



## **ERCOT Monthly Operational Overview** (November 2016)

ERCOT Public  
December 15, 2016

# Grid Planning & Operations

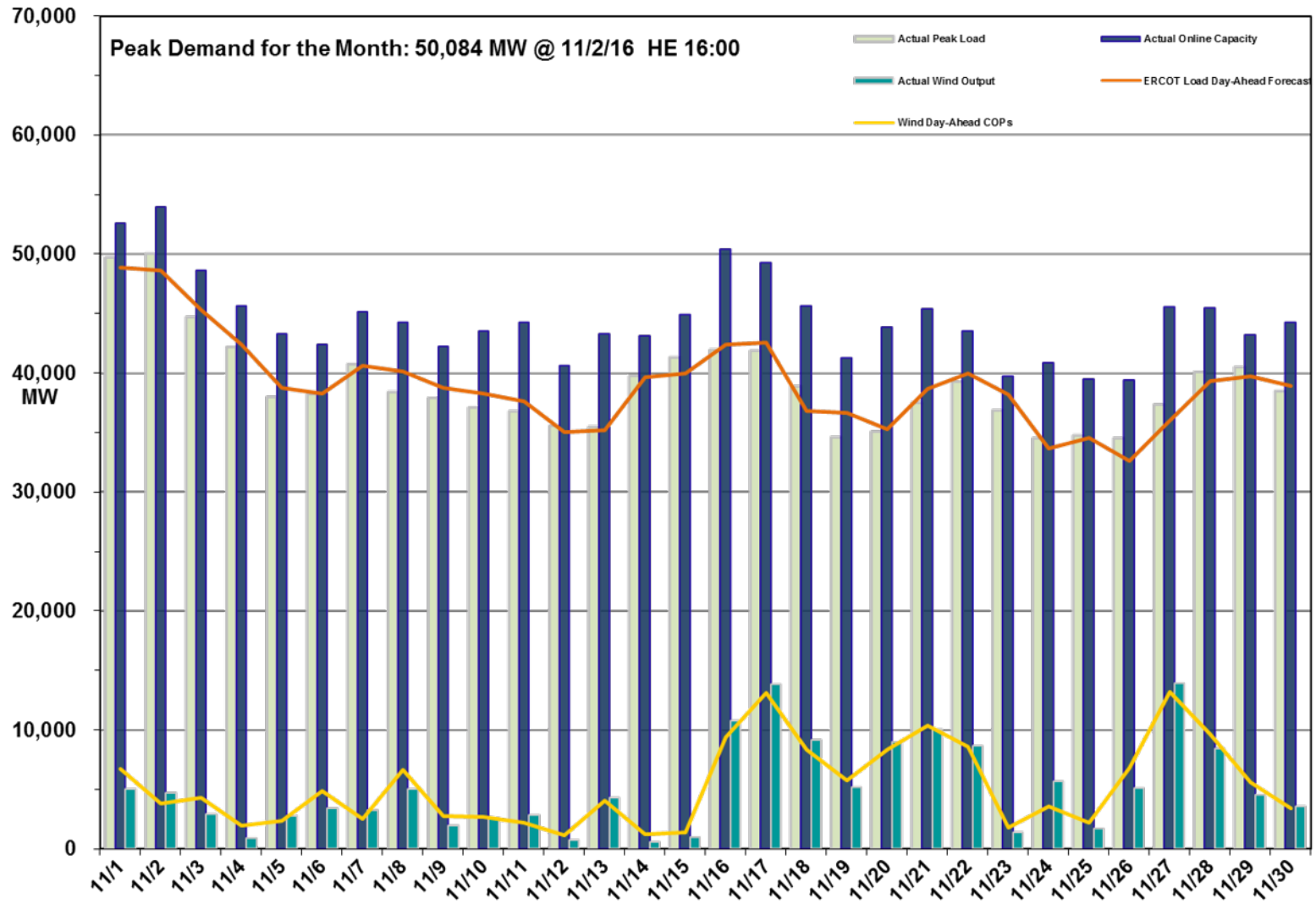
### Operations

- The preliminary Settlements hourly peak demand of 50,084 MW on November 2<sup>nd</sup>, was greater than the day-ahead mid-term load forecast peak of 48,833 MW for HE17 on November 1<sup>st</sup>.
  - The operational instantaneous peak demand was 50,198 MW (telemetry)
- Day-ahead load forecast error for November was 2.26%
- ERCOT issued two notifications:
  - One Advisory issued due to DAM timeline deviation
  - One Watch issued due to SCED failure

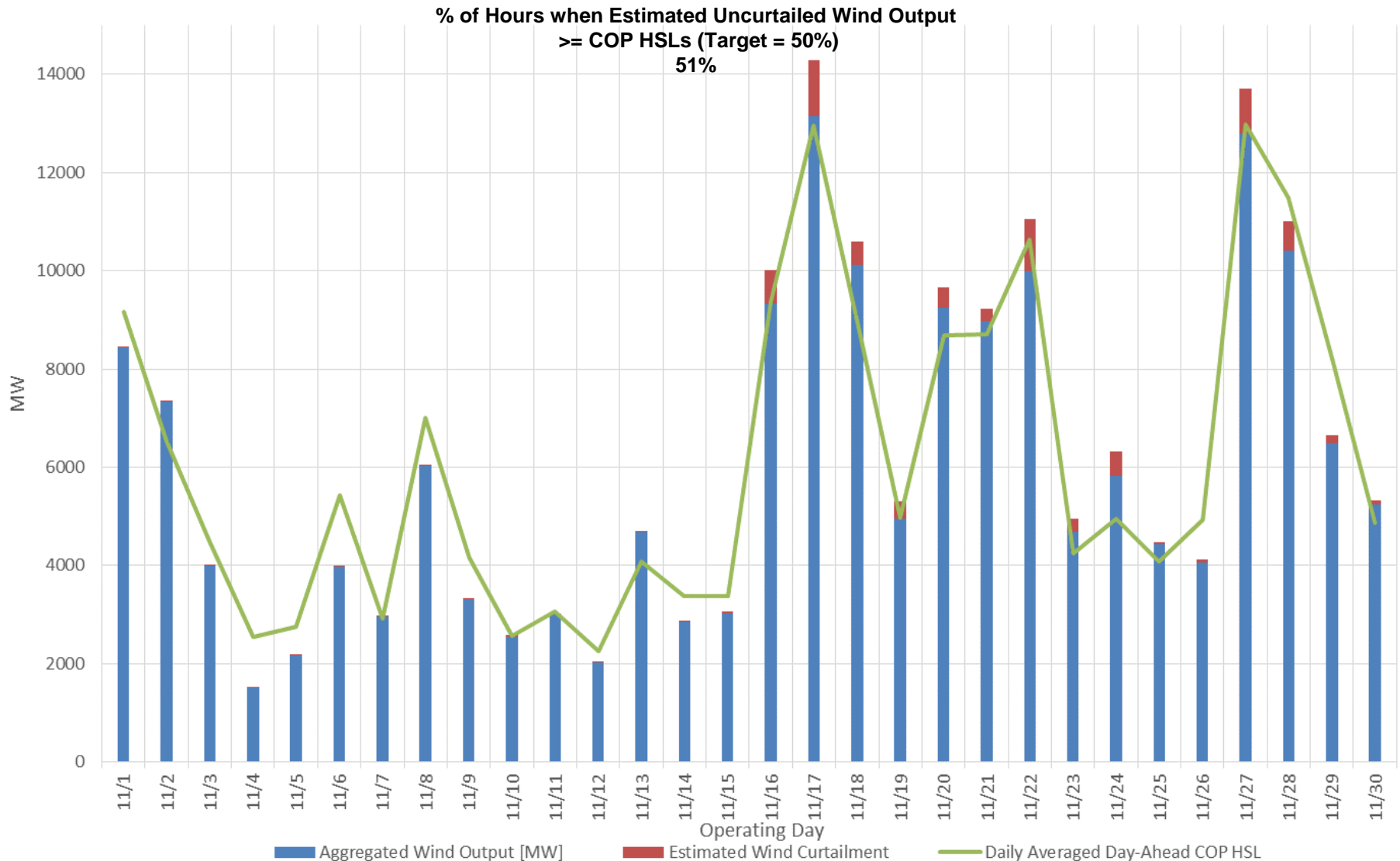
### Planning Activities

- 247 active generation interconnection requests totaling 59,527 MW, including 26,643 MW of wind generation, as of November 30, 2016. Nine additional requests and an increase of 1,601 MW from October 31, 2016.
- 17,150 MW wind capacity in commercial operations on November 30, 2016.

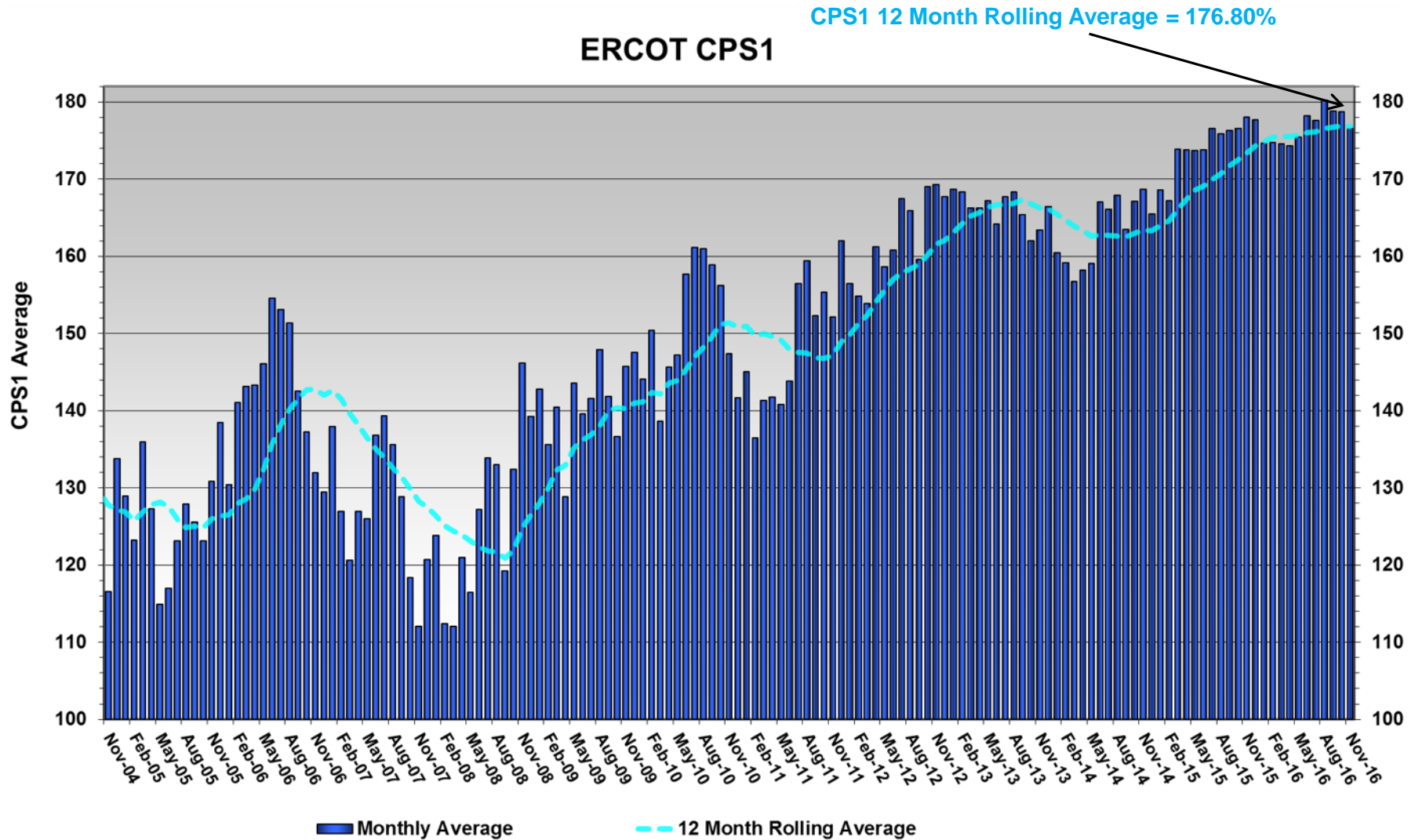
# Daily Peak Demand: Hourly Average Actual vs. Forecast, Wind Day-Ahead COPs, & On-Line Capacity at Peak – November 2016



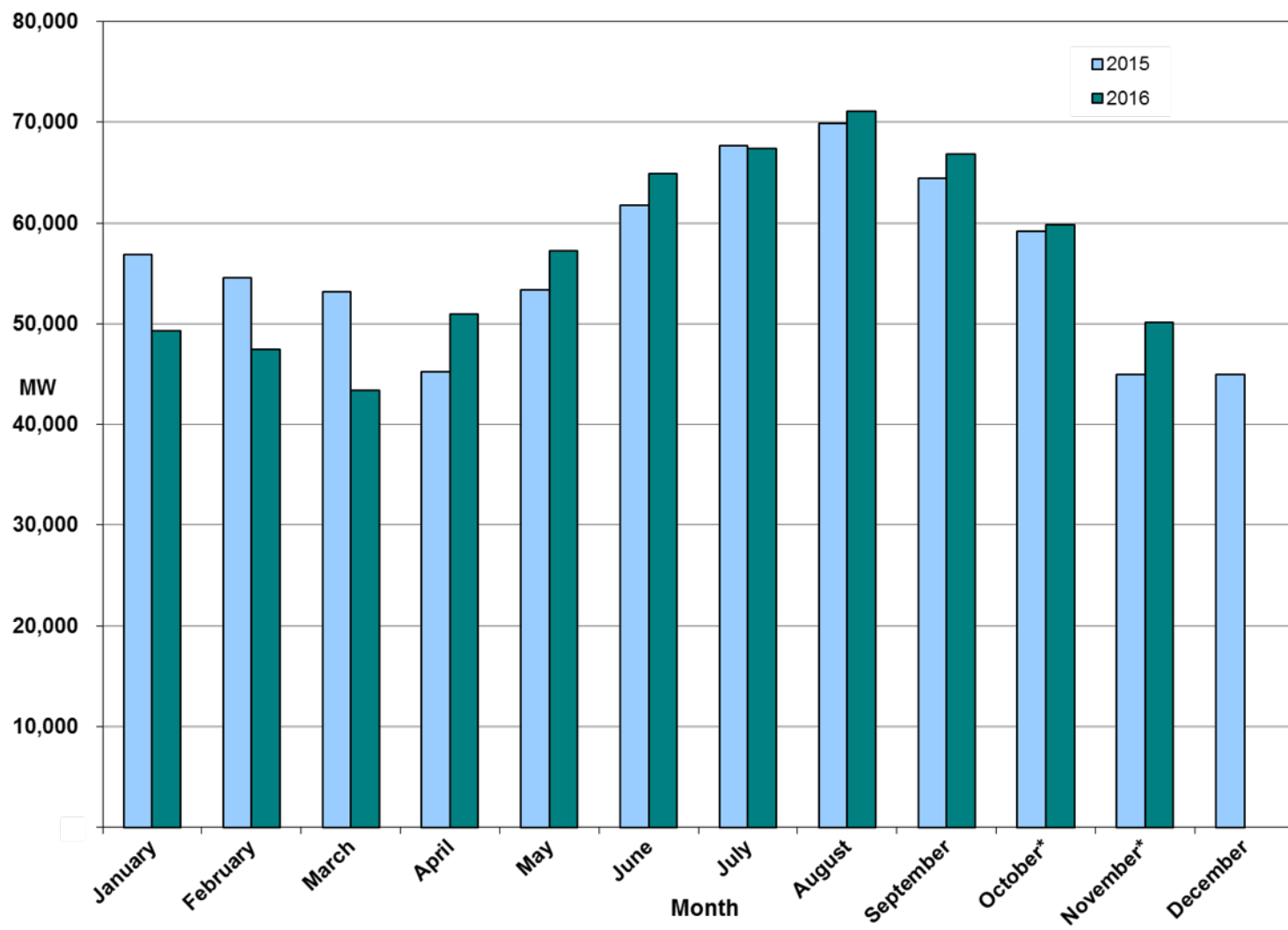
# Actual Wind Output plus Curtailments vs. Wind Day-Ahead COPs for All Hours – November 2016



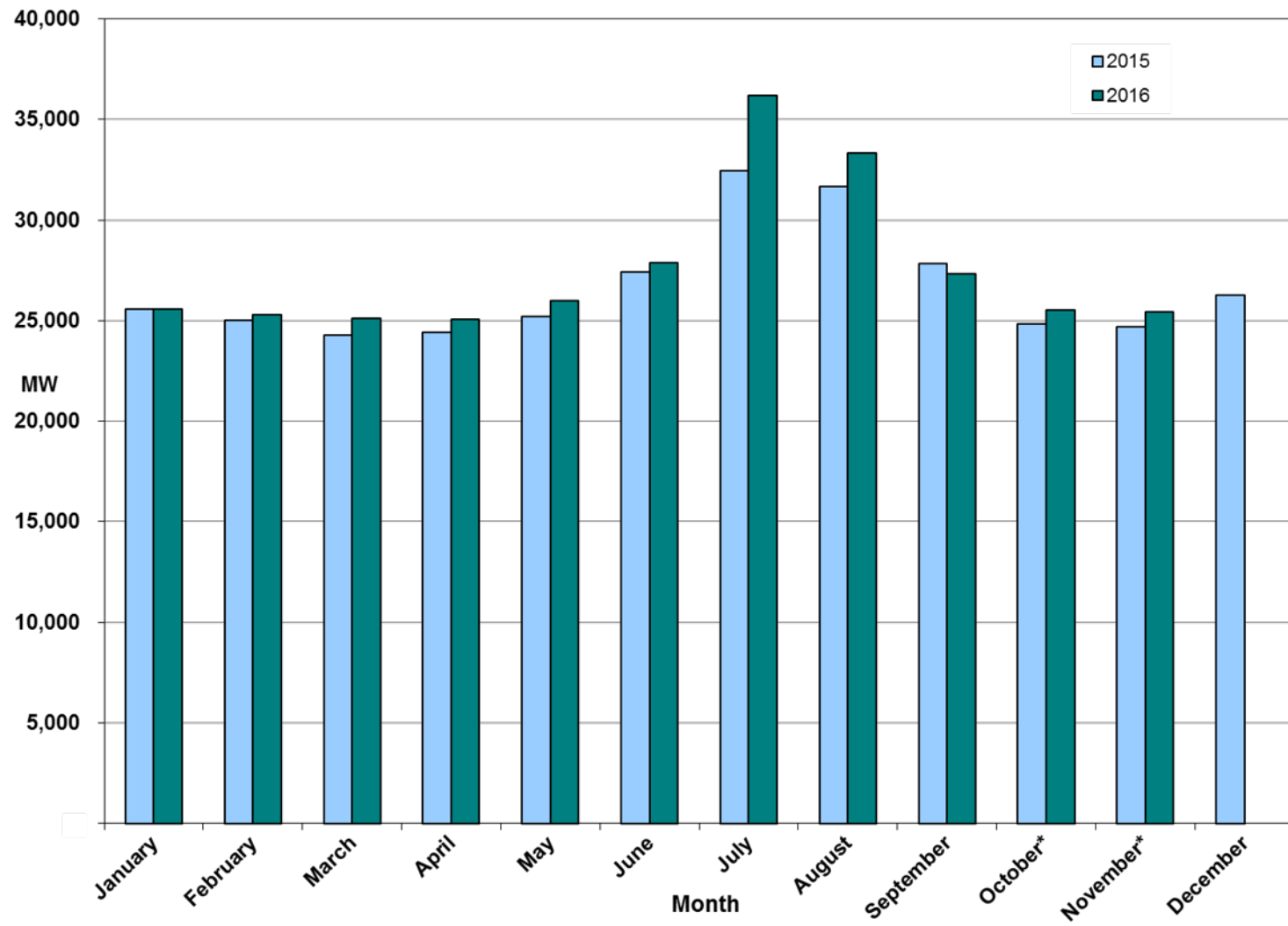
# ERCOT's CPS1 Monthly Performance – November 2016



