



## Item 4.3: Operations Report (September – October 2018)

*Bill Magness*  
President & CEO  
ERCOT

Board of Directors Meeting

ERCOT Public  
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## Summary – September 2018

### Operations

- The preliminary Settlements hourly peak demand of 64,606\* MW on September 18 was higher than the day-ahead mid-term load forecast peak of 64,458 MW for the same operating hour.
  - The operational instantaneous peak demand was 64,790 MW (telemetry).
- Day-ahead load forecast error for September was 2.41%
- ERCOT issued 10 notifications:
  - Three Advisories issued due to Physical Responsive Capability being below 3000 MW
  - Six DC Tie-related Watches
  - One OCN issued for projected reserve capacity shortage

### Planning Activities

- 426 active generation interconnection requests totaling 82,461 MW, including 40,327 MW of wind generation, as of September 30, 2018. Nine additional requests and a decrease of 1,030 MW from August 30, 2018.
- 21,550 MW wind capacity in commercial operations as of October 1, 2018.

## Summary – October 2018

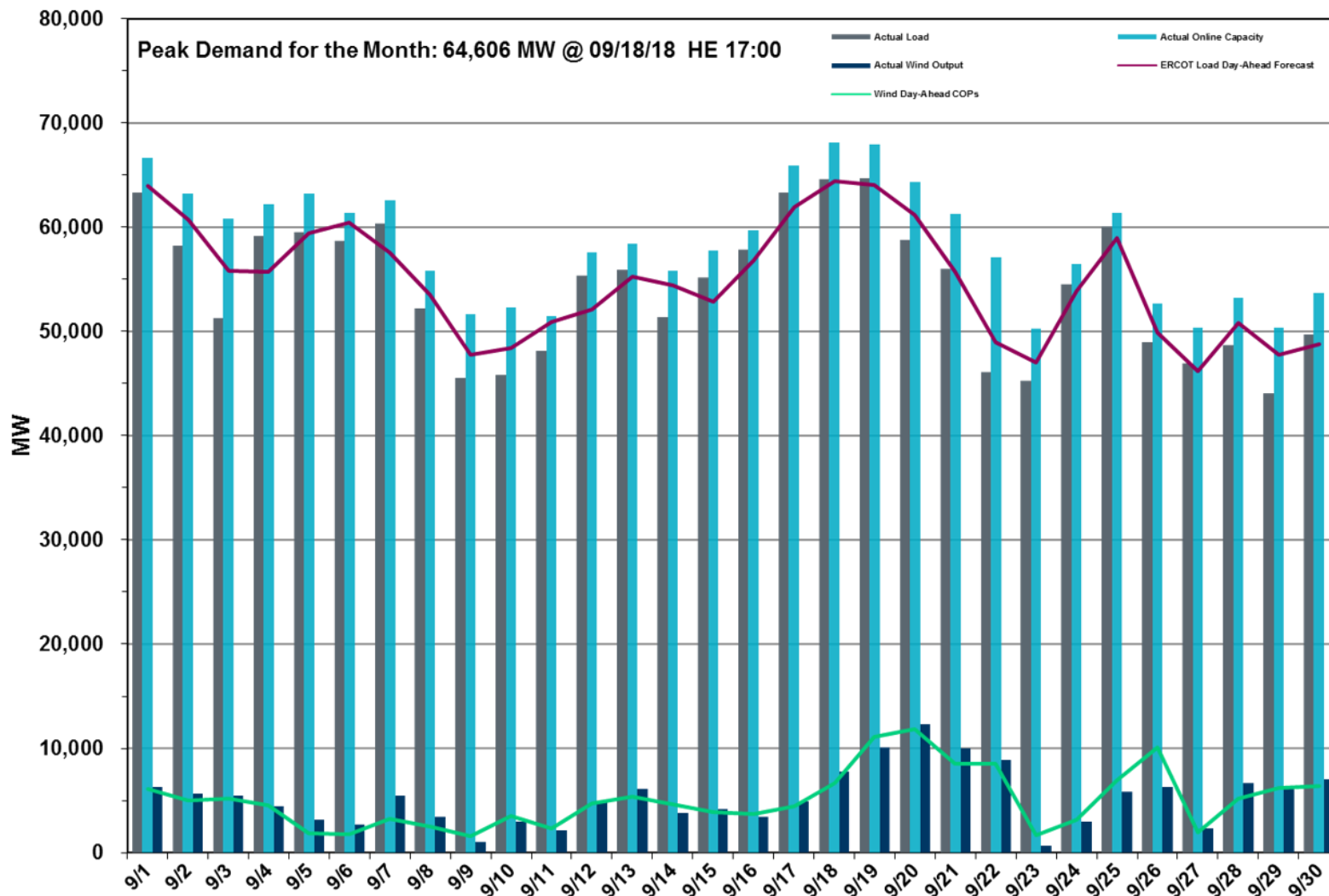
### Operations

- The preliminary Settlements hourly peak demand of 60,750\* MW on October 4 was higher than the day-ahead mid-term load forecast peak of 58,891 MW for the same operating hour.
  - The operational instantaneous peak demand was 60,881 MW (telemetry).
- Day-ahead load forecast error for October was 2.35%
- ERCOT issued 9 notifications:
  - Four DC Tie Curtailment Notices
  - Two OCN issued for projected reserve capacity shortage
  - One OCN issued for possible severe weather (tornado warnings)
  - Two Advisories issued for postponing the deadline for the posting of the DAM Solution

