



## Item 4.3: Operations Report

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President & CEO  
ERCOT

Board of Directors Meeting

ERCOT Public  
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### Operations

- The peak demand of 49,279 MW on January 11th was less than the day-ahead mid-term forecast peak of 49,764 MW of the same operating period. In addition, it was less than the January 2015 actual peak demand of 56,764 MW. The instantaneous peak load on January 11th was 49,801 MW.
- Day-ahead load forecast error for January was 3.22%
- ERCOT issued two notifications
  - Two advisories due to Physically Responsive Capability being less than 3,000 MW.

### Planning Activities

- 241 active generation interconnection requests totaling 57,422 MW, including 24,472 MW of wind generation, as of January 31, 2016. Fourteen fewer requests and a decrease of 3,722 MW from December 31, 2015.
- 15,929 MW wind capacity in commercial operations on January 31, 2016.

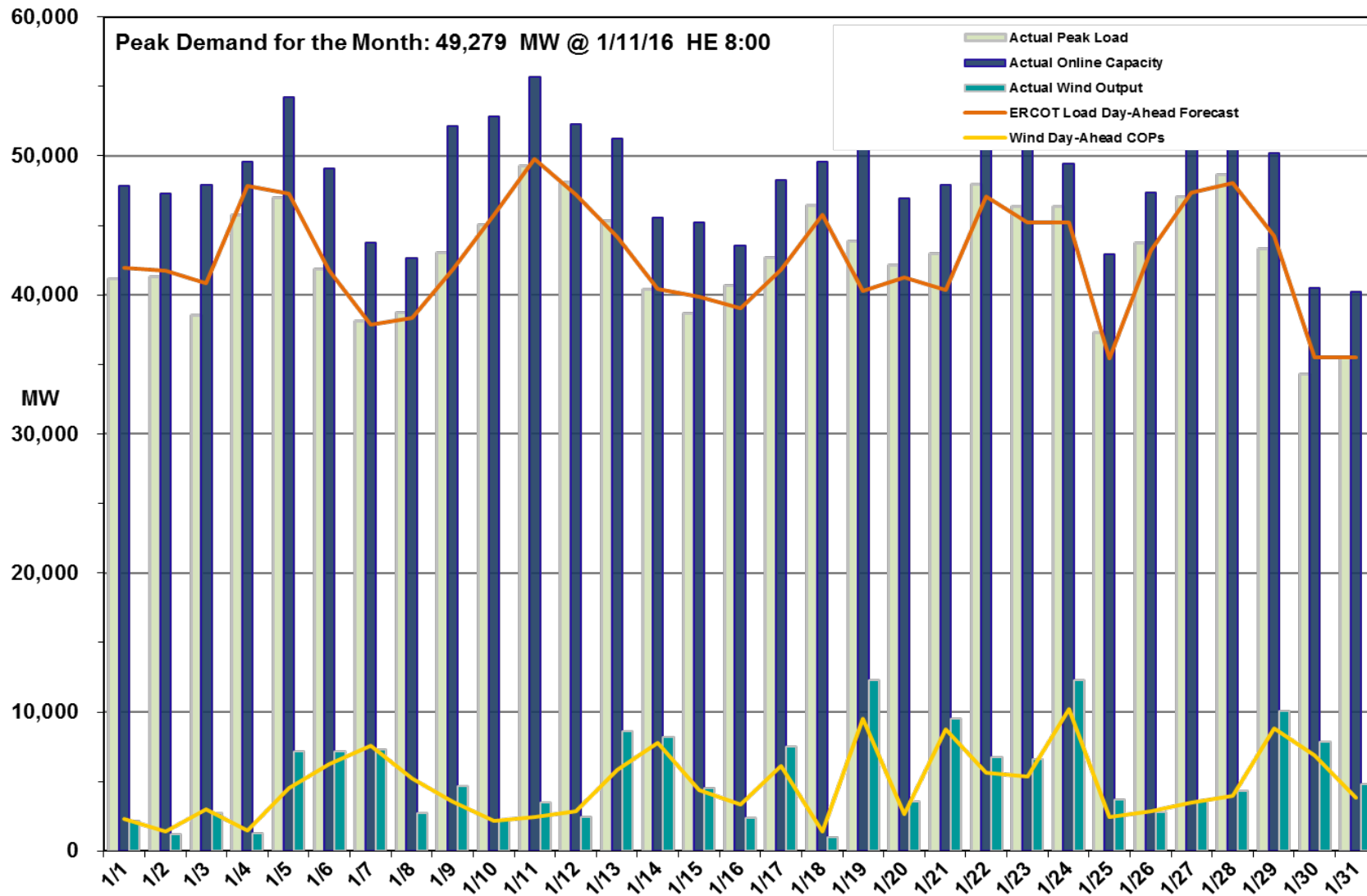
### Operations

- The peak demand of 47,404 MW on February 4th was more than the day-ahead mid-term forecast peak of 46,978 MW of the same operating period. In addition, it was less than the February 2015 actual peak demand of 54,714 MW. The instantaneous peak load on February 4th was 48,089 MW.
- Day-ahead load forecast error for February was 2.39%
- ERCOT issued one notification
  - One advisory due to postponement of the deadline for posting the DAM solution, delayed due to long solution run time.

