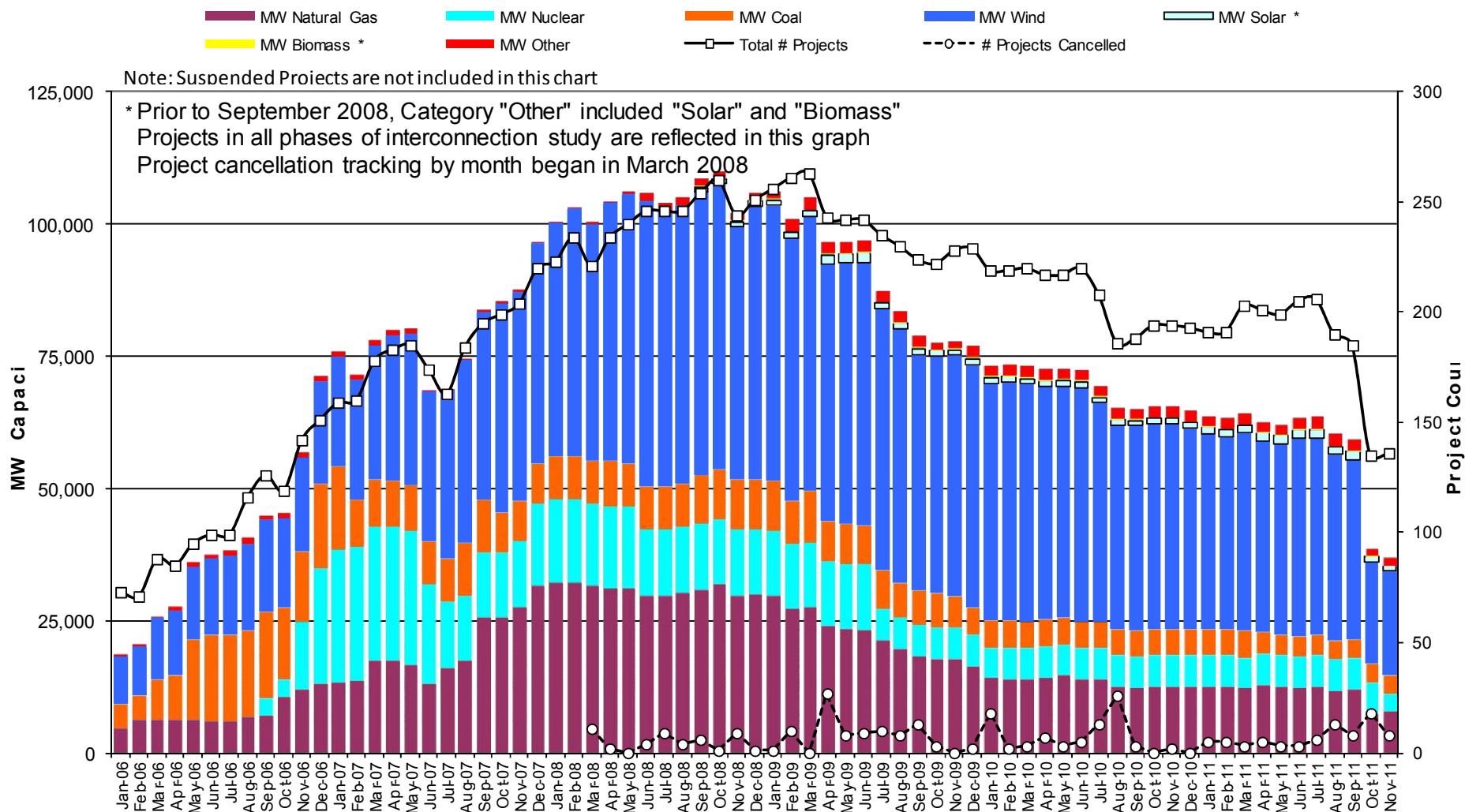


Resource Adequacy & Regulatory Uncertainties

RESERVE MARGIN, WITH POTENTIAL RESOURCES FROM QUEUE



GENERATION INTERCONNECTION PROJECTS UNDER STUDY

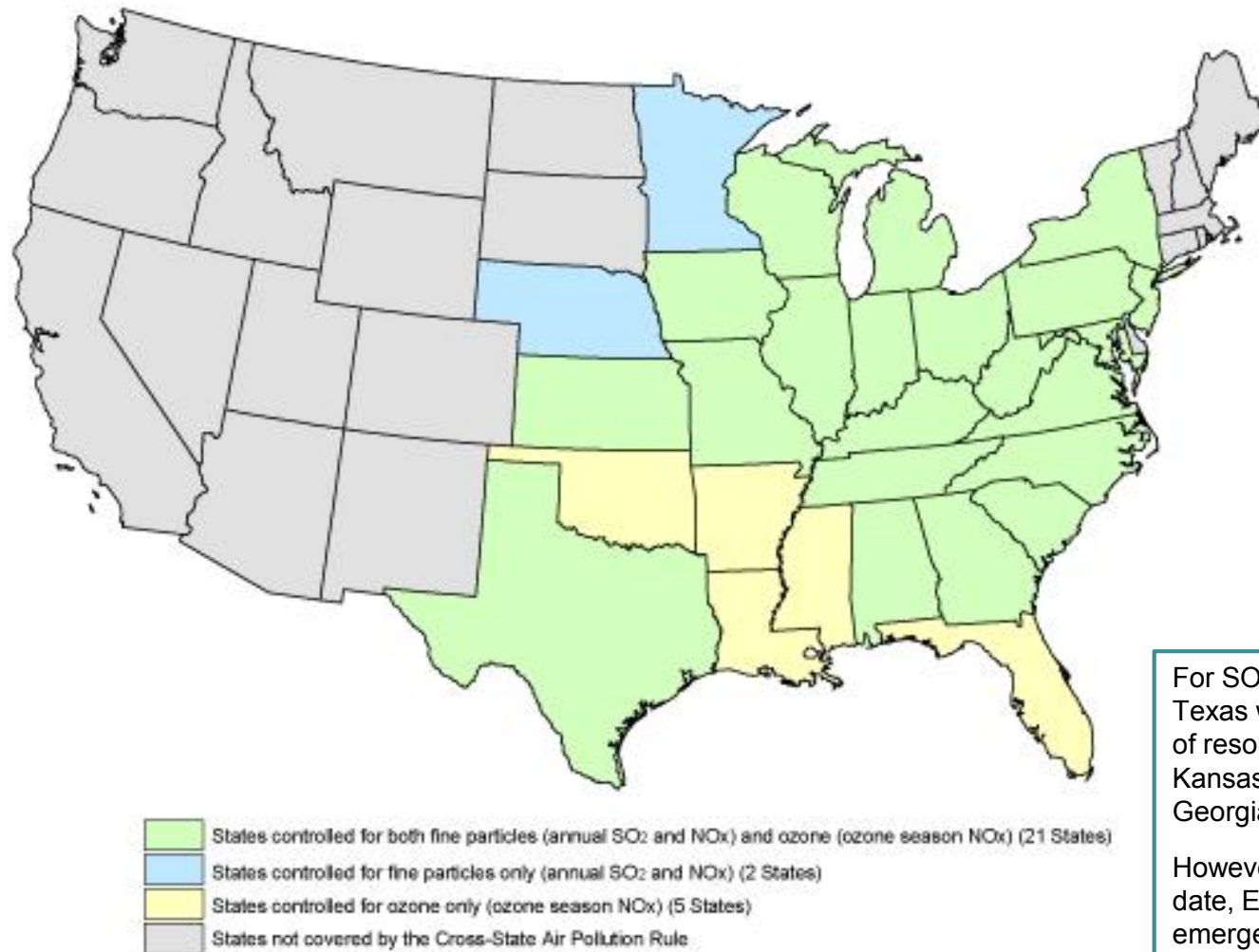


Cross State Air Pollution Rule

CSAPR RULE REQUIREMENTS

- The CSAPR affects generating units in most of the eastern US (depicted on next slide).
- Under the CSAPR, generating units must have CSAPR allowances to match annual emissions of SO₂ and NO_x and separate allowances for peak season (May – Sept.) NO_x emissions.
- Units are allocated a number of allowances based on historical generation. These unit allocations have been published.
- Trading of allowances within a state is unlimited. Interstate trading of allowances is allowed, but net state-wide imports of allowances are capped at approximately 18% of a state's total allocation.

STATES INCLUDED IN THE CSAPR



For SO₂ allowances, owners of resources in Texas will be allowed to trade with owners of resources in the “Group 2” states: Kansas, Nebraska, Minnesota, Alabama, Georgia, and South Carolina.