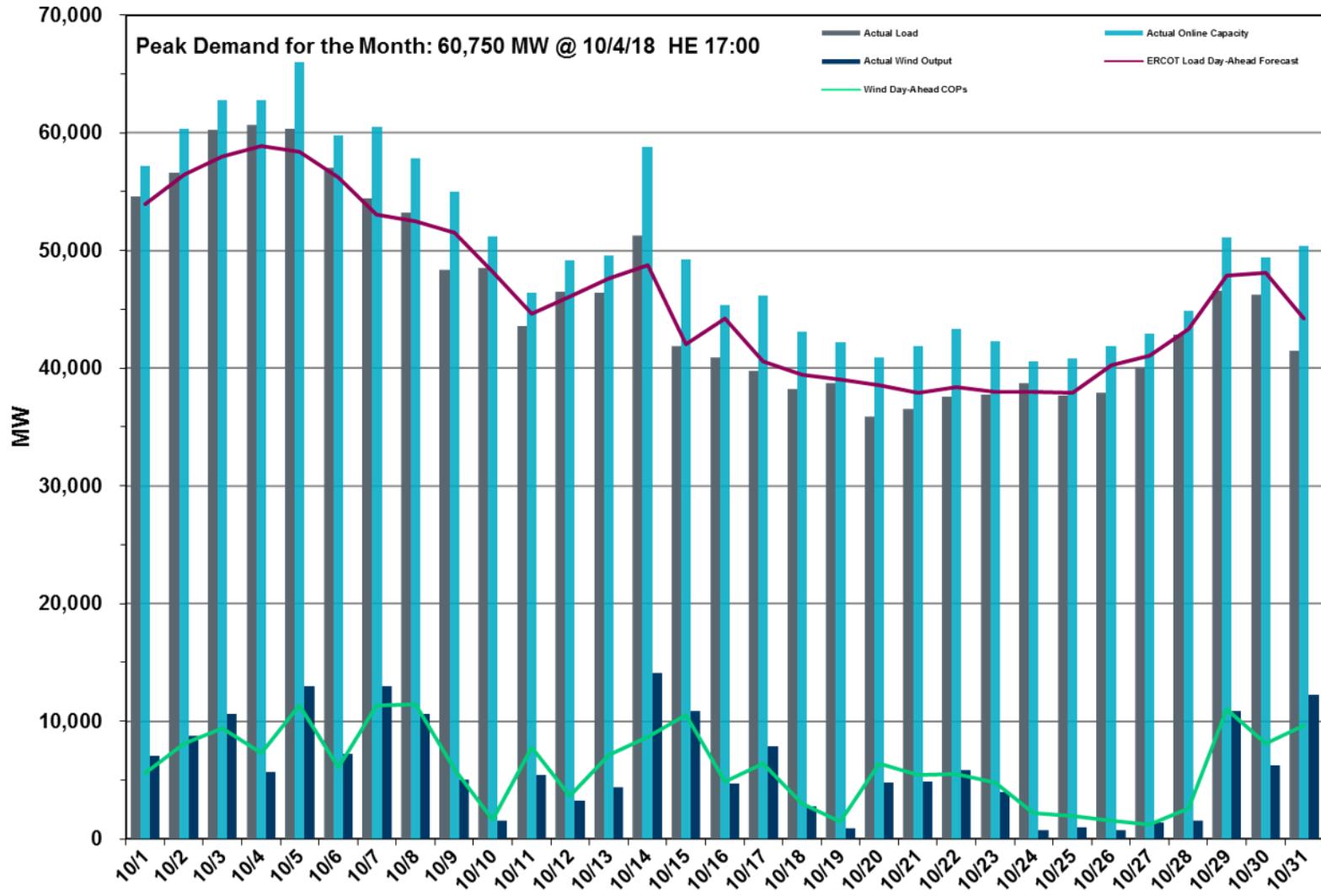
### Planning Activities

- 429 active generation interconnection requests totaling 83,449 MW, including 40,238 MW of wind generation, as of October 31, 2018. Three additional requests and a decrease of 89 MW from September 30, 2018.
- 21,550 MW wind capacity in commercial operations as of November 1, 2018.

# Daily Peak Demand: Hourly Average Actual vs. Forecast, Wind Day-Ahead COPs & On-Line Capacity at Peak – September 2018



# Daily Peak Demand: Hourly Average Actual vs. Forecast, Wind Day-Ahead COPs & On-Line Capacity at Peak – October 2018



## Market Statistics – September 2018

Market Statistics	September 2017	September 2018	2017 Average	2018 YTD Average
Percentage of Real-Time load transacted in the Day-Ahead Market <sup>1</sup>	89%	92%	90%	89%
Average 'ERCOT Hub Average 345 kV Hub' Settlement Point Price in Day-Ahead Market (\$/MWh)	25.79	28.40	26.63	39.97
Average 'ERCOT Hub Average 345 kV Hub' Settlement Point Price in Real-Time (\$/MWh)	25.92	29.15	26.61	32.56
Average East Houston Fuel Index Price (\$/MMBtu)	2.94	2.99	2.98	3.01

<sup>1</sup> The calculation method for this metric was updated in November 2017. It is now defined as the net withdraw of DAM transactions at Load Zones (including energy purchases, sales, and point-to-point transactions) by QSEs that represent physical Load, divided by the total real-time Load.

## Market Statistics – October 2018

Market Statistics	October 2017	October 2018	2017 Average	2018 YTD Average
