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## **Item 9: Demand Response Update**

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Board of Directors Meeting

ERCOT Public

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# Subjects

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1. Retail Demand Response/Price Responsive Load Evaluation
2. Emergency Response Service (ERS) Progress Report
3. Loads in Security-Constrained Economic Dispatch (SCED)
4. Residential DR Summary

# Retail DR and Price Response Evaluation

- **ERCOT and MPs worked together to begin quantifying economic Load response**
  - Demand Response that occurs outside of ERCOT/TDSP operations (Ancillary Services, ERS or TDSP Load Management Programs)
- **Valuable for:**
  - Identifying impacts on load forecasting
  - Determining ROI on advanced metering infrastructure
  - Tracking growth of products as a key success metric in the ERCOT retail market
- **PUC Rule requires LSEs to provide info and data to ERCOT**
- **ERCOT retained Frontier Associates for data analytics**
- **Goal: quantify potential demand reductions that can be expected from customers during events:**
  - Periods of high wholesale market prices
  - Actual and potential 4CP intervals

# Product types & REP-reported enrollment

Product (code)	ESI IDs 6/15/13	Evaluated?
Real-Time Pricing (RTP)	4,105	Y
Block & Index (BI)	22,947	Y
Peak Rebate (PR)	1,877	Y
Other Load Control (OLC)	10,071	Y
Other Voluntary DR Product (OTH)	733	Y
Time of Use (TOU)	117,570	N <sup>1</sup>
Four Coincident Peak Advisory (4CP)	10	N <sup>2</sup>
Critical Peak Pricing (CPP)	0	N
Financial Option (FO)	0	N

<sup>1</sup> TOU products are incentives for long-term behavioral shifts rather than event-based demand response. We deemed analysis to be beyond the scope of this initial project and will revisit after 2014 reporting is in.

<sup>2</sup> 4CP response may be self-initiated or initiated in response to a signal from a third party; REP advisories are likely only a small subset of the total. Therefore, 4CP analysis (discussed later in this slide deck) was approached differently.

# Response to high wholesale prices (>\$3,000, non-4CP)

Frontier Associates findings:

Product type	Estimated MW response
Real-time Pricing + Block & Index	232 <sup>1</sup>
NOIE Load Control	200
Peak rebate	0.5
<b>Price Response Total</b>	<b>432.5</b>

(1) Includes an estimate for industrials within NOIE service areas.

## NOTES:

- Only one settlement interval cleared at \$3000 or above in summer 2013; therefore, 2013 results should not be considered a definitive quantification of retail price response capability in ERCOT.
- Analytical methodologies and code developed during this analysis will be valuable for tracking trends in future years.

# Response during actual and potential 4CP intervals

Frontier Associates and ERCOT Staff analyses

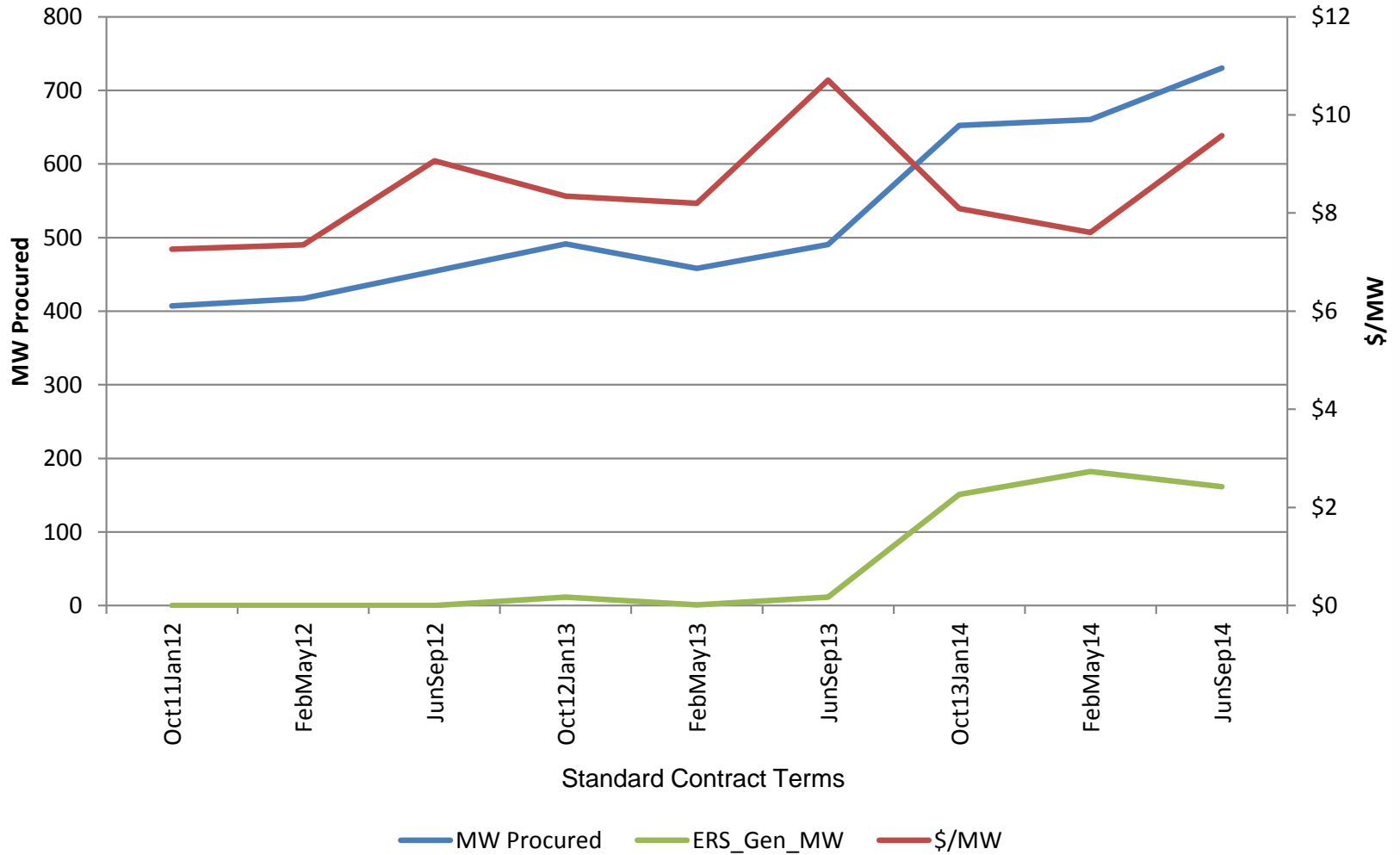
Customer type	Estimated MW response
IDR transmission-connected	250 <sup>1</sup> - 344 <sup>2</sup>
IDR distribution-connected	127 <sup>3</sup>
NOIE	200 <sup>4</sup>
<b>4CP Total</b>	<b>577 - 671</b>

