

# ERCOT

## Asset Management Opportunities in the Evolving Market

**February 2, 2015**



---

## What is Driving US Energy Prices?

- **Shale Gas: Fundamental Shift Happens**
- **US LNG Exports: the Great Debate**
- **The Polar Vortex: It Used to Be Called “Winter”**
- **Changing in Generation Mix, a Coal Crunch**
- **Renewable Penetration and Distributed Generation**
- **Demand Response: Paying for (Negative) Megawatts**
- **Our Industrial Renaissance Dream Big**
- **Resource Adequacy and Reserve Margins**

# Overview of US Power Markets

---

- Power Market is made up of Regional Transmission Organizations (RTOs) and non-RTOs.
- Each RTO region has an independent set of operating procedures, governed by FERC, with the exception of ERCOT which is governed by the PUCT.
- The non-RTO regions are governed by the incumbent utilities and state agencies.

**We're Gonna  
Rock Down To**



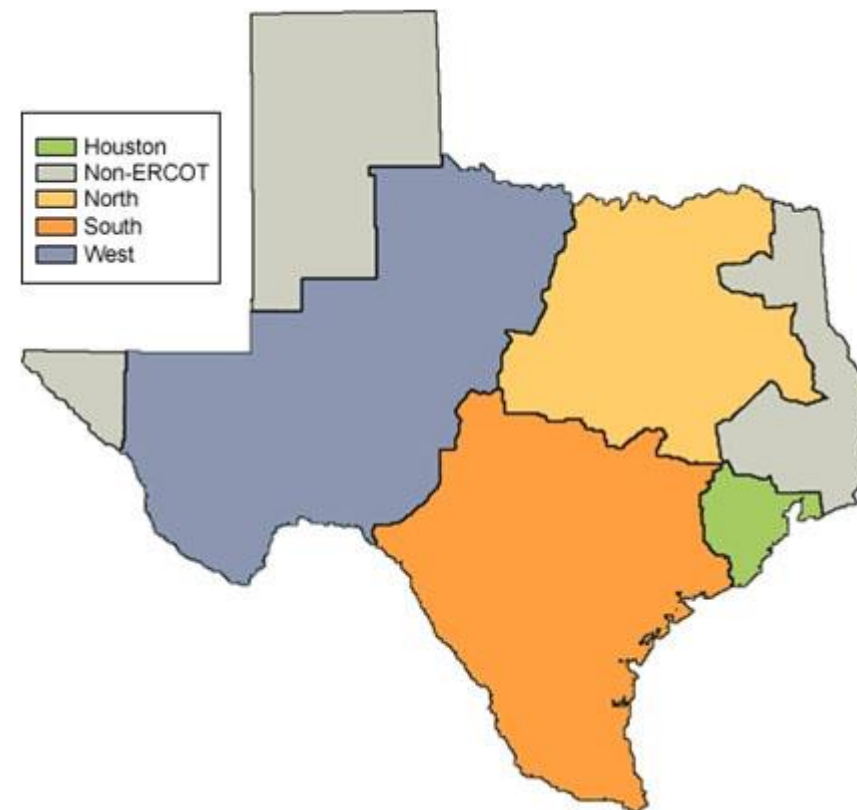
RTO regions have robust energy markets, but their capacity markets differ greatly. Non-RTO regions tend to be predominantly bilateral transactions.

- ERCOT has no capacity market.
- PJM and ISONE have 1 year auctions that start date 3 years out.
- CAISO has illiquid and short term but in early discussion of 3 year forward capacity market.