Percentage of Real-Time load transacted in the Day-Ahead Market <sup>1</sup>	92%	89%	90%	89%
Average 'ERCOT Hub Average 345 kV Hub' Settlement Point Price in Day-Ahead Market (\$/MWh)	26.39	31.05	26.63	39.16
Average 'ERCOT Hub Average 345 kV Hub' Settlement Point Price in Real-Time (\$/MWh)	27.91	37.25	26.61	32.98
Average East Houston Fuel Index Price (\$/MMBtu)	2.93	3.48	2.98	3.06

<sup>1</sup> The calculation method for this metric was updated in November 2017. It is now defined as the net withdraw of DAM transactions at Load Zones (including energy purchases, sales, and point-to-point transactions) by QSEs that represent physical Load, divided by the total real-time Load.

## Operational Performance Measures – September & October 2018

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 – September & October 2018

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> <li>• The calculation method for the load hedging metric was updated starting in November 2017</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> </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 – September & October 2018

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 September to resolve system capacity shortage</li> <li>5 resources were committed in October to resolve congestions and system capacity shortage</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 September or October</li> </ul>
Congestion Revenue Rights Price Convergence	Yes	<ul style="list-style-type: none"> <li>Price convergence in September and October returned to more normal ranges of cost-to-value</li> </ul>

