



TEXAS RENEWABLE ENERGY INDUSTRIES
ASSOCIATION
APRIL 9, 2012

Trip Doggett
President & CEO
ERCOT

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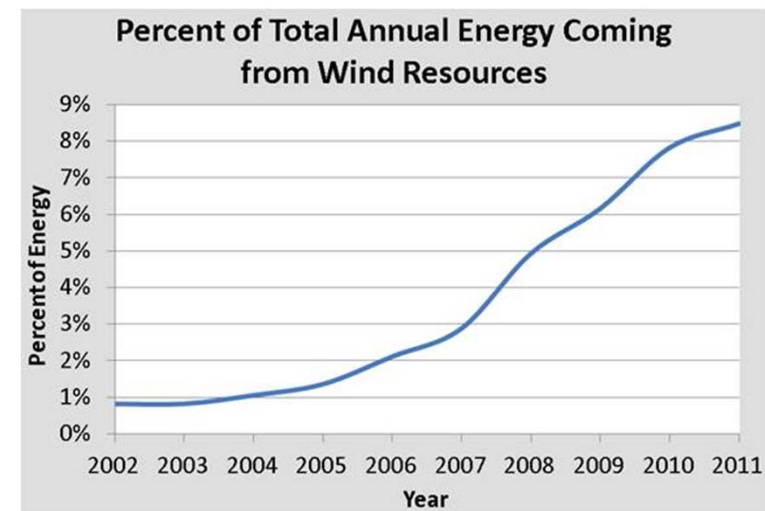
ERCOT OVERVIEW

The ERCOT market covers roughly **85% of Texas' overall power usage**

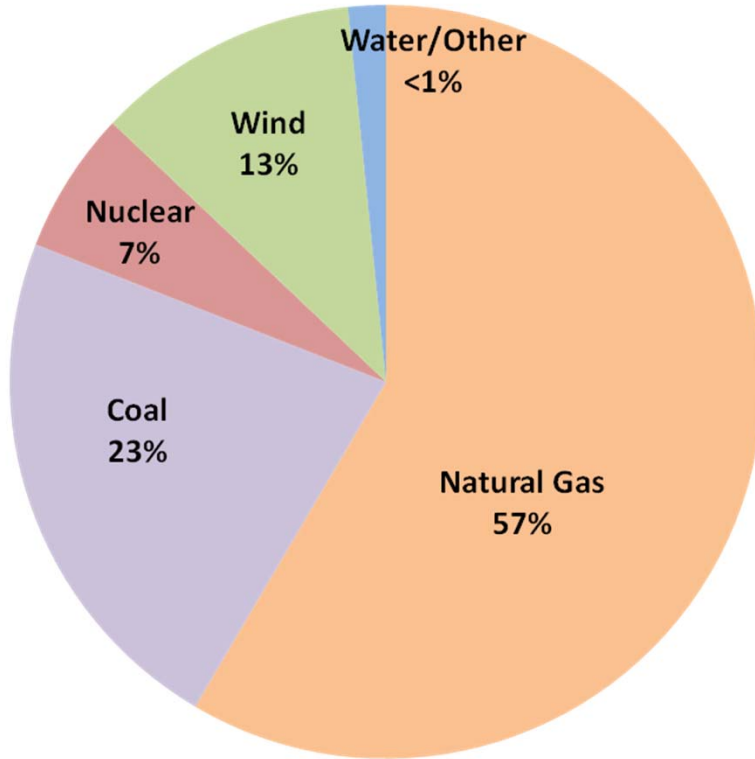
Record peak demand: **68,379 MW**
• Occurred on August 3, 2011

Total installed wind capacity of **9,838 MW**
• over 18,000 MW of new wind capacity generation requests under review

Wind generation record: **7,917 MW**
• Representing 24% of 33,373MW load at 4:13pm on March 18, 2012