## ERCOT at a glance

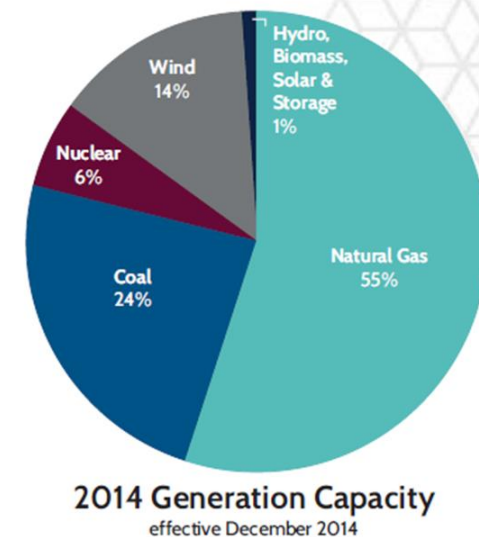
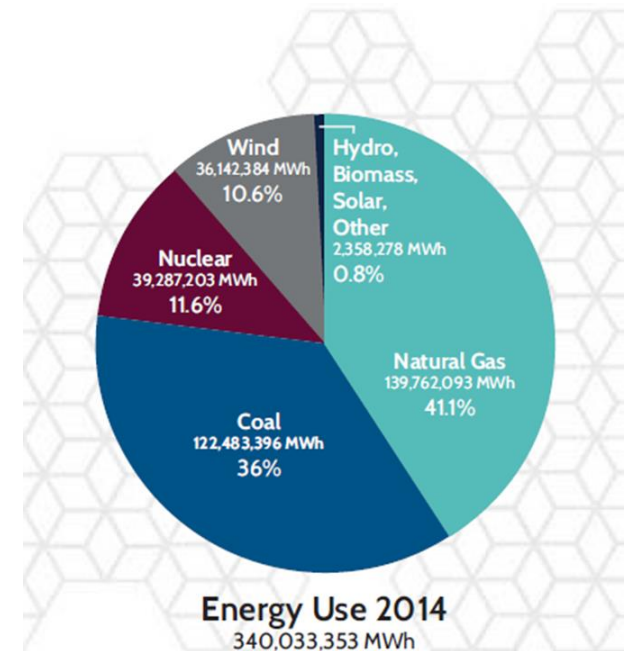
---

- ERCOT is an independent system operator or (ISO)
- Electric Reliability Council of Texas
- Manage electric flow to 23 million Texans
- 85% of the electric load in Texas
- 75% of land area in Texas
- 40,530 miles of transmission lines
- 550+ generation units
- ERCOT does not include: El Paso area, Texas Panhandle, Northeast Texas, Longview, Marshall and Texarkana, Southeast Texas, Beaumont, Port Arthur and the Woodlands



# ERCOT Quick Facts

- More than 11,000 MW of installed wind capacity
  - Most of any state
- Wind generation record: 10,957 MW (December 25, 2014)
  - 34% of load at the time
- ~ 7,000 MW of additional wind by 2019
- Additional 6,800 MW of wind is being discussed, which will require new transmission upgrades

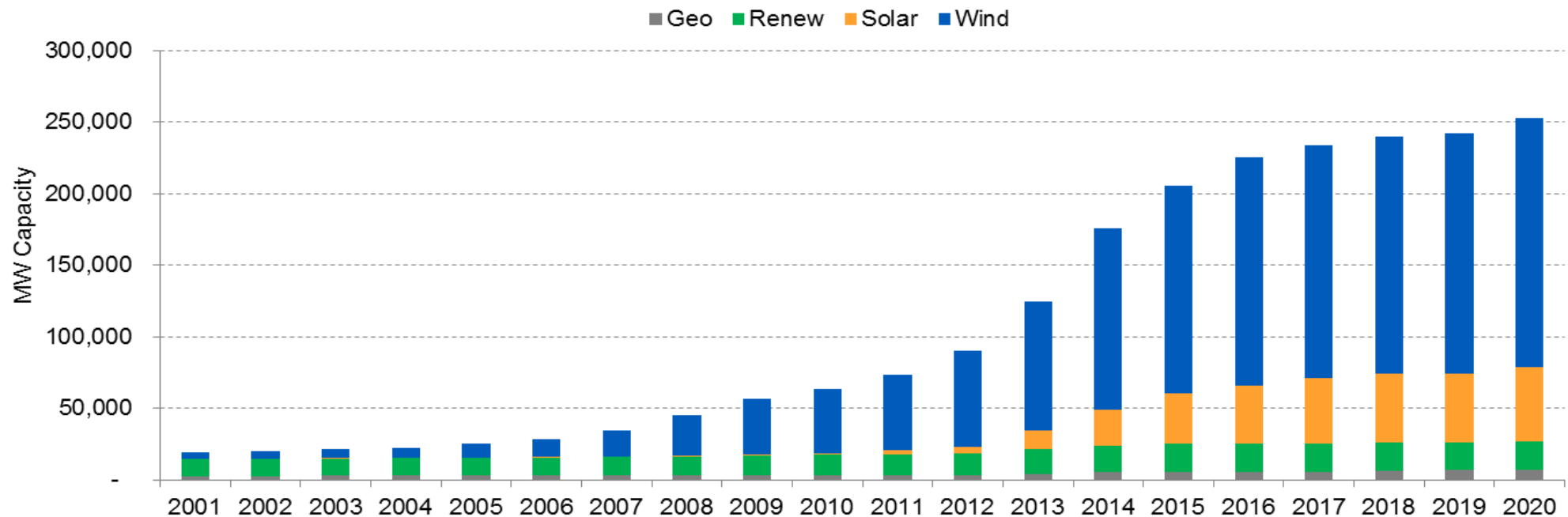


# Growth of Renewables

Since 2001 more than 6,000 MW of solar and 65,000 MW of wind have been built across North America:

- Increased congestion;
- Increased need for expensive peaking, quick-start and regulation services;
- Dampening of forward curves with consequent affect on new build economics.