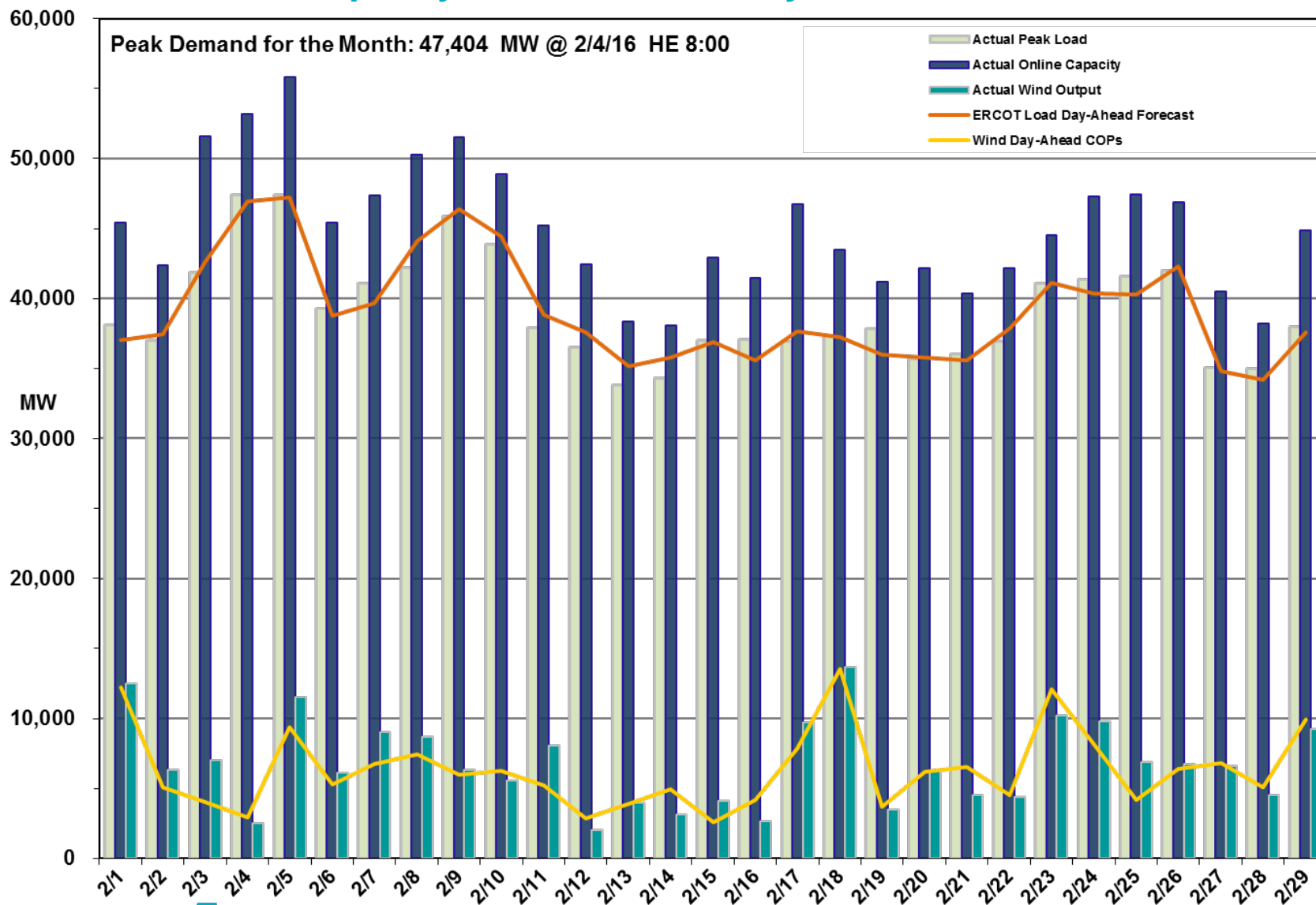
### Planning Activities

- 236 active generation interconnection requests totaling 55,207 MW, including 23,508 MW of wind generation, as of February 29, 2016. Five fewer requests and a decrease of 2,215 MW from January 31, 2016.
- 15,929 MW wind capacity in commercial operations on February 29, 2016.

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



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



## Market Statistics – January 2016

Market Statistics	January 2015	January 2016	2015 Average	2016 YTD Average
Percentage of Real-Time load hedged in Day-Ahead Market	136.32%	130.08%	131.26%	130.08%
Average 'ERCOT Hub Average 345 kV Hub' Settlement Point Price in Day-Ahead Market (\$/MWh)	25.89	19.72	28.38	19.72
Average 'ERCOT Hub Average 345 kV Hub' Settlement Point Price in Real-Time (\$/MWh)	24.43	18.51	26.05	18.51
Average East Houston Fuel Index Price (\$/MMBtu)	2.92	2.21	2.57	2.21

## Market Statistics – February 2016

Market Statistics	February 2015	February 2016	2015 Average	2016 YTD Average
Percentage of Real-Time load hedged in Day-Ahead Market	134.02%	135.80%	131.26%	132.94%
Average 'ERCOT Hub Average 345 kV Hub' Settlement Point Price in Day-Ahead Market (\$/MWh)	25.37	15.76	28.38	17.89
Average 'ERCOT Hub Average 345 kV Hub' Settlement Point Price in Real-Time (\$/MWh)	27.49	15.09	26.05	16.93
Average East Houston Fuel Index Price (\$/MMBtu)	2.68	1.89	2.57	2.06

## Operational Performance Measures – January & February 2016

Performance Measure	Target Met	Further Information