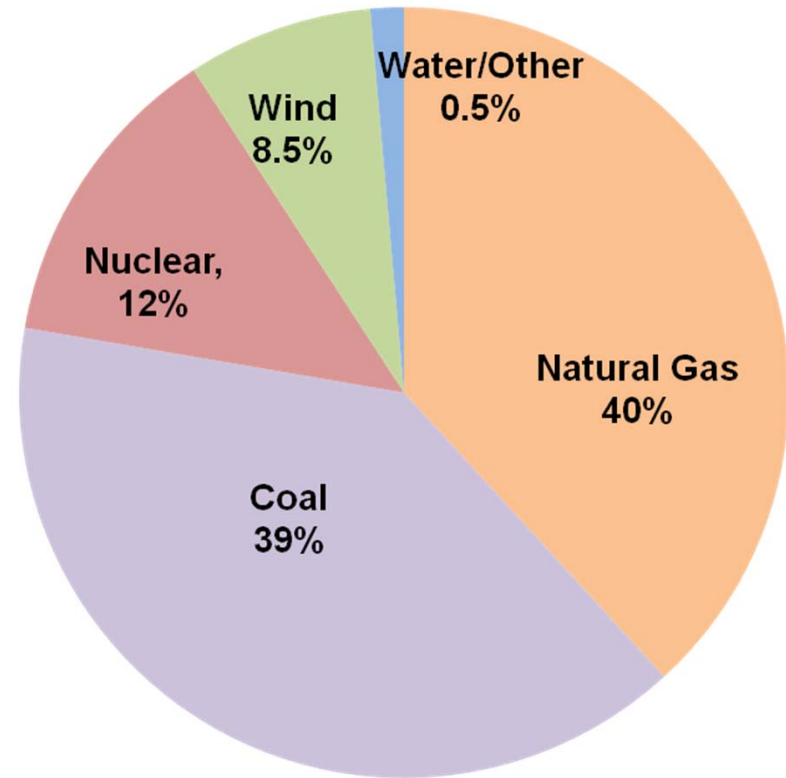


ERCOT CAPACITY AND ENERGY BY FUEL TYPE



Installed Capacity, January 2012

~ 80,000 MW



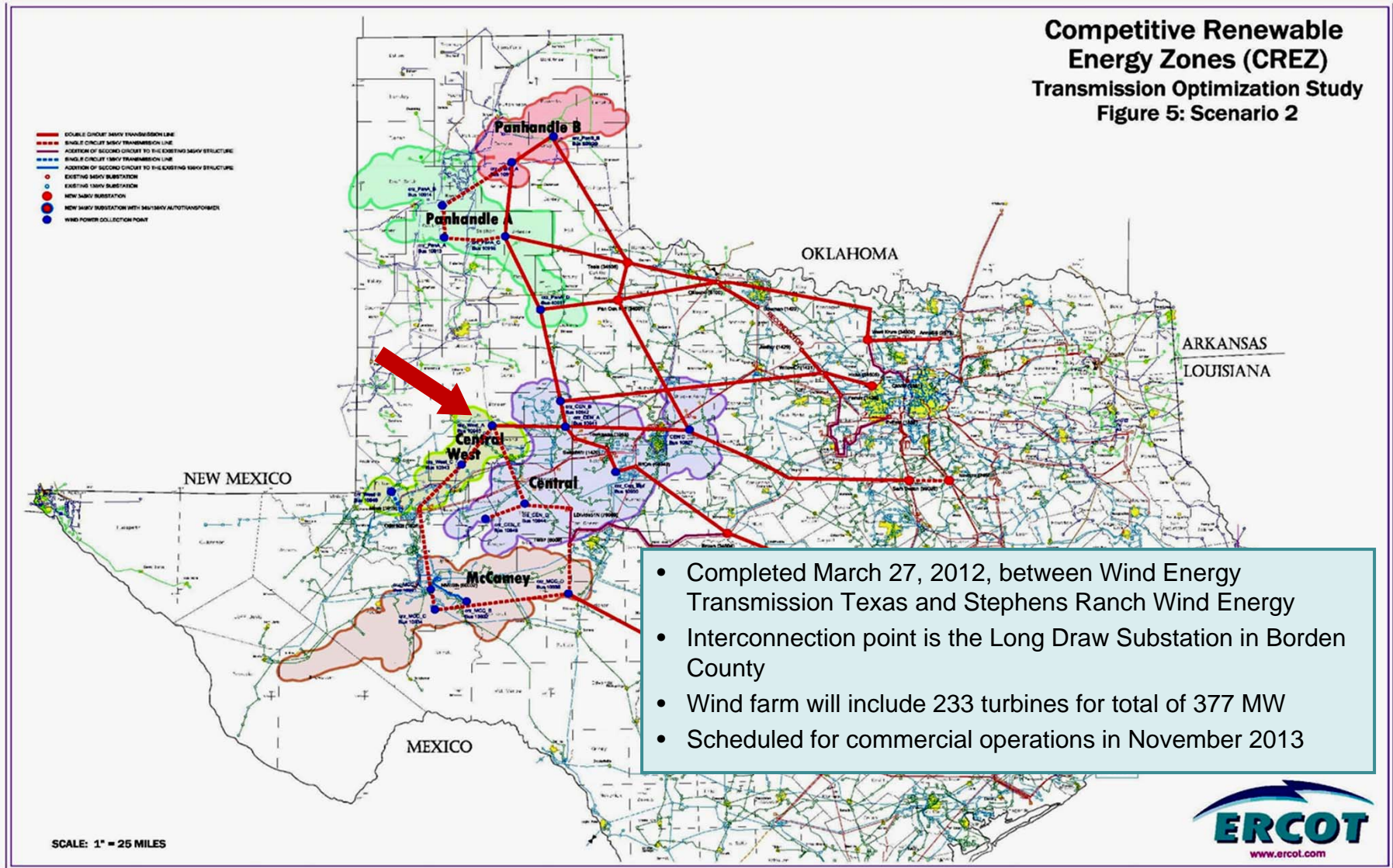
Energy Produced, 2011

335 billion kilowatt-hours

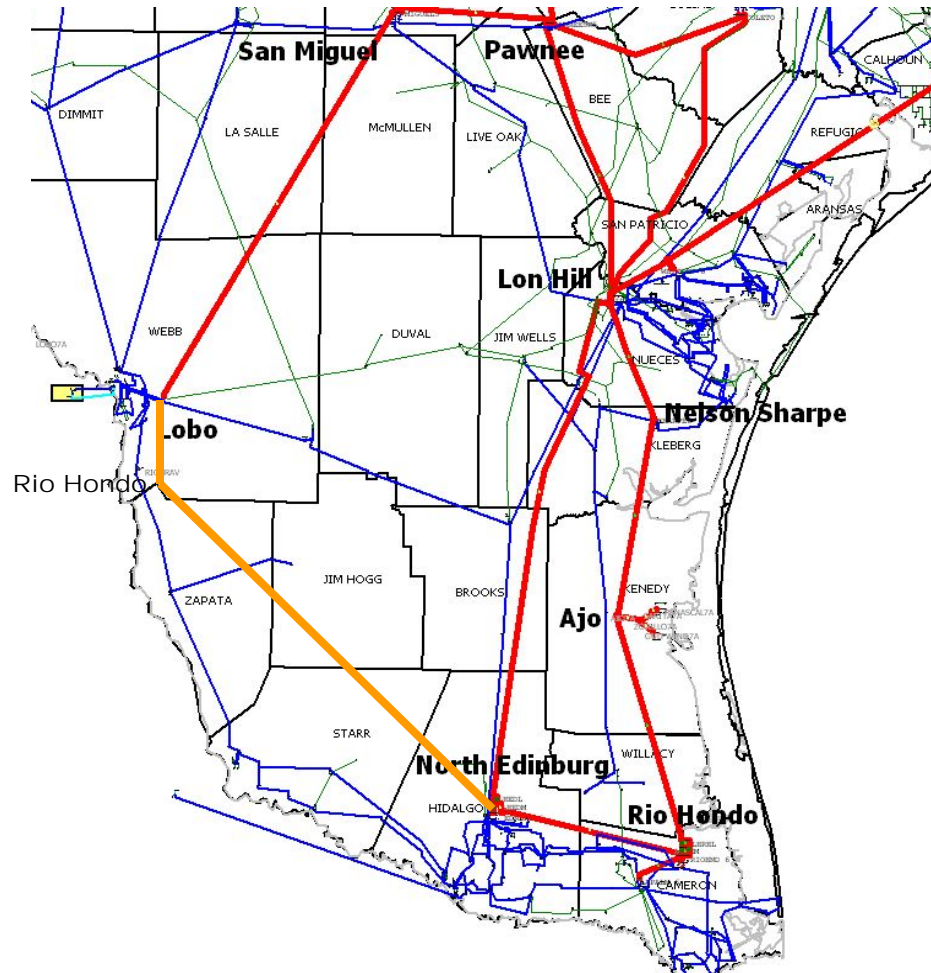
SUCCESSSES

FIRST INTERCONNECTION AGREEMENT FOR A CREZ SUBSTATION

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

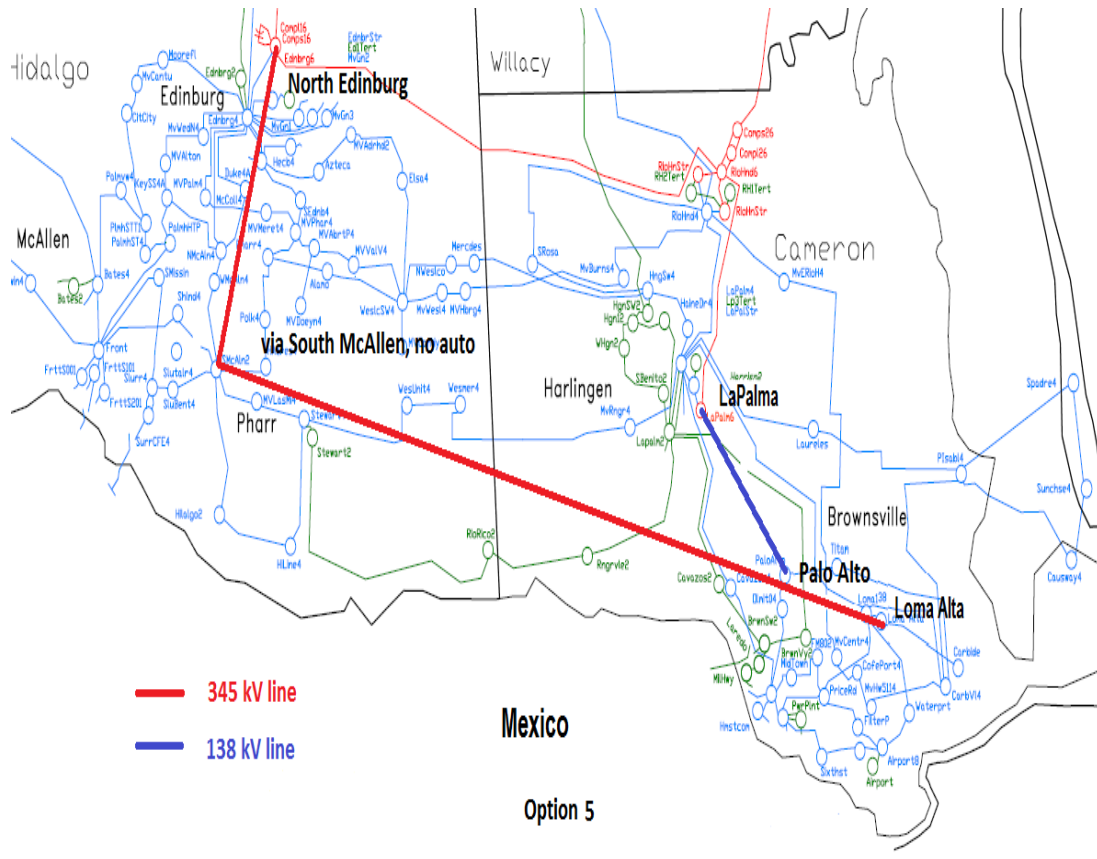


LOWER RIO GRANDE VALLEY PROJECT



- **Driver – Reliability Need**
- **Project Components**
 - Lobo-Rio Bravo-N. Edinburg 163 mile single circuit 345 kV line on double circuit structures with 50% series compensation
 - Energized reconductor of Lon Hill-N. Edinburg and Lon Hill-Rio Hondo 345 kV lines
 - Reconfigure N. Edinburg and Rio Hondo series capacitors
- **Cost Estimate - \$527 million**
- **Expected in-service - 2016**