## United States Renewable Generation and Proposed Generation



Source: Energy Velocity

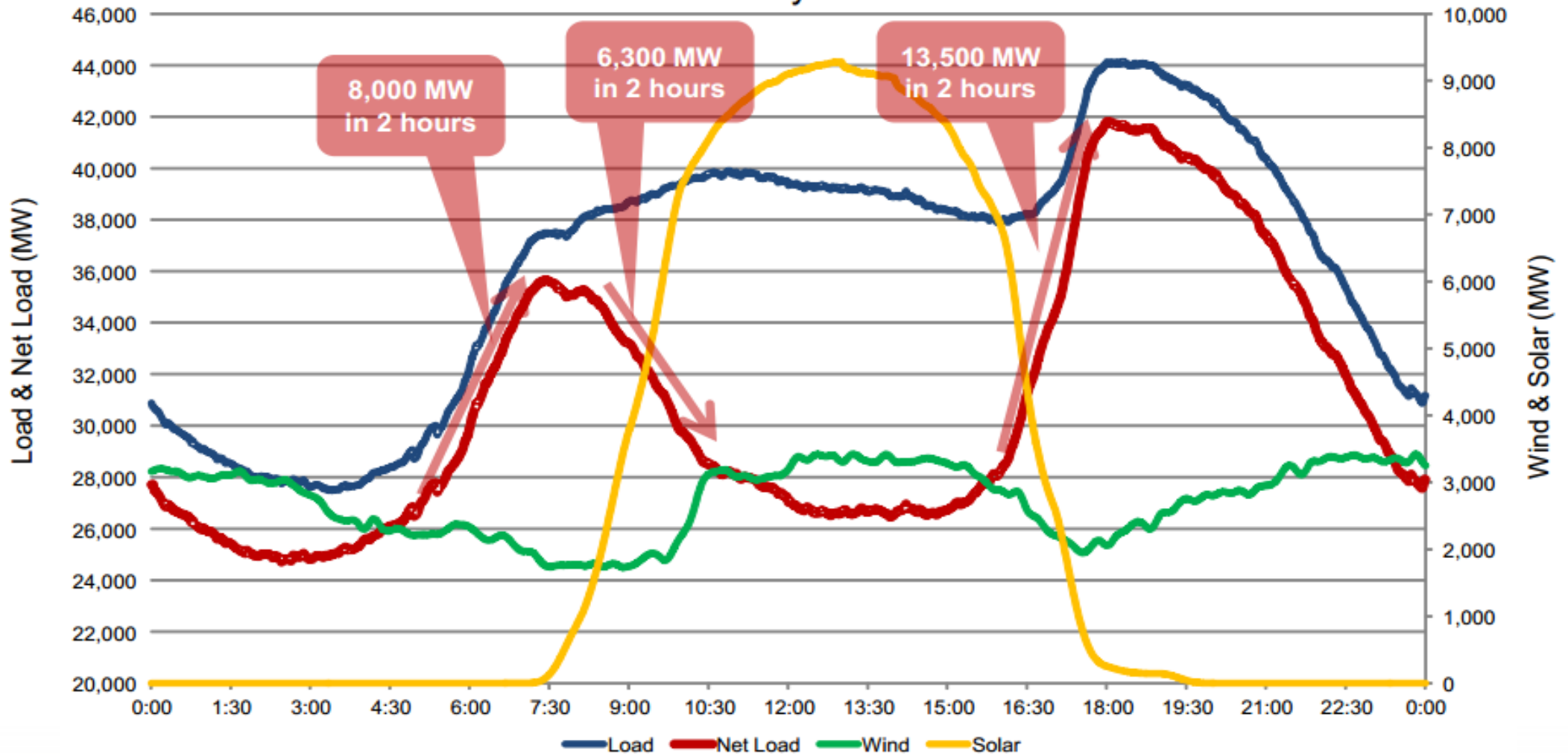


# Installation of Wind Farms Across the US



# What is Solar Energy Bringing?

CAISO Load, Wind & Solar Profiles – High Load Case  