## Monthly Peak Actual Demand – November 2016



## Monthly Minimum Actual 15-Minute Demand – November 2016





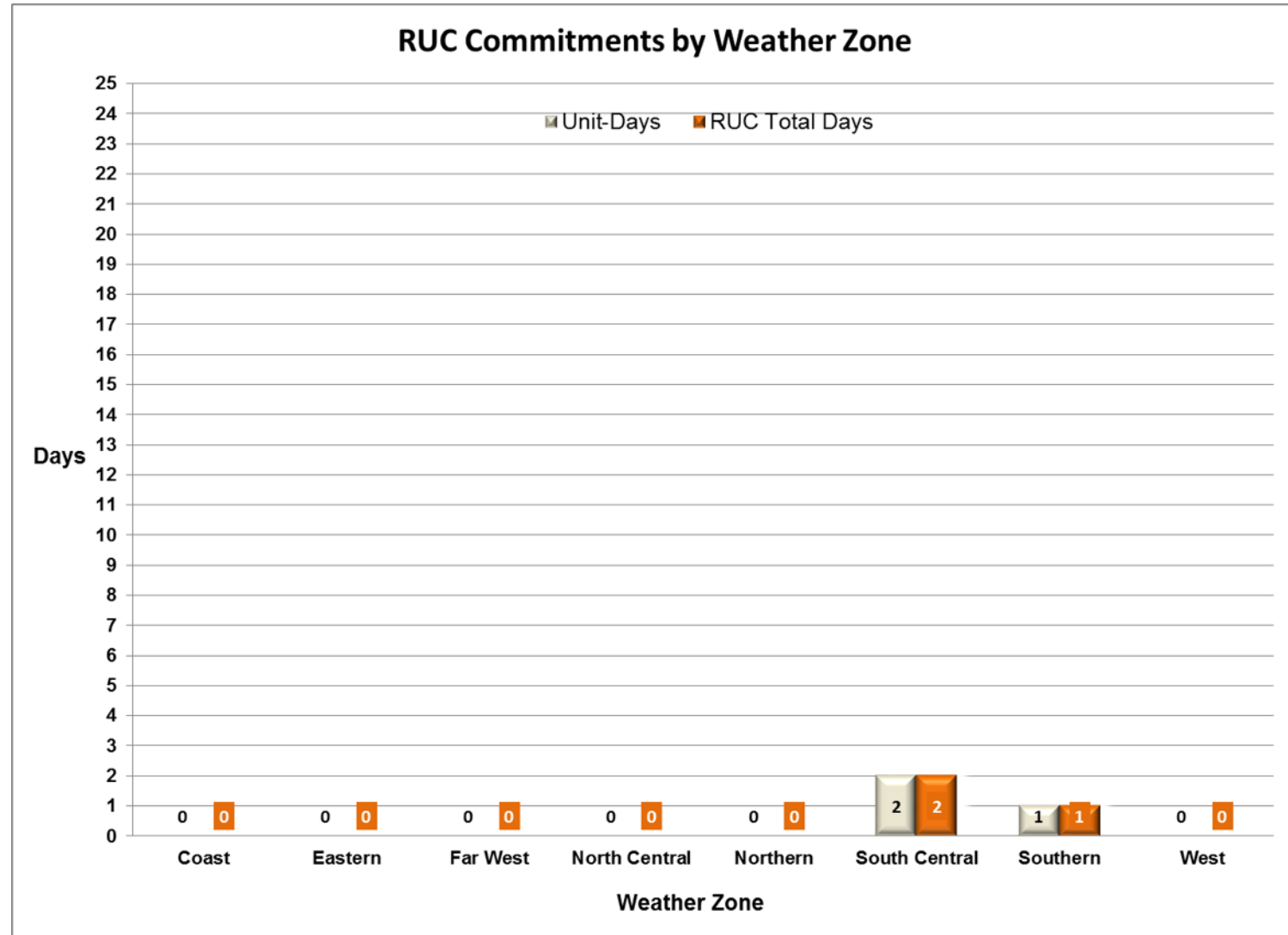
## Day-Ahead Load Forecast Performance – November 2016

**Mean Absolute Percent Error (MAPE) for ERCOT Mid-Term Load Forecast (MTLF)  
Run at 14:00 Day Ahead**

	<b>2013 MAPE</b>	<b>2014 MAPE</b>	<b>2015 MAPE</b>	<b>2016 MAPE</b>	<b>November 2016 MAPE</b>	
<b>Average Annual MAPE</b>	2.86	2.83	2.86	2.56	2.26	
<b>Lowest Monthly MAPE</b>	2.07	2.15	1.89	1.94	<b>Lowest Daily MAPE</b>	0.88 November 14
<b>Highest Monthly MAPE</b>	3.50	3.70	3.81	3.86	<b>Highest Daily MAPE</b>	4.50 November 19

## Reliability Unit Commitment (RUC) Capacity by Weather Zone

### November 2016



## Generic Transmission Constraints (GTCs) – November 2016

GTCs	Nov-15 Days GTCs	Sept-16 Days GTCs	Oct-16 Days GTCs	Nov-16 Days GTCs	Last 12 Months Total Days (Dec 15 – Nov 16)
North – Houston	0	0	0	0	2
Valley Import	0	1	1	0	6
Zorillo - Ajo	12	1	0	0	76
Panhandle	3	13	24	20	124
Laredo	1	7	0	0	13
Liston	-	19	17	16	249
Red Tap	-	0	0	0	0

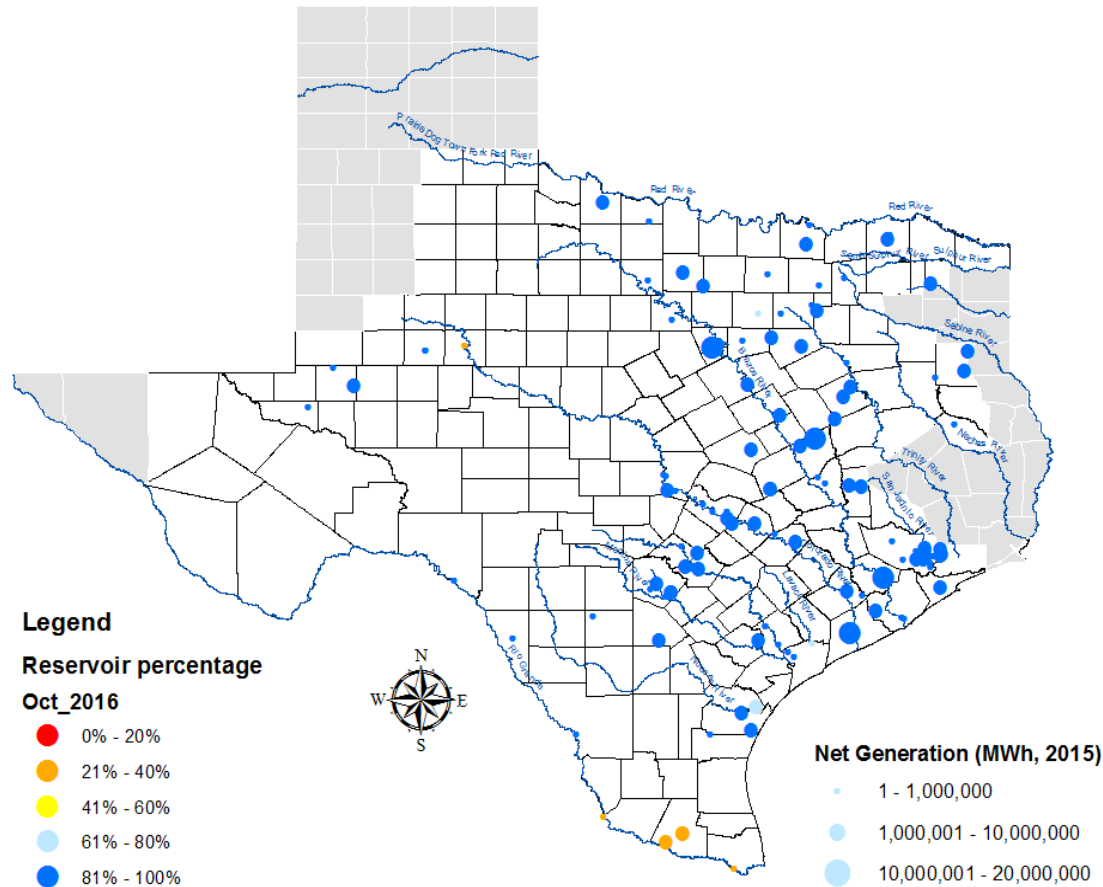
**GTC:** A transmission flow limit more constraining than a Transmission Element's normal limit established to constrain flow between geographic areas of the ERCOT Transmission System that is used to enforce stability and voltage constraints that cannot be modeled directly in ERCOT's transmission security analysis applications.

**Note:** This table lists how many times a constraint has been activated to avoid exceeding a GTC limit, it does not imply an exceedance of the GTC occurred.

## Advisories and Watches – November 2016

- One Advisory issued due to DAM timeline deviation.
  - Issued on 11/13
- One Watch issued due to SCED failure.
  - Issued on 11/21

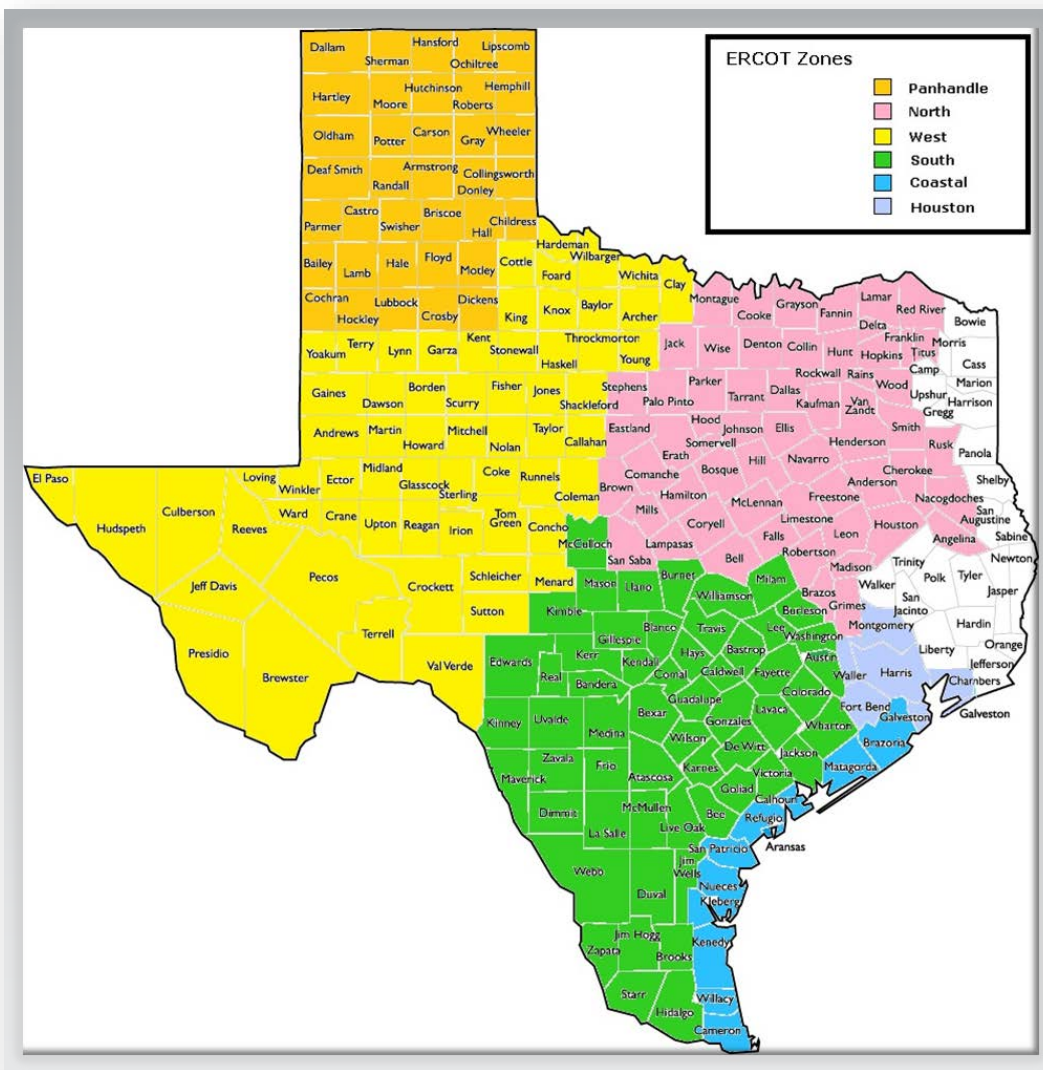
# Lake Levels Update – December 1, 2016



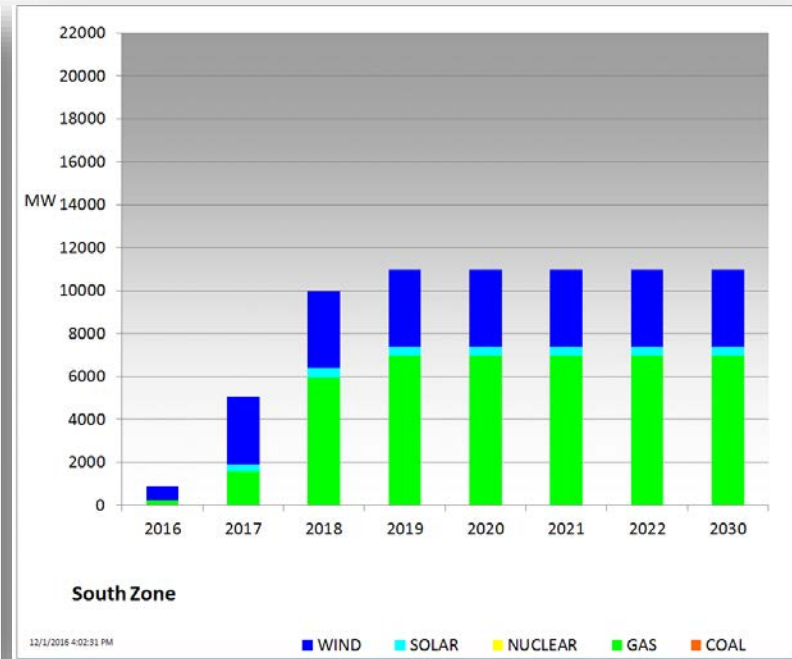
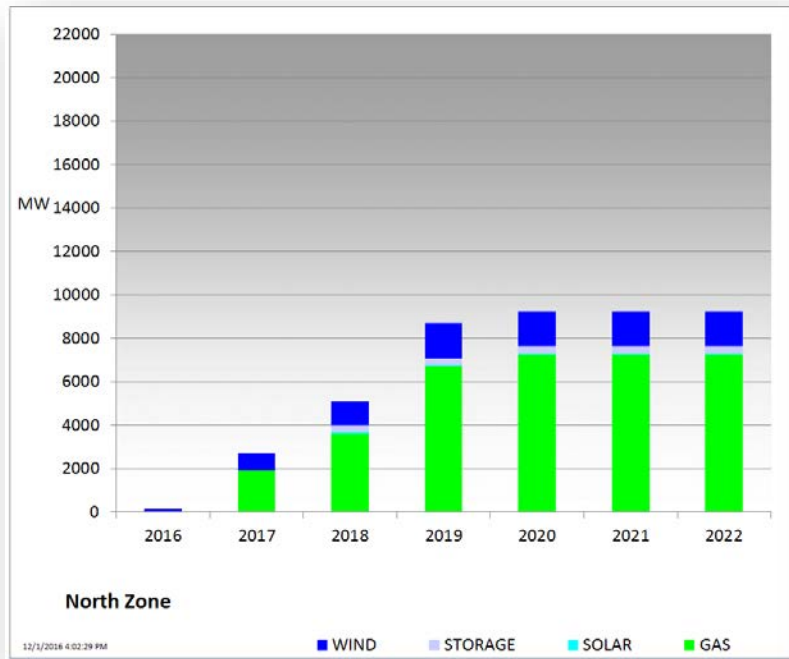
## Planning Summary – November 2016

- ERCOT is currently tracking 247 active generation interconnection requests totaling 59,527 MW. This includes 26,643 MW of wind generation.
- ERCOT is currently reviewing proposed transmission improvements with a total cost of \$855.7 Million.
- Transmission Projects endorsed in 2016 total \$489.1 Million.
- All projects (in engineering, routing, licensing, and construction) total approximately \$6.23 Billion (as of October 1, 2016).
- Transmission Projects energized in 2016 total about \$1.72 Billion (as of October 1, 2016).