CROSS VALLEY 345kV PROJECT

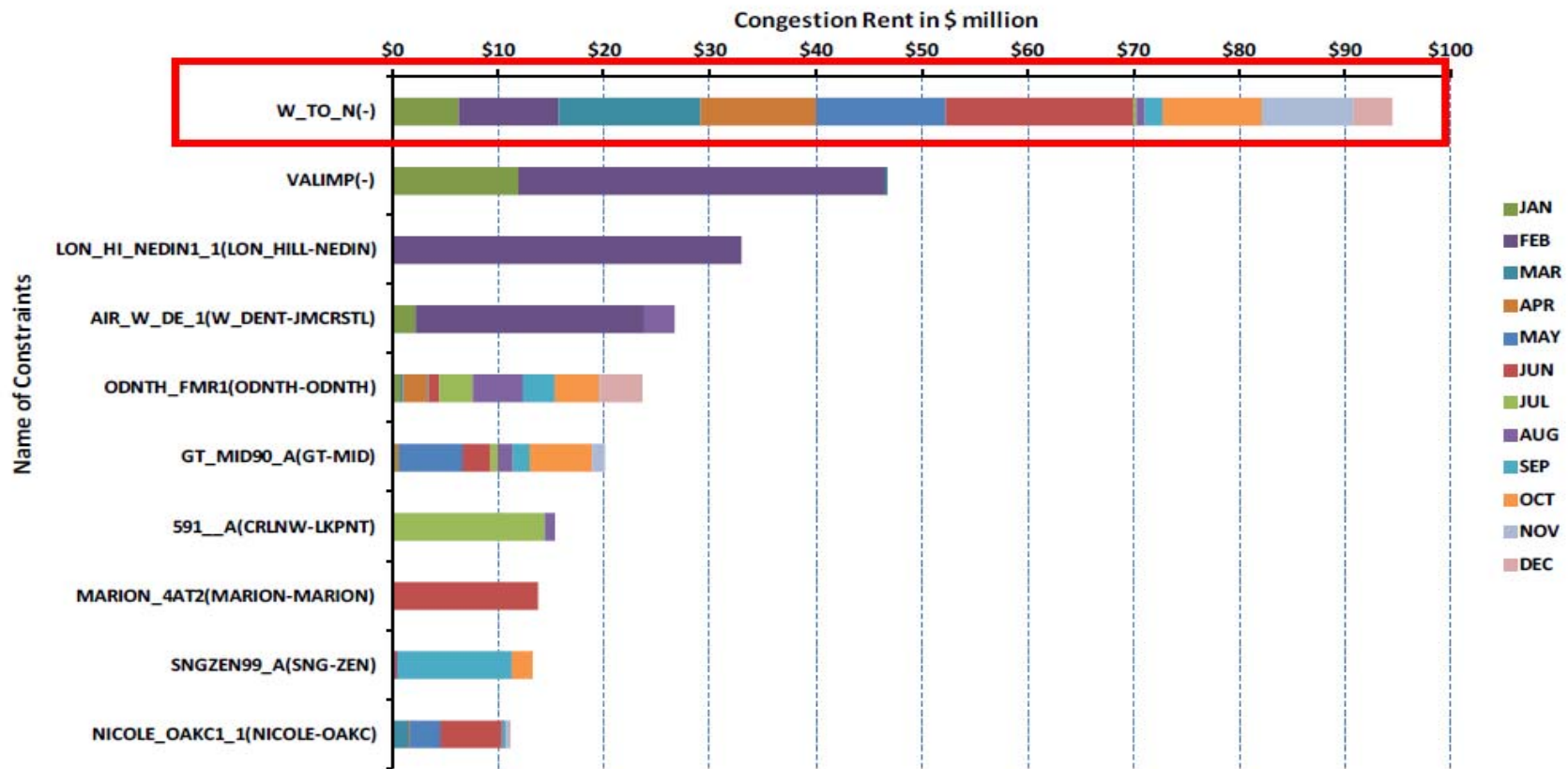


- **Driver – Reliability Need**
- **Project Components:**
 - New La Palma-Palo Alto 138 kV line (~12 miles) with a rating of at least 215 MVA
 - New North Edinburg-Loma Alta 345 kV line (double circuit capable with one circuit in place) routed in proximity to the existing South McAllen Substation (~106.5 miles)
 - New 345kV bus at the Loma Alta station with one 345/138kV autotransformer
- **Cost estimate = \$274.7M**
- **Expected in-service - 2016**

REPORTED IMPACT OF WEST TO NORTH CONSTRAINT IN 2011

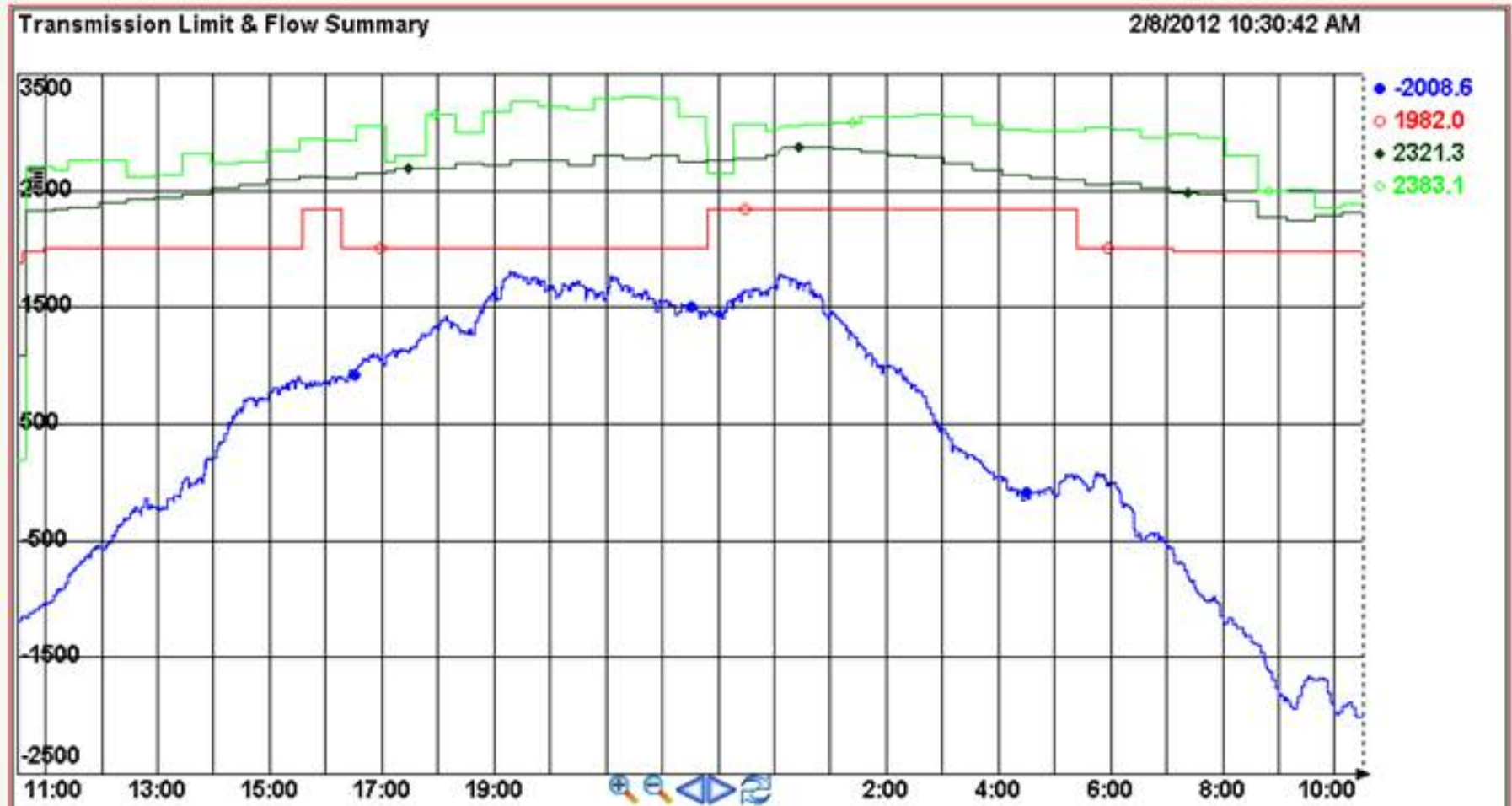
Real-Time Transmission Constraints

Top 10 Constraints by Total Congestion Rent



*as reported by the ERCOT Independent Market Monitor February 21, 2012 Board of Directors report