January 2020



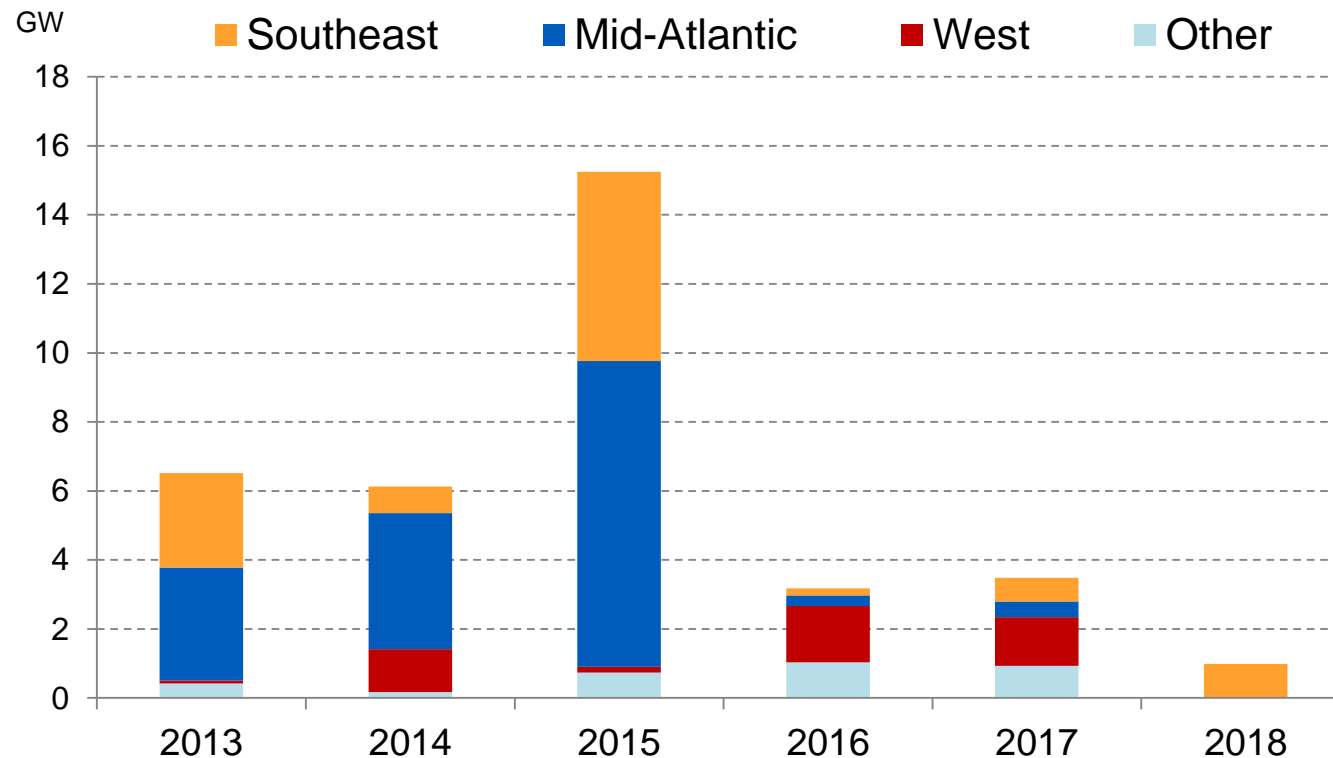
\* Source: CAISO



# Environmental: Coal Retirements

Since 2009, price-based coal displacement has led demand growth for natural gas; plant retirements should cement demand.

