



ASSOCIATION OF WATER BOARD DIRECTORS

**Trip Doggett
President & CEO
ERCOT**

July 21, 2012

HISTORY OF ELECTRIC RELIABILITY COUNCIL OF TEXAS, INC

- 1941 – Utilities band together to aid war effort
- 1970 – Texas Interconnected System (TIS) forms ERCOT to comply with North American Electric Reliability (NERC) requirements
- 1981 – ERCOT assumes central operating coordinator role
- 1995 – Texas legislature votes to deregulate wholesale generation
- 1996 – ERCOT becomes first Independent System Operator (ISO) in US
- 1999 – Legislature votes to deregulate retail electric market
- 2001 – Ten control centers merged into one control center
- 2002 – Retail electric market opens, enabling customer choice for 6.1 million
- 2010 – ERCOT implements Nodal Markets
- 2012 – ERCOT has about 600 employees and an annual budget of about \$170 million

ERCOT OVERVIEW

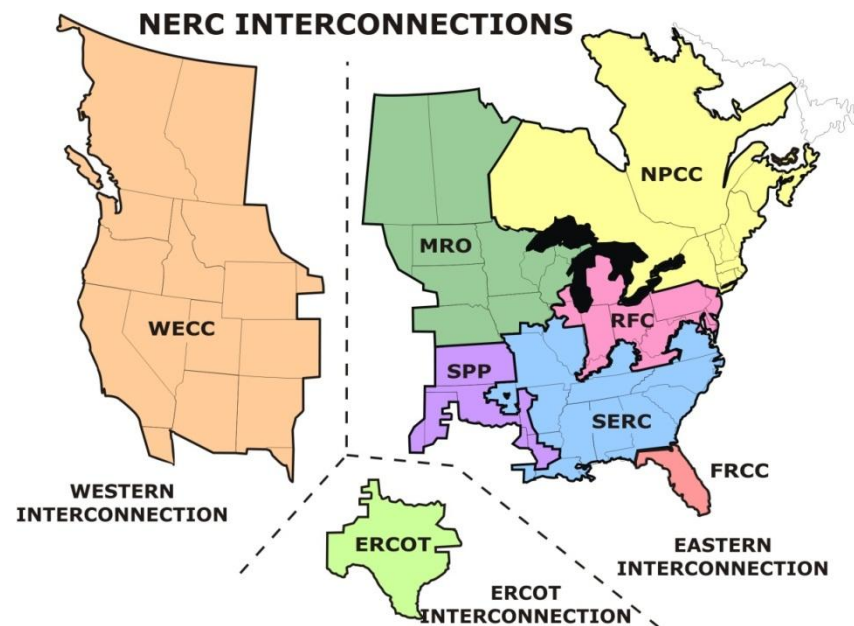
RESPONSIBILITIES

The Texas Legislature restructured the Texas electric market in 1999 by unbundling the investor-owned utilities and creating retail customer choice in those areas, and assigned ERCOT four primary responsibilities:

- System reliability – planning and operations
- Open access to transmission
- Retail switching process for customer choice
- Wholesale market settlement for electricity production and delivery.

QUICK FACTS

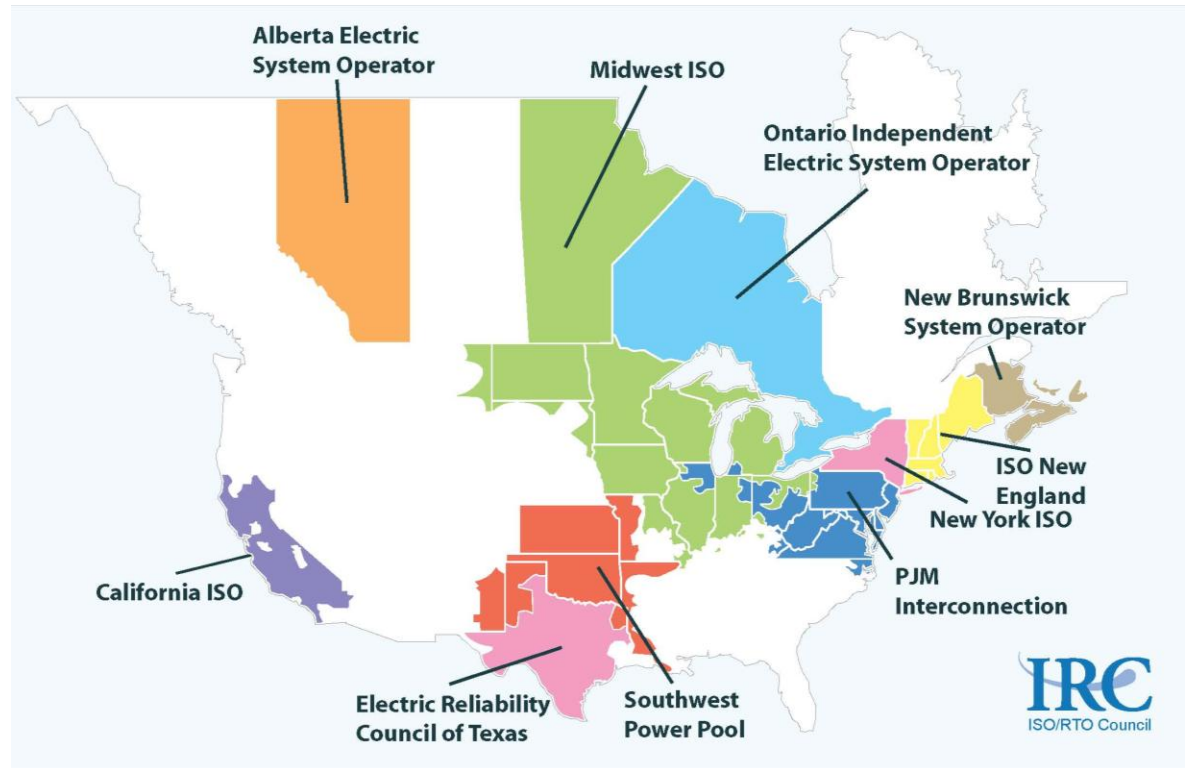
- 75% of Texas land
- 85% of Texas load
- More than 40,500 miles of transmission lines
- 550+ generation units
- 68,379 MW peak demand (set August 3, 2011)
- Physical assets are owned by transmission providers and generators, including Municipal Utilities and Cooperatives