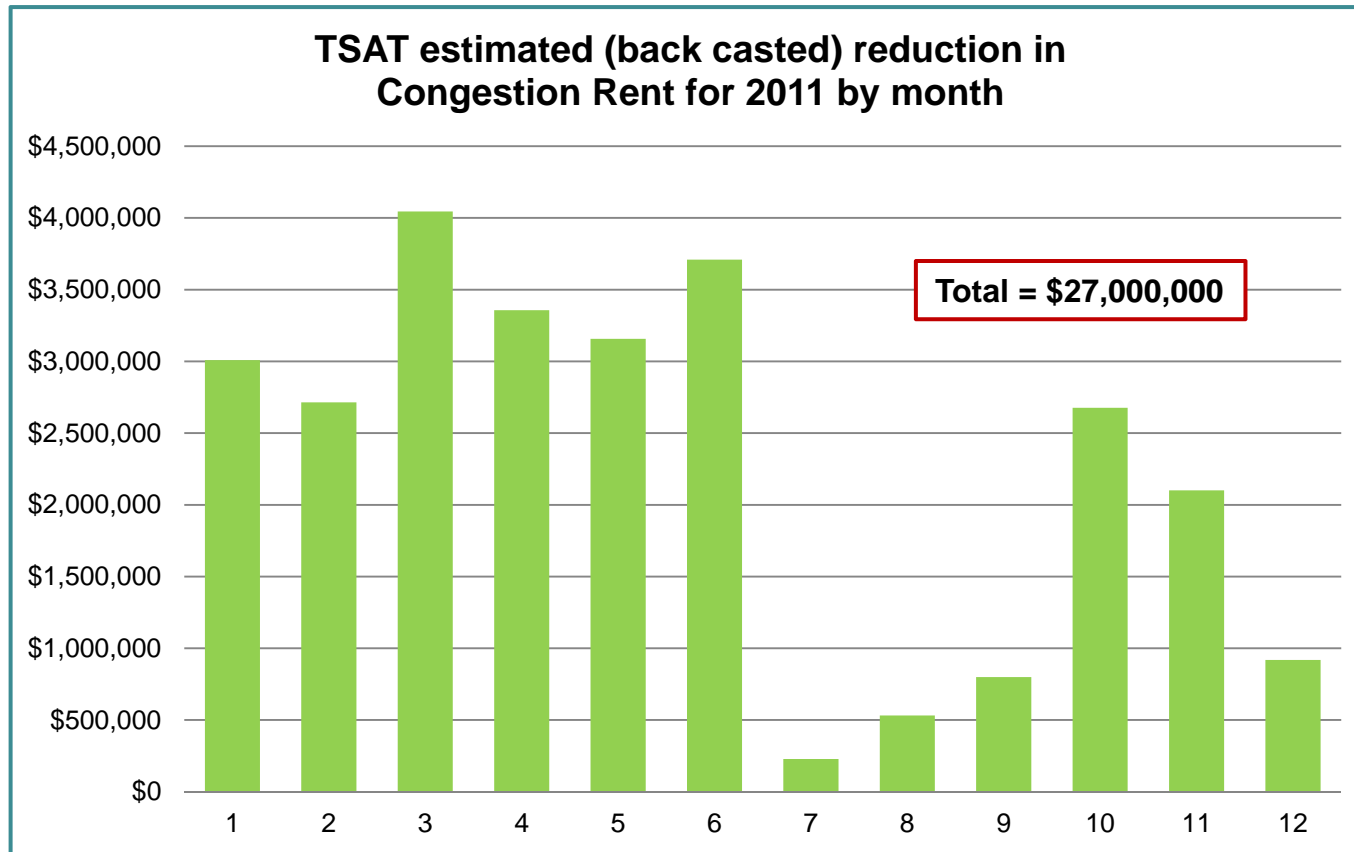
EXAMPLE OF THE IMPROVEMENT OF USING TSAT AND VSAT ACROSS SEVERAL HOURS



Blue= actual flow
 Red=RTMONI (planning old limits)
 Black = VSAT(new voltage limit)
 Green = TSAT(new stability limit)

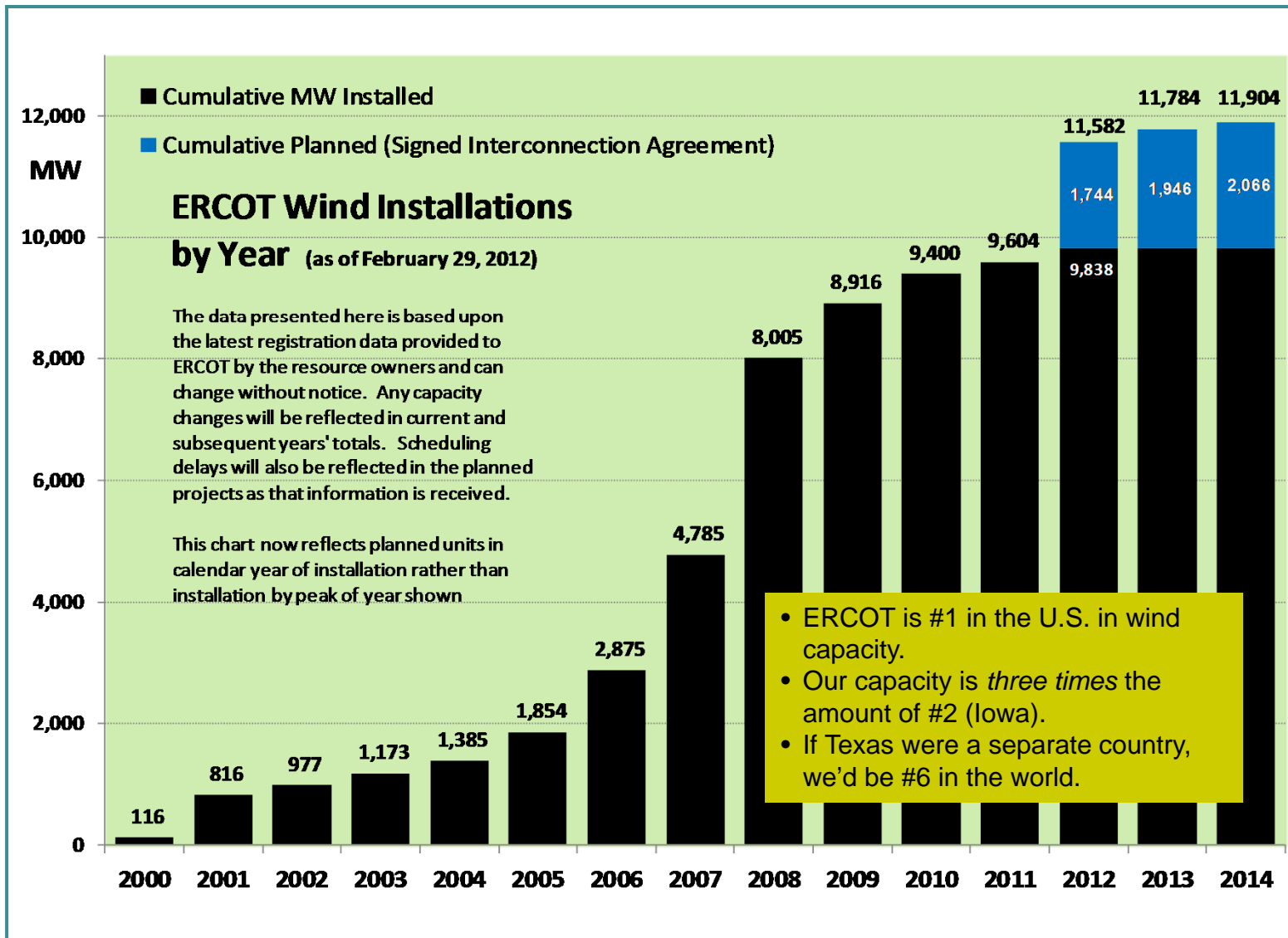
Operators will now be able to control using the “Green” or “Black” limit depending on which is lower in real time. Over the Planning “Red” this will allow more flow from West to North

BENEFITS OF REAL-TIME TRANSIENT STABILITY ANALYSIS TOOL (TSAT)