## Mapping of Counties to ERCOT Zones – November 2016



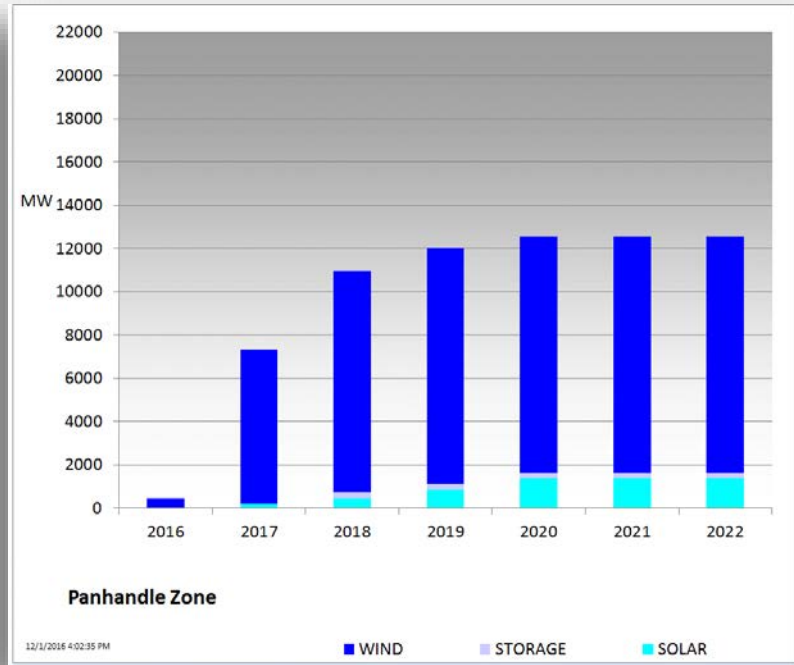
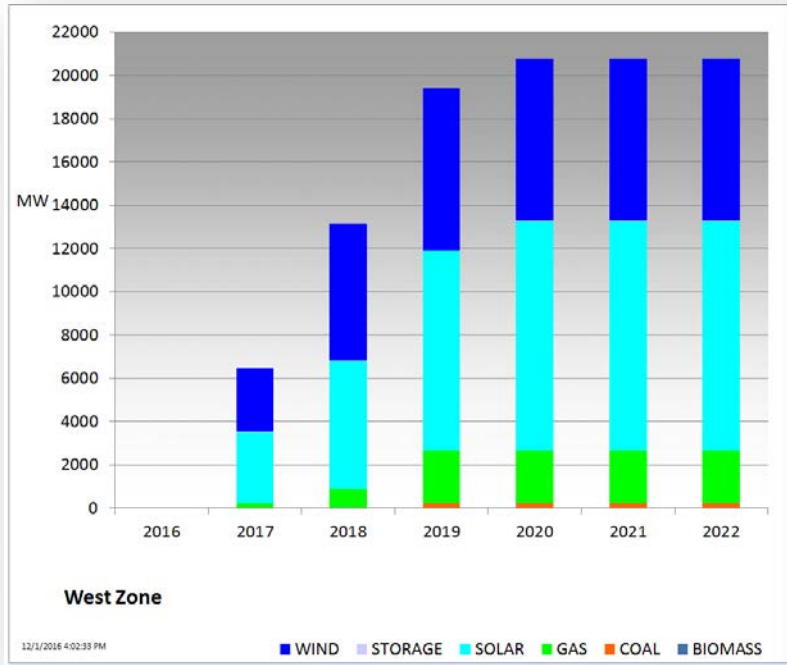
# Cumulative MW Capacity of Interconnection Requests by Zone November 2016





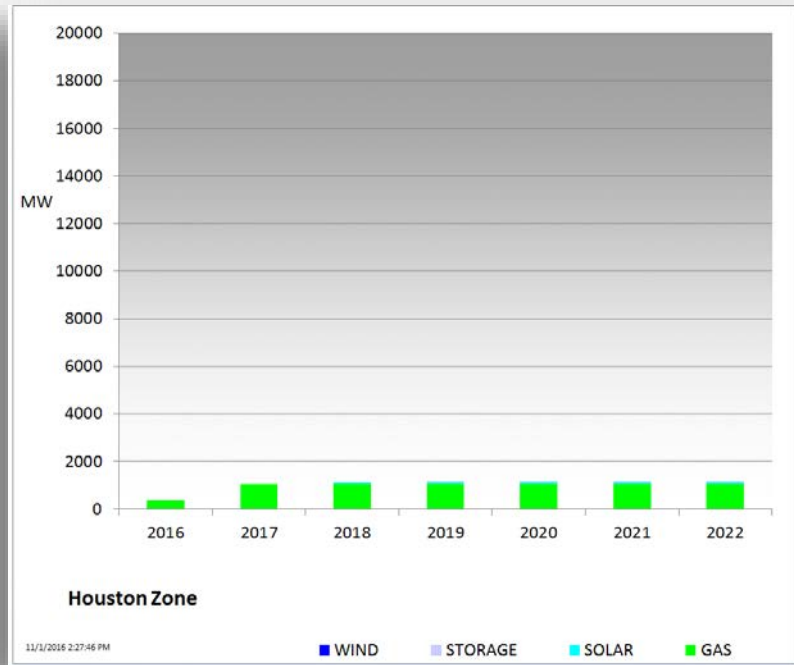
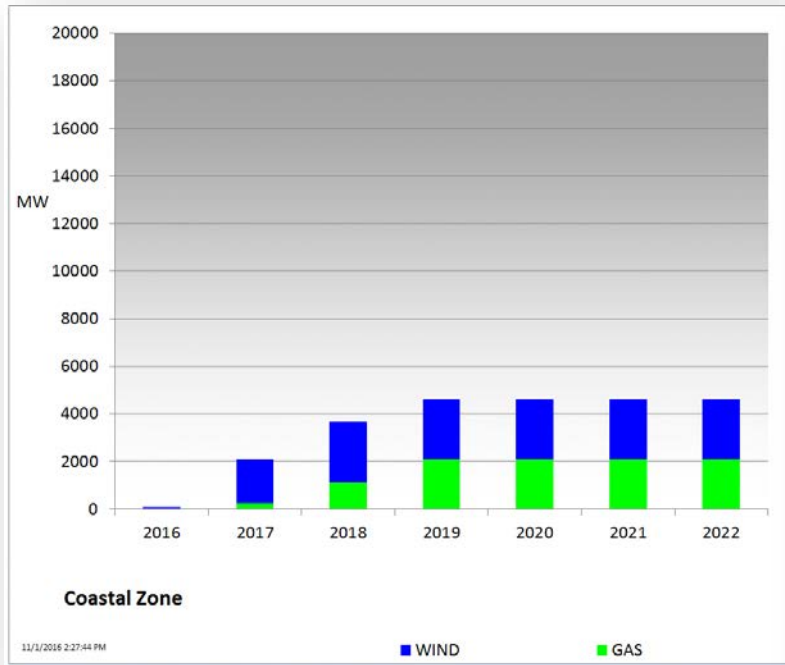
# Cumulative MW Capacity of Interconnection Requests by Zone

## November 2016

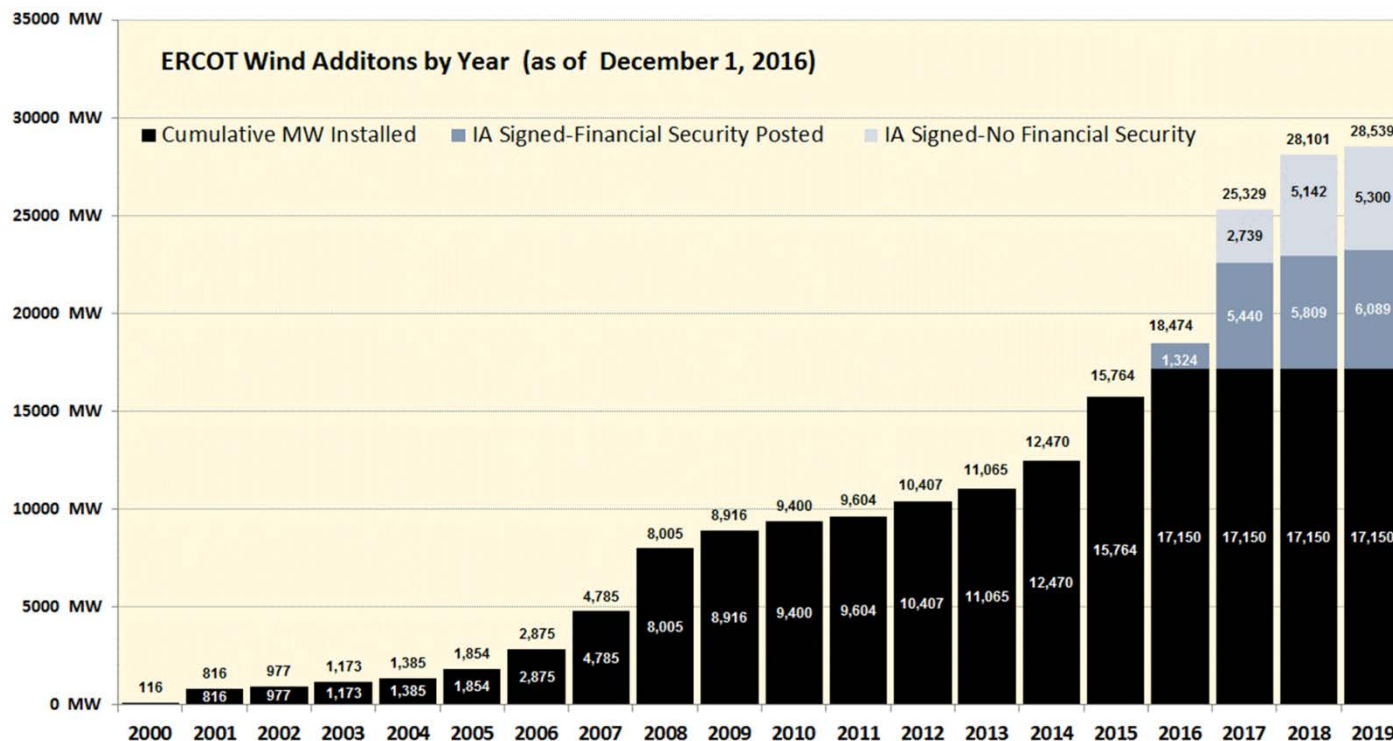


# Cumulative MW Capacity of Interconnection Requests by Zone

## November 2016



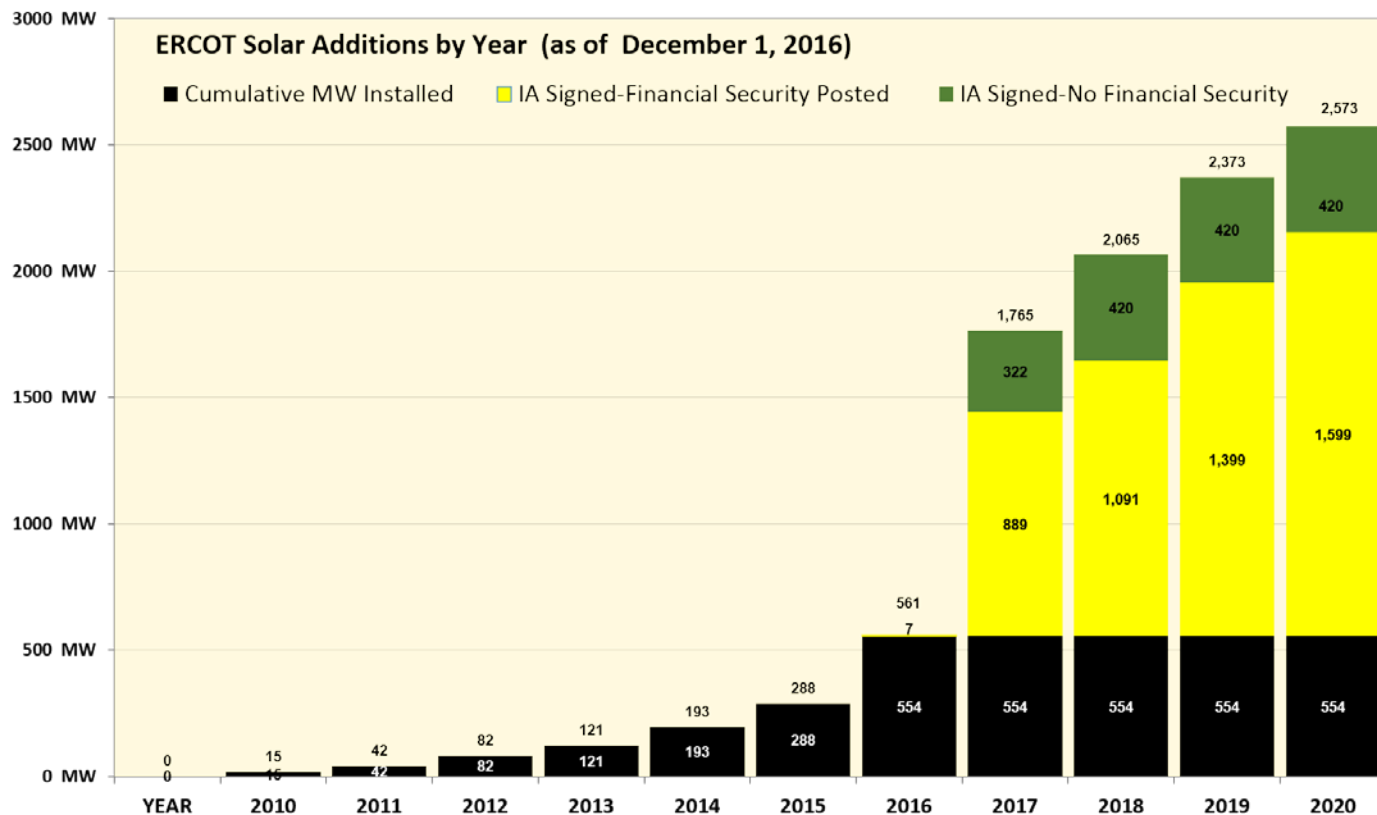
# Wind Generation – November 2016



**Notes:**

- The data presented here is based upon the latest information provided to ERCOT by resource owners and developers and can change without notice.
- Installed capacities for the current year account for changes reported by the facility owners during the reporting month, and will be reflected in subsequent years' totals.
- Installed capacities include only wind facilities that have registered with ERCOT (Those larger than one megawatt and supply power to the ERCOT system.)
- This chart reports annual planned units with projected Commercial Operations Dates throughout the calendar year. In contrast, ERCOT's Capacity, Demand and Reserves (CDR) report shows planned capacity projected to be commercially available on or before the start of the Summer and Winter Peak Load seasons.
- Financial security posted for funding interconnection facilities does not include CREZ security deposits, which are refunded to the Interconnecting Entity when an IA is signed.

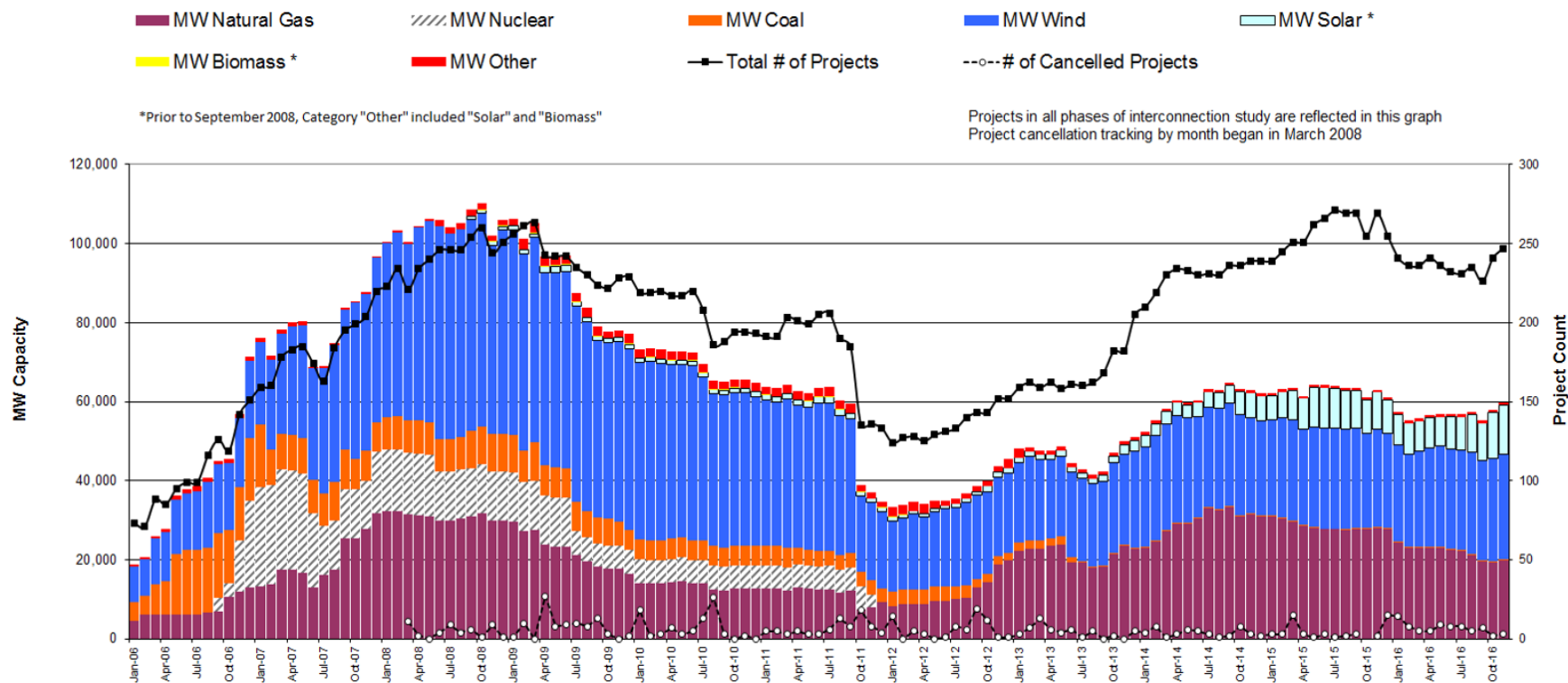
# Solar Generation – November 2016



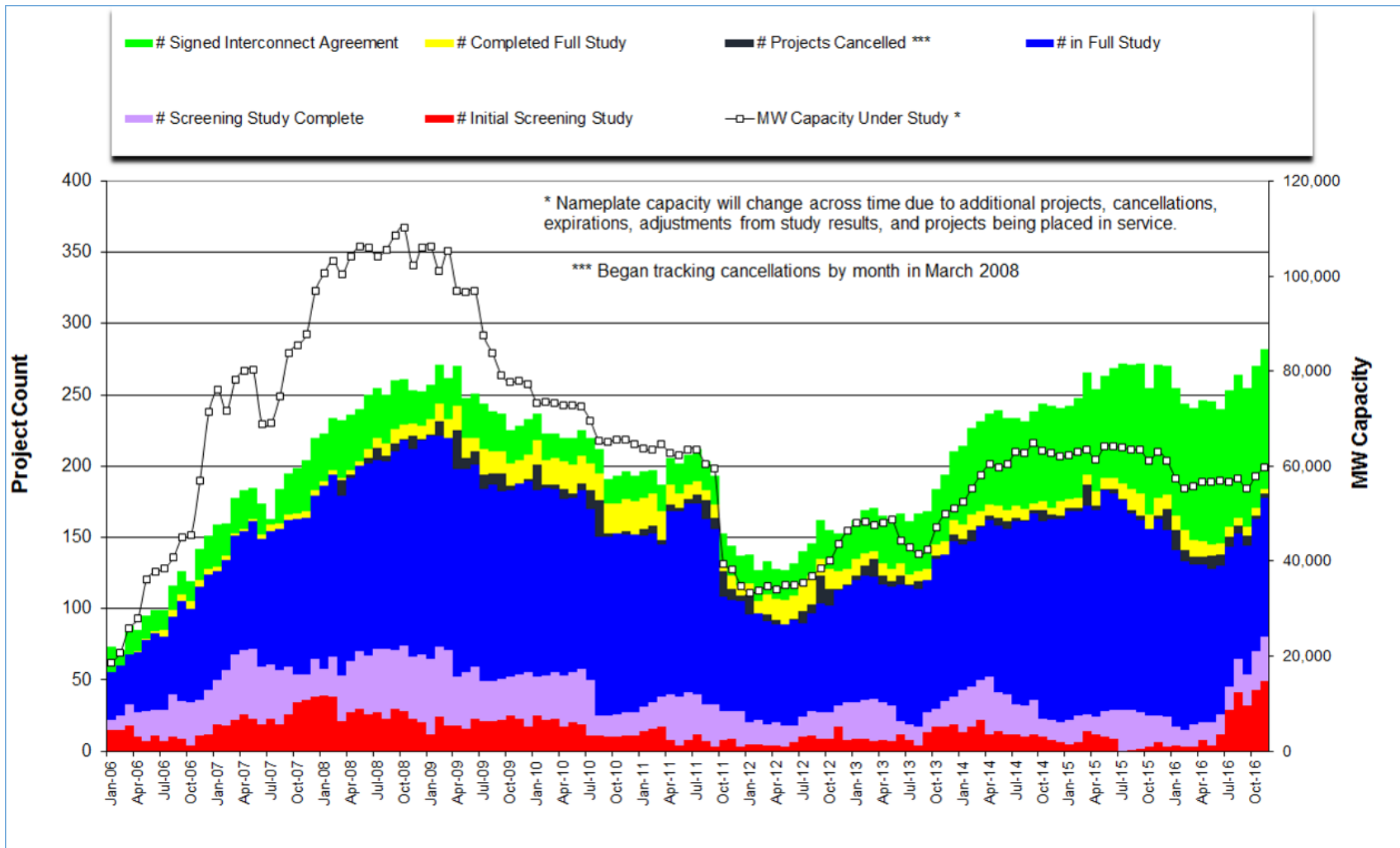
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# Generation Interconnection Activity by Fuel – November 2016