Retail Transaction Performance (Target 98%)	Yes	<ul style="list-style-type: none"><li>• Retail transaction processing performance was near 100%.</li></ul>
Settlements Performance (Target 99%)	Yes	<ul style="list-style-type: none"><li>• 100% timely statement and invoice posting</li></ul>



## Operational Dashboard – January & February 2016

Metric	Trending as Expected	Further Information
Day-Ahead Schedule	Yes	<ul style="list-style-type: none"> <li>• Normal level of market activity and liquidity</li> <li>• Loads appear to have hedged against exposure to Real-Time prices</li> </ul>
Day-Ahead Electricity And Ancillary Service Hourly Average Prices	Yes	<ul style="list-style-type: none"> <li>• Hourly average prices correctly reflect the opportunity cost of energy</li> </ul>
Day-Ahead vs Real-Time Load Zone Settlement Point Price (Hourly Average)	Yes	<ul style="list-style-type: none"> <li>• Day-Ahead &amp; Real-Time prices for different Load Zones reflect relative transmission congestion</li> </ul>
Day-Ahead vs Real-Time Trading Hub Settlement Point Price (Hourly Average)	Yes	<ul style="list-style-type: none"> <li>• The average energy price across the system reflects marginal offers and scarcity pricing impacts</li> <li>• Higher average Day-Ahead energy prices reflect the risk premium between Day-Ahead &amp; Real-Time</li> </ul>
Day-Ahead Reliability Unit (DRUC) Commitment Monthly Summary	Yes	<ul style="list-style-type: none"> <li>• Capacity committed by the DRUC process indicates the level of out of market activity needed Day-Ahead to maintain reliability</li> <li>• No resource was committed in DRUC in this period</li> </ul>