## Operational Dashboard – September 2018

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>99.1% of ERCOT load settled with 15-minute interval data.</li> <li>7.2M Advanced Metering System (AMS) Electric Service Identifier (ESIIDs) included in settlement as of September 2018.</li> </ul>
Settlement Dollars	Yes	<ul style="list-style-type: none"> <li>As of settlement of Operating Day 09/30/2018, the daily average settlement dollars for September 2018 are \$14.97M, which is down from \$19.61M in August 2018 and up from September 2017 which had an average of \$13.22M.</li> </ul>
Revenue Neutrality	Yes	<ul style="list-style-type: none"> <li>As of settlement of Operating Day 09/30/2018, Revenue Neutrality uplift is a charge of \$7.00M, which is down from a \$12.61M charge in August 2018 and up from a \$4.68M charge in September 2017.</li> </ul>
Market-Based Uplift to Load	Yes	<ul style="list-style-type: none"> <li>As of settlement of Operating Day 09/30/2018, the market-based uplift to load is a credit of \$6.02M, as opposed to a \$5.78M credit in August 2018 and a credit of \$1.88M in September 2017.</li> </ul>

## Operational Dashboard – October 2018

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>99.2% of ERCOT load settled with 15-minute interval data.</li> <li>7.2M Advanced Metering System (AMS) Electric Service Identifier (ESIID)s included in settlement as of October 2018.</li> </ul>
Settlement Dollars	Yes	<ul style="list-style-type: none"> <li>As of settlement of Operating Day 10/31/2018, the daily average settlement dollars for October are \$18.14M, which is up from \$14.97M in September 2018 and up from October 2017 which had an average of \$15.02M.</li> </ul>
Revenue Neutrality	Yes	<ul style="list-style-type: none"> <li>As of settlement of Operating Day 10/31/2018, Revenue Neutrality uplift is a charge of \$11.42M, which is up from September 2018 which was a charge of \$7.00M and up from October 2017 which was a charge of \$10.45M.</li> </ul>
Market-Based Uplift to Load	Yes	<ul style="list-style-type: none"> <li>As of settlement of Operating Day 10/31/2018, the market-based uplift was a charge of \$13.43M, as opposed to a credit of \$6.02M in September 2018 and a charge of \$11.13M in October 2017.</li> </ul>

## Select Project Highlights – (as of 11/21/2018)

Project	Trending as Expected	Further Information
<b>CRR Framework Upgrade</b> – Improves the ability to support and maintain the CRR system by upgrading the User Interface framework and its related components to current versions	Yes	The project is in stabilization and is trending to the revised schedule and budget. <ul style="list-style-type: none"> <li>• Go-Live occurred on 11/19/2018; there were no significant issues.</li> <li>• Leadership focus is on vendor management, CRR application vendor quality practices, and prioritization of backlogged work.</li> </ul>
<b>2015 CMM NPRRs and Tech Refresh</b> – Combines CMM NPRRs and a technical refresh of the CMM application	Yes	The CMM Phase 1B project is in Execution and trending to revised schedule and budget. <ul style="list-style-type: none"> <li>• Phase 1B scope includes delivery of the CMM technical refresh and a subset of credit-related NPRRs (NPRR519, NPRR620, NPRR660, NPRR741, NPRR755).</li> <li>• Changes have been made to roles, process, and governance to mitigate identified risks and challenges.</li> <li>• Re-plan activities concluded in October 2018. The target Go-Live date is planned for June 2019.</li> <li>• Functional Acceptance Testing is underway and scheduled to conclude in February 2019.</li> <li>• Phase 1A project completed in February 2018.</li> </ul>
<b>SCR781 RARF Replacement</b> – Allow Market Participants to electronically submit, review, and make online changes to data ERCOT requires of them. This is the first phase of a multi-phased project approach. Phase 1 will define the overall requirements, but only focus implementation on resource asset and network modeling data collected via ERCOT’s Resource Asset Registration Form (RARF)	Yes	Alignment of the project schedule with the Digital Engagement Strategy (DES) delivery roadmap continues. In the interim, execution activities continue to make progress in the following areas: <ul style="list-style-type: none"> <li>• Development support vendor for UI/UX Design System has been chosen and work is underway.</li> <li>• RFP responses for API Strategy are under review by ERCOT team members with a goal to begin work in Q1 2019.</li> <li>• Critical architecture work (e.g., data architecture, technical architecture) is in progress and on schedule.</li> <li>• Ongoing delivery execution activities are under review and being aligned with the DES roadmap. This alignment addresses both the new Generation Interconnection