## Expected Coal Plant Retirements by Year and Region

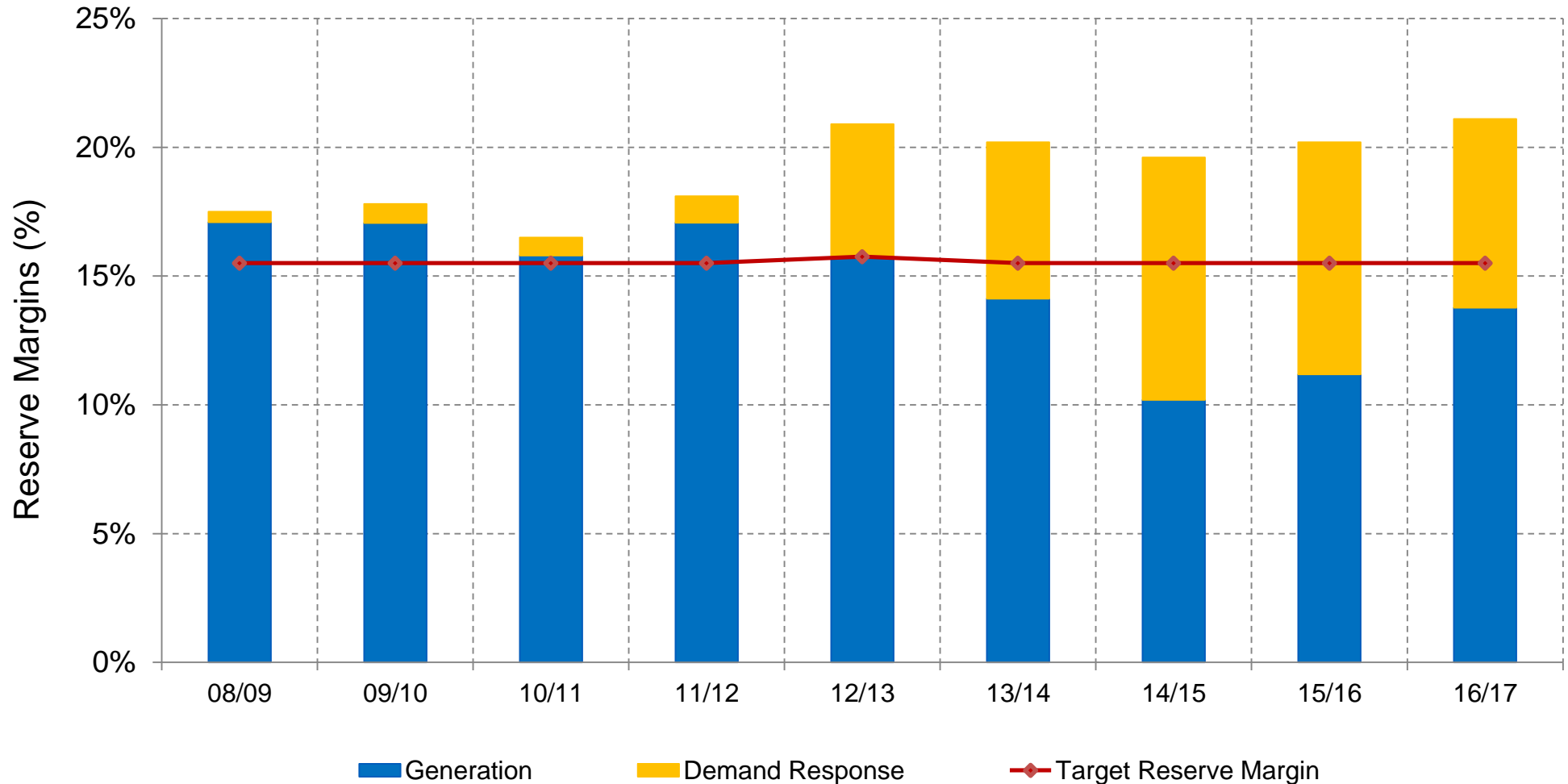


- The introduction of competition between coal and gas in the power sector has ***absorbed excess gas molecules*** and ***reduced price volatility***.
- At least 28 GW of coal-fired capacity should retire by 2016, largely due to ***stricter emissions regulation***.
- 4 GW of nuclear retirements have been announced and the long-anticipated nuclear renaissance has flamed out.

# Increased Reliance on Demand Response for Reliability



## PJM Reserve Margins Cleared in Base Residual Capacity Auction (BRA)



## Product types & REP – reported enrollment

Product (code)	ESI IDs 06/15/2013		ESI IDs 09/30/2014	
	Residential	C&I	Residential	C&I
Peak Rebate (PR)	2,410	58	410,675	30,236
Time of Use (TOU)	135,320	328	290,308	3,007
Other Load Control (OLC)	13,606	14	19,232	64
Real-Time Pricing (RTP)	288	4,358	1,001	9,700
Block & Index (BI)	-	23,928	-	6,796
Other Voluntary DR Product (OTH)	169	1,554	57	155
Four Coincident Peak Advisory (4CP)	-	35	-	247
<b>Total</b>	<b>151,793</b>	<b>30,275</b>	<b>721,273</b>	<b>50,205</b>

### Notes:

- 170-fold increase in residential Peak Rebate
- 115% increase in residential Time of Use
- 123% increase in C&I Real-time Pricing
- 72% decline in C&I Block & Index Pricing

## If you Build it, They Will Come

---

### **EPA issues final notice to ExxonMobil Baytown on new ethylene production unit**



### **A Fracking Boom Where There Is No Fracking**

On the Texas coast, the state's fracking boom has sparked an industrial surge and new fears about pollution.

