



• August 15-18, 2010 • Dallas, Texas •  
• Dallas Convention Center •



## Load Participation in ERCOT

&

## Other Demand Response Opportunities

Mark Patterson, Manager, ERCOT Demand Integration

# ERCOT Region

75% of Texas land area

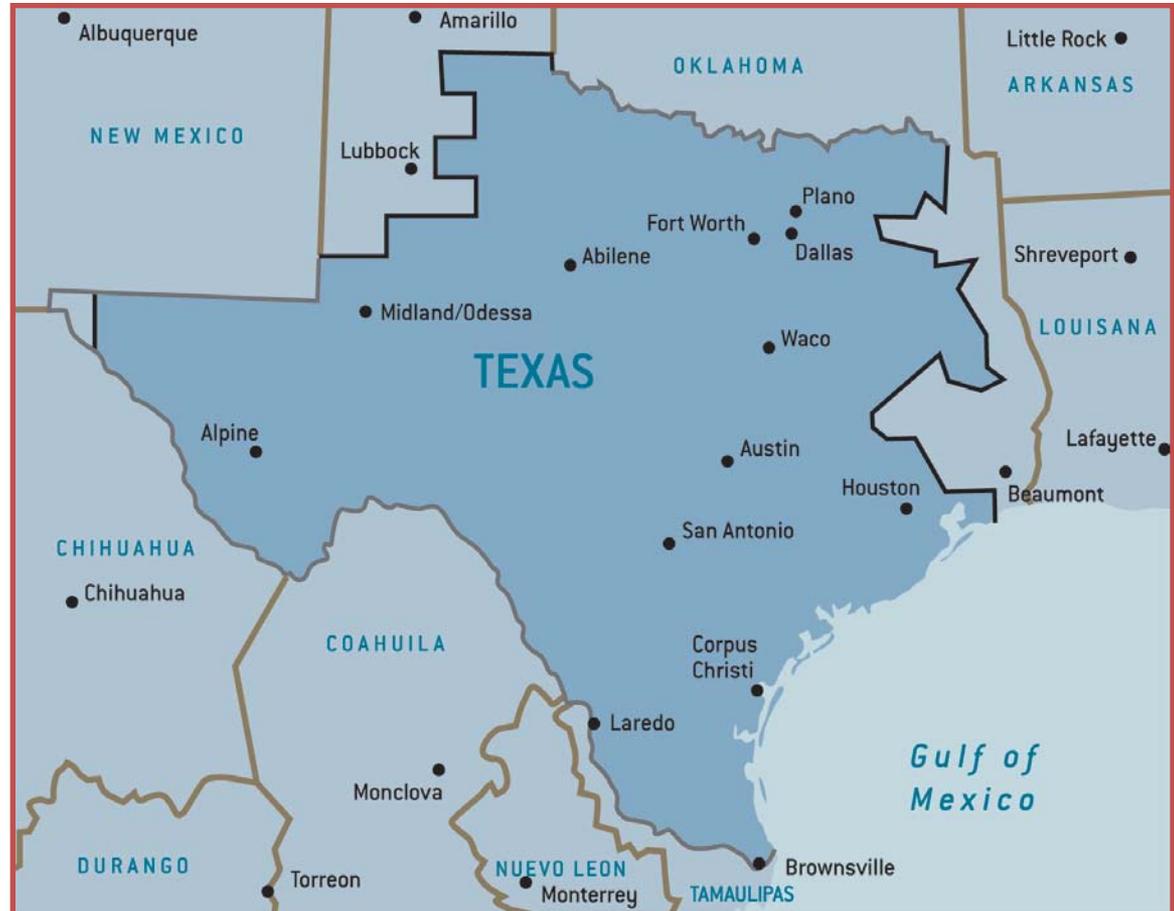
Includes Houston, Dallas, Fort Worth, San Antonio, Austin, Corpus Christi, Abilene and the Rio Grande Valley

Does not include:

- El Paso area
- Texas Panhandle
- Northeast Texas
  - Longview, Marshall and Texarkana
- Southeast Texas
  - Beaumont, Port Arthur, and the Woodlands

85% of Texas load

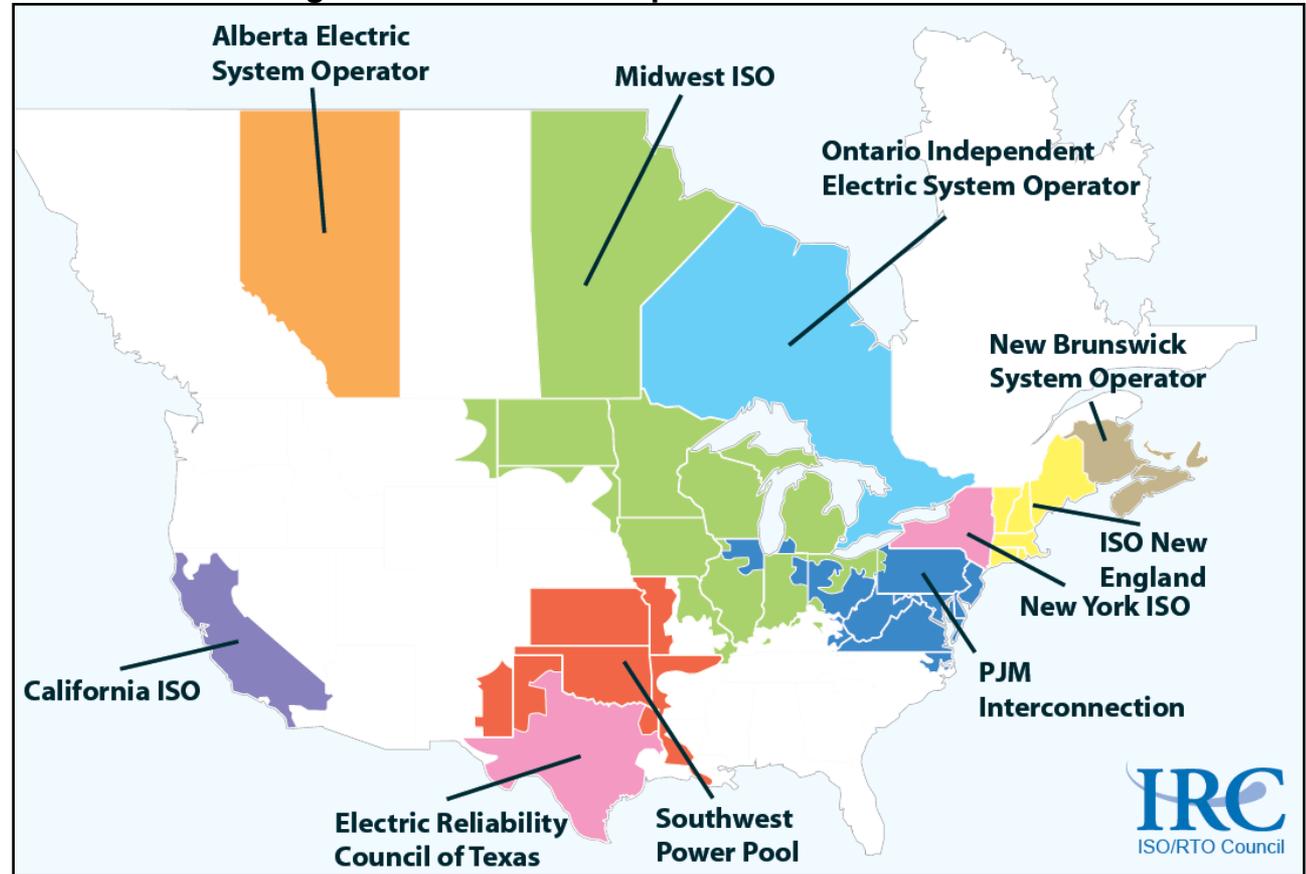
20 million Texans served



# ERCOT Designated Independent System Operator

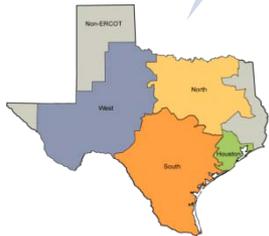
1996 – ERCOT was designated **Independent System Operator (ISO)** to insure impartial, third-party organization to oversee equal access to power grid.