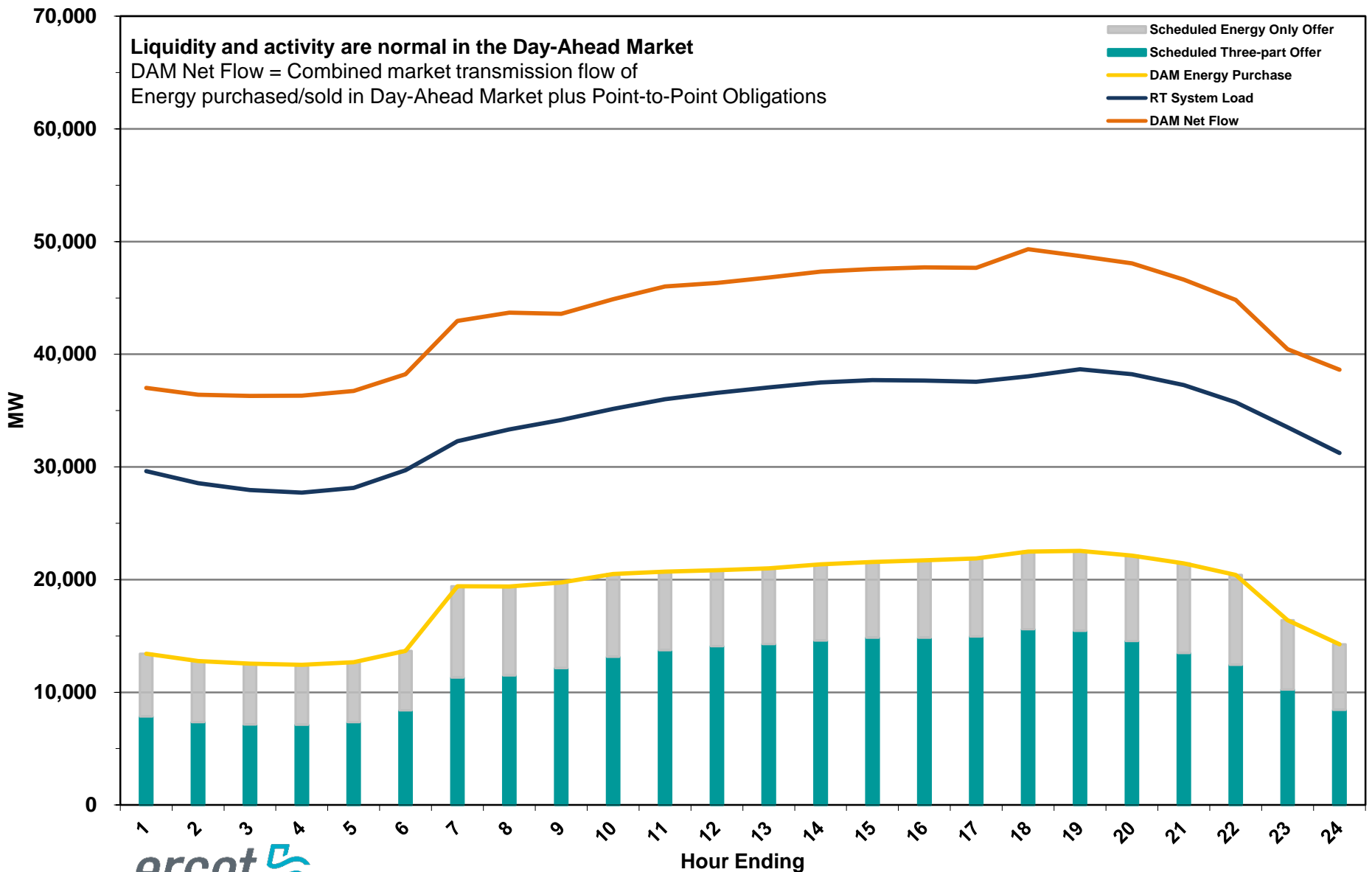


# Generation Interconnection Activity by Project Phase – November 2016



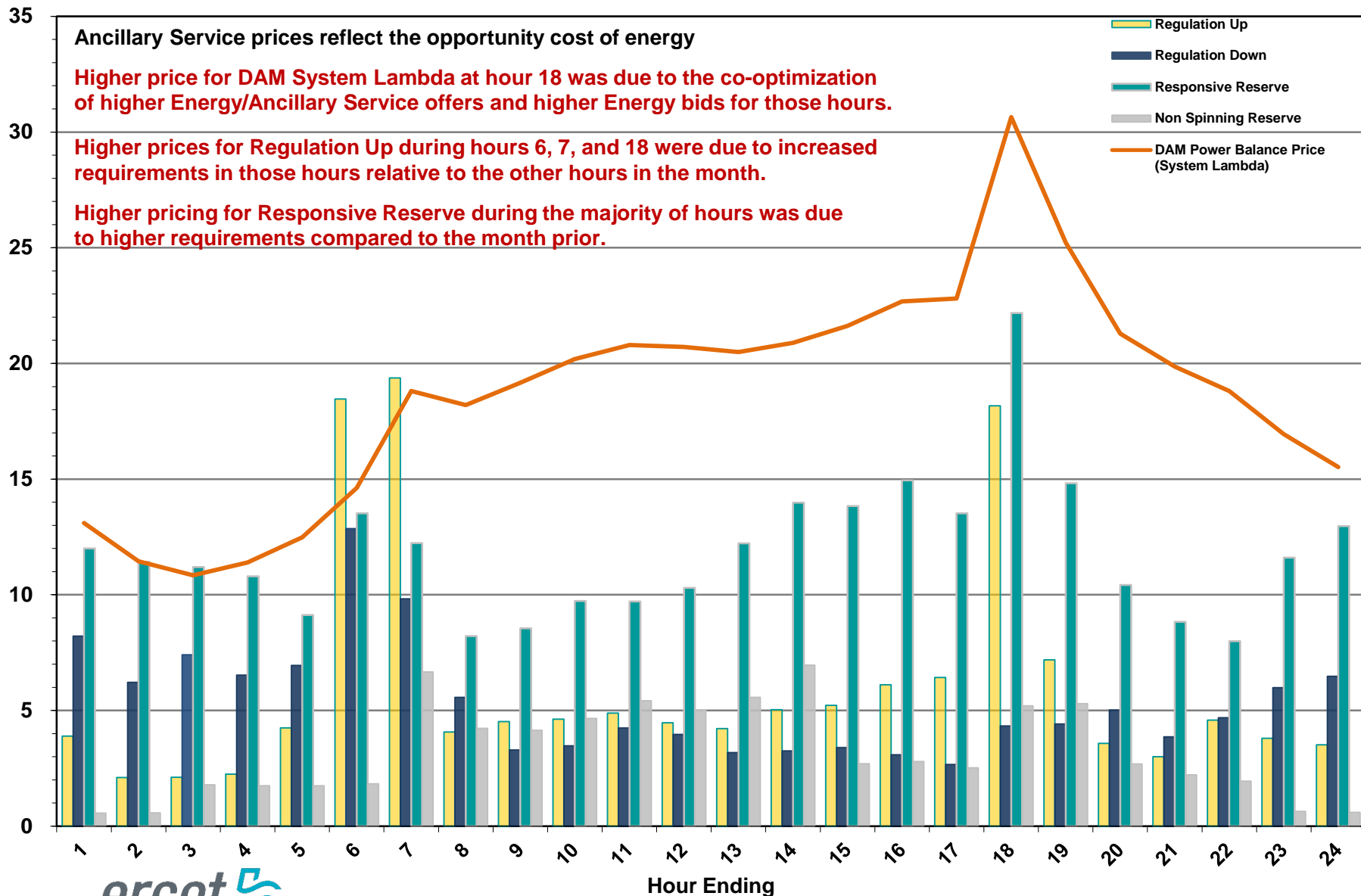
# Market Operations

# Day-Ahead Schedule (Hourly Average) – November 2016

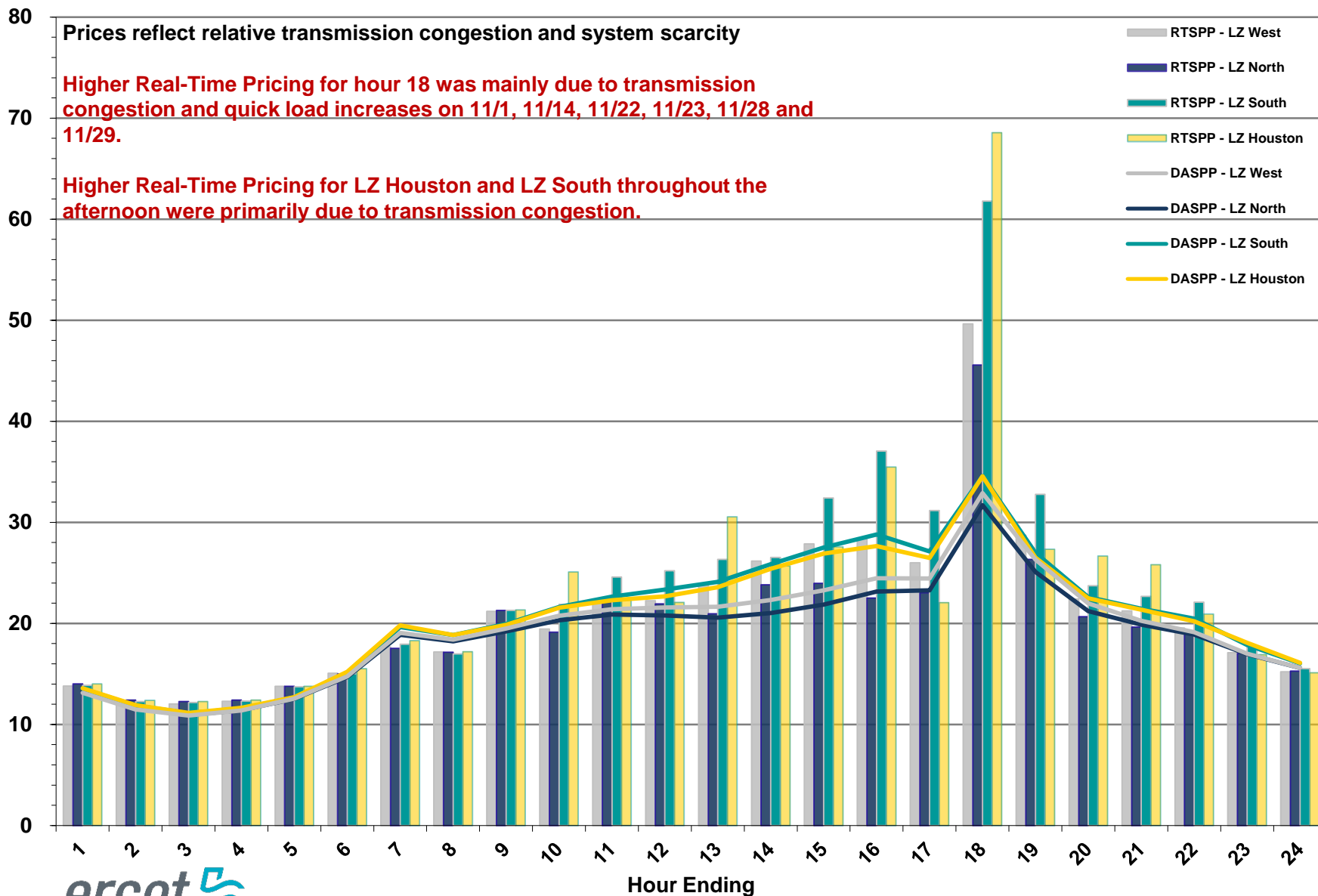




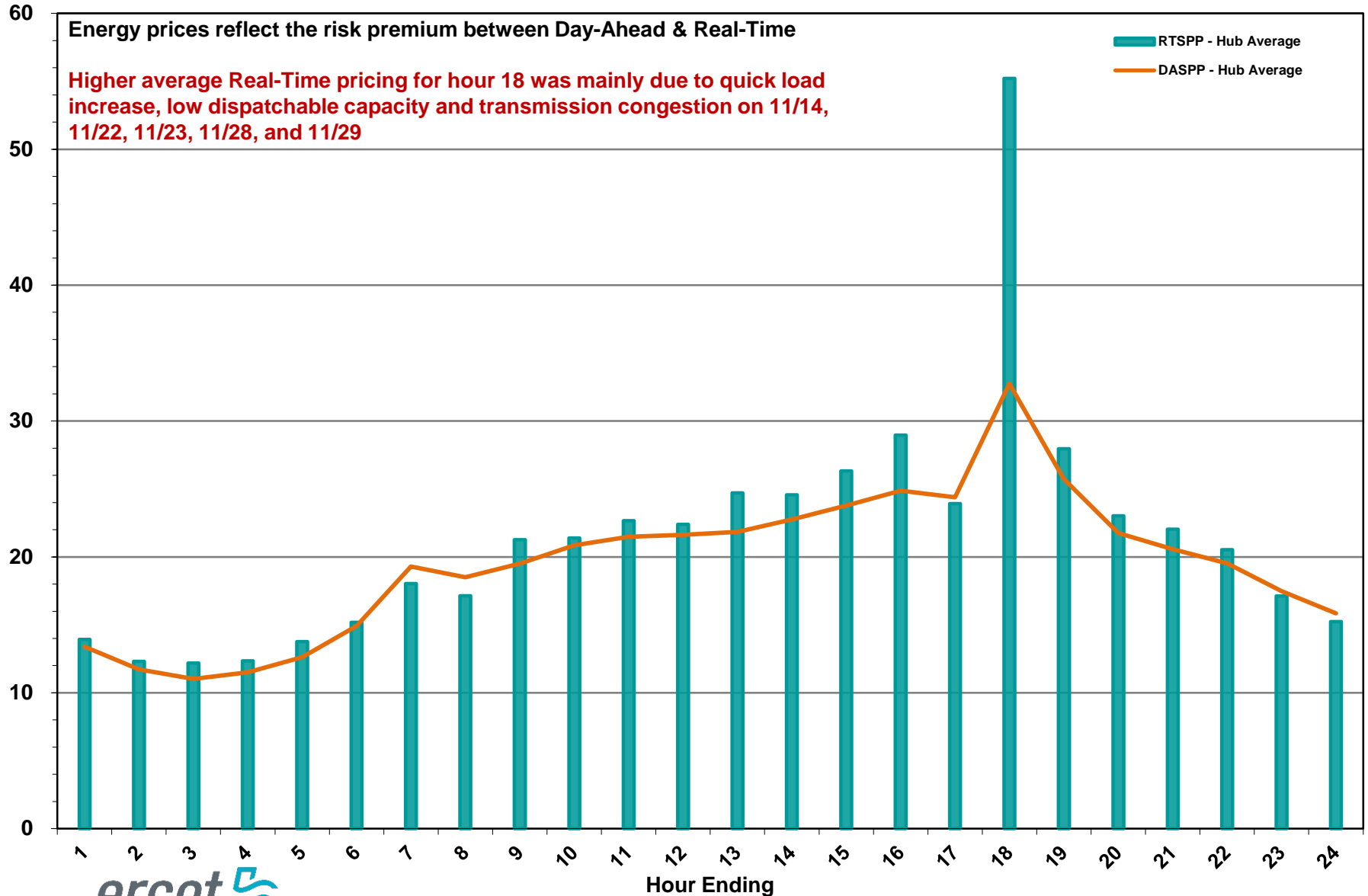
# Day-Ahead Electricity and Ancillary Service Prices (Hourly Average) – November 2016



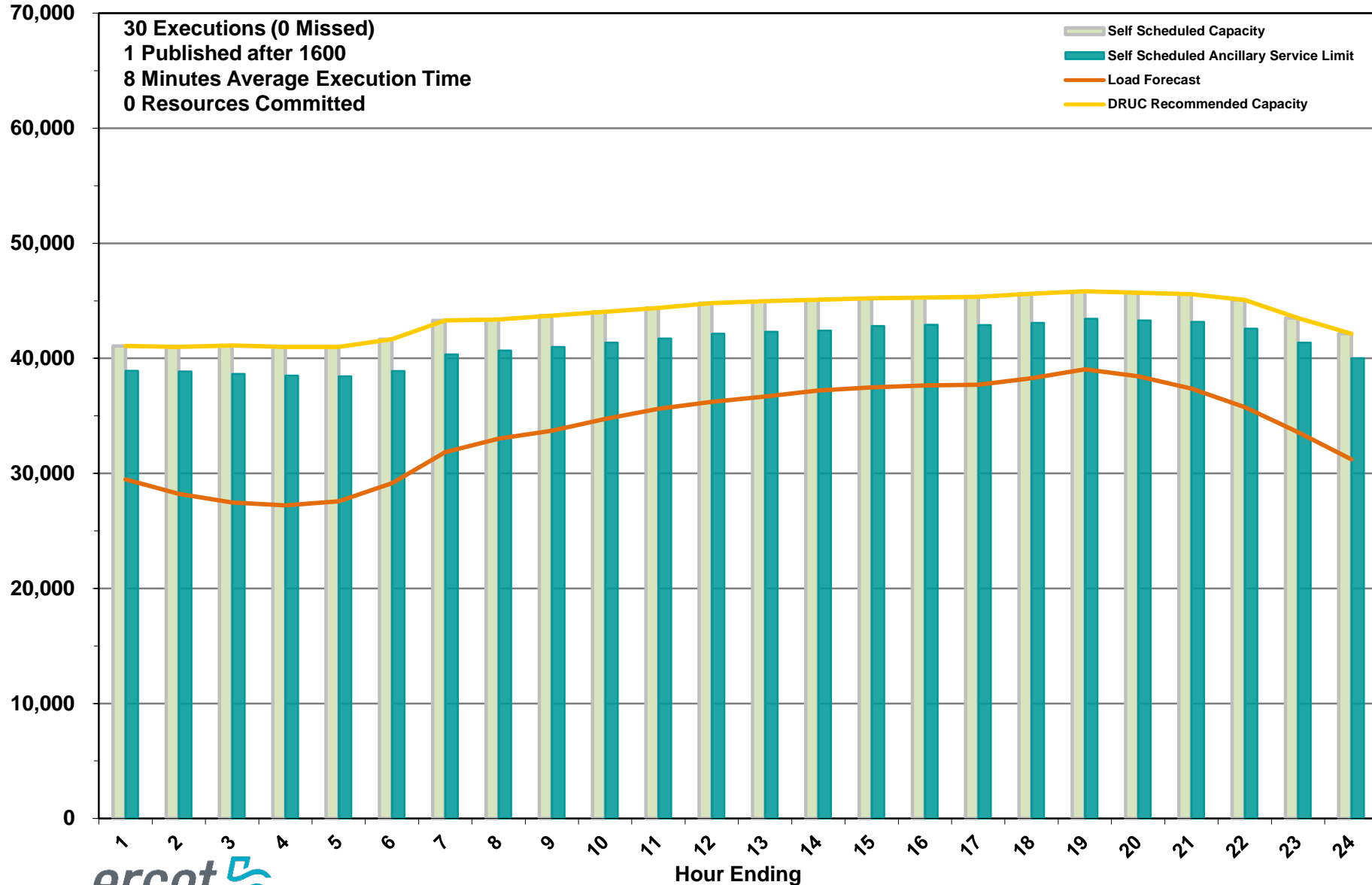
# Day-Ahead vs Real-Time Load Zone SPP (Hourly Average) – November 2016