ERCOT connections to other grids are limited to direct current (DC) ties, which allow control over flow of electricity

ERCOT IS ONE OF 10 NORTH AMERICAN ISOs/RTOs

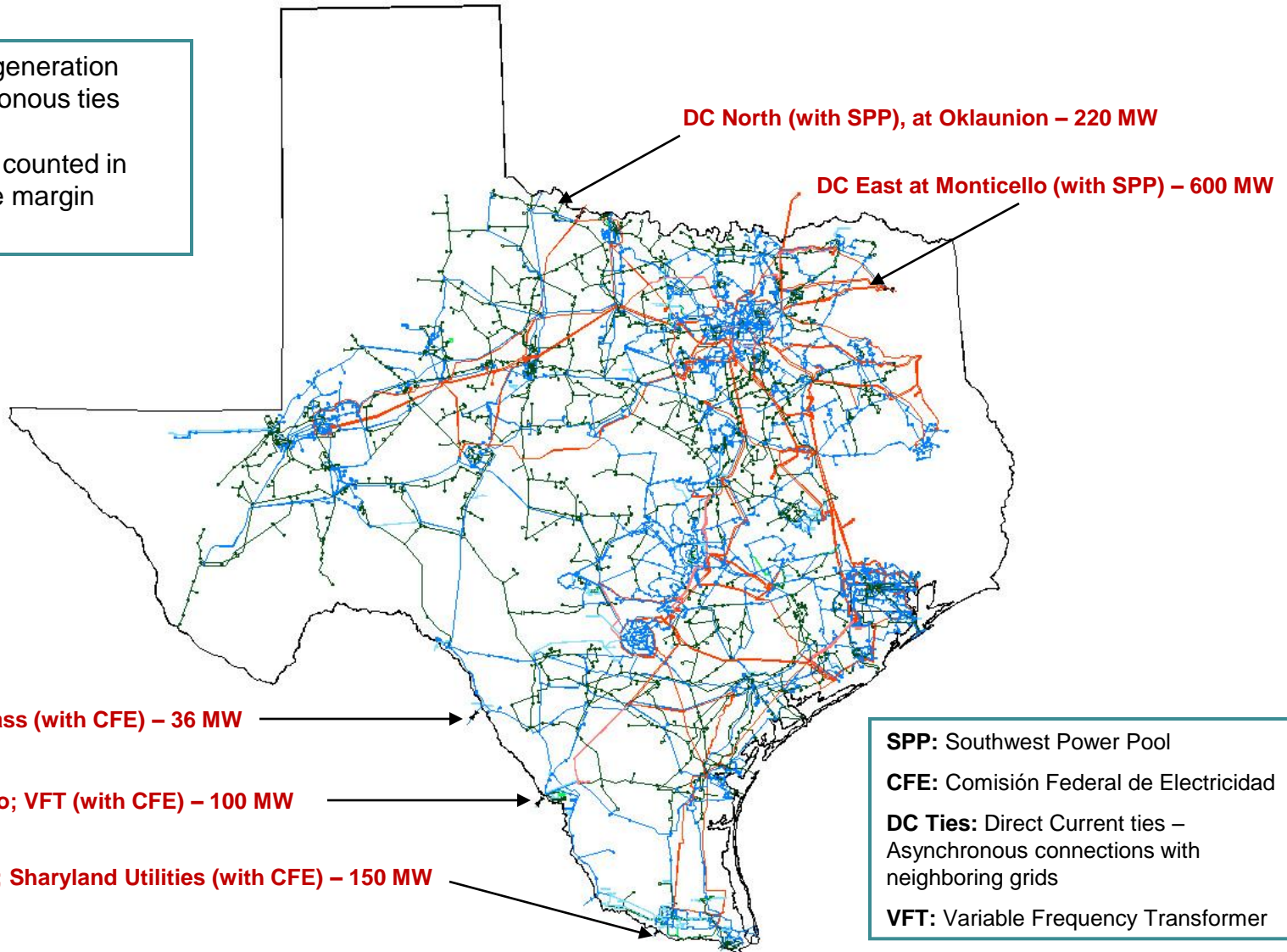
- ISOs/RTOs serve 67% of U.S. population
- Goal: Reliability, Efficiency, Transparency & Impartiality