10 Independent System Operators /  
Regional Transmission Operators in North America



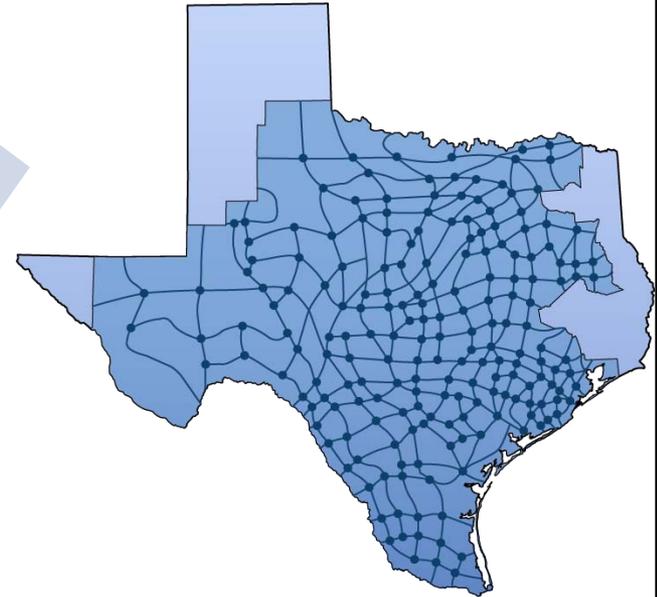
# ERCOT's Changing

**Today**



Zonal  
Market

Nodal  
Market



**December 1, 2010**

# Day Ahead Market – Ancillary Services

*What are Ancillary Services (“A/S”)?*

- According to ERCOT, “Ancillary Services are those services necessary to support the transmission of energy from resources to loads while maintaining reliable operation of transmission provider’s transmission systems in accordance with Good Utility Practice.”
- Ancillary Service Products receive a Capacity Payment!
- The four primary Day Ahead Ancillary Service Products are:
  - **Regulation Up (URS)**: Controls the power output in response to a small change in system frequency; signal is sent every 4 seconds, 24 hours a day; all signals from ERCOT cause an increase in energy to the grid
  - **Regulation Down (DRS)**: Same as Regulation Up but all signals from ERCOT cause a decrease in energy to the grid
  - **Responsive Reserve (RRS)**: Provided by unloaded generation facilities on line, interruptible loads controlled by high set under-frequency relays, interruptible loads on AGC like control or DC tie response that stops frequency decay; RRS from generation is usually only deployed in response to significant system disturbances
  - **Non-spinning Reserve (NSRS)**: Utilizes the portion of off-line capacity capable of being synchronized and ramped (or interrupted by a load) to a specified output level within 30 minutes and is capable of running at specified output level for 1 hour



# ERCOT Demand Response

- The Nodal ERCOT market rules allow demand side participation under three general classes of services:

Resource Type	Service that can be Provided	Requirements
<b>Voluntary Load Response (VLR)</b>	Curtailment or reduction in response to Market Price or other factors	<ul style="list-style-type: none"> <li>Metering and/or curtailment technology defined in REP contract</li> </ul>
<b>Non-Controllable Load Resource (Non-CLR)</b>	Various Ancillary Services: <ul style="list-style-type: none"> <li>Responsive Reserve Service</li> <li>Non-Spinning Reserve Service</li> </ul>	<ul style="list-style-type: none"> <li>IDR meter</li> <li><b>Under-frequency Relay</b></li> <li>Telemetry</li> <li>ERCOT Qualification</li> </ul>
<b>Controllable Load Resource (CLR)</b>	Various Ancillary Services: <ul style="list-style-type: none"> <li>Regulation Up Service</li> <li>Regulation Down Service</li> <li>Responsive Reserve Service</li> <li>Non-Spinning Reserve Service</li> </ul>	<ul style="list-style-type: none"> <li>IDR meter</li> <li>Telemetry</li> <li><b>Automatic Governor Control (AGC) like control</b></li> <li>ERCOT Qualification</li> </ul>
<b>Emergency Interruptible Load Service (EILS)</b>	Curtailment in response to ERCOT Dispatch	<ul style="list-style-type: none"> <li>IDR meter or Non-IDR Aggregations</li> <li>ERCOT Qualification</li> </ul>

# Day Ahead Market – Load Resource Requirements

Requirements for Load Resources in Nodal include:

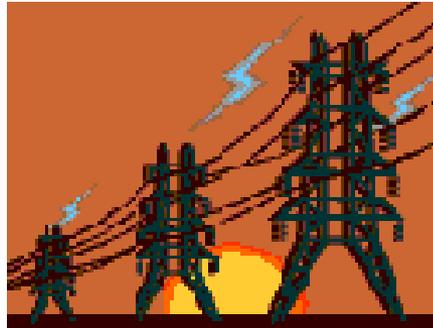
- Registration as a Load Resource under a Resource Entity with an existing relationship to a Qualified Scheduling Entity (QSE)
- Interval Data Recording (IDR) Meter Installed
- Real Time Telemetry provided to ERCOT thru QSE
  - Real Power (MW)
  - Reactive Power (MVars) for CLR
  - Analog Power Response (MW)
  - Status of Interrupting Device (CB, etc.)
  - Status of UF Relay (Non-Controllable Load Resources)
- One Line Drawing submitted with all applicable data
- Relay Test Reports Submitted (Non-Controllable Load Resource)
- Complete Qualification Test for the Ancillary Service(s) to be provided



# Day Ahead Market – Non-CLR Deployments

Non-CLR Load Resources Providing RRS can be deployed:

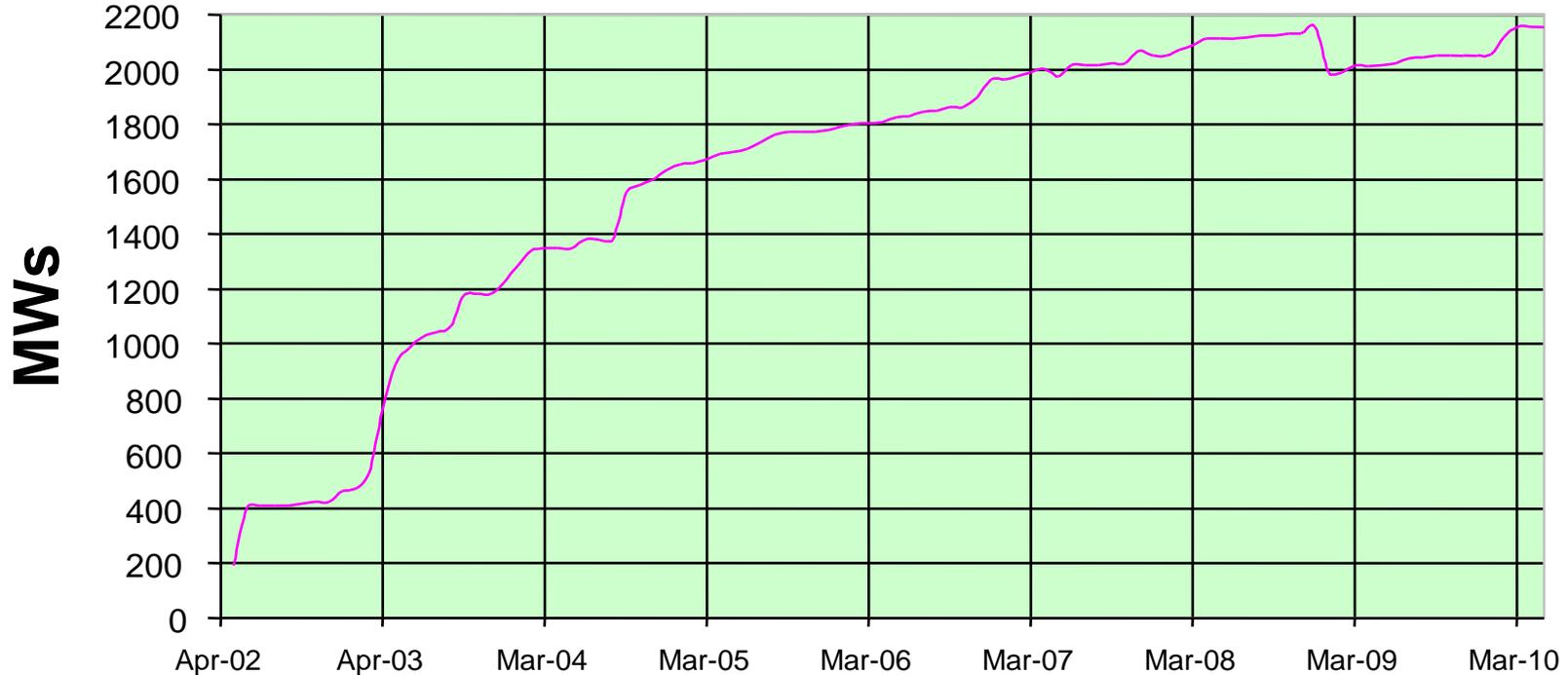
1. Automatic trip based on UFR settings
2. Verbal dispatch by ERCOT during EECF event (by group or as a block\*)
3. Verbal dispatch by ERCOT during an Emergency Condition (by group or as a block\*)
4. Verbal dispatch by ERCOT to solve a local Emergency Condition  
(location-specific)



# Load Resource Registration

Approximately 160 LRs registered with a peak interruptible capacity of ~2200 MW

## Non\_CLR's Registered and Qualified for ERCOT AS Market



# Load Resource Deployments

LRs have been deployed 12 times since April 2006:

- April 17, 2006 EECP VDI
- Oct. 3, 2006 VDI for Frequency Restoration
- Dec. 22, 2006 Under-frequency event & VDI for Frequency Restoration
- July 2, 2007 VDI for Frequency Restoration
- Sept. 5, 2007 VDI for Frequency Restoration
- Dec. 12, 2007 VDI for Frequency Restoration
- Feb. 28, 2008 EECP VDI
- Mar. 16, 2008 Under-frequency event & VDI for Frequency Restoration
- Aug. 11, 2008 VDI for Frequency Restoration
- Dec. 16, 2008 VDI for Frequency Restoration
- Jan. 9, 2010 VDI for Frequency Restoration
- May 15, 2010 Under-frequency event

\* Formerly Emergency Electric Curtailment Plan (EECP) (amended by PRR 775, effective 5/1/09)

# Day Ahead Market – Controllable Loads

## ***FUTURE OF LOAD PARTICIPATION IN ERCOT***

### Controllable Load Resources (New for Nodal Implementation)

- “Load Resource capable of controllably reducing or increasing consumption under dispatch control (similar to AGC) and that immediately responds proportionally to frequency changes (similar to generator governor action).”