# Operational Dashboard – January & February 2016

Metric	Trending as Expected	Further Information
Hourly Reliability Unit Commitment (HRUC) Monthly Summary	Yes	<ul style="list-style-type: none"> <li>Capacity committed by the HRUC process indicates the level of out of market activity needed during the Operating Day to maintain reliability</li> <li>3 resources were committed in both January and February</li> </ul>
Supplemental Ancillary Service Market Monthly Summary	Yes	<ul style="list-style-type: none"> <li>Normal trend indicates that deliverability was not a major concern</li> </ul>
Non-Spinning Reserve Service Deployment	Yes	<ul style="list-style-type: none"> <li>Non-Spin was not deployed in January or February</li> </ul>
Congestion Revenue Rights Price Convergence	Yes	<ul style="list-style-type: none"> <li>Normal trend indicates good ability of market participants to estimate value of hedges</li> </ul>

## Operational Dashboard – January 2016

Metric	Trending as Expected	Further Information
Retail Transactions	Yes	<ul style="list-style-type: none"> <li>Seasonal variations in transaction volumes trending as expected</li> </ul>
Advanced Metering	Yes	<ul style="list-style-type: none"> <li>98.7% of ERCOT load settled with 15-minute interval data.</li> <li>6.8M Advanced Metering System (AMS) Electric Service Identifier (ESIID)s included in settlement as of January 2016.</li> </ul>
Settlement Dollars	Yes	<ul style="list-style-type: none"> <li>As of settlement of Operating Day 1/31/2016, the daily average settlement dollars for January are \$7.57M, which is down from \$8.18M in December 2015 and down from January 2015 which had an average of \$8.58M.</li> </ul>
Revenue Neutrality	Yes	<ul style="list-style-type: none"> <li>As of settlement of Operating Day 1/31/2016, Revenue Neutrality uplift is a charge of \$3.85M, which is up from a \$1.27M charge in December 2015 and up from a \$2.39M charge in January 2015.</li> </ul>
Market-Based Uplift to Load	Yes	<ul style="list-style-type: none"> <li>As of settlement of Operating Day 1/31/2016, the market-based uplift to load is a charge of \$18.58M, as opposed to a \$25.20M charge in December 2015 and a charge of \$11.19M in January 2015.</li> </ul>

## Operational Dashboard – February 2016

Metric	Trending as Expected	Further Information
Retail Transactions	Yes	<ul style="list-style-type: none"> <li>Seasonal variations in transaction volumes trending as expected</li> </ul>
Advanced Metering	Yes	<ul style="list-style-type: none"> <li>98.7% of ERCOT load settled with 15-minute interval data.</li> <li>6.8M Advanced Metering System (AMS) Electric Service Identifier (ESIID)s included in settlement as of February 2016.</li> </ul>
Settlement Dollars	Yes	<ul style="list-style-type: none"> <li>As of settlement of Operating Day 2/29/2016, the daily average settlement dollars for February are \$6.65M, which is down from \$7.57M in January 2016 and down from February 2015 which had an average of \$9.28M.</li> </ul>
Revenue Neutrality	Yes	<ul style="list-style-type: none"> <li>As of settlement of Operating Day 2/29/2016, Revenue Neutrality uplift is a charge of \$2.32M, which is down from January 2016 which was a charge of \$3.85M and up from February 2015 which was a charge of \$0.21M.</li> </ul>
Market-Based Uplift to Load	Yes	<ul style="list-style-type: none"> <li>As of settlement of Operating Day 2/29/2016, the market-based uplift was a charge of \$26.25M, as opposed to a charge of \$18.58M in January 2016 and a charge of \$10.40M in February 2015.</li> </ul>