ERCOT TIES WITH NEIGHBORING GRIDS – 1,106 MW

1,106 MW total generation from non-synchronous ties

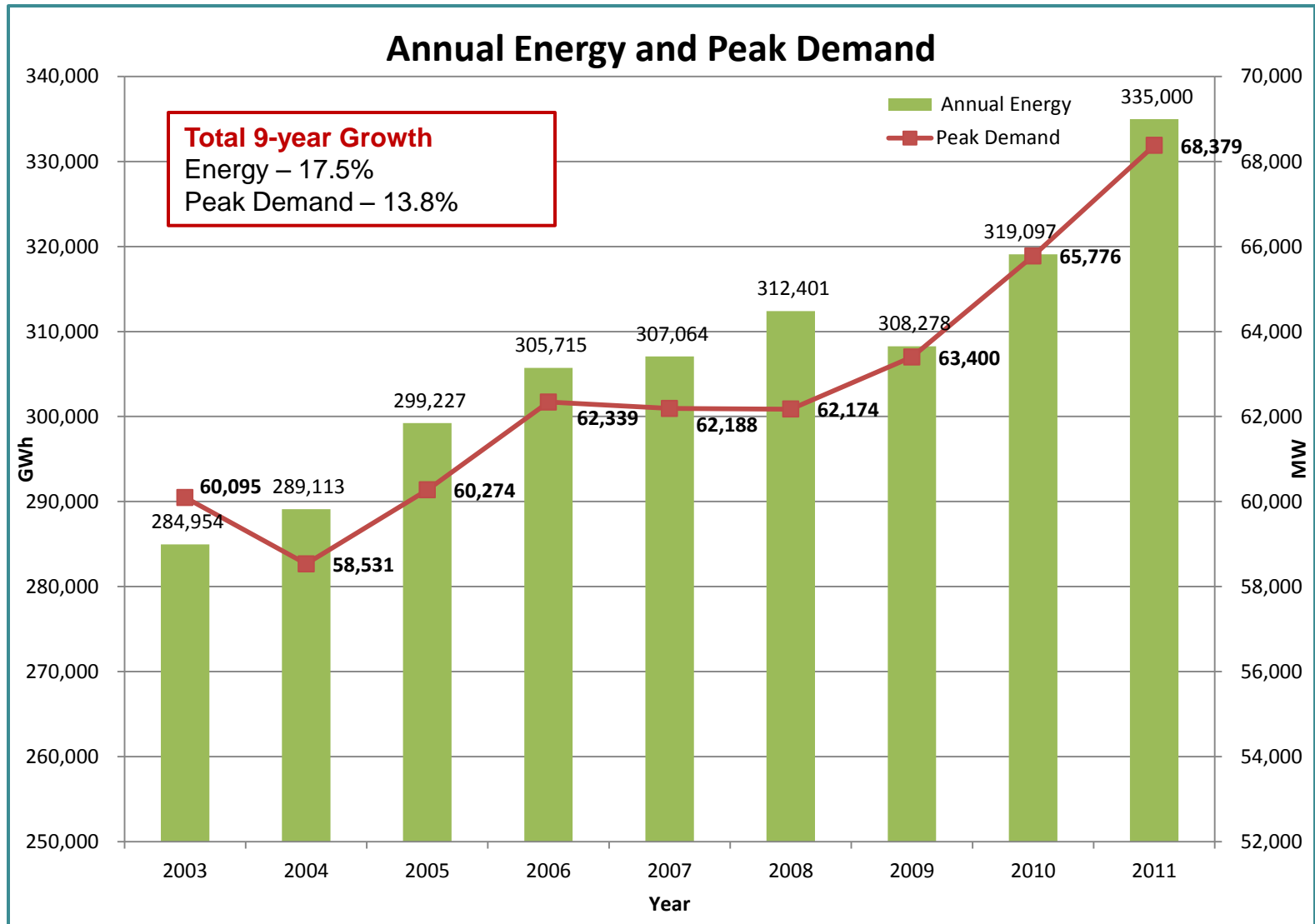
553 MW or 50% counted in summer reserve margin calculation



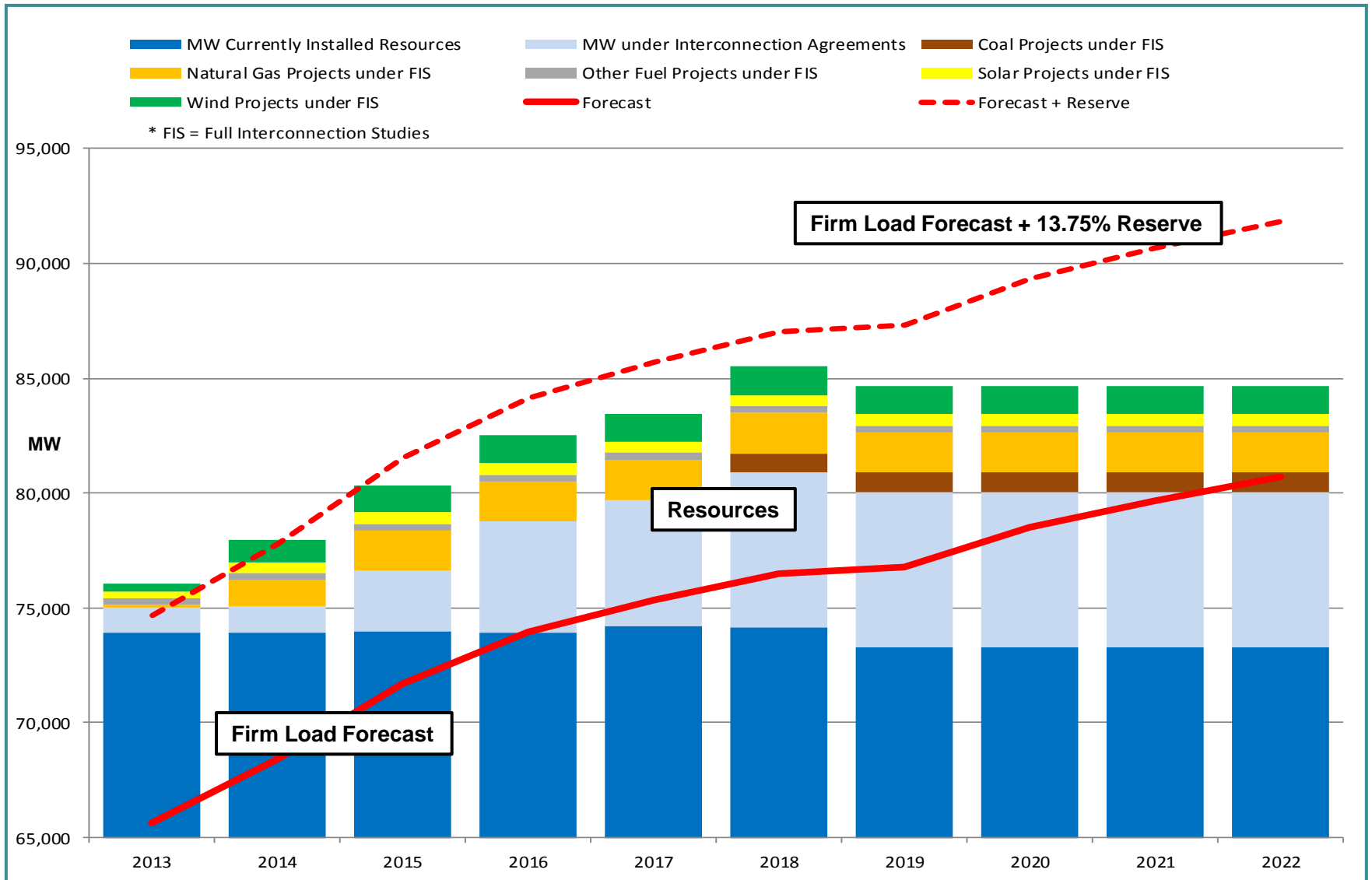
ERCOT 'directs traffic' on the grid to maintain reliability and ensure supply of electricity