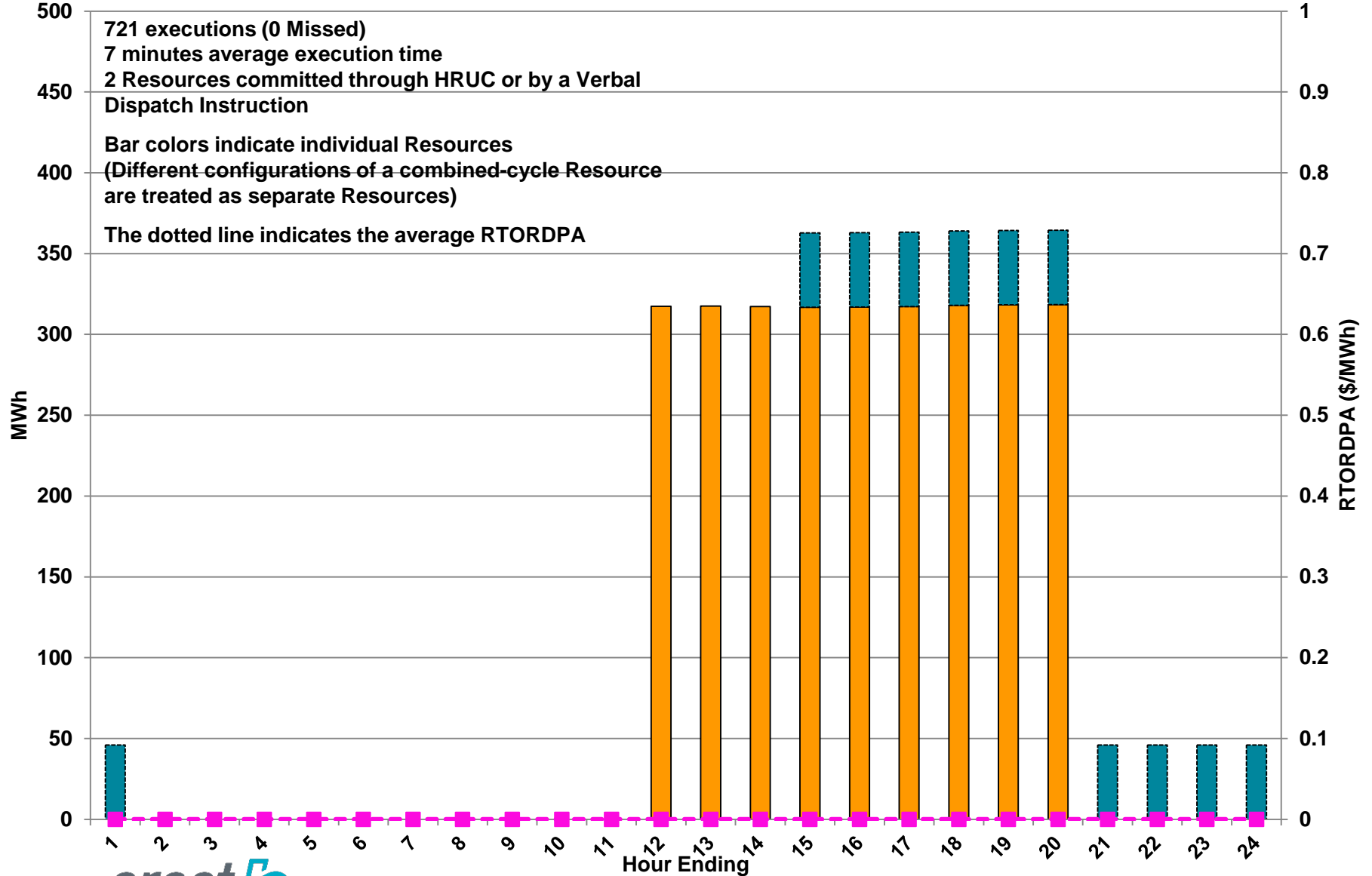
# Day-Ahead vs Real-Time Hub Average SPP (Hourly Average) – November 2016



# DRUC Monthly Summary (Hourly Average) – November 2016



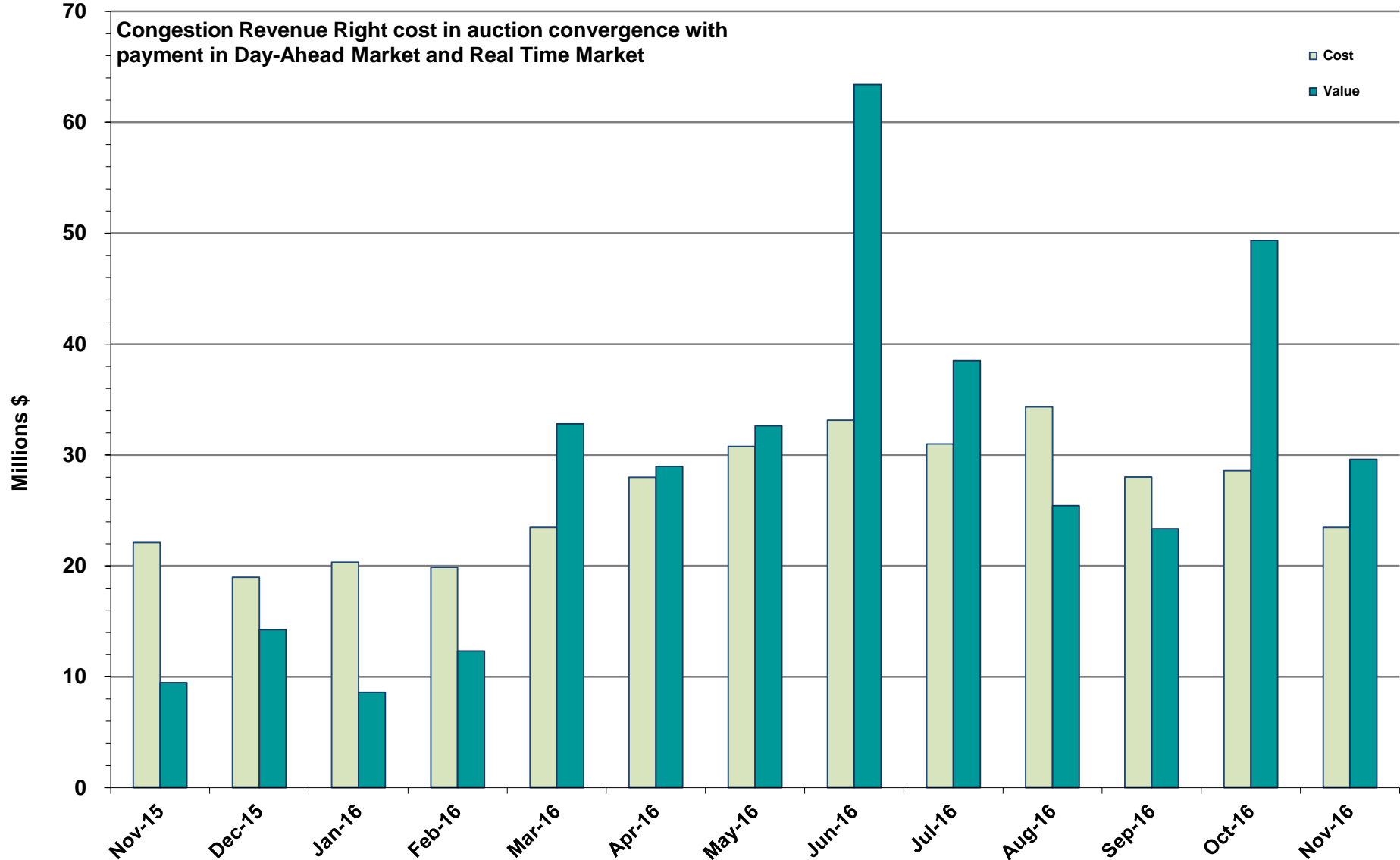
# HRUC Monthly Summary and Real Time On-Line Reliability Deployment Price Adder (RTORDPA) (Hourly Average) – November 2016



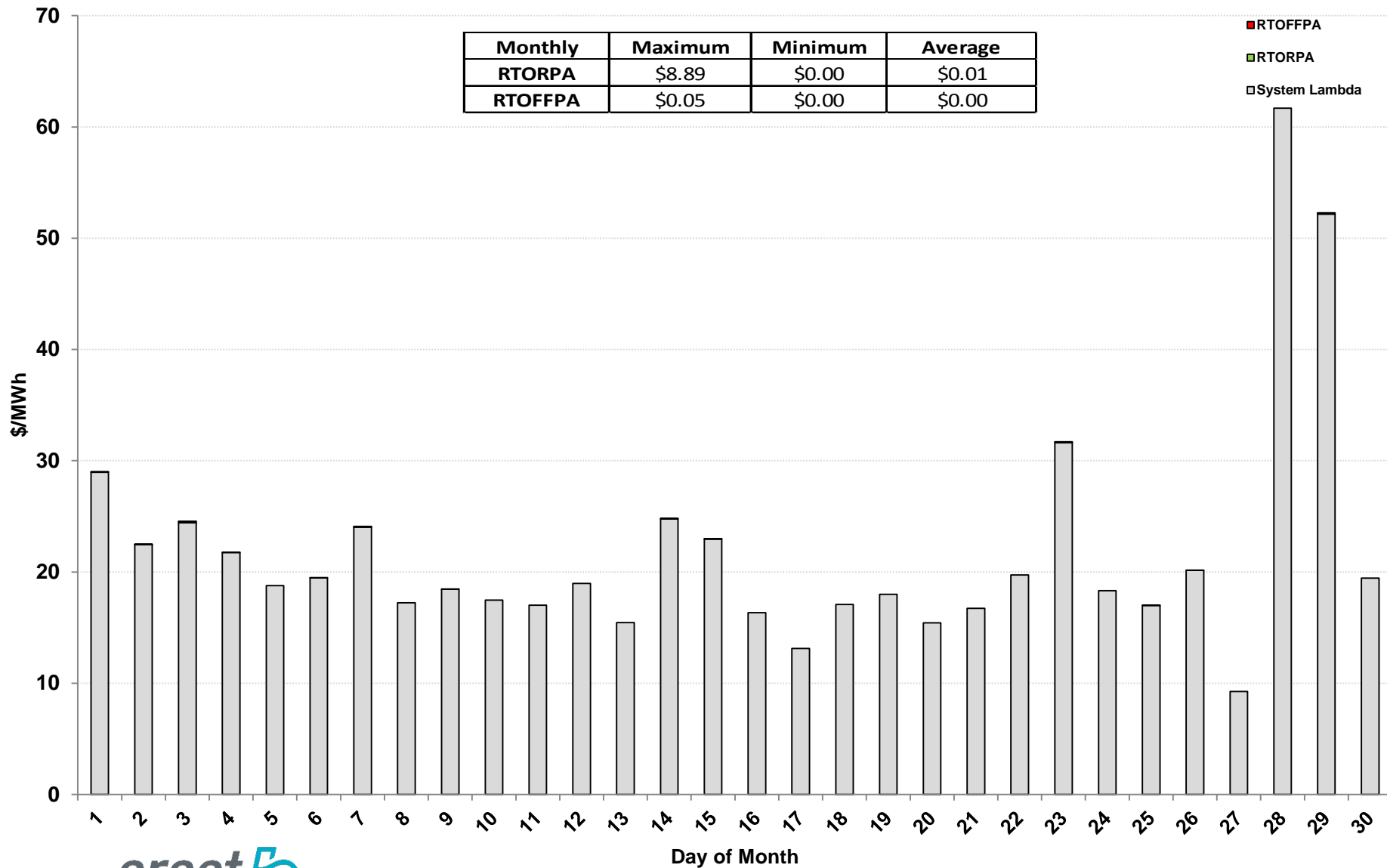
## Non-Spinning Reserve Service Deployment – November 2016

Deployment Start Time	Deployment End Time	Deployment Duration (Hours)	Max Deployment (MW)	Reason
11/29/2016 3:09:57 PM	11/29/2016 4:36:33 PM	1.4	46	Transmission Congestion

## CRR Price Convergence – November 2016



# Daily Average System Lambda and ORDC Price Adders – November 2016





## ERS Procurement for – October 2016 – January 2017

	TP1	TP2	TP3	TP4	TP5	TP6
Non Weather-Sensitive ERS-10 MW	299.408	309.348	307.197	301.417	297.547	270.698
Non Weather-Sensitive ERS-30 MW	544.383	586.506	572.900	562.770	540.306	479.082
Weather-Sensitive ERS-10 MW	0	0	0	0	0	0
Weather-Sensitive ERS-30 MW	1.91	0	1.68	2.16	0	0
Total MW Procured	845.701	895.854	881.777	866.347	837.853	749.780
Clearing Price	\$17.63	\$6.32	\$2.07	\$17.14	\$18.26	\$2.52

\*Weather-Sensitive Time Periods are TP1,TP3 and TP4.

### Time Period      Time Period Hours

Time Period 1      Hours Ending 0600 - 0800 (5:00:00 a.m. to 8:00:00 a.m.) Monday through Friday except ERCOT Holidays.

Time Period 2      Hours Ending 0900 - 1300 (8:00:00 a.m. to 1:00:00 p.m.) Monday through Friday except ERCOT Holidays.

Time Period 3      Hours Ending 1400 - 1600 (1:00:00 p.m. to 4:00:00 p.m.) Monday through Friday except ERCOT Holidays.

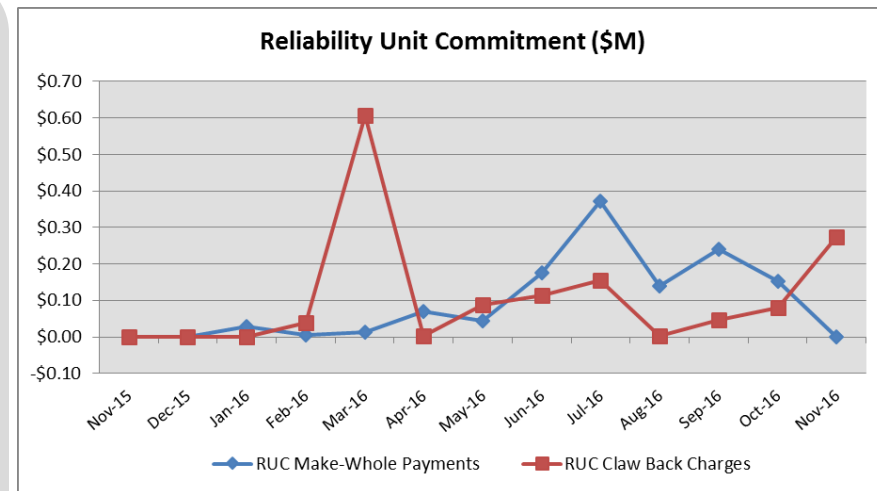
Time Period 4      Hours Ending 1700 - 1900 (4:00:00 p.m. to 7:00:00 p.m.) Monday through Friday except ERCOT Holidays.

Time Period 5      Hours Ending 2000 - 2200 (7:00:00 p.m. to 10:00:00 p.m.) Monday through Friday except ERCOT Holidays.

Time Period 6      All other hours

## Reliability Services – November 2016

Reliability Unit Commitment (RUC)	\$ in Millions
RUC Make-Whole Payments	\$0.00
RUC Clawback Charges	\$0.27
<b>RUC Commitment Settlement</b>	<b>\$0.27</b>
RUC Capacity Short Charges	\$0.00
RUC Make-Whole Uplift	\$0.00
<b>RUC Commitment Cost Allocation</b>	<b>\$0.00</b>
RUC Decommitment Payments	\$0.00



RUC Make-Whole Payments were \$0.00M in November 2016.  
RUC Clawback Charges were \$0.27M.

There was \$0.27M allocated directly to load in November 2016, compared to:

- \$0.08M in October 2016
- \$0.00M in November 2015

## Capacity Services – November 2016

Capacity Services	\$ in Millions
Regulation Up Service	\$1.55
Regulation Down Service	\$1.09
Responsive Reserve Service	\$21.03
Non-Spinning Reserve Service	\$4.31
Black Start Service	\$0.61
Voltage Services - Reactive Power	\$0.00
Voltage Services - Lost Opportunity	\$0.00
<b>Total Charges</b>	<b>\$28.59</b>

Capacity Services costs decreased from last month and decreased from November 2015.

November 2016 cost was \$28.59M, compared to:

- A charge of \$30.60M in October 2016
- A charge of \$33.80M in November 2015

## Energy Settlement – November 2016

Day-Ahead Market Energy Settlement	\$ in Millions
Energy Purchases	\$281.07
Point to Point Obligation Purchases	\$22.10
RMR Day-Ahead Revenue	\$0.00
Energy Sales	(\$273.55)
Day-Ahead Congestion Rent	\$29.62
Day-Ahead Market Make-Whole Payments	(\$0.07)

Day-Ahead Market energy settlement decreased from last month and increased from November 2015.

Real-Time Market energy settlement activity decreased from last month and increased from November 2015.

Real-Time Market Energy Settlement	\$ in Millions
Energy Imbalance at a Resource Node	(\$285.40)
Energy Imbalance at a Load Zone	\$447.04
Energy Imbalance at a Hub	(\$134.00)
Real Time Congestion from Self Schedules	\$0.00
Block Load Transfers and DC Ties	(\$1.13)
Impact to Revenue Neutrality	\$36.64
Emergency Energy Payments	(\$0.09)
Base Point Deviation Charges	\$0.14
Real-Time Metered Generation (MWh in millions)	24.51

## Congestion Revenue Rights (CRR) – November 2016

	\$ in Millions
Annual Auction	(\$18.22)
Monthly Auction	(\$5.26)
<b>Total Auction Revenue</b>	<b>(\$23.48)</b>
Day-Ahead CRR Settlement	(\$35.38)
Day-Ahead CRR Short-Charges	\$6.75
Day-Ahead CRR Short-Charges Refunded	(\$6.75)
Real-Time CRR Settlement	\$0.00
Real-Time CRR Short-Charges	\$0.00
Real-Time CRR Short-Charges Refunded	\$0.00
<b>Total CRR Funding</b>	<b>(\$35.38)</b>
Day-Ahead Point to Point Obligations Settlement	\$22.10
Real-Time Point to Point Obligation Settlement	(\$30.39)
<b>Net Point to Point Obligation Settlement</b>	<b>(\$8.29)</b>

Congestion Revenue Rights settlement payments were fully funded. The additional funding to settle the CRR Short Charges was provided from the CRR Balancing Account Fund.

Point to Point Obligations settled with a net credit of \$8.29M compared to a net charge of \$6.81M last month.

## CRR Balancing Account Fund – November 2016

<b>CRR Balancing Account Fund</b>	<b>\$ in Millions</b>
<b>Beginning Balance for the Month</b>	\$10.00
<b>CRR Balancing Account Credit Total</b>	\$0.99
<b>CRR PTP Option Award Charges</b>	\$0.05
<b>Day-Ahead CRR Short-Charges Refunded</b>	(\$6.75)
<b>Load Allocated CRR Amount</b>	\$0.00
<b>Total Fund Amount</b>	\$4.29

ERCOT implemented the rolling CRR Balancing Account Fund beginning with Operating Month December 2014. The month of November 2016 closed with a shortfall of \$5.71M which was withdrawn from the CRR Balancing Account Fund.

As of November 2016, the CRR Balancing Account Fund was reduced to \$4.29M.