## Market Enhancements Under Consideration

Enhancement	Further Information
Evaluating market design improvement proposals	<ul style="list-style-type: none"><li>• Future Ancillary Services Team (FAST) Activity<ul style="list-style-type: none"><li>• NPRR 667 was posted on 11/18/2014</li><li>• Brattle presented the results from the Cost Benefit Analysis (CBA) on the Future Ancillary Services framework on 11/9/2015</li><li>• Full report posted on 12/21/2015 (<a href="http://www.ercot.com/content/wcm/key_documents_lists/30517/667N_PRR_12a_Cost_Benefit_Analysis_122115.pdf">http://www.ercot.com/content/wcm/key_documents_lists/30517/667N_PRR_12a_Cost_Benefit_Analysis_122115.pdf</a>)</li><li>• Additional CBA information was presented at the March 2016 PRS meeting, and both NPRR 667 and an alternative proposal, NPRR756, were discussed. Review of comments on the alternative NPRR is expected at the April 2016 PRS meeting.</li></ul></li></ul>
Evaluating Pilot Project Feasibility	<ul style="list-style-type: none"><li>• No current pilot projects</li></ul>

## Major Project Highlights – (as of 04/06/2016)

Project	Trending as Expected	Further Information
<p><b>EMS Upgrade Program</b> – Upgrade EMS and OTS from ALSTOM EMP 2.3 to EMP 3.0</p>	Yes	<ul style="list-style-type: none"> <li>• Program is in the Execution Phase and tracking to the planned schedule and budget</li> <li>• GE/Alstom Development               <ul style="list-style-type: none"> <li>◦ Critical defect release scheduled for the week of April 11<sup>th</sup> and April 25<sup>th</sup> which is needed for May Closed Loop Test and planned cutover</li> </ul> </li> <li>• ERCOT Development               <ul style="list-style-type: none"> <li>◦ Critical defect release scheduled for the week of April 4<sup>th</sup> and April 25<sup>th</sup> which is needed for May Closed Loop Test and planned cutover</li> </ul> </li> <li>• Infrastructure               <ul style="list-style-type: none"> <li>◦ Production verification and site failovers in progress</li> </ul> </li> <li>• Operator Training Simulator               <ul style="list-style-type: none"> <li>◦ Released to the training department for Hurricane Drill simulation development</li> </ul> </li> <li>• Testing               <ul style="list-style-type: none"> <li>◦ EMS integrated testing ongoing</li> <li>◦ Failover, backups and recovery testing ongoing</li> <li>◦ 2<sup>nd</sup> Closed Loop Test and Planned cutover scheduled for May 2016</li> </ul> </li> </ul>
<p><b>NMMS Upgrade Project</b> – Replace the current Siemens NMMS application with the next generation of model management software available from Siemens</p>	Yes	<ul style="list-style-type: none"> <li>• NMMS Upgrade core project, the Market-facing portion, is currently conducting Factory Acceptance Testing (FAT) activities and remains on track with a go-live target of late September 2016; budget also remains on track</li> <li>• The Topology Processor Upgrade, the internal ERCOT portion, has begun development and is also on schedule for delivery in early 2017</li> <li>• Acceptance, security, integration and performance testing cycles run through mid-July</li> <li>• Market training and education completes in early September, a few weeks prior to the target go-live date of the core project</li> </ul>