- Balances load and generation at all times (instantaneously!)
- Manages congestion (flow of power) across the system
- Secures resources to meet reliability requirements under normal and contingency conditions
- Coordinates planned outages of generators and transmission lines
- Coordinates emergency actions & recovery

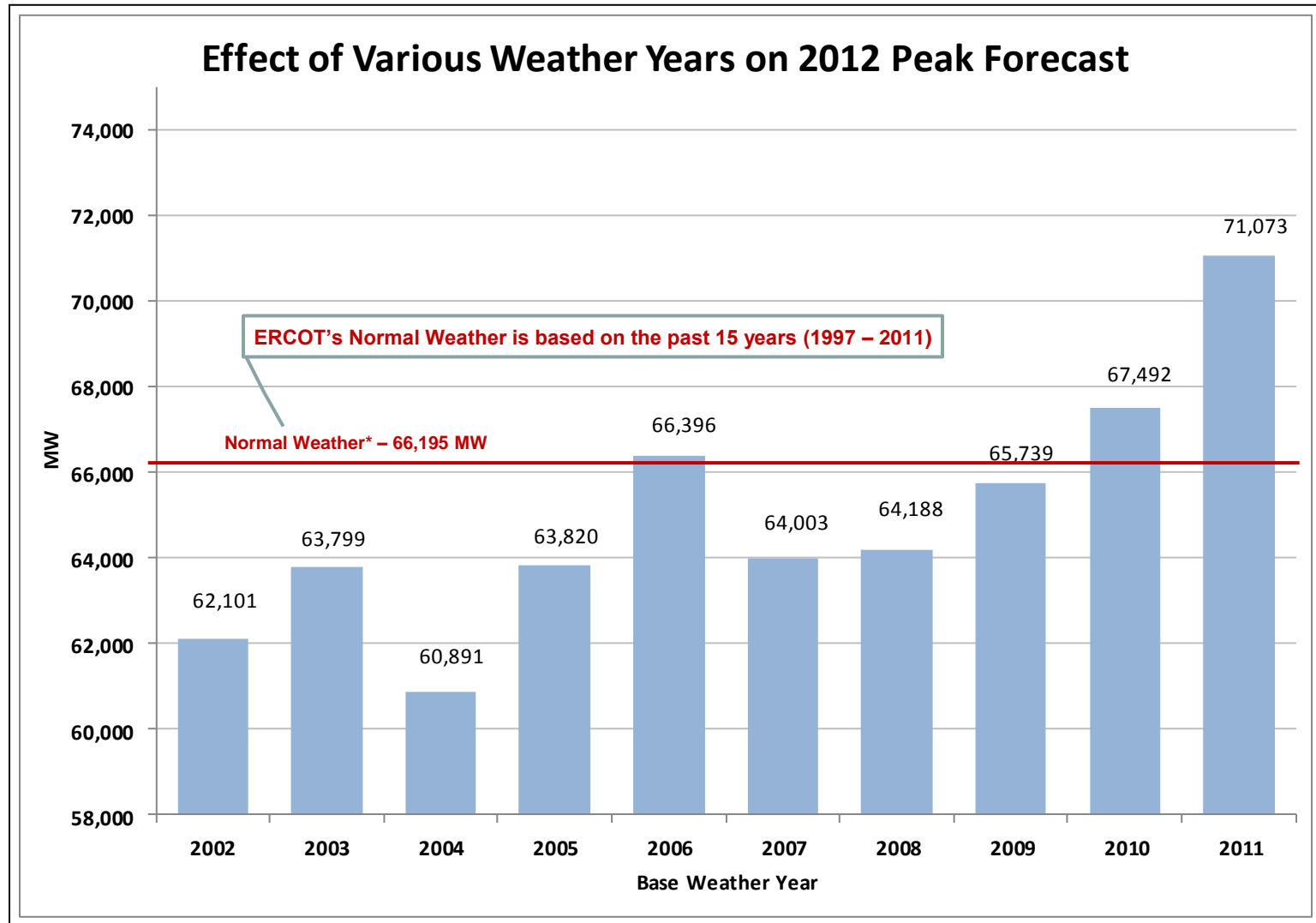
ANNUAL ENERGY & PEAK DEMAND (2003-2011)