**Texas has 7 of the 15 fastest-growing U.S. cities.  
All 15 of the nation's fastest-growing cities were located in the South or West.**



**Report: Export boom will boost Houston job growth**

# How are Companies Adapting to these Changes?



Utilities Facing a 'Mortal Threat' From Solar



Home Depot Starts Selling Personal Wind Turbines

IKEA starts selling solar panels for homes



Companies Unplug From the Electric Grid, Delivering a Jolt to Utilities





## How are Companies Adapting to these Changes?



Google buys Nest for \$3.2B — its key to the connected home

Honeywell WiFi Smart Thermostat adds voice control for Nest rebuke.



Comcast and NRG Launch Electricity Bundle in Pennsylvania  
Yes, it comes with free HBO.

## **Why is this important?**

---

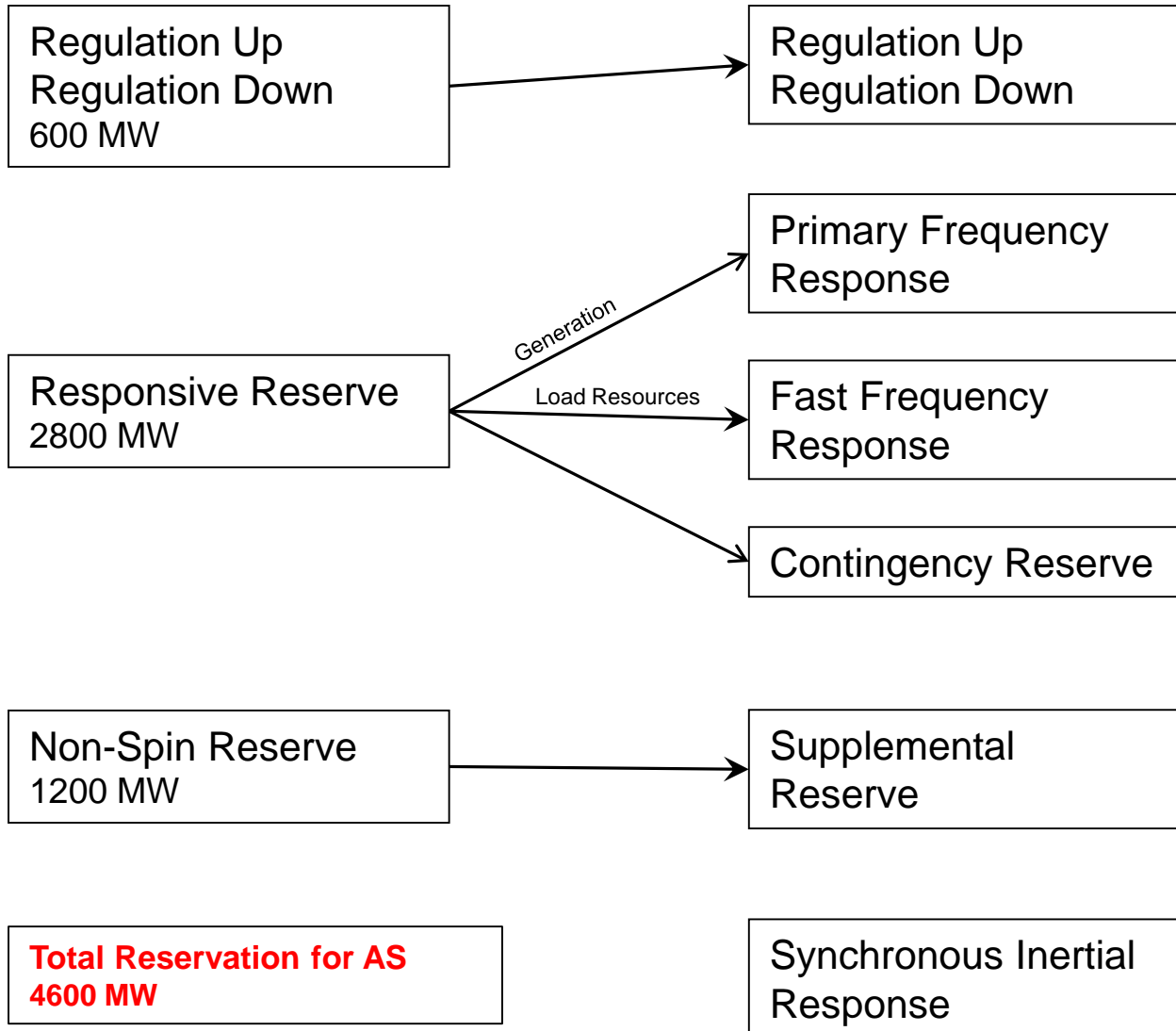
### **The power business is changing**

- Many utilities are exploring ways to build competitive advantages with different business models and offerings**
- New technologies are being utilized**
- New products are being developed**