## NOTES:

- (1) Frontier Associates analysis of aggregated load of all 391 transmission-connected customers in competitive choice areas. Historical baseline calculation yields an estimate of 251 MW. Regression analysis suggests a reduction of 201 MW on average over the past 5 years.
- (2) ERCOT analysis of transmission-connected customers with detected event-day response behavior (149 of 391 ESI IDs).
- (3) ERCOT analysis of distribution-connected customers with detected event-day response behavior (2,720 of 11,376 ESI IDs).
- (4) Based on a review of savings estimates reported by NOIEs (no independent data analysis).

# ERS Growth Trends

## Weighted Average MW Procured vs Average Cost per MW



# Residential DR: Weather-Sensitive ERS

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- 3 QSEs awarded in Summer 2014 Contract Term
  - 3 Residential Aggregations
  - 30-minute ERS
- 21.6 MW awarded across peak hours (1 PM – 8 PM)
- Initial participation 54,322 ESI IDs
- Monthly updates allowed; projected final participation in August will be 60,098 ESI IDs



# Residential DR: Real-Time Market ('Loads in SCED')

- Enabled on 6/1/14
- Will allow SCED-qualified Controllable Load Resources to set LMPs in the Real-Time Energy Market by submitting 'up-to bids to buy'
  - Benefits:
    - Price-certain avoided cost of power at Load's strike price
    - Potential for Non-Spin and/or ORDC payments
- Aggregated Load Resources also enabled on 6/1/14
  - 25-30 MW of Aggregate Load Resources (ALRs) currently in qualification process, consisting of aggregated residential Load
    - AC, water heaters, pool pumps under direct load control
  - Depending on control system sophistication, residential loads may be well-suited for SCED dispatch
    - Ability to move incrementally in both directions, similar to a generator

# Residential DR: Summary

Applies to customers in competitive choice areas only

DR Type	Residential Participants*	Barriers
Retail Real-time Pricing	164 <sup>1</sup>	REP billing system upgrades
Retail “Other Load Control”	10,071 <sup>1</sup>	Cost of DR infrastructure
Retail Peak Rebate	1,652 <sup>1</sup>	Accuracy of individual customer baselines; REP billing system upgrades
Retail TOU	117,623 <sup>1</sup>	REP billing system upgrades
Weather-Sensitive ERS	60,098 <sup>2</sup>	Cost of DR/QSE infrastructure
Ancillary Services	0 <sup>2</sup>	Cost of DR/QSE infrastructure including telemetry
Loads in SCED	0 <sup>2</sup>	Cost of DR/QSE infrastructure including telemetry; 5-minute incremental DR in both directions not suitable for blocky loads; limited to LSE QSEs

(1) As reported by REPs as of 6/15/13 snapshot.

(2) Enrolled and qualified as of 7/31/14