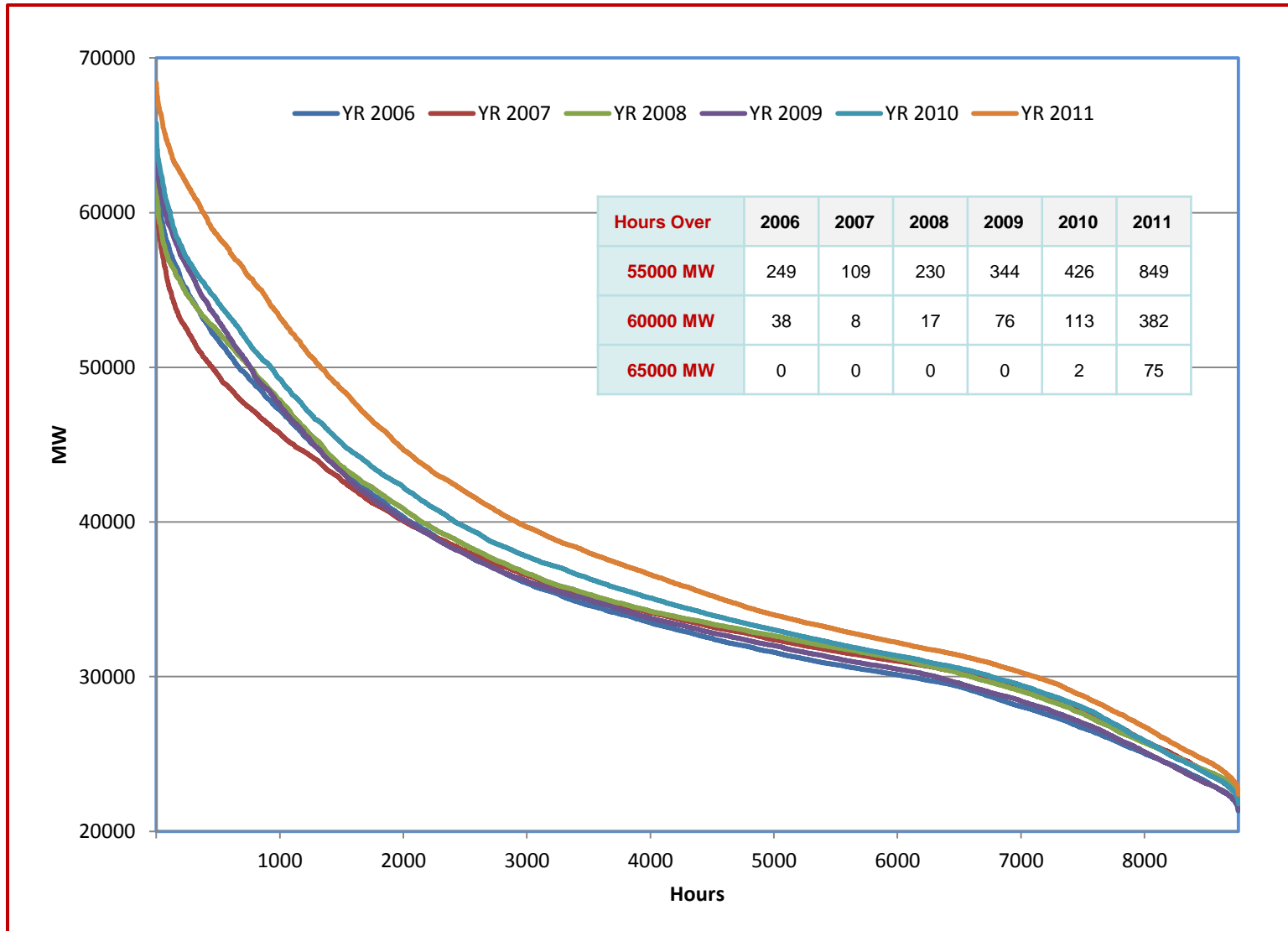
MAY 2012 CAPACITY, DEMAND AND RESERVES REPORT (CDR)