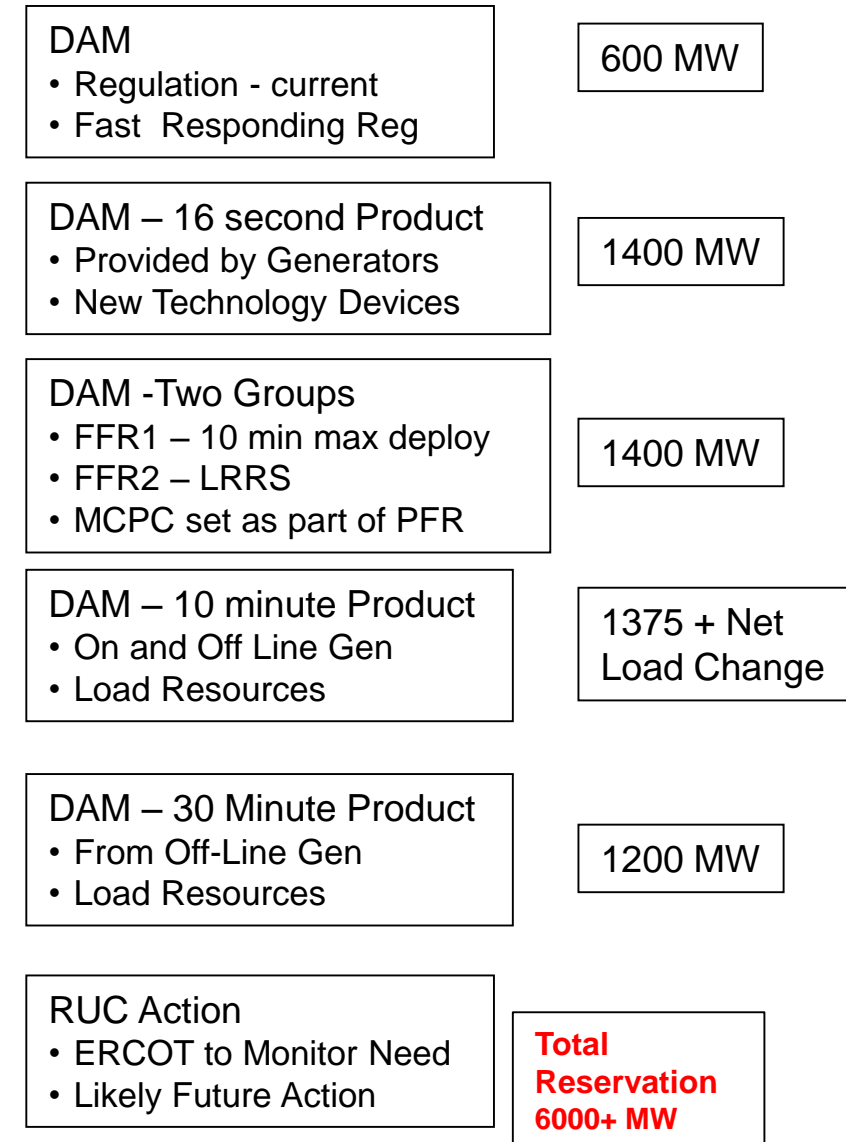
# ERCOT – FAST (Future Ancillary Services)