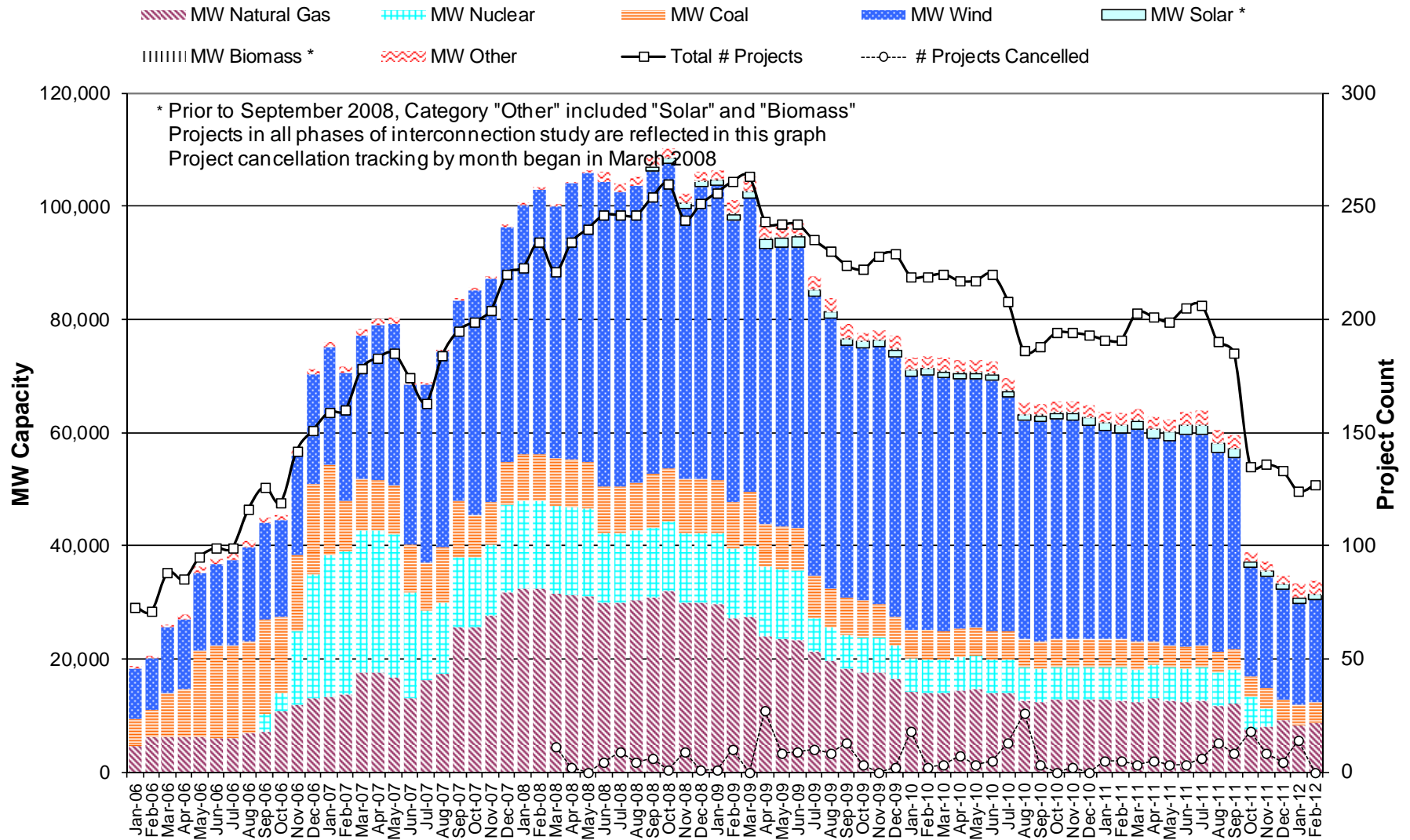


- Actual testing showed between 200 and 500 MW improvements in West to North transfers
- Estimated benefit was calculated using 200 MW as the maximum improvement and using average shadow prices and average limits for each hour
- IMM reported actual Congestion Rent for West to North constraint in 2011 was \$95,000,000

WIND INTEGRATION



GENERATION INTERCONNECTION ACTIVITY BY FUEL



CHALLENGES

NEW RECORDS IN USAGE

New Peak Demand Record: 68,379 megawatts

- 68,379 megawatts (MW), Aug. 3, 2011
- The 2010 peak demand – 65,776 MW, Aug. 23, 2010 – was broken 3 consecutive days:
 - Aug. 1, 2011 66,867 MW
 - Aug. 2, 2011 67,929 MW
 - Aug. 3, 2011 68,379 MW

New Weekend Record

- 65,159 MW, Sunday, Aug. 28
 - 5 percent increase over 2010 previous record – 62,320 MW

Winter Peak Record

- 57,282 MW (February 10, 2011)
 - 3 percent increase over 2010 previous record - 55,878 MW

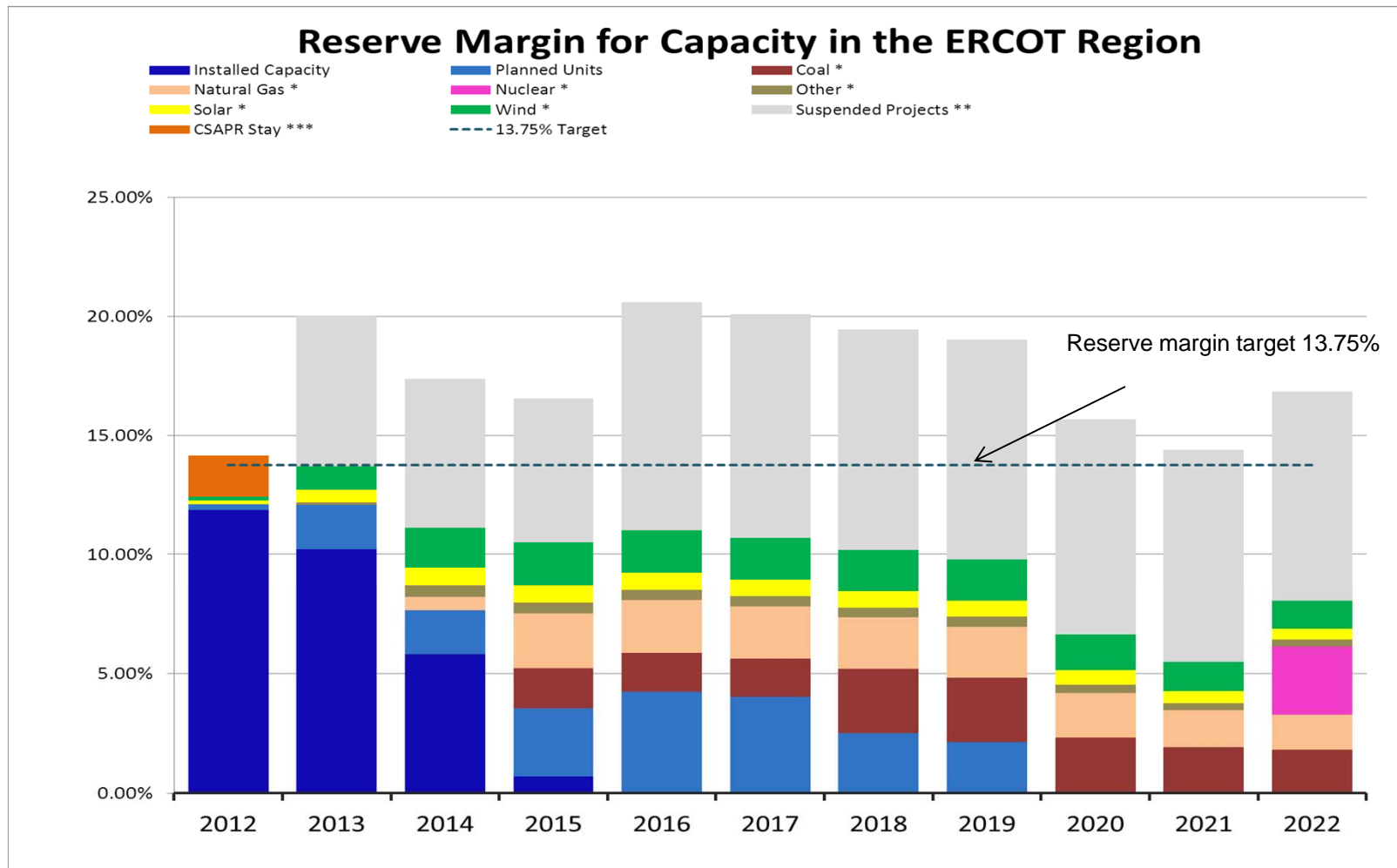
Wind Record

- A new instantaneous wind record of 7,917 MW occurred on March 18 at 4:13pm.

RESERVE MARGINS: PROJECTING ADEQUACY OF SUPPLY

- **Target reserve margin for the ERCOT Region is 13.75%**
- **Defined as:**
 - Percentage difference between available generating capacity and forecasted peak system load
- **Ensures (but does not guarantee) adequate electric supply will be available in case of contingency need**
 - Unexpected weather extremes or loss of major generation units
- **Available capacity includes:**
 - Gas, coal and nuclear fuel units accounted at their season operating limit level (unless scheduled to retire or mothball)
 - Hydro plants and wind farms at their “high confidence summer peak” level
 - Planned units (with signed transmission interconnection agreements and required permits)
 - Loads Acting as Resources - Large customers registered and bidding to provide capacity services in market-based load participation programs
 - DC Ties - capacity that can be imported through DC links from neighboring grids