[http://nodal.ercot.com/protocols/2008/04/02/02-040108\\_Nodal.doc#\\_Toc189453661](http://nodal.ercot.com/protocols/2008/04/02/02-040108_Nodal.doc#_Toc189453661)

- Potential controllable loads include:
  - Large Electro-chemical Processes
  - Variable Speed Motors
  - Thermal Energy Storage
  - Others???
  - Fast acting-controls and flexible processes are the key

# Looking Ahead: Opportunities and Challenges

- Opportunities
  - Load Participation in the Regulation markets
  - How much new participation to expect now that pure Loads can qualify as CLR's (current requirement for Load at net-gen site)
  - Expansion of Ancillary Services Markets:
    - 18,000 MW of wind will be in place within 2-3 years
    - ERCOT expects to need more Regulation and Nonspin to help address wind/net-load events
    - Possible new AS type (10- or 15-minute Nonspin)
    - Load participation in the real-time energy market (SCED)

# Emergency Interruptible Load Service (EILS)



*'Another tool for the operator toolbox'*

## **Emergency Interruptible Load Service (EILS) is:**

- Service provided by loads (customers) willing to interrupt during an electric grid emergency in exchange for a payment
  - “Controlled interruption of prepared customers vs. uncontrolled interruption of unprepared customers”
- An additional tool for ERCOT Operations, deployed ONLY in the late stages of a grid emergency
  - Last resort prior to firm load shedding (rotating outages)
- EILS Resources may be individual Loads or aggregations
- Must have:
  - 15-minute interval metering or statistically valid sample approved by ERCOT
  - Capability of interrupting on 10 minutes notice at any time during the committed hours

# Contract Periods & Time Periods

- EILS is procured for 4-month Contract Periods
  - February thru May
  - June thru September
  - October thru January
- Participants may bid to provide the service for one or more Time Periods:
  1. Business Hours 1: 8AM to 1PM Monday-Friday\*
  2. Business Hours 2: 1PM to 4PM Monday-Friday\*
  3. Business Hours 3: 4PM to 8PM Monday-Friday\*

\* Except ERCOT Holidays

  4. Non-Business Hours: All other hours
- Time Periods are designed to allow flexibility in for customers during traditional business hours

# Deployment



- ERCOT Operations orders an EILS deployment via a phone call to the all-QSE hotline
- EILS Resources must reduce load according to their committed level within 10 minutes of the QSE's receipt of the instruction
  - Must maintain this performance until released
- ERCOT Operations will release EILS Resources after the emergency is over via another hotline call
  - Must be back online and ready to perform within 10 hours of the release
- EILS Resources are subject to a maximum of 2 deployments (or 8 hours) per Contract Period
  - If a deployment event is still in effect when the 8<sup>th</sup> hour expires, EILS Resources must remain offline until recalled by ERCOT Operations

# References & Additional Information

- EILS page at ERCOT.com
  - <http://www.ercot.com/services/programs/load/eils/index.html>
  - Includes:
    - Technical Requirements & Scope of Work
    - Reports of procurement results from previous Contract Periods
    - FAQs
    - Description of factors used in determining reasonableness of bids
    - Annual report to the Public Utility Commission
    - Other supporting documents
- PUC Substantive Rule 25.507
  - <http://www.puc.state.tx.us/rules/subrules/electric/25.507/25.507ei.cfm>
- ERCOT Protocols
  - <http://www.ercot.com/mktrules/protocols/current>

# TDU Standard Offer Program (SOP)

- Investor-owned TDUs in ERCOT are required by statute (SB 7) to meet a percentage of their annual growth in demand through energy efficiency programs.
  - Currently 20%.
  - Based on forecasted, normalized load growth.
- A portion of the TDU's goal can be met through Load Management (LM) SOPs.
- PUC Rules limit the amount of growth that each TDU can meet via LM SOPs.
  - That level was increased during the last rulemaking. (Another rulemaking is currently underway, FYI.)
- Each TDU can set the number of MW of LM it will procure each year, up to the limit set in the rule.
  - The rest of the 20% must be met via Energy Efficiency programs.
- LM SOPs offer a fixed price (per kW/year) for demand response assets. Everyone is paid the same price.
- RFPs are issued; as soon as the MW allocated to LM is met, no more offers are accepted.
- Assets are tested.
- Assets are deployed concurrent with EEA Step 2B (EILS), and may be deployed by the TDUs for other purposes.