**(2018 implementation)**

## Current



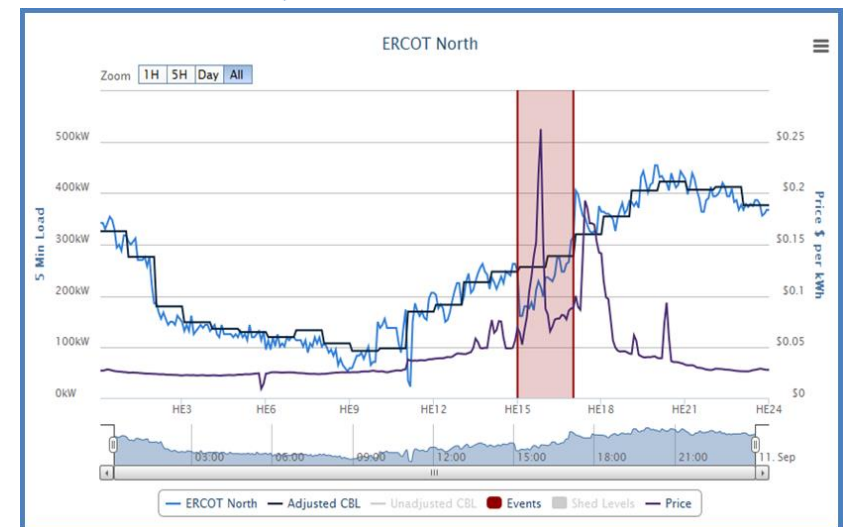
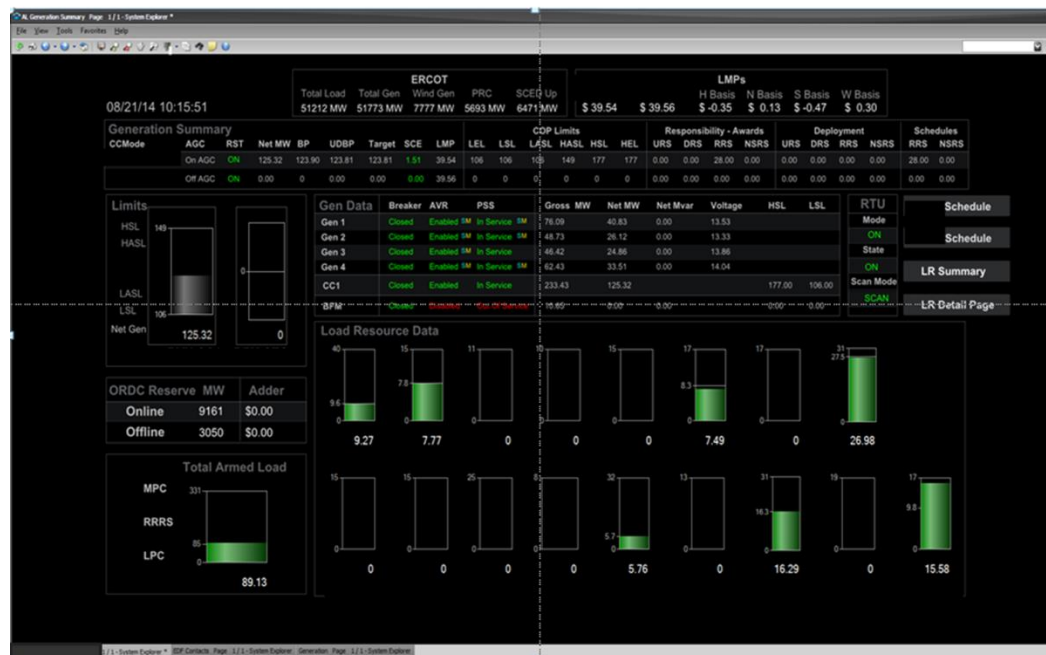
## Future



# What can you do?

- Information is key!
- Clients want a call to action
  - Smart Meter Texas (Retail)
- Education
- Customer Intimacy (Marketing Strategy)
- Leverage Technology

- Big Data Analytics
- Facility Benchmarking
- Utility Bill Processing
- Real-Time Reporting
- Demand Management
- Load Response



## List of Services

---

- **Analytics**
- **Monthly Meetings**
- **Daily Calls**
- **Asset Management**
- **Quarterly Strategy Meetings**
- **Client Portals (SCADA / RT Analytics IP)**
- **Scheduling**
- **Trading**



---

It is not the strongest or the most intelligent who will survive but those who can best manage change. --  
*Charles Darwin*



# Terms of Use

These materials have been prepared by EDF Trading for a specific purpose. Any individual or entity using these materials agrees to adhere strictly and abide by the following TERMS OF USE.

The user agrees not to copy, retransmit, disseminate, reuse or redistribute these materials.

Certain information contained in these materials may have been obtained from outside sources that EDF Trading considers reliable. Although EDF Trading strives to provide accurate and authoritative information, it does not warrant or guarantee the accuracy or completeness of the information contained in these materials or the accuracy of information obtained from outside sources. EDF Trading reserves the right to modify or correct any error or omissions contained in these materials without notice.

All references to the Dodd-Frank law and its governing bodies are based upon terms, rules and interpretations as currently defined by such governing bodies and any case or administrative law. Certain provisions of the law are still undefined by the governing bodies, and any EDF Trading representations or interpretations of the law's impact are based on its best reasonable expectations.

You agree by and through your use of these materials to waive all claims against, and to hold harmless, EDF Trading, its directors, officers, or employees from any damages claimed to have been caused in any way from your use of these materials.

© 2011, EDF Trading Limited. No portion of these materials may be reproduced, reused, or otherwise distributed.