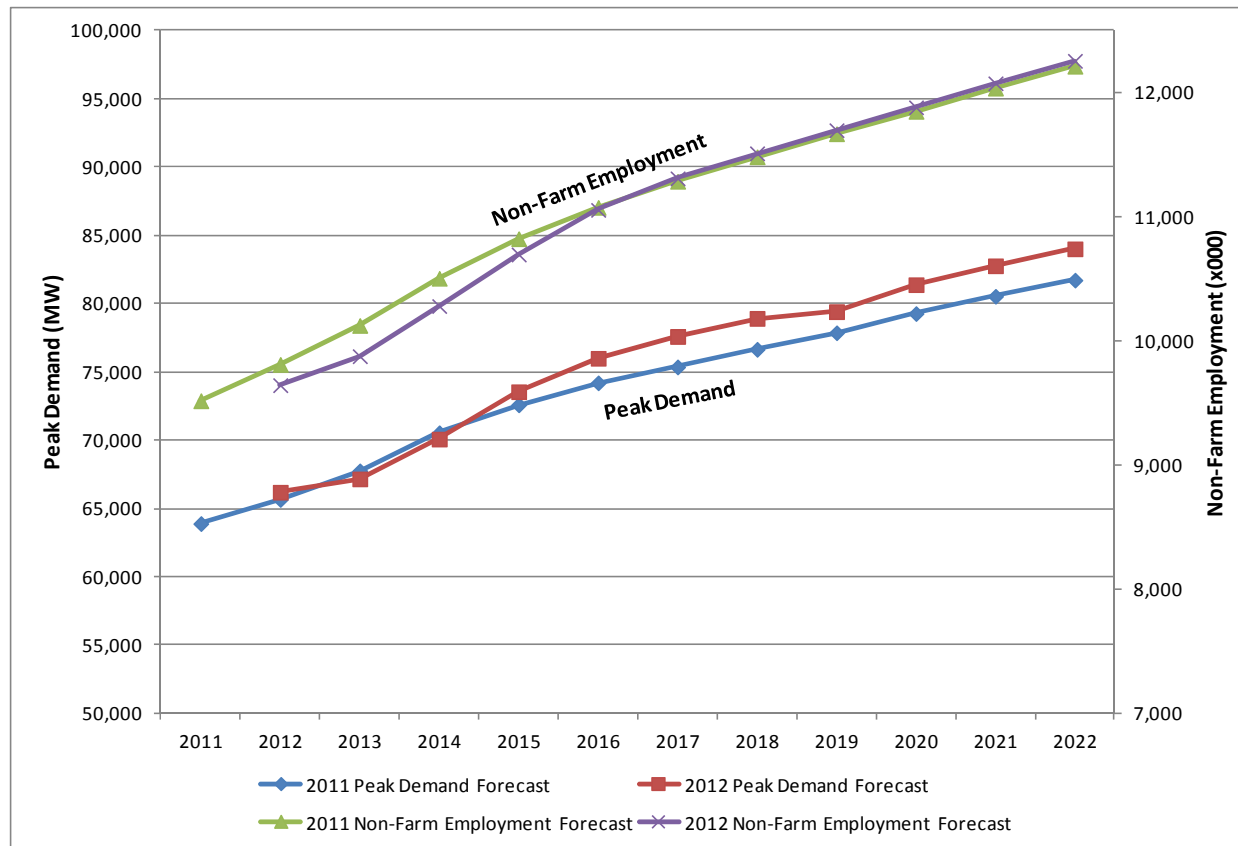
METRICS RELATED TO RESOURCE ADEQUACY



- Fuel Composition of Projects Undergoing Full Interconnection Studies - these projects may be cancelled or delayed beyond the indicated commercial dates shown
- *** Monticello 1&2 – 1130MW (as a result of a federal court's order to stay EPA's CSAPR)

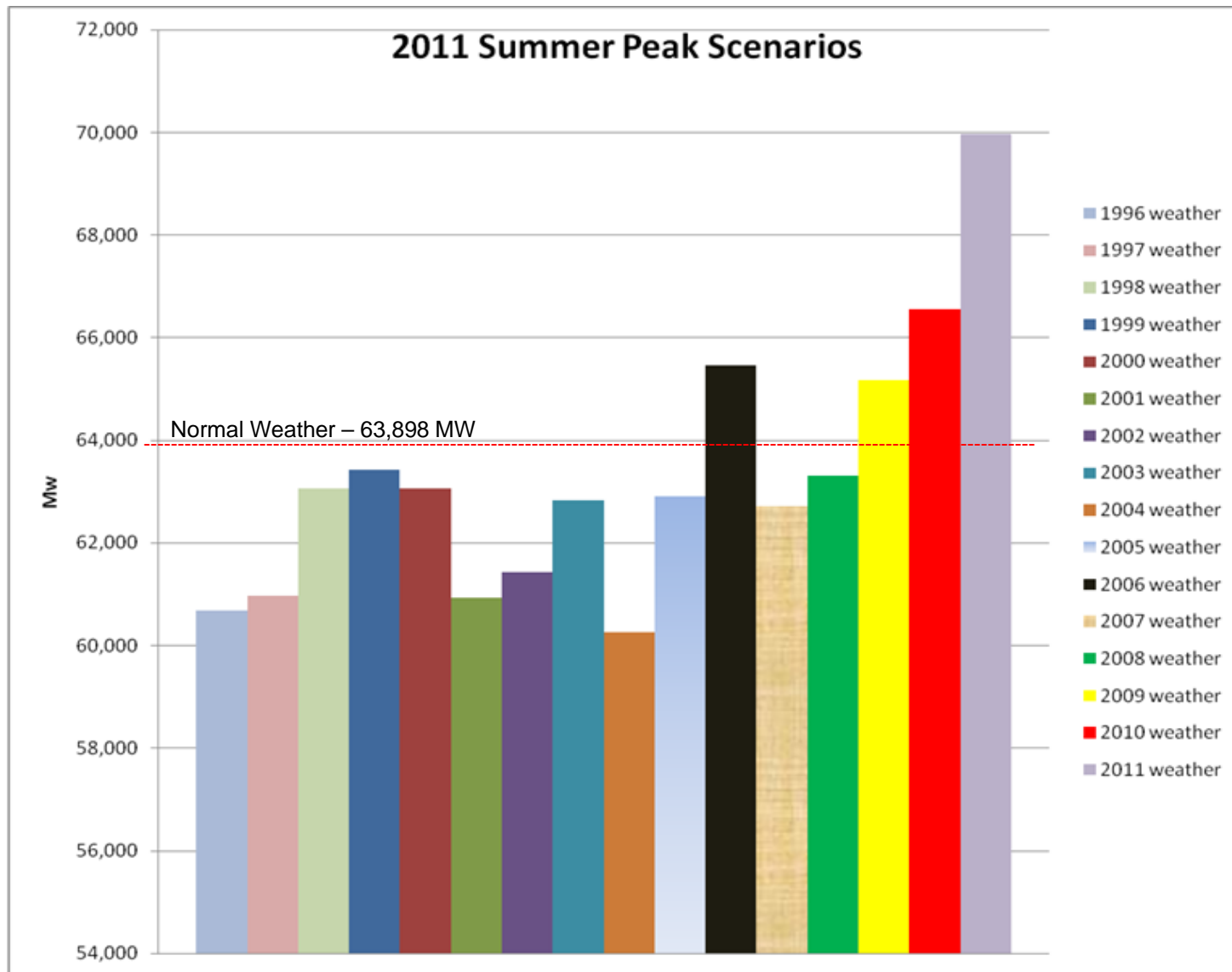
2012 CDR – LOAD FORECAST

- Updated economic forecast from Moody's
 - Slower growth in near-term
- Updated assessment of normal weather profile