However, based on information obtained to date, ERCOT does not anticipate the emergence of an active market for trading of Group 2 SO₂ allowances.

CSAPR RELIABILITY IMPLICATIONS FOR 2012-13

Scenario 1 – Successful implementation of compliance plans

- Mothballs and peak output reductions to ensure compliance
- Extended outages during lower price periods
- 1,200 to 1,400 MW capacity reduction during peak months
- 3,000 capacity reduction during off-peak months (Mar, Apr, Oct, Nov)

Scenario 2 – Plus Additional daily dispatching of base-load coal units

- Additional maintenance requirements due to increased ramping and starts/stops
- Capacity reduction in Oct & Nov increases to 5,000 MW

Scenario 3 – Plus Limited availability of low sulfur coals

- Output restrictions to ensure compliance
- Capacity reduction in Oct & Nov increases to 6,000 MW

CSAPR UPDATE

ERCOT is analyzing the reliability impacts of the proposed revisions to the CSAPR rule announced by the EPA on October 6, 2011.

The changes proposed:

- Did not alter the rule's January 1, 2012 implementation date
- Did not revise modeling errors that ERCOT has reported do not reflect actual conditions on the ERCOT electric grid
- Have not been finalized, and may be altered or withdrawn by the EPA

The announced revisions to the rule arise from changes to model input assumptions in emissions rates of existing units in Texas. These changes lead to a 30% increase in the number of SO₂ allowances given to plants in Texas.

The proposed changes also delay implementation of limits on interstate trading of allowances until 2014.

ERCOT is gathering information from generators regarding changes to their compliance plans reported to ERCOT after the initial adoption of CSAPR.

Resource Adequacy predictions become quite challenging in the light of Regulatory Uncertainties

Advanced Metering & Demand Response

ADVANCED METERING & DEMAND RESPONSE

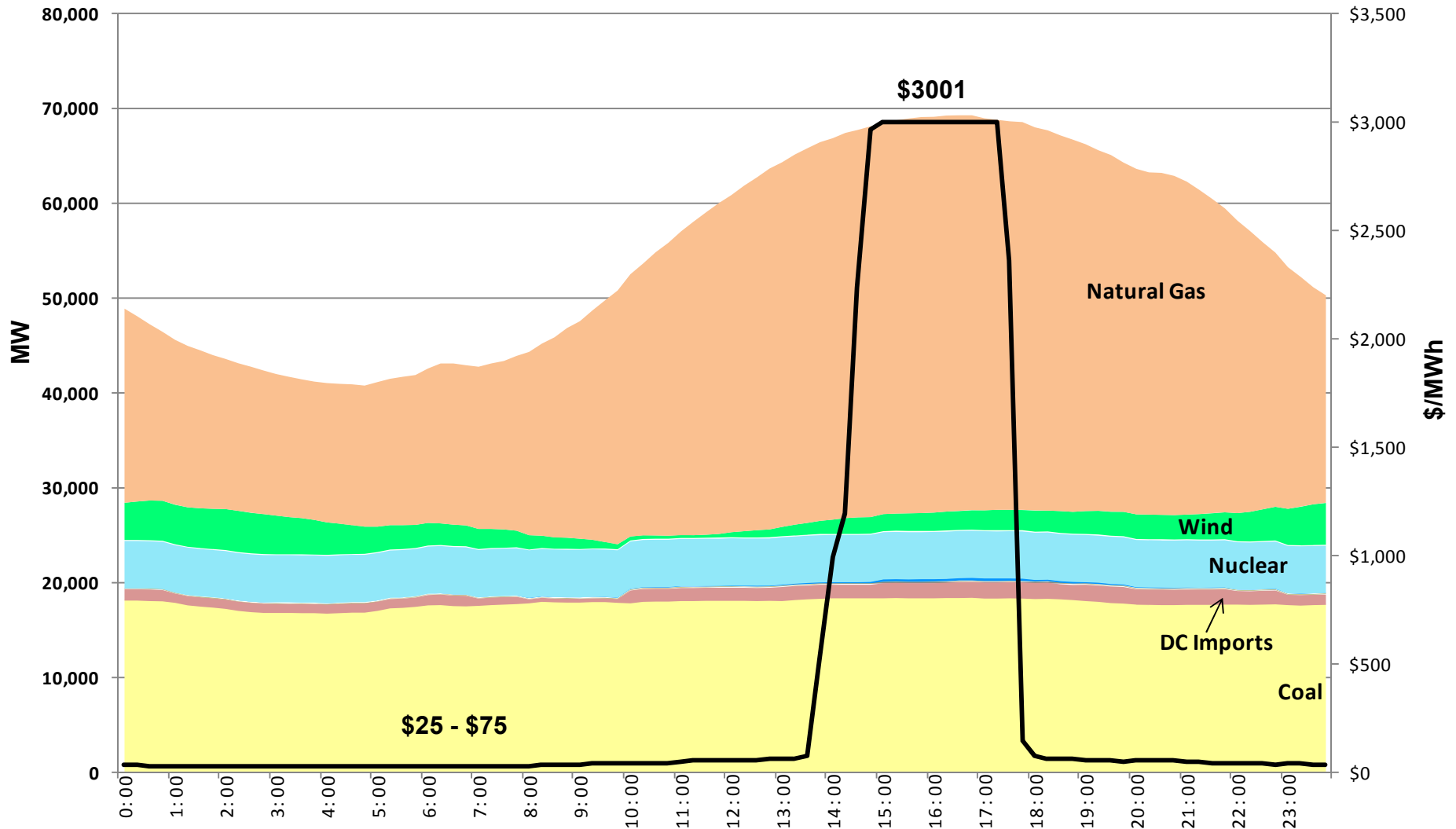
- **Part of “Smart Grid” efforts**
- **Remote meter reading**
- **Informed Customers**
- **Dynamic pricing – limited approach**
- **Demand Response Programs**
 - Decrease Consumption
 - Need programs to Increase Consumption