## Revenue Neutrality – November 2016

### Revenue Neutrality Settlement

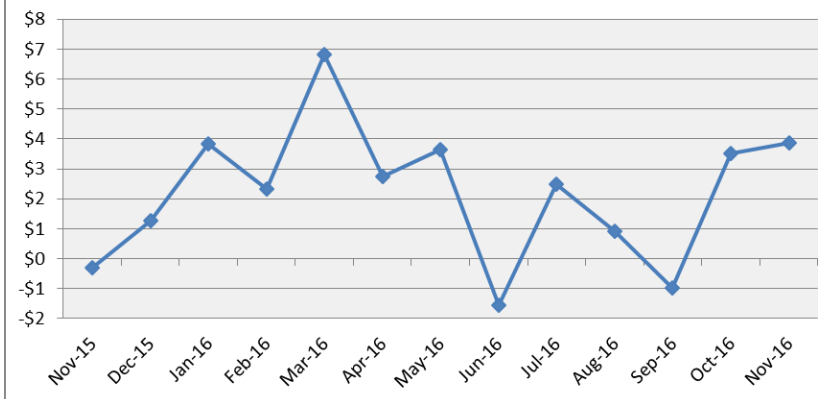
	\$ in Millions
Real-Time Point to Point Obligation Settlement	(\$30.39)
Real-Time Point to Point Options and Options with Refund Settlement	\$0.00
Real-Time Energy Imbalance Settlement	\$27.63
Real-Time Congestion from Self-Schedules Settlement	\$0.00
DC Tie & Block Load Transfer Settlement	(\$1.13)
<b>Charge to Load</b>	<b>\$3.89</b>

Revenue Neutrality charges to load increased compared to last month and increased compared to November 2015.

November 2016 was a charge of \$3.89M, compared to:

- \$3.50M charge in October 2016
- \$0.31M credit in November 2015

Revenue Neutrality Uplift (\$M)



## Real-Time Ancillary Service Imbalance (ORDC) – November 2016

Real-Time Ancillary Service Imbalance	\$ in Thousands
Real-Time AS Imbalance Payment Amount	(\$8.35)
Load Allocated AS Imbalance Revenue Neutrality Amount	\$8.34
<b>Total Charges</b>	<b>\$8.34</b>

In November 2016, total credits to QSEs w/an Ancillary Service Imbalance were \$8,346, while total credits in October 2016 were \$108,664.

21 of the 30 days in November had settlement dollars equal to \$0 for the day.

All days in November with settlement greater than \$0 were settled as a net credit to QSEs w/ an Ancillary Service Imbalance and as a charge to QSEs representing load.

The highest payment to QSEs w/an Ancillary Service Imbalance occurred on November 23<sup>rd</sup> in the amount of \$2,234.



## Net Allocation to Load – November 2016

### Market-Based Allocation

\$ in Millions

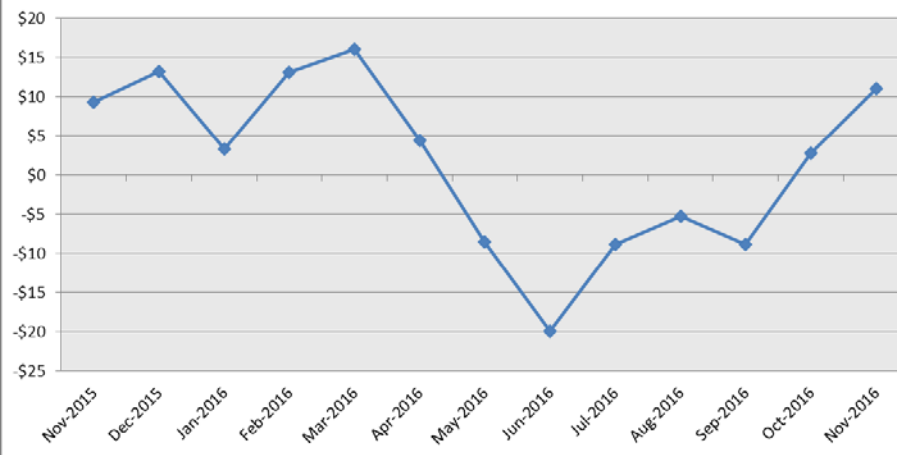
CRR Auction Revenue Disbursement Settlement	(\$23.48)
Balancing Account Proceeds Settlement	\$0.00
Net Reliability Unit Commitment Settlement	(\$0.27)
Ancillary Services Settlement	\$28.59
Reliability Must Run Settlement (incl. RMR for Capacity)	\$2.30
Real-Time Revenue Neutrality Settlement	\$3.89
Emergency Energy Settlement	\$0.09
Base Point Deviation Settlement	(\$0.14)
ORDC Settlement	\$0.01
<b>Total</b>	<b>\$10.99</b>
<b>Fee Allocation</b>	
ERCOT Administrative Fee Settlement	\$13.66
<b>Net Allocated to Load</b>	<b>\$24.65</b>

The charge for the net allocation to Load increased from last month and increased from November 2015.

November 2016 was a charge of \$24.65M, compared to:

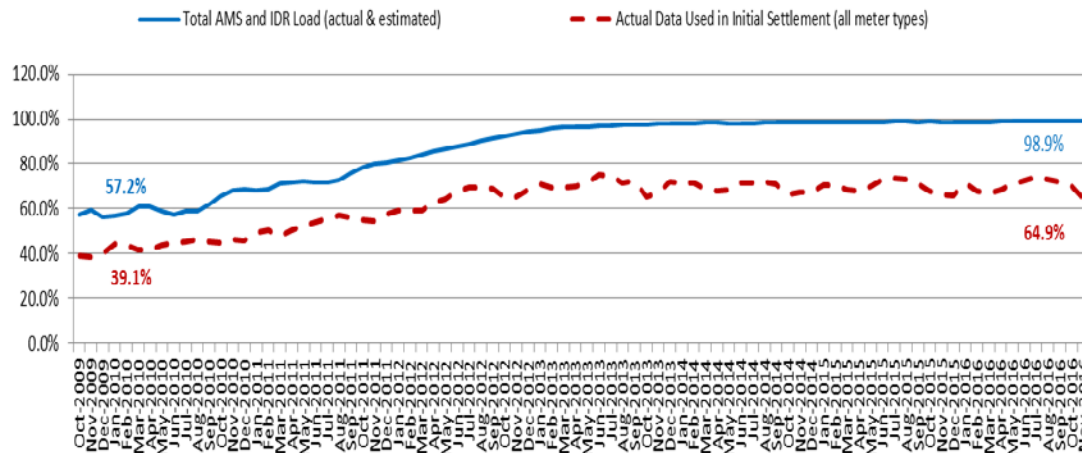
- A charge of \$19.05M in October 2016
- A charge of \$20.40M in November 2015

Market Based Fees Net Impact to Load (\$M)



# Advanced Meter Settlement Impacts – November 2016

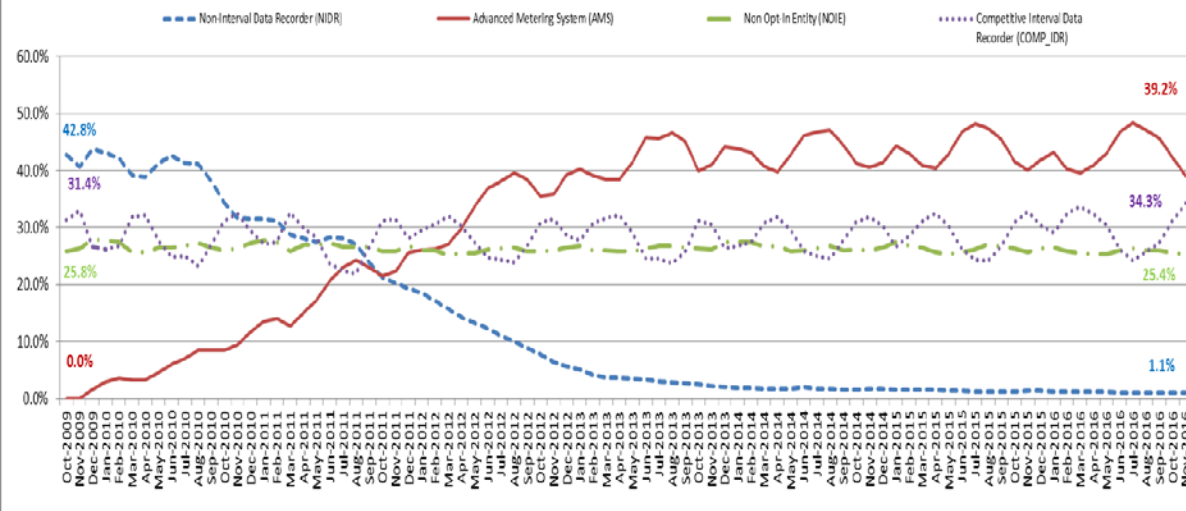
Percent Actual/Percent Interval Data Recorder (IDR)



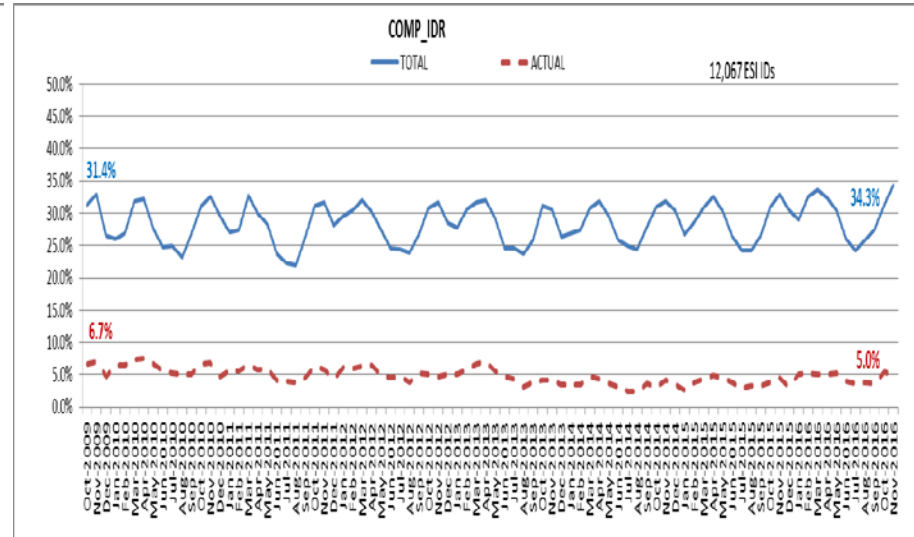
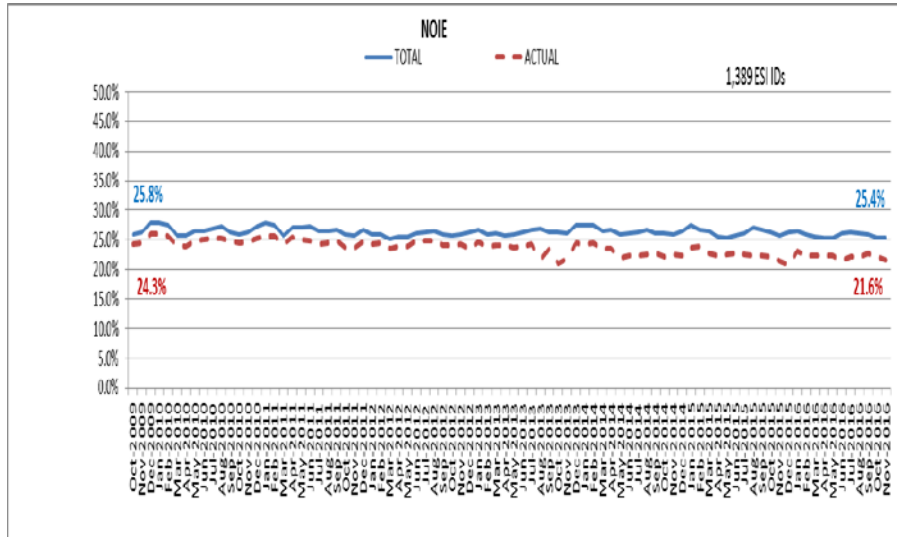
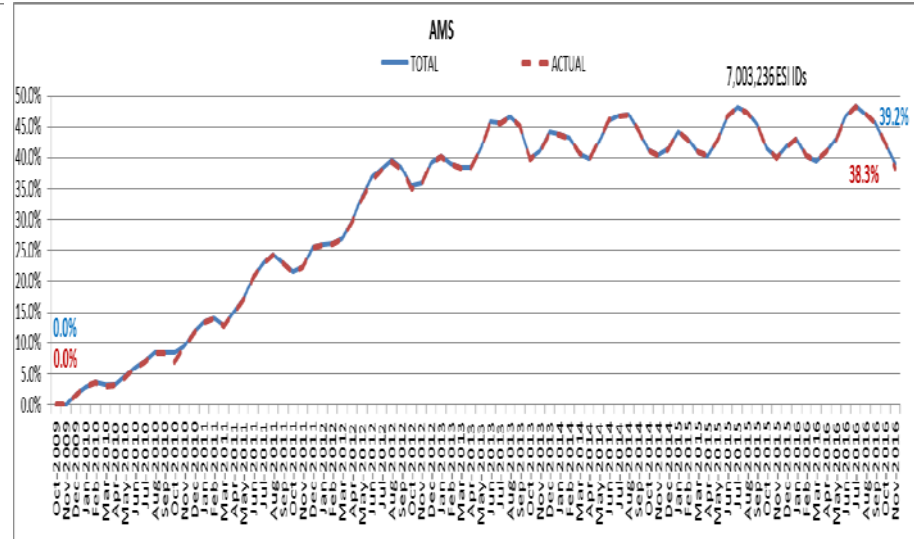
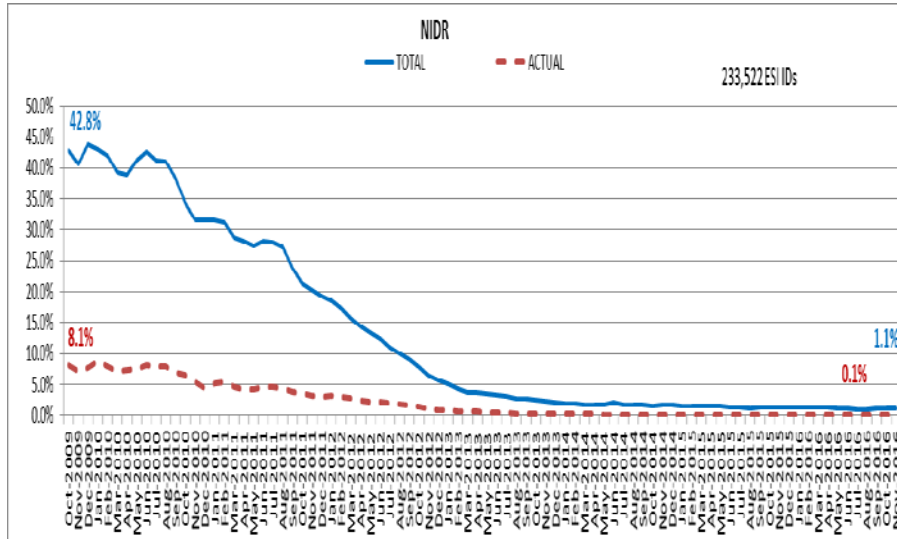
November 2016: At month end, settling 7.0M ESIIDs using Advanced Meter data.

November 2016: 98.9% of the load in ERCOT is settled with 15-min interval data (AMS, Competitive IDR, and NOIE IDR).

Percent of Load by Meter Type



# ERCOT Wide Load Volumes by Meter Type – INITIAL Settlement – November 2016

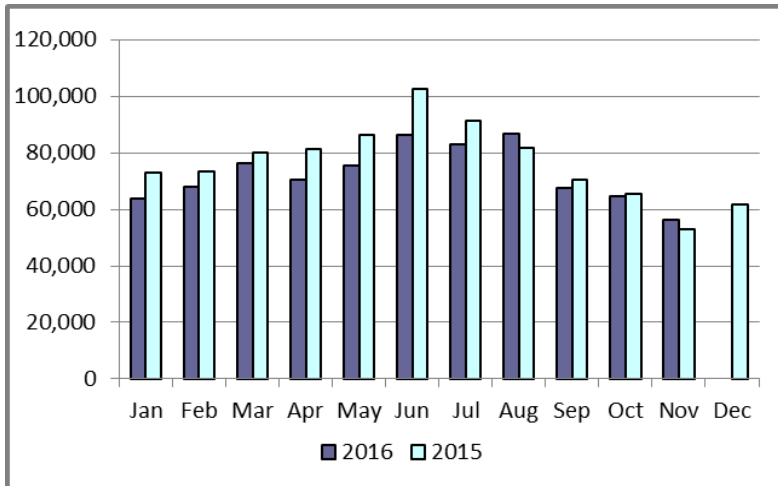


## Retail Transaction Volumes – Summary – November 2016

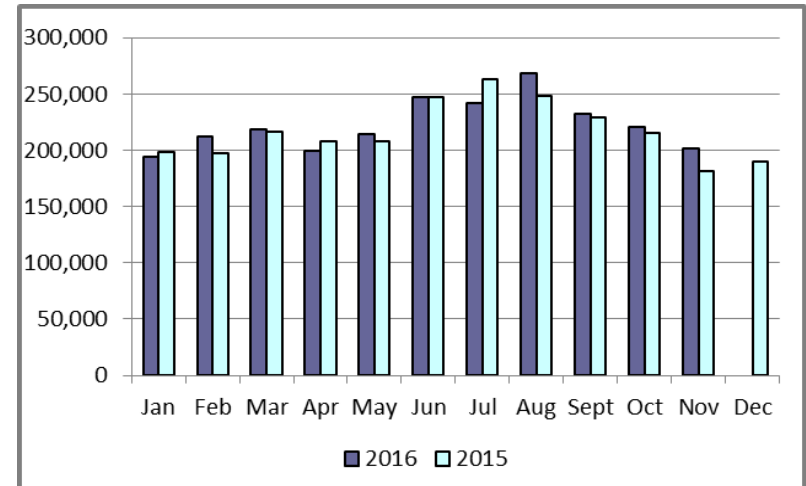
	Year-To-Date		Transactions Received	
Transaction Type	November 2016	November 2015	November 2016	November 2015
Switches	797,801	857,811	56,202	52,887
Acquisition	0	0	0	0
Move - Ins	2,451,399	2,412,695	201,714	181,098
Move - Outs	1,240,756	1,240,301	100,578	96,214
Continuous Service Agreements (CSA)	520,081	472,085	39,856	34,796
Mass Transitions	0	0	0	0
<b>Total</b>	<b>5,010,037</b>	<b>4,982,892</b>	<b>398,350</b>	<b>364,995</b>