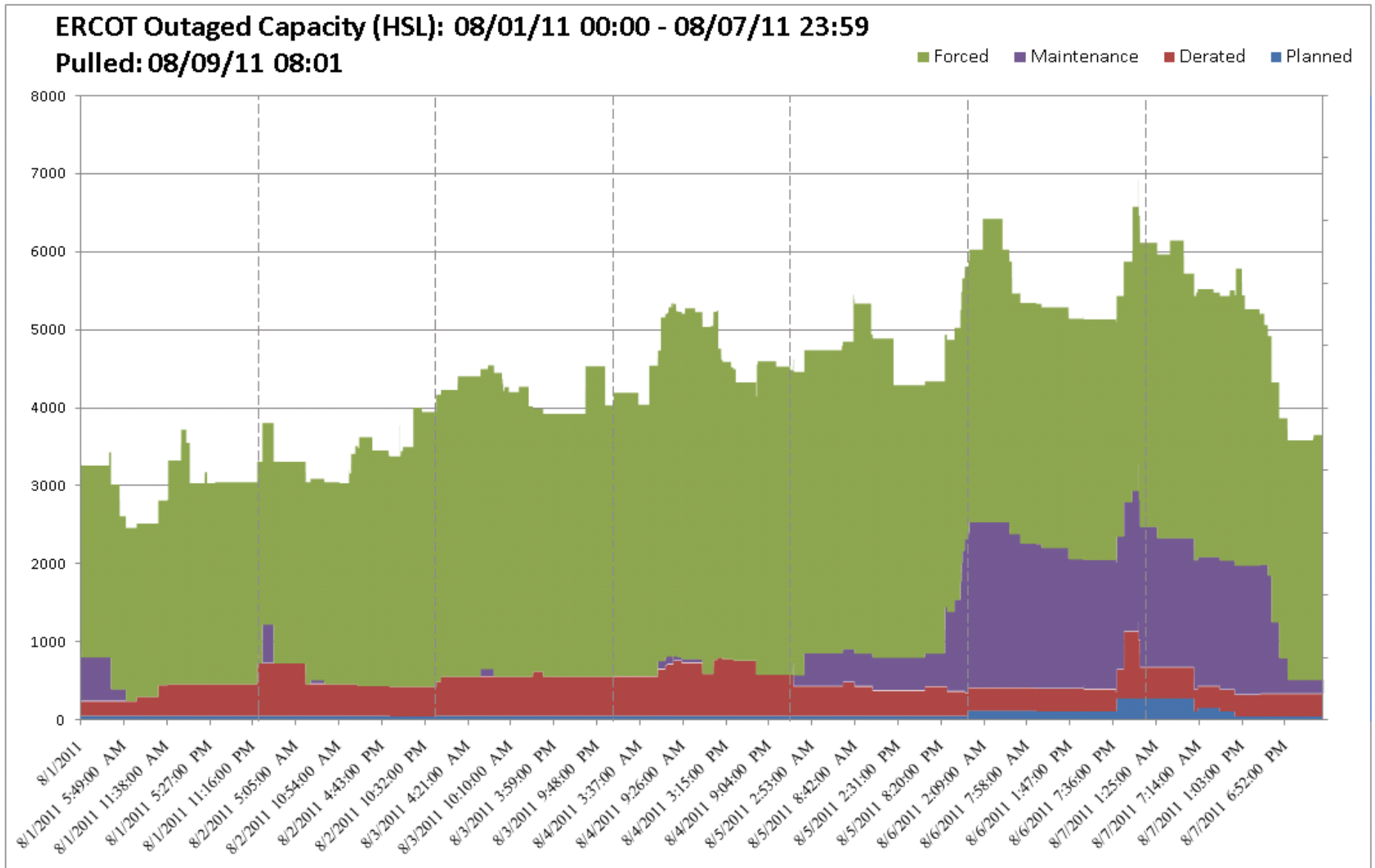


Average annual peak load growth over next ten years = 2.4% per year

SUMMER PEAK SCENARIOS



GENERATION OUTAGES: 08/01 – 08/07



SEASONAL ASSESSMENT OF RESOURCE ADEQUACY (SARA) RELEASE SCHEDULE

SARA	Preliminary Release	Final Release
Spring – Mar, Apr & May	November 1 st	March 1 st
Summer – Jun, Jul, Aug & Sep	March 1 st	May 1 st
Fall – Oct & Nov	May 1 st	September 1 st
Winter – Dec, Jan & Feb	September 1 st	November 1 st

- Release date of final SARA for upcoming season and preliminary SARA for the following season would be aligned
- Release date of final SARA for Summer and Winter seasons would be one month prior start of season (May 1 and November 1, respectively)
- This results in only four releases per year and sets those dates as March 1, May 1, September 1 and November 1

2012 SUMMER SARA (PRELIMINARY)

Final Summer SARA
Release on 01 May 2012

Item	Summer 2012	Base Case	Extreme Load & Typical Gen Outages	Extreme Load & Extreme Gen Outages
1	Total Resources	73,301		
2	Peak Demand	67,492		
3	Uses of Reserve Capacity	3,814	7,395	9,462
4	Capacity Available for Operating Reserves* (1-2-3)	1,995	-1,586	-3,653
5	Demand Adjustment during Scarcity**	750		
6	Adjusted Capacity Available for Operating Reserves (4+6)	2,745	-836	-2,903

*Less than 2300MW indicates risk of EEA1

**Represents effects of price responsive demand, conservation appeals, demand programs, etc. based on summer 2011 experience; does not include Load Resources or EILS activation

RESOURCE ADEQUACY MITIGATION ACTIONS

Completed

- Online Non-Spin standing deployment & offer floor
- Offline Non-Spin offer floor
- Responsive Reserve & Regulation Up offer floor
- Institutionalize the process to recall units for capacity
- Pricing of energy for RUC units deployed for capacity at SWCAP
- Expansion of Responsive Reserve with a corresponding reduction in Non-Spin

Work In Progress

- The proper magnitude and slope of the Power Balance Penalty Curve
- Review raising the System Wide Offer Cap
- Low Sustainable Limit problem for units RUC'ed online for capacity
- Compensation for Reliability Unit Commitments made to provide local reliability and transmission relief and address the issue of whether and how RUC claw-back should be adjusted
- Review Peaker Net Margin Cap
- Demand Response & Load Management Initiatives
- Posting non-binding near real-time forward prices
- Brattle Group Study

RESOURCE ADEQUACY STUDY

- **Scope**

- Identify and examine the factors that influence investment decisions related to the financing and development of projects to meet ERCOT's resource adequacy goals. Consider supply-side and demand-side resources, from both a wholesale and retail perspective.
- Provide suggestions for ways to enhance favorable investment outcomes for long-term resource adequacy in ERCOT

- **Estimated Project Completion – June 01, 2012**

- **Approach**

- Interview stakeholders regarding investment criteria and concerns
- Analyze likely outcomes under current and proposed rules
- If we find that resource adequacy shortfalls are likely, evaluate the pros and cons of a range of policy options

DROUGHT

THE 2011 TEXAS DROUGHT

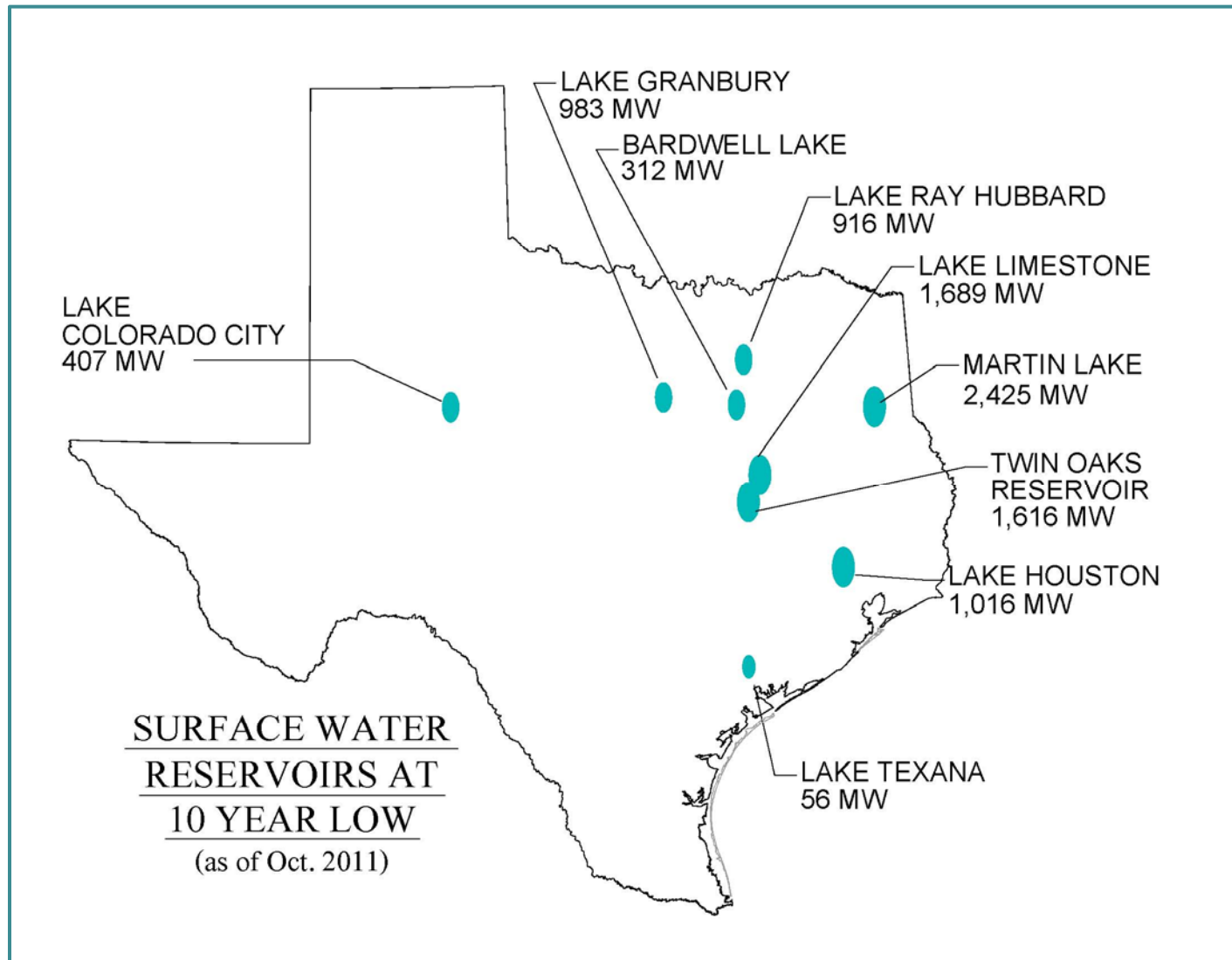
Excerpts from Oct 2011 Report by Office of State Climatologist:

- Large portion of Texas will likely endure a second summer of drought.
- 2011-12 La Niña is forecasted to be less intense than 2010-11.
- It is impossible to determine at this point whether the drought will last beyond a second year.
 - On rare occasions in the past, La Niña conditions were observed for 3 consecutive years.
- Texas precipitation is also influenced by Pacific Decadal Oscillation & Atlantic Multidecadal Oscillation.
 - During the past decade, both patterns have been in an unfavorable state.
- Global patterns tend to reverse themselves over time, possibly leading to an extended period of wetter weather for Texas, though this may not happen for another 3-15 years.