2012 PEAK LOAD FORECAST – SENSITIVITY TO WEATHER



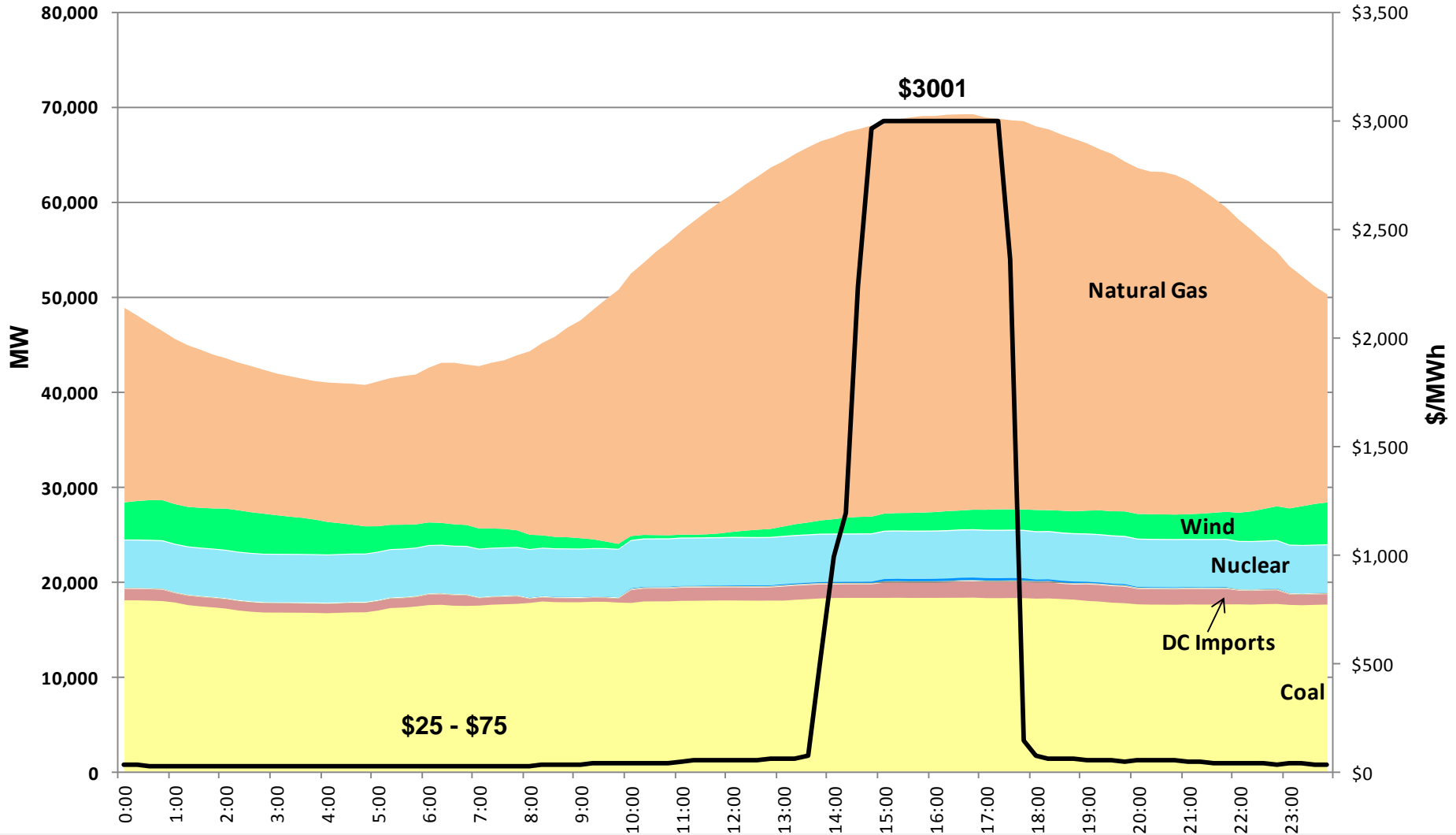
LOAD DURATION CURVES – 2006 TO 2011



SUMMER PEAK DAY LOAD SHAPE WITH FUEL MIX

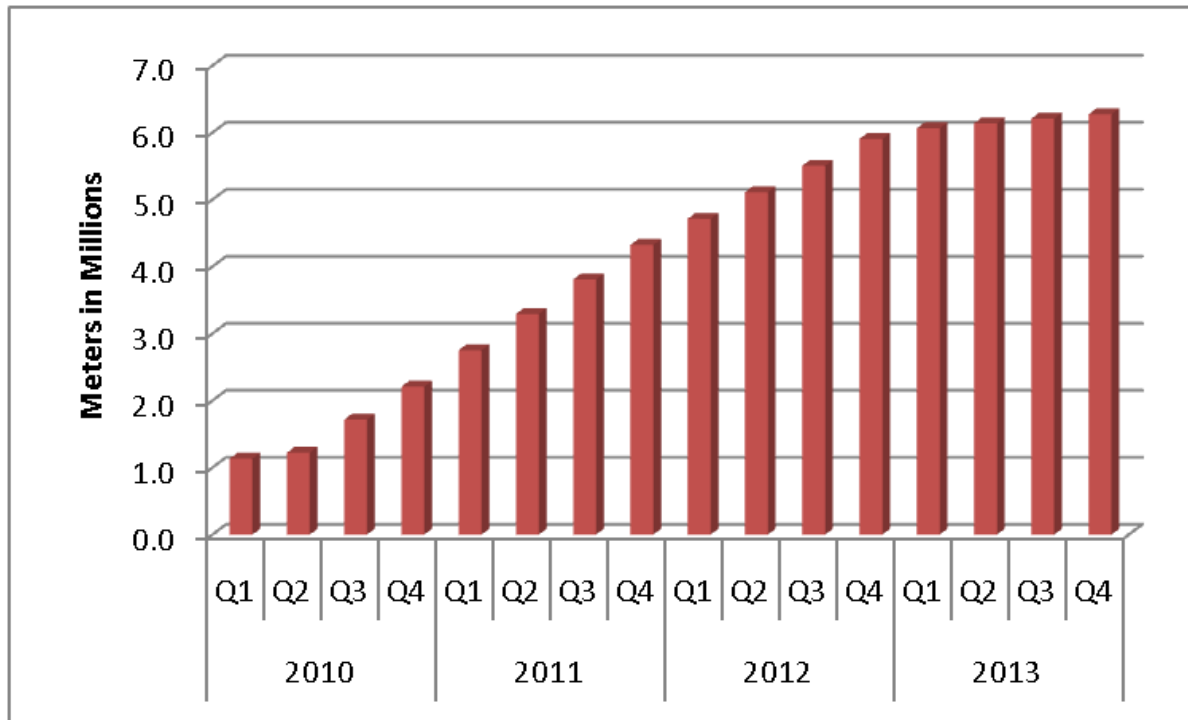
August 3, 2011

- Natural Gas
- Wind
- Nuclear
- Hydro
- Other
- DC Imports
- Coal
- Energy Price