# Retail Transaction Volumes – Summary – November 2016

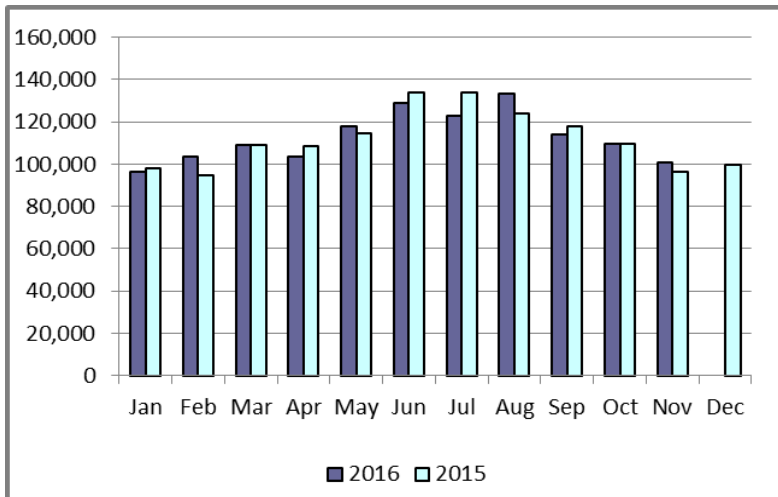
## Switches/Acquisitions



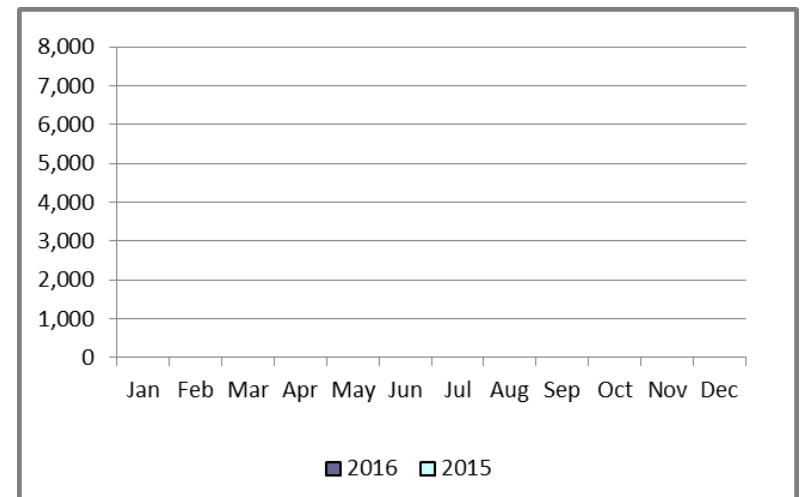
## Move-Ins



## Move-Outs

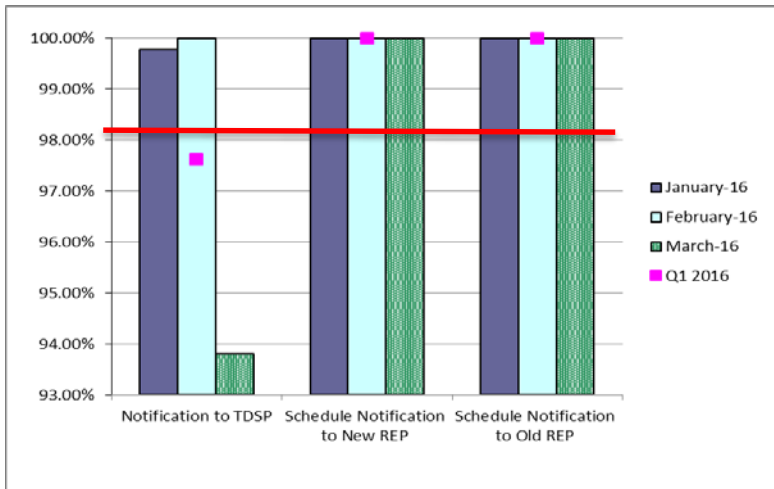


## Mass Transition

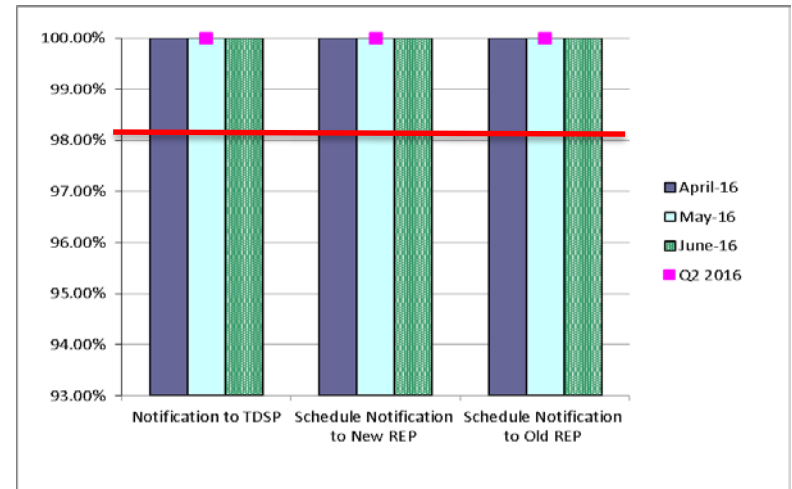


# Retail Performance Measures – Switch – November 2016

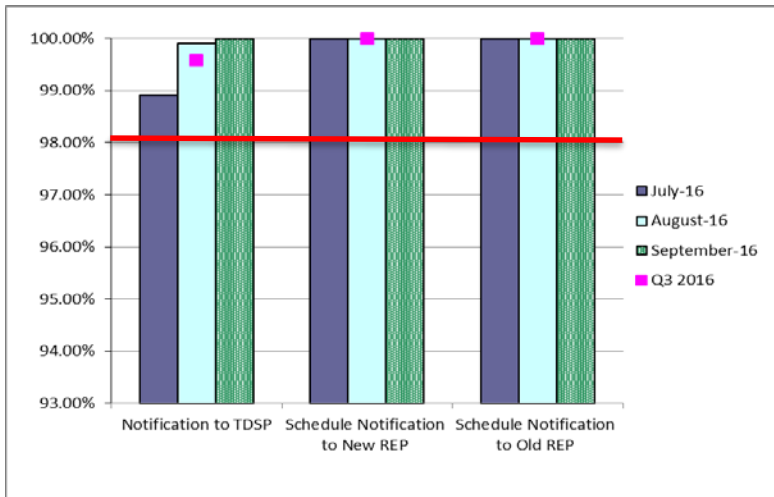
## 1<sup>st</sup> Quarter



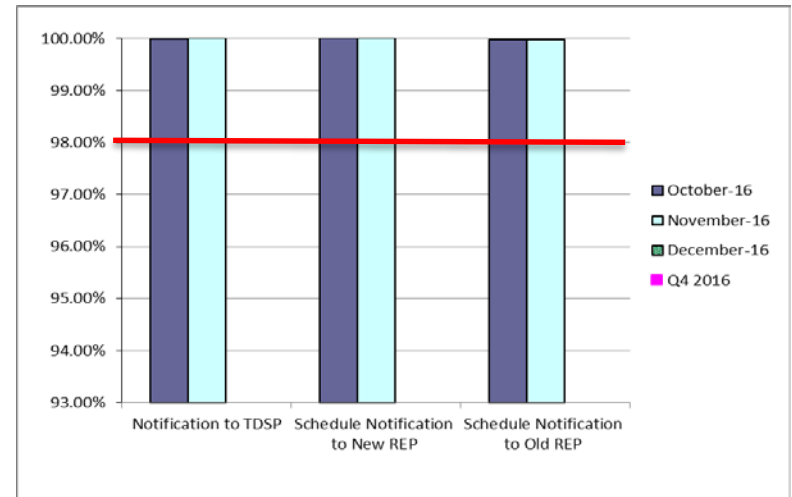
## 2<sup>nd</sup> Quarter



## 3<sup>rd</sup> Quarter

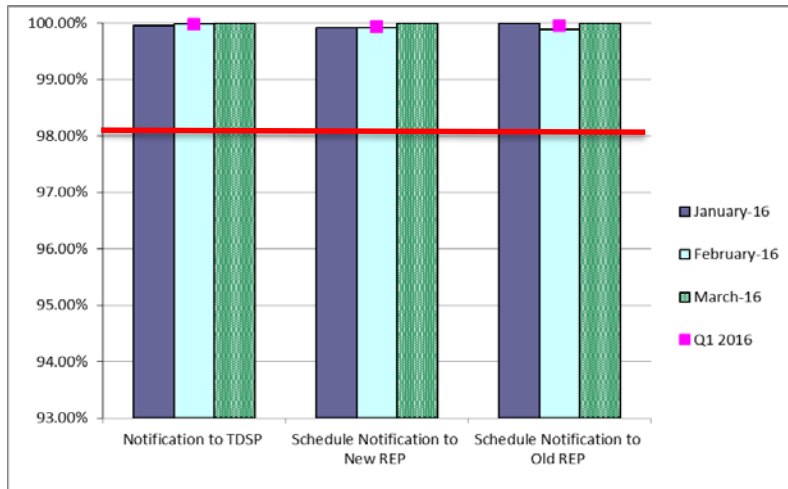


## 4<sup>th</sup> Quarter

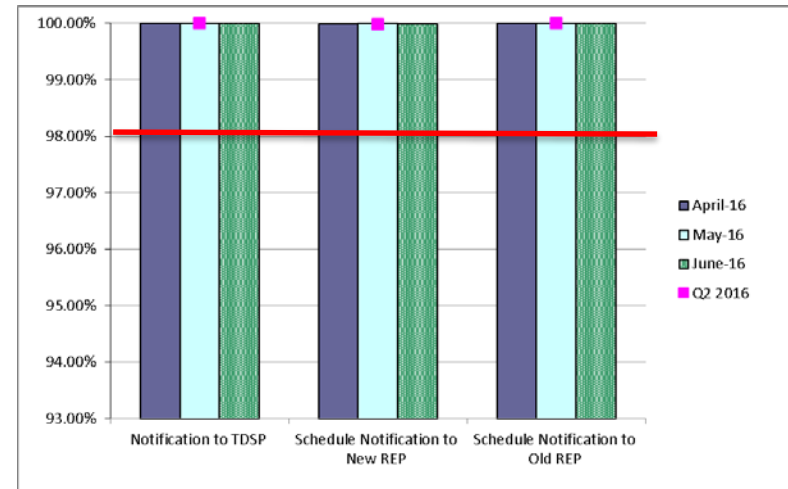


# Retail Performance Measures – Same Day Move-In – November 2016

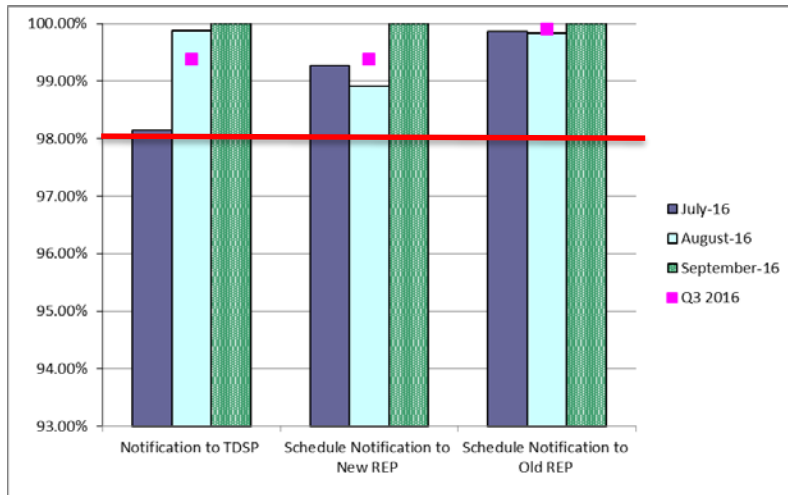
## 1<sup>st</sup> Quarter



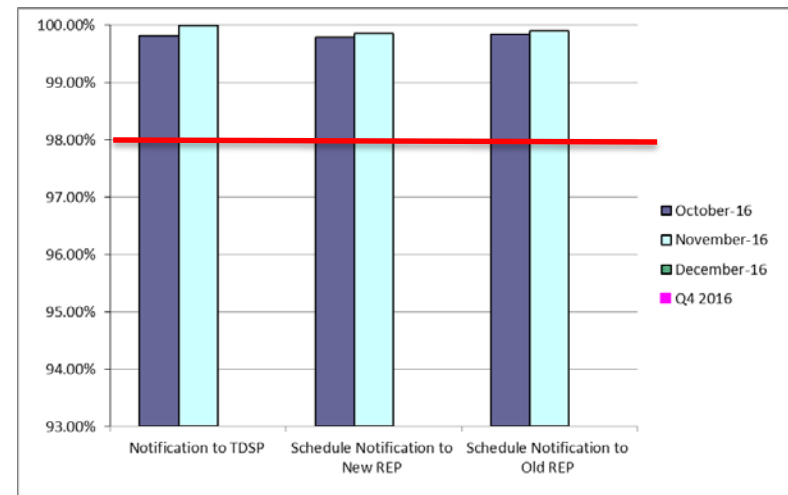
## 2<sup>nd</sup> Quarter



## 3<sup>rd</sup> Quarter

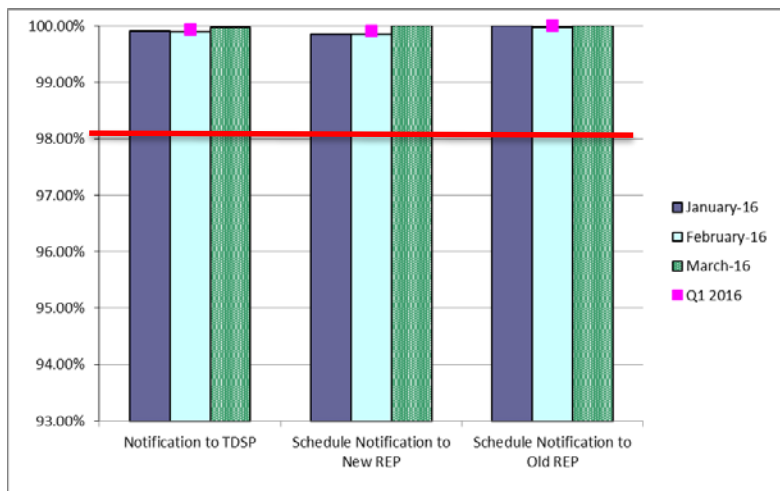


## 4<sup>th</sup> Quarter

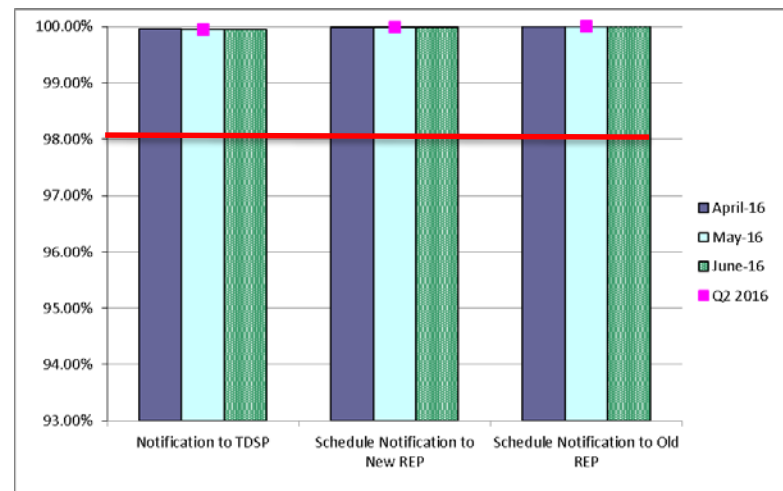


# Retail Performance Measures – Standard Move-In – November 2016

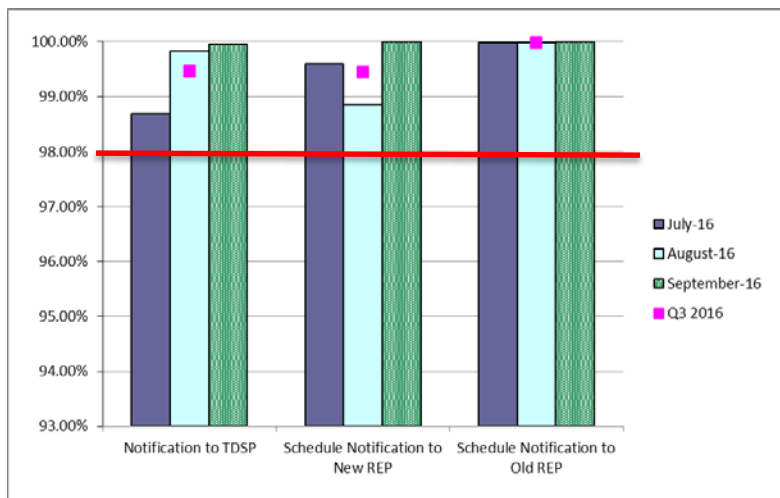
## 1<sup>st</sup> Quarter



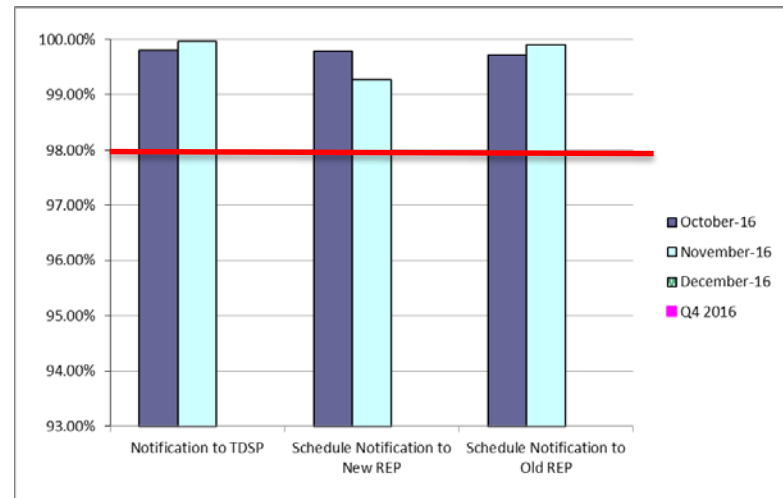
## 2<sup>nd</sup> Quarter



## 3<sup>rd</sup> Quarter



## 4<sup>th</sup> Quarter





# Projects Report

# ERCOT Portfolio Stoplight Report – November 2016

Impact Metric Tolerances		2016 Project Funding		\$22,500,000	2016 Portfolio Spending Estimate	
<p>Unfavorable variances are represented as negative numbers within the report.</p> <p>- Green = No more than 4.9% unfavorable variance</p> <p>- Yellow = Unfavorable variance between 4.9% and 9.9%</p> <p>- Red = Unfavorable variance more than 9.9%</p>		Projects In Flight/On Hold (Count = 78)			\$11,253,081	Note: Approximately \$1.75M in PPL spending was accelerated from 2016 to 2015. This spending is being offset by equivalent reductions in 2016
		Projects Not Yet Started (Count = 18)			\$ 2,500	
		Projects Completed (Count = 42)			\$ 6,716,242	
		Carryover of Excess 2015 Project Spending			\$ 1,743,545	
		Spending Reductions Required to Maintain Capital Budget			\$ -	
		TOTAL			\$19,715,368	
Project Number	Projects in Initiation Phase (Count = 2)					
229-01	IT Change and Configuration Management Phase 2					
218-01	Cyber Security Project #21					

## Footnotes

- 1 - One or more phases took longer than expected, resulting in additional time required
- 2 - One or more phases required more labor than expected, resulting in additional funding and/or time required
- 3 - Project placed on hold
- NA - Metric not calculated because:
  - it is reported at the parent project level, or
  - it is an administrative project