**Demand Response presents a great opportunity to address both
Wind Integration and Resource Adequacy issues**

SUMMER PEAK DAY LOAD SHAPE WITH FUEL MIX

August 3, 2011

Natural Gas Wind Nuclear Hydro
Other DC Imports Coal Energy Price



DEMAND RESPONSE POTENTIAL IN ERCOT

- **FERC estimates >18 GW of DR potential in Texas by 2019**
 - Attributed to high peak demand
 - This would represent 20-25% of total ERCOT peak

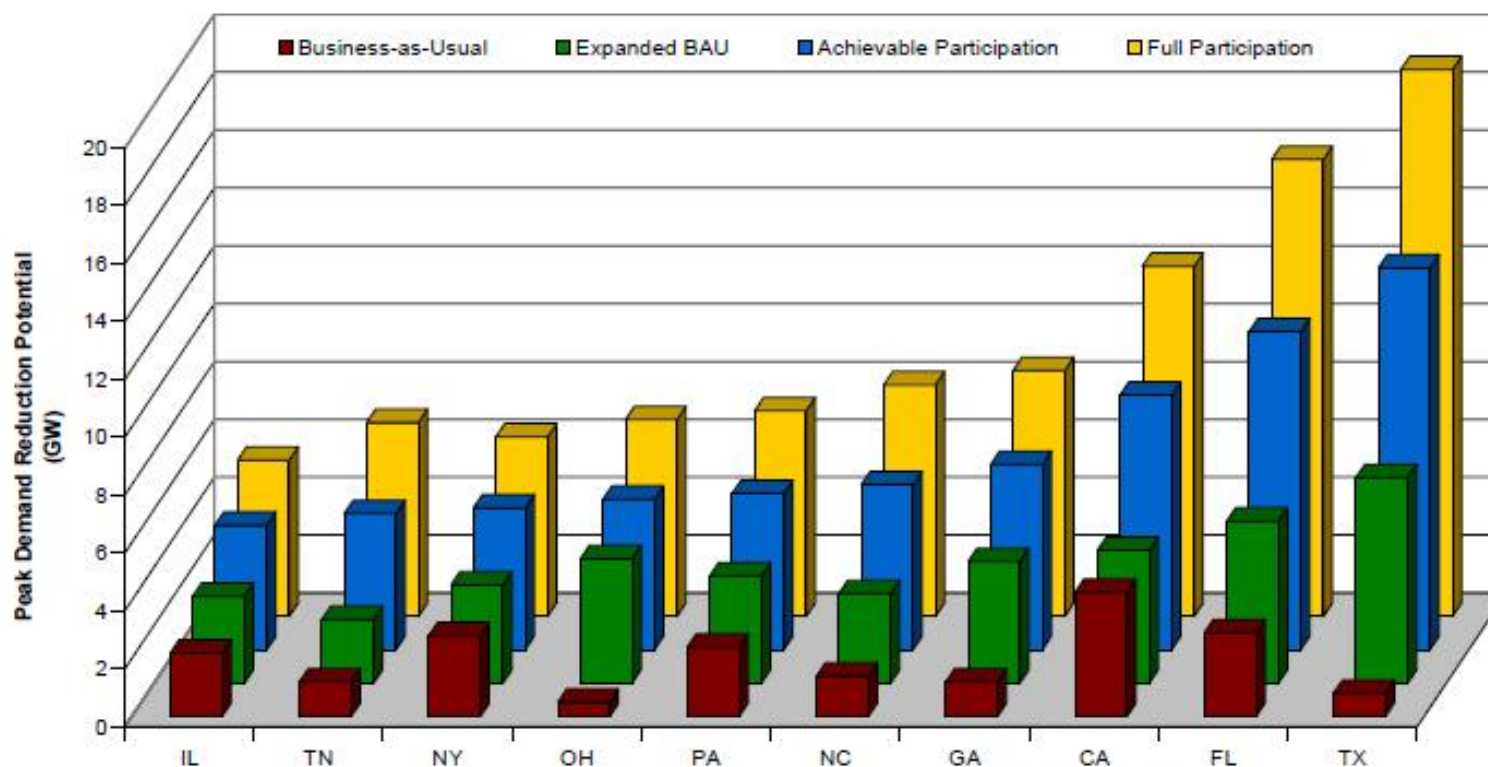


Figure 16: Top Ten States by Achievable Potential in 2019 (GW)

Source: FERC 2009 National Assessment of DR, page 42

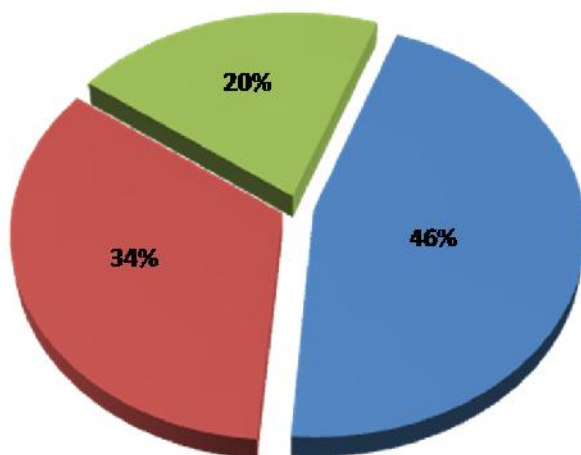
OFF-PEAK VS. ON-PEAK LOAD

21,000 MW of residential
summer peak load

Moderate day, low A/C load

10-11 AM, March 31, 2010

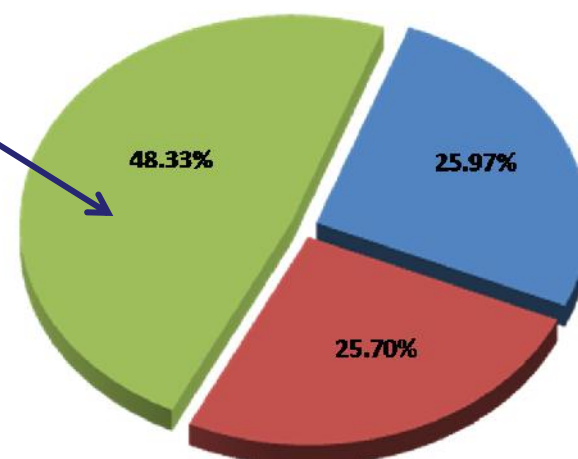
■ Business IDR Required ■ Business non-IDR Required ■ Residential