TODAY WE'RE SETTling OVER 5.3 MILLION ADVANCED METERS

Advanced Meter Deployment Plan



June 2012
83.2% of the ERCOT
Competitive Load
settled with 15-min
interval data (AMS
and IDR)

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

POTENTIAL FOR ALR (AGGREGATED LOAD RESOURCE)

ALR

A collection of devices and/or premises capable of delivering demand response based on ERCOT market rules

Load Management/ Measurement Devices

C&I:

- HVAC
- Lighting
- Refrigerators
- Pumps
- Other...

Residential:

- Thermostats
- Pool pumps
- Water heaters
- PEVs
- Etc....



Premises: C&I:

- Pumping stations
- Retail chains
- Warehouses
- Office buildings
- Light industrials
- Other....



Residential:

- Homes
- Apartment buildings
- Etc.

QSE

- Financial counterparty with ERCOT
- Maintains telemetry from ALR to ERCOT
- Receives dispatch instructions and sends to ALR to provide demand response



ISO

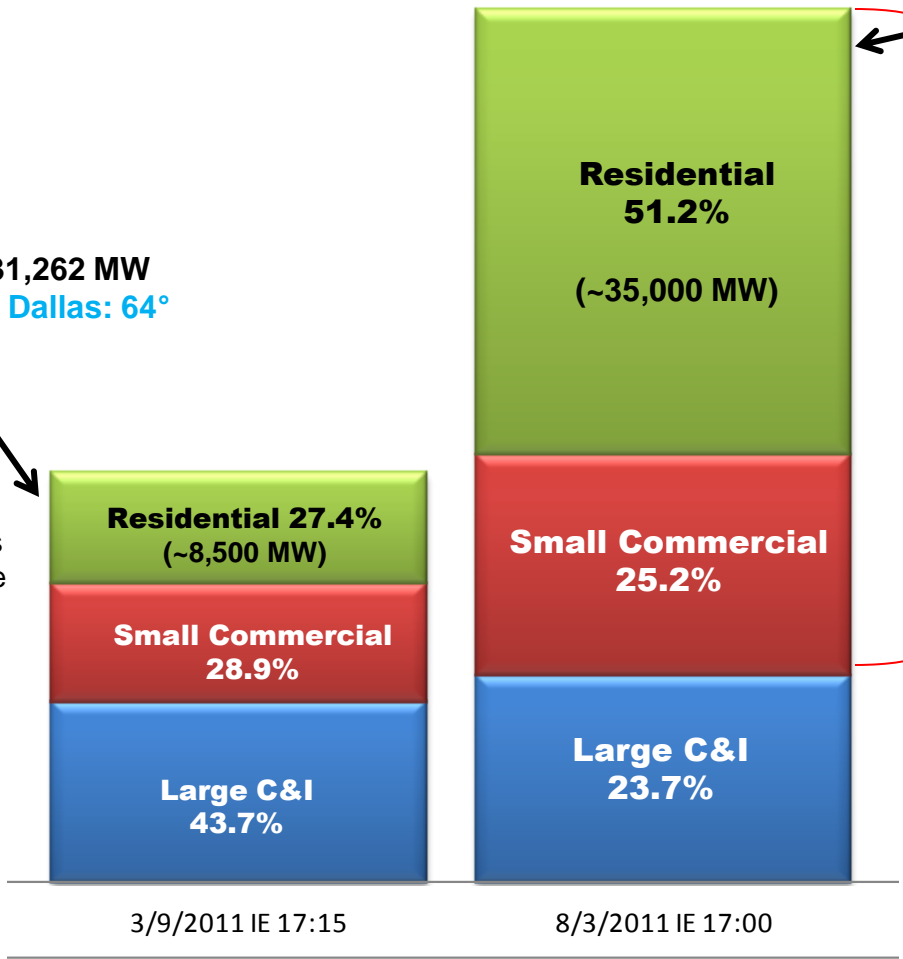
- Procures Ancillary Services in the Day-Ahead Market
- Monitors grid conditions in real time
- Dispatches Ancillary Services according to needs
- Measures and verifies performance of DR resources