## Major Project Highlights – (as of 04/06/2016) – continued

Project	Trending as Expected	Further Information
<p><b>OSI PI Visualization Enhancements –</b> Provide hardware and OSI PI tools for improved visualization to Operations staff to support development of control room displays and web-based tools that delivers fast, easy, and secure access to all PI System data.</p>	Yes	<ul style="list-style-type: none"> <li>• The final components of this project migrated to Production on January 22<sup>nd</sup> and a Stabilization period completed in early March</li> <li>• The project completed Closing and Lessons Learned activities in March and is now officially closed</li> </ul>
<p><b>CIP v5 Readiness Program –</b> Develop, modify and implement processes, procedures, workflows, and tools to ensure ERCOT's compliance with NERC CIP v5 standards</p>	Yes	<ul style="list-style-type: none"> <li>• NERC Critical Infrastructure Protection (CIP) Cybersecurity Standards version 5 is a regulatory requirement that is effective July 1, 2016 (changed from April 1, 2016)</li> <li>• The overall program is managed by the Readiness Project which is on schedule and on budget</li> <li>• Internal controls and assessment testing will continue up to the effective date</li> <li>• The following efforts for readiness have been completed:               <ul style="list-style-type: none"> <li>◦ Port Access and Reporting Tool, Firewall Reporting, Firewall Access System, Next Generation Scanning, Information Technology Change Management, Privilege Account Management, IDM Reporting, IT Change and Configuration Management System, Updates to Policies and Standards and Patch Management</li> </ul> </li> </ul>
<p><b>Data Center 4.0 Optimization (DC<sup>4</sup>) Program –</b> Replace the aging data center infrastructure with modernized infrastructure technologies to minimize the impact of failures, support future business growth, deliver highly automated next-generation infrastructure services, and ensure sustained reliability</p>	Yes	<ul style="list-style-type: none"> <li>• The DC<sup>4</sup> Program is in Planning and is tracking to the approved schedule and budget               <ul style="list-style-type: none"> <li>◦ Completion of the guiding principles for the future-state architecture</li> <li>◦ The DC<sup>4</sup> RFP vendor responses are being reviewed and evaluated</li> <li>◦ This planning effort includes the continuation of the future-state architecture, the analysis of the asset inventory, and planning the migrations based on application, current projects, business impacts, and release dependencies</li> </ul> </li> <li>• Other projects under the program:               <ul style="list-style-type: none"> <li>◦ The DC<sup>4</sup> Compute-DB Infrastructure Install and Migration is gating to Execution in April 2016 and will begin testing and migrating Power7 applications to Power8 hardware</li> <li>◦ DC<sup>4</sup> Network-Core Network and DC<sup>4</sup> Telecom-Control Room &amp; Grid Ops projects were initiated in March and are expected to go into planning in May 2016</li> </ul> </li> </ul>

## Major Project Highlights – (as of 04/06/2016) – continued

Project	Trending as Expected	Further Information
<p><b>Enterprise Resource Planning (ERP)</b> – Provide a single, integrated software solution for Human Resource, Accounting/Finance, Purchasing, Asset Management and related general business planning, strategy, and reporting functions</p>	<p>Yes</p>	<ul style="list-style-type: none"> <li>• The project is completing Planning Phase 2, which focused on delivery of plans for organizational change management, integration testing, data conversion and the post-production support model. A gate into the Execution phase will occur in early April, at which time the go-live date will be confirmed.</li> <li>• Activities completed or underway include:               <ul style="list-style-type: none"> <li>○ Finalizing the overall schedule and confirming the budget</li> <li>○ Delivery of test scripts and scenarios for HR, Finance and Procurement functions</li> <li>○ Ongoing activities to support end-to-end testing of all functions and workflows in the new application</li> <li>○ Data extraction, transformation and loading activities from legacy systems into the new ERP solution</li> <li>○ Planning for data validation activities</li> <li>○ Completing the Training and Employee Adoption strategy and approach</li> </ul> </li> </ul>
<p><b>NPRR219 and SCR783, Outage Scheduler Enhancements – Group 2, Usability and Filtering Enhancements</b> – NPRR219 implements system changes that enables Resource Entities to enter outages for their Transmission Facilities in the Outage Scheduler System. SCR783 restores needed functionality that existed in the Zonal Outage Scheduler and adds functionality that Market Participants expected and needed in the Nodal Outage Scheduler</p>	<p>Yes</p>	<ul style="list-style-type: none"> <li>• Planning is complete, including Business Requirements, Detail Design and Test Plan deliverables. Project currently in Execution phase and tracking to approved budget and schedule. The expected go-live is targeted for October 2016</li> <li>• Vendor code changes were completed by mid-February and this code is being integrated with ERCOT internal systems. Upon integration of these changes by mid-April, Functional Acceptance Testing will commence</li> <li>• Team is providing periodic project updates to Market working groups including: QMWG, OWG and OTWG. Additionally, a Market Notice has been sent regarding instructor-led training sessions scheduled for May 2016. Training sessions will take place in Dallas, Houston and Austin</li> </ul>



# Appendix

The *ERCOT Monthly Operational Overview* is posted on or about the 15<sup>th</sup> of the following month to (<http://www.ercot.com/committees/board/>)