Hot day, high A/C load

4-5 PM, Aug. 4, 2010

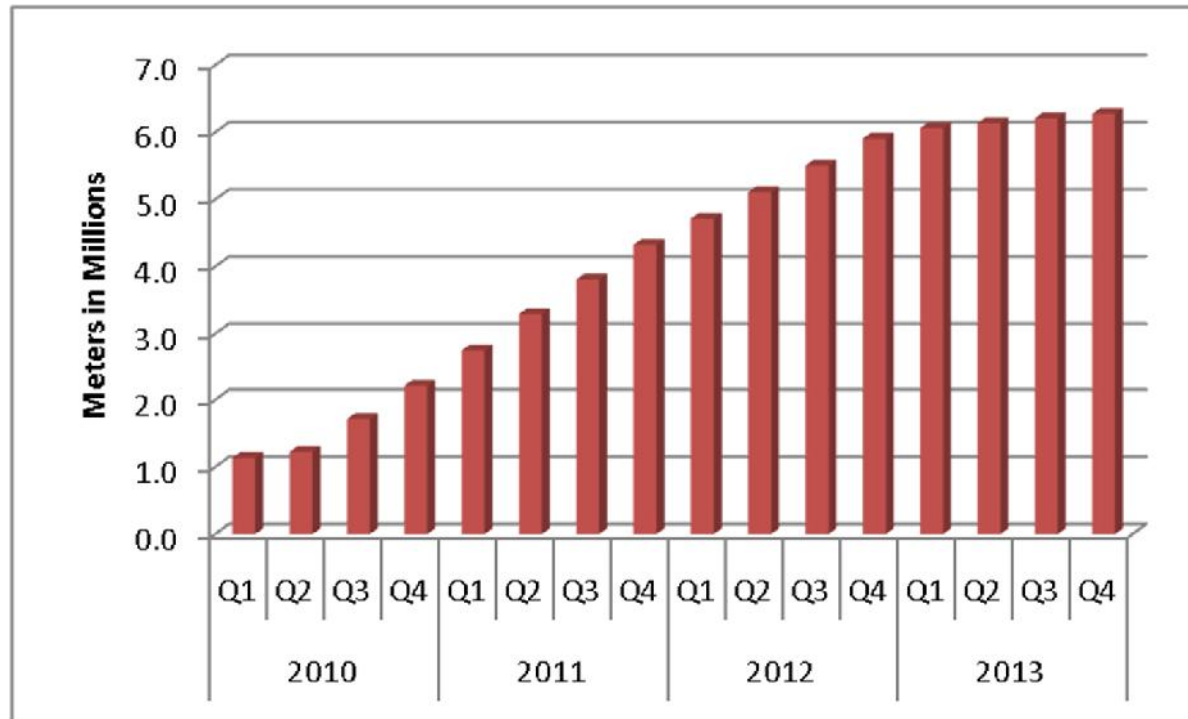
■ Business IDR Required ■ Business non-IDR Required ■ Residential



- Both days were Wednesdays
- Customer class breakdown is for competitive choice areas only
- IDR meters are required at >700kW

TODAY WE'RE SETTTLING ABOUT FOUR MILLION ADVANCED METERS

Advanced Meter Deployment Plan



Advanced meters give customers the data they need to make educated decisions about their electricity usage

QUESTIONS?

CHANGES THAT AFFECT RESERVE MARGIN SINCE JUNE 2011

CDR (FOR SUMMER 2012)

The Peak Demand forecast has been updated (increase in Firm Load Forecast of 738 MW for 2012)

-1% reserve margin impact

Additional Mothballed Units	Capacity (MW)	Planned Units	
Greens Bayou 5	-406	09INR0001-Sandy Creek 1	-925 Delayed
Midlothian 5	-225	09INR0029-CFB Power Plant Units 11&12	-260 In-service, but zero net capacity to grid
Monticello 1	-565	11INR0086-RRE Austin Solar	-60 Delayed
Monticello 2	-565	08INR0011-Senate Wind Project	-13 Delayed 150 MW Unit at 8.7%
Sam Bertron 3	-230	Misc DG Units	25 New
Sam Bertron 4	-230		-1234
Sam Bertron T2	-13		
Change in Prob. Of Return %s	717		
	-1517		
Mothballed Units Returned to Service		Changes to Unit Maximum Sustainable Limits reported in RARFs	
Spencer 4	61	Net Change	339
Spencer 5	61		
Sam Bertron 1	174		
Sam Bertron 2	174		
	470		
		Change to PUN Available Generation based on Aug 2011 Actuals	
		Net Change	-681 Based on Aug 2011 Actual Output
		Total Change in Resources Available	-2623

-4% reserve margin impact

Jack County 2 (565MW) and Sherbino Mesa Wind 2 (150MW with ELCC of 13MW) moved from Planned to Installed)