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°

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



Currently cannot qualify as Load Resources

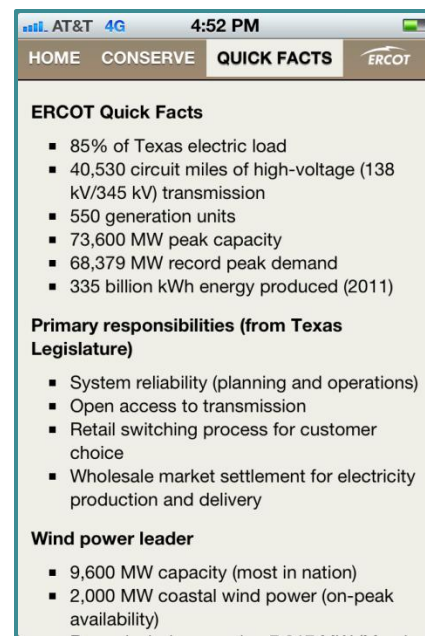
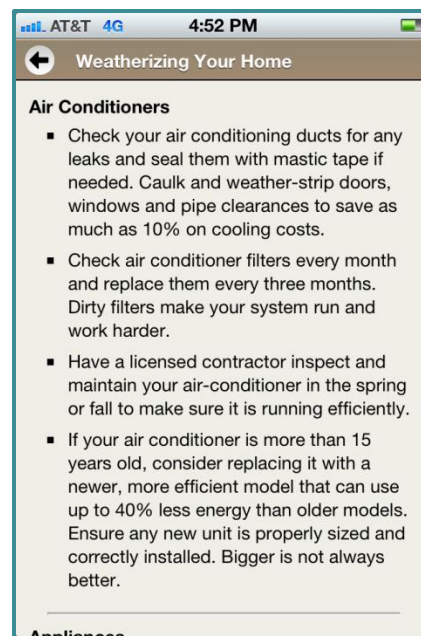
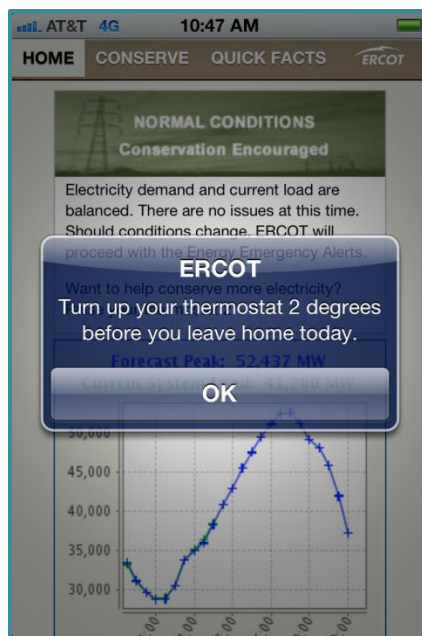
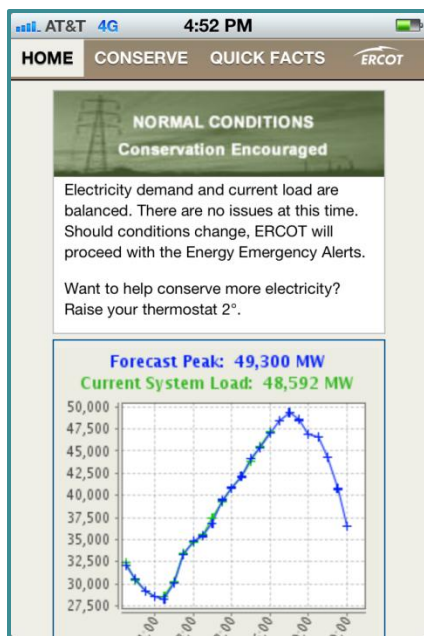
- ERCOT staff is working on ALR enablement with market participants in both NOIE and competitive choice areas

ERCOT DR SUMMARY

Load Type	Service	Requirements	Description/Notes
Voluntary Load Response (VLR)	Load reduction in response to Market Price, 4CP signals or other factors	<ul style="list-style-type: none"> • Metering • Load reduction technology • Retail contract with demand response incentives 	<ul style="list-style-type: none"> • Economic: not dispatched by or reported to ERCOT ISO • May include dynamic pricing (Time of Use, Critical Peak, Real-Time Pricing, 4CP) • May be via centrally dispatched load control
Load Resources (LRs)	Responsive Reserves	<ul style="list-style-type: none"> • Interval metering • Telemetry • Under-Frequency Relay • Load reduction technology • ERCOT Qualification 	<ul style="list-style-type: none"> • Industrial Loads • 207 LRs with ~2400 MW of total registered capacity • Limited to 50% of total RRS (1400 of 2800 MW) Dispatched during Energy Emergency Alert (EEA) or automatically due to frequency drop • Currently open only to Loads at single sites (no aggregations)
Controllable Load Resources (CLRs)	Regulation Service Responsive Reserves	<ul style="list-style-type: none"> • Interval metering • Telemetry • Ability to receive AGC-type signals • Governor-type frequency response • ERCOT Qualification 	<ul style="list-style-type: none"> • Industrial Loads with sophisticated control systems and ramping capability • 1 CLR (~20 MW) currently enrolled
Emergency Response Service (ERS)	10-minute special emergency DR service; Also 30-minute ERS Pilot underway	<ul style="list-style-type: none"> • Interval metering • Load reduction technology • ERCOT Qualification 	<ul style="list-style-type: none"> • Residential, commercial & industrial Loads (aggregations allowed) • Procured 3 times per year for 4-month Contract Periods • Dispatched during EEA • ~500 MW enrolled depending on Time Period

- **Demand response will be critically important in meeting ERCOT's needs in the coming years**
 - **POLICIES:** Remove barriers to DR participation and open new and existing DR markets
 - **MARKET RULES:** Treat and compensate DR on an equal footing with generation
 - **ERCOT:** Develop/enhance services that open the door to promising new technologies and providers
 - **DR AGGREGATORS:** Educate customers on the value of DR and load management
 - **RETAILERS/LOAD-SERVING ENTITIES:** Develop products to build DR in their portfolios
 - Hedge against high prices
 - Enhancements to customer loyalty
 - Contribute to grid reliability

ERCOT MOBILE APP – NOW AVAILABLE!



ERCOT Mobile App

- iPhone and Android Phone users
- Pop up notifications
- Applications for first release
 - Conservation Spotlight
 - Load Forecast versus Actual graph
 - ERCOT Conservation Tips
 - ERCOT Quick Facts
- Over 7900 downloads