ERCOT ACTIONS TO MANAGE DROUGHT IMPACT

- Surveyed generation entities in the state and reviewed drought concerns and possible mitigations
- Identified surface water most impacted and projected impacts to generation for 2012
- Reviewed public sources regarding state and regional water plans
- Met with TCEQ staff and drought response teams
- Facilitated a workshop with generation and transmission entities to share best practices relevant to drought conditions

SURFACE WATER SUPPLIES AT 10 YEAR LOWS (OCT 2011)



LAKE LEVELS UPDATE – APRIL 2012

Surface Water & (MW)	*Level @ Full Conservation Pool	*Level on Jan 1, 2011	*Level on Oct 7, 2011	*Level on Apr 01, 2012
Lake Texana (56)	44.50	41.00	32.81	44.05
Bardwell Lake (312)	421.00	420.71	416.23	425.47
Lake Colorado City (407)	2,070.20	2057.33	2052.4	2,051.70
Lake Ray Hubbard (916)	435.50	432.37	429.22	435.55
Lake Granbury (983)	693.00	691.90	686.27	692.72
Lake Houston (1016)	41.73	42.10	36.76	42.14
Twin Oaks Reservoir (1616)	401	398.87	398.27	401.02
Lake Limestone (1689)	363	359.03	354	363.17
Martin Lake (2425)	306	300.48	295.06	301.68

* In Feet above Mean Sea Level

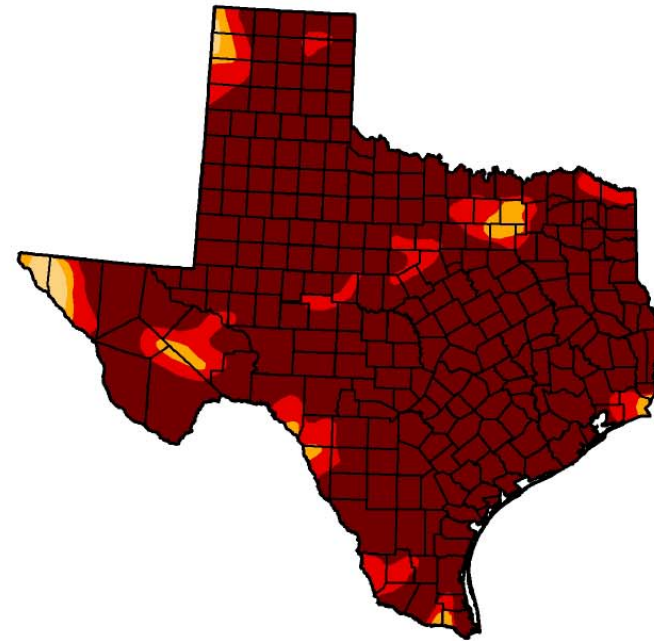
TEXAS DROUGHT CONDITIONS – OCT 4, 2011

U.S. Drought Monitor Texas

October 4, 2011
Valid 7 a.m. EST

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	0.00	100.00	100.00	99.16	96.99	87.99
Last Week (09/27/2011 map)	0.00	100.00	100.00	99.16	96.65	85.75
3 Months Ago (07/05/2011 map)	2.41	97.59	95.73	94.39	90.21	71.30
Start of Calendar Year (12/28/2010 map)	7.89	92.11	69.43	37.46	9.59	0.00
Start of Water Year (09/27/2011 map)	0.00	100.00	100.00	99.16	96.65	85.75
One Year Ago (09/28/2010 map)	75.57	24.43	2.43	0.99	0.00	0.00



Intensity:



The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.



Released Thursday, October 6, 2011

<http://droughtmonitor.unl.edu>

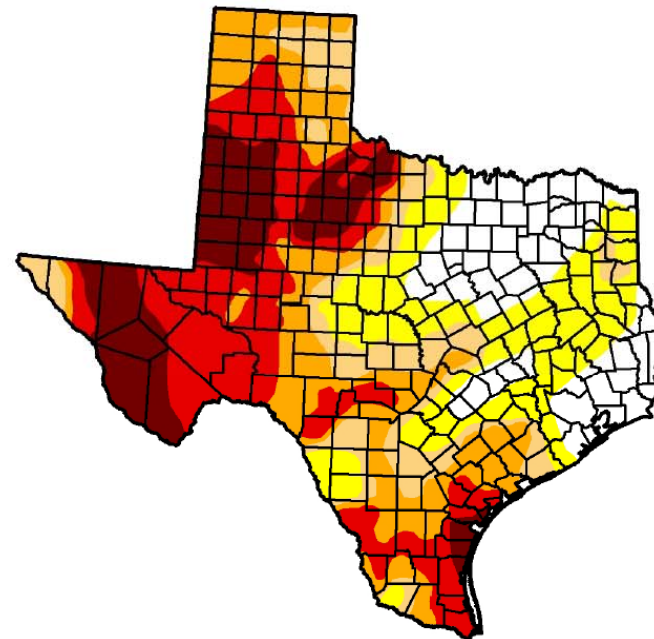
TEXAS DROUGHT CONDITIONS – APR 3, 2012

U.S. Drought Monitor Texas

April 3, 2012
Valid 7 a.m. EST

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	16.55	83.45	65.39	53.08	34.81	14.05
Last Week (03/27/2012 map)	12.67	87.33	67.07	55.37	36.38	17.92
3 Months Ago (01/03/2012 map)	0.01	99.99	97.83	84.81	67.32	32.40
Start of Calendar Year (12/27/2011 map)	0.01	99.99	97.83	84.81	67.32	32.36
Start of Water Year (09/27/2011 map)	0.00	100.00	100.00	99.16	96.65	85.75
One Year Ago (03/29/2011 map)	0.00	100.00	94.87	78.54	43.07	0.00



Intensity:

- D0 Abnormally Dry
- D1 Drought - Moderate
- D2 Drought - Severe
- D3 Drought - Extreme
- D4 Drought - Exceptional

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.

<http://droughtmonitor.unl.edu>



Released Thursday, April 5, 2012
Brian Fuchs, National Drought Mitigation Center

MANAGING DROUGHT IMPACT – GENERATION SECTOR ACTIONS INCLUDE ...

- Generators are designed to
 - Conserve – minimize water usage
 - Reuse – Reuse water from one process for another
 - Recycle – Return clean water to the source after usage
- Generators regularly account for all water withdrawn to regulatory authorities
- Many generators utilize salt water or effluent, where practical
- Generators regularly maintain equipment to avoid water leakage/wastage
- A couple of generators have installed pipelines to access accumulated (from rain & seepage) water at mine sites
- Some generator resources are re-engineering their water intake structures to allow for deeper intake level conditions

MANAGING DROUGHT IMPACT – TRANSMISSION SECTOR CONCERNS INCLUDE ...

- Increased insulator contamination incidents (salt, smoke, bird excrement, etc.)
- Fires, smoke implications, vegetation management, and risks to wooden h-frame infrastructure
- Potential issues associated with transmission system planning if there are significant generator de-ratings
- Coordination with the local authorities (police, fire, etc.) requesting de-energizing of transmission facilities for safety to allow for aerial firefighting.

DROUGHT CONCLUSIONS

- Persistent drought conditions are impacting electric generation resources, but are unlikely to cause significant generation shortfalls in 2012
- If the drought continues into 2013, consequences to electric generation availability are likely to become more severe
- ERCOT will continue to analyze survey results and will continue to keep regulatory authorities well-informed

**Did you know real time grid information
is available through social media?**

**Facebook:
Electric Reliability Council of Texas**

Twitter: http://twitter.com/ercot_iso