# ERCOT Portfolio Stoplight Report – November 2016

Project Number	Projects in Planning Phase (Count = 32)	Phase Start	Baseline Phase Finish	Approved Phase Finish	Scheduled Go-Live Date	Scheduled Phase Finish	Schedule Health		Budget Health	
173-02	ERCOT Flight Certification Website	10/5/2016	2/1/2017	2/1/2017	TBD	2/1/2017		0%		3%
183-01	CMM Tech Refresh	12/16/2015	8/17/2016	3/15/2017	TBD	3/15/2017		0%	NA	See 2015 CMM NPRRs
183-01	CMM-FT GUI Integration	12/16/2015	8/17/2016	3/15/2017	TBD	3/15/2017		0%	NA	See 2015 CMM NPRRs
185-01	Records Management and eDiscovery	1/28/2016	8/31/2016	12/7/2016	TBD	12/14/2016		-2%		6%
190-01	SharePoint Governance Project	4/27/2016	7/20/2016	12/14/2016	TBD	1/11/2017	1	-12%		10%
193-01	PMU Tool Evaluation and Implementation	5/4/2016	11/9/2016	11/9/2016	TBD	4/30/2017	1	-91%		0%
196-01	GINR Project Status Application Replacement	7/27/2016	3/1/2017	12/7/2016	TBD	12/21/2016	1	-10%		6%
198-01	Reactive Power Coordination	7/13/2016	10/12/2016	1/11/2017	TBD	1/11/2017		0%		4%
205-01	TIBCO BusinessWorks Application Upgrade	9/21/2016	12/28/2016	12/28/2016	TBD	12/28/2016		0%		73%
209-01	Multi Station Breaker to Breaker One Lines (Planning)	10/19/2016	12/6/2016	1/31/2017	TBD	1/31/2017		0%		82%
210-01	REC Technology Refresh	10/5/2016	1/4/2017	1/4/2017	TBD	1/4/2017		0%		8%
211-01	Identity & Access Management Evaluation	10/5/2016	2/22/2017	2/22/2017	TBD	2/22/2017		0%		20%
212-01	Test Data and Environment Enhancements Initiative (TDEE)	10/5/2016	11/2/2016	4/19/2017	TBD	4/19/2017		0%		3%
217-01	Cyber Security Project #20	12/7/2016	5/11/2017	5/11/2017	TBD	5/11/2017		0%		23%
222-01	Physical Security Project #3	10/26/2016	2/1/2017	2/1/2017	TBD	2/1/2017		0%		0%
224-01	TelAlert Replacement	11/2/2016	2/1/2017	2/1/2017	TBD	2/1/2017		0%		0%
228-01	Enterprise Database Upgrade - Planning Phase 1	11/30/2016	1/31/2017	1/31/2017	TBD	1/31/2017		0%		0%
230-01	SAS Technical Architecture Redesign	12/7/2016	3/1/2017	3/1/2017	TBD	3/1/2017		0%		4%
Various	2015 CMM NPRRs	12/16/2015	8/17/2016	3/15/2017	TBD	3/15/2017		0%		34%
RMGR134	Allow AMS Data Submittal Process for TDSP-Read Non-Modeled Generators	11/30/2016	12/14/2016	12/14/2016	TBD	12/14/2016		0%		1%
SCR790	Wind Resource Power Production and Forecast Transparency	10/5/2016	1/4/2017	1/4/2017	TBD	1/4/2017		0%		1%
NPRR484	Revisions to Congestion Revenue Rights Credit Calculations and Payments - Phase 1b / 2	12/16/2015	8/17/2016	3/15/2017	TBD	3/15/2017		0%	NA	See 2015 CMM NPRRs
NPRR519	Exemption of ERS-Only QSEs from Collateral and Capitalization Requirements	12/16/2015	8/17/2016	3/15/2017	TBD	3/15/2017		0%	NA	See 2015 CMM NPRRs
NPRR620	Collateral Requirements for Counter-Parties with No Load or Generation	12/16/2015	8/17/2016	3/15/2017	TBD	3/15/2017		0%	NA	See 2015 CMM NPRRs
NPRR648	Remove References to Flowgate Rights	12/16/2015	8/17/2016	3/15/2017	TBD	3/15/2017		0%	NA	See 2015 CMM NPRRs
NPRR660	Remove CRR State Change Adder	12/16/2015	8/17/2016	3/15/2017	TBD	3/15/2017		0%	NA	See 2015 CMM NPRRs
NPRR683	Revision to Available Credit Limit Calculation	12/16/2015	8/17/2016	3/15/2017	TBD	3/15/2017		0%	NA	See 2015 CMM NPRRs
NPRR702	Flexible Accounts, Payment of Invoices, and Disposition of Interest on Cash Collateral	12/16/2015	8/17/2016	3/15/2017	TBD	3/15/2017		0%	NA	See 2015 CMM NPRRs
NPRR741	Clarifications to TPE and EAL Credit Exposure Calculations	12/16/2015	8/17/2016	3/15/2017	TBD	3/15/2017		0%	NA	See 2015 CMM NPRRs
NPRR744	RUC Trigger for the Reliability Deployment Price Adder and Alignment with RUC Settlement	11/16/2016	1/31/2017	1/31/2017	TBD	1/31/2017		0%		1%
NPRR746	Adjustments Due to Negative Load	11/30/2016	1/18/2017	1/18/2017	TBD	1/18/2017		0%		3%
NPRR743	Revision to MCE to Have a Floor For Load Exposure	12/16/2015	8/17/2016	3/15/2017	TBD	3/15/2017		0%	NA	See 2015 CMM NPRRs

# ERCOT Portfolio Stoplight Report – November 2016

Project Number	Projects in Execution Phase (Count = 37)	Phase Start	Baseline Go-Live Date	Approved Go-Live Date	Scheduled Go-Live Date	Scheduled Phase Finish	Schedule Health		Budget Health	
065-01	NMMS Upgrade	12/17/2014	9/22/2016	2/13/2017	2/13/2017	4/12/2017		0%		-1%
158-01	Load Forecast Enhancements	9/28/2016	3/31/2017	3/31/2017	3/31/2017	5/18/2017		0%		6%
170-01	Enterprise Content Alignment Program	8/26/2015	11/15/2017	11/15/2017	9/25/2017	9/25/2017		6%		-1%
170-03	ECAP - Enterprise Content Management System (Proof of Concept)	11/16/2016	3/15/2017	3/15/2017	3/7/2017	3/7/2017		6%		12%
170-04	ECAP - ERCOT Information Governance and Taxonomy	11/16/2016	1/19/2017	1/19/2017	1/19/2017	1/19/2017		0%		25%
172-01	Physical Security Project #2	6/30/2016	2/13/2017	4/6/2017	3/27/2017	4/19/2017		3%		23%
173-01	Serena Software (MarkeTrak) Upgrade	10/5/2016	1/29/2017	1/29/2017	1/29/2017	3/15/2017		0%		6%
177-01	Cyber Security Project #19	4/6/2016	7/13/2016	10/31/2016	7/24/2017	7/26/2017	1	-127%		23%
181-01	CRR Framework Upgrade	10/26/2016	10/2/2017	10/2/2017	10/2/2017	12/28/2017		0%		2%
187-00	Capital Efficiencies and Enhancements - 2016	1/1/2015	12/31/2016	12/31/2016	12/31/2016	12/31/2016		0%		0%
188-01	Mass Transition/Acquisition Enhancements (MTAQ)	5/25/2016	4/2/2017	4/2/2017	4/2/2017	5/17/2017		0%		-3%
197-01	AREA - Demand and Energy Report	9/14/2016	5/4/2017	5/4/2017	5/4/2017	5/11/2017		0%		7%
202-01	Email Gateway Replacement	11/9/2016	4/4/2017	4/4/2017	4/4/2017	4/5/2017		0%		18%
203-01	DW Replication Upgrade	10/26/2016	12/10/2016	2/17/2017	2/17/2017	2/28/2017		0%		30%
216-01	CAT & RRS Tools for Control Room Project	11/30/2016	9/15/2017	9/15/2017	9/15/2017	10/18/2017		0%		12%
216-01	Capacity Availability Tool (CAT)	11/30/2016	9/15/2017	9/15/2017	9/15/2017	10/18/2017		0%	NA	See CAT & RRS Tools for Cntl Rm
216-01	Responsive Reserve Service Sufficiency Analysis	11/30/2016	9/15/2017	9/15/2017	9/15/2017	10/18/2017		0%	NA	See CAT & RRS Tools for Cntl Rm
223-01	Control Room Video Support and Upgrade	11/16/2016	2/17/2017	2/17/2017	2/17/2017	3/1/2017		0%		0%
227-01	Engineer Workstations and Other Equipment	11/30/2016	3/1/2017	3/1/2017	3/1/2017	3/1/2017		0%		52%
233-00	Capital Efficiencies and Enhancements - 2017	1/1/2017	12/31/2017	12/31/2017	12/31/2017	12/31/2017		0%		0%
Various	NOGRR147 and SCR787 NDCRC Enhancement	9/14/2016	12/8/2016	12/8/2016	12/8/2016	1/5/2017		0%		-1%
Various	2016 RARF Enhancements	11/16/2016	2/17/2017	2/17/2017	2/17/2017	3/8/2017		0%		23%
SCR777	Bilateral CRR Interface Enhancement	10/26/2016	10/2/2017	10/2/2017	10/2/2017	12/28/2017		0%	NA	See #181-01
SCR786	Retail Market Test Environment	6/22/2016	12/12/2016	12/12/2016	12/12/2016	2/1/2017		0%		37%
SCR787	Maintain NDCRC Data For Generator Transfer Between Resource Entities	9/14/2016	12/8/2016	12/8/2016	12/8/2016	1/5/2017		0%	NA	See NOGRR147 & SCR787
SCR788	Addition of Integral ACE Feedback to GTBD Calculation	10/5/2016	12/8/2016	12/8/2016	12/8/2016	12/16/2016		0%		15%
RMGRR127	Efficiencies for Acquisition Transfer	5/25/2016	4/2/2017	4/2/2017	4/2/2017	5/17/2017		0%	NA	See #188-01
RRGRR003	Modifications to Improve Wind Forecasting	11/16/2016	2/17/2017	2/17/2017	2/17/2017	3/1/2017		0%	NA	See 2016 RARF Enh.
RRGRR006	Clarification of Descriptions and Alignment with Resource Asset Registration Forms	11/16/2016	2/17/2017	2/17/2017	2/17/2017	3/1/2017		0%	NA	See 2016 RARF Enh.
RRGRR007	Adding Solar Resource Registration Inputs	11/16/2016	2/17/2017	2/17/2017	2/17/2017	3/1/2017		0%	NA	See 2016 RARF Enh.
RRGRR009	Adding Voltage Limit Sets, Relay Loadability, MLSE, and GMD Data	11/16/2016	2/17/2017	2/17/2017	2/17/2017	3/1/2017		0%	NA	See 2016 RARF Enh.
NOGRR147	Reactive Power Testing Requirements	9/14/2016	12/8/2016	12/8/2016	12/8/2016	1/5/2017		0%	NA	See NOGRR147 & SCR787
NPRR272	Definition and Participation of Quick Start Generation Resources	8/3/2016	2/9/2017	2/9/2017	2/8/2017	2/21/2017		0%		16%
NPRR649	Addressing Issues Surrounding High Dispatch Limit (HDL) Overrides	11/9/2016	2/16/2017	2/16/2017	2/16/2017	2/28/2017		0%		14%
NPRR758	Improved Transparency for Outages Potentially Having a High Economic Impact	11/30/2016	3/9/2017	3/9/2017	3/9/2017	3/9/2017		0%		3%
NPRR764	QSE Capacity Short Calculations Based on an 80% Probability of Exceedance (P80)	11/16/2016	3/9/2017	3/9/2017	3/9/2017	5/17/2017		0%		5%
NPRR785	Synchronizing WGR and PVGR COPs with the Short Term Wind and PhotoVoltaic Forecasts	11/30/2016	3/9/2017	3/9/2017	3/9/2017	3/9/2017		0%		2%

# ERCOT Portfolio Stoplight Report – November 2016

Project Number	Projects in Stabilization (Count = 2)	Execution Phase Start	Baseline Go-Live Target	Approved Go-Live Target	Actual Go-Live Date	Scheduled Execution Phase Finish	Schedule Health		Budget Health	
189-01	Enterprise Resource Planning	4/13/2016	9/27/2016	9/27/2016	9/27/2016	1/31/2017		0%		63%
NPRR754	Revise Load Distribution Factors Report Posting Frequency	10/12/2016	12/11/2016	12/11/2016	12/5/2016	12/13/2016		10%		23%
Project Number	Projects On Hold (Count = 5)	Forecast Start Date	Baseline Phase Finish	Approved Go-Live Target	Scheduled Go-Live Date	Scheduled Phase Finish	Schedule Health		Budget Health	
SCR781	MP Online Data Entry - Market Requirements	8/20/2014	11/28/2014	TBD	TBD	TBD			3	See #106-01
NPRR573	Alignment of PRC Calculation	TBD	TBD	TBD	TBD	TBD			3	
106-01	MP Online Data Entry - Ph 1	10/9/2013	3/5/2014	TBD	TBD	TBD			3	
129-01	Access and Roles Management	7/1/2014	10/1/2014	TBD	TBD	TBD			3	
166-01	Jboss Application Monitoring & Management (JAMM)	TBD	TBD	TBD	TBD	TBD			3	
Project Number	Projects Completed (Count = 41)	Baseline Execution Phase Start	Baseline Go-Live Target	Approved Go-Live Target	Actual Go-Live Date	Actual Execution Phase Finish	Schedule Health		Budget Health	
NOGRR050	Resolution of Reporting Issues Related to NPRR219	12/2/2015	9/14/2016	9/14/2016	9/26/2016	11/2/2016		-4%	NA	See #174-01
NPRR219	Resolution of Alignment Items A33, A92, A106, and A150 - TSPs Must Submit Outages for Resource Owned Equipment and Clarification of Changes in Status of Transmission Element Postings	12/2/2015	9/14/2016	9/14/2016	9/26/2016	11/2/2016		-4%	NA	See #174-01
NPRR419	Revise Real Time Energy Imbalance and RMR Adjustment Charge	1/13/2016	4/12/2016	4/12/2016	4/12/2016	6/6/2016		0%		7%
NPRR495	Changes to Ancillary Services Capacity Monitor	7/20/2016	11/3/2016	11/3/2016	11/3/2016	11/30/2016		0%	NA	See NPRR495 and 736
TBD	Monthly BLT Payment and Charge for Presidio Exception	4/9/2015	6/23/2016	6/23/2016	6/16/2016	6/23/2016		1%	NA	See #187-00
NPRR515	Day-Ahead Market Self-Commitment of Generation Resources	10/5/2015	3/31/2016	3/31/2016	6/23/2016	7/13/2016	2	-47%		0%
NPRR556	Resource Adequacy During Transmission Equipment Outage	9/21/2015	10/23/2015	10/23/2015	10/23/2015	12/10/2015		0%		23%
NPRR588	Clarifications for PV Generation Resources	9/16/2015	2/19/2016	2/19/2016	2/9/2016	3/30/2016		6%	NA	See #161-01
NPRR615	PVGR Forecasting	9/16/2015	2/19/2016	2/19/2016	2/9/2016	3/30/2016		6%	NA	See #161-01
NPRR617	Energy Offer Flexibility	1/27/2016	6/23/2016	6/23/2016	6/22/2016	8/10/2016		0%	NA	See NPRR617 / NPRR700
NPRR662	Proxy Energy Offer Curves	3/2/2016	8/31/2016	8/31/2016	8/31/2016	9/28/2016		0%		13%
NPRR680	Allow QSEs to Self-Arrange AS Quantities Greater Than Their AS Obligation	10/28/2015	12/11/2015	12/11/2015	12/11/2015	12/18/2015		0%		13%
NPRR686	Changing the IRR Forecast from Next 48 Hours to Next 168 Hours	9/16/2015	2/19/2016	2/19/2016	2/10/2016	3/30/2016		5%	NA	0%

# ERCOT Portfolio Stoplight Report – November 2016

Project Number	Projects Completed (Count =41)	Baseline Execution Phase Start	Baseline Go-Live Target	Approved Go-Live Target	Actual Go-Live Date	Actual Execution Phase Finish	Schedule Health		Budget Health	
NPRR700	Utilizing Actual Fuel Costs in Startup Offer Caps	1/27/2016	6/23/2016	6/23/2016	6/22/2016	8/10/2016		0%	NA	See NPRR617 / NPRR700
NPRR736	Updates to the Ancillary Service Capacity Monitor Display	7/20/2016	11/3/2016	11/3/2016	11/3/2016	11/30/2016		0%	NA	See NPRR495 and 736
NPRR770	Addition of Outaged Resource Capacity to Short-Term System Adequacy Report	7/20/2016	11/3/2016	11/3/2016	11/3/2016	11/30/2016		0%	NA	See NPRR495 and 736
RMGRR126	Additional ERCOT Validations for Customer Billing Contact Information File	5/25/2016	7/24/2016	7/24/2016	7/24/2016	5/17/2017		0%	NA	See #188-01
SCR783	Outage Scheduler Enhancements – Group 2, Usability and Filtering Enhancements	12/2/2015	9/14/2016	9/14/2016	9/26/2016	11/2/2016		-4%	NA	See #174-01
Various	NPRR495 and NPRR736 Changes to Ancillary Services Capacity Monitor	7/20/2016	11/3/2016	11/3/2016	11/3/2016	11/30/2016		0%		20%
052-01	EMS Upgrade	9/24/2014	5/25/2016	5/25/2016	6/16/2016	11/30/2016		-3%		6%
174-01	2015 Outage Scheduler Enhancements	12/2/2015	9/14/2016	9/14/2016	9/26/2016	11/2/2016		-4%		-2%
184-01	NPRR617 and 700 Implementation	1/27/2016	6/23/2016	6/23/2016	6/23/2016	8/10/2016		0%	2	-5%
116-01	Collage Replacement	2/6/2014	9/22/2014	9/22/2014	2/29/2016	4/7/2016	2	-230%	2	-45%
120-01	IT Production Hardening	5/21/2015	4/1/2016	4/1/2016	4/14/2016	4/27/2016		-4%		33%
134-01	Privileged Account Management	4/1/2015	9/30/2015	9/30/2015	9/30/2015	1/27/2016		0%		14%
141-01	Production Virtualization	6/1/2016	7/27/2016	9/28/2016	TBD	9/28/2016		0%		2%
143-01	OSI Pi Visualization Enhancements	1/16/2015	6/19/2015	6/19/2015	1/22/2016	2/18/2016	1	-140%		0%
144-01	OC-48 Replacement with DWDM	2/4/2015	12/22/2015	12/22/2015	1/12/2016	3/2/2016	1	-6%		3%
161-01	NPRRs 588 and 615	9/16/2015	2/19/2016	2/19/2016	2/9/2016	3/30/2016		6%		-1%
163-01	Cyber Security Project #10	7/1/2015	9/15/2015	9/15/2015	9/22/2015	12/16/2015	1	-9%		9%
165-00	Capital Efficiencies and Enhancements - 2015	1/1/2015	12/31/2015	12/31/2015	12/31/2015	12/31/2015		0%		42%
168-01	Configuration Management System Requirements for CIP v5 Readiness	7/6/2015	12/17/2015	12/17/2015	12/17/2015	7/13/2016		0%		3%
169-01	Short Circuit Ratio Functionality	1/20/2016	9/19/2016	9/19/2016	9/16/2016	9/30/2016		1%		33%
170-05	ECAP - ERCOT Identity Alignment	2/24/2016	9/18/2016	9/18/2016	9/18/2016	11/23/2016		0%		5%
171-01	CIP v5 Readiness Project	7/22/2015	4/29/2016	7/1/2016	4/29/2016	7/13/2016		18%		-2%
179-01	Infoblox Hardware Refresh	2/4/2016	8/12/2016	8/12/2016	6/27/2016	8/17/2016		24%		1%
180-01	Upgrade of MDM - GEMS	3/30/2016	8/29/2016	8/29/2016	9/9/2016	10/12/2016	1	-7%		22%
191-01	CRR Auction Improvements	4/27/2016	9/1/2016	9/9/2016	9/9/2016	11/16/2016		0%		8%
191-01	Improved CRR Credit Limit Display and Calculation Triggers	4/27/2016	9/1/2016	9/9/2016	9/9/2016	11/16/2016		0%		See #191-01
191-01	Improved Re-Calculation of CRR Baselading for CRR Auctions	4/27/2016	9/1/2016	9/9/2016	9/9/2016	11/16/2016		0%		See #191-01
206-01	IT Change Management Evaluation	8/24/2016	11/16/2016	11/16/2016	TBD	11/16/2016		0%		13%

# ERCOT Portfolio Stoplight Report – November 2016

Project Number	2016 Projects Not Yet Started (Count = 1)	Forecast Start Date
TBD	Reporting Solution Resiliency (RSR)	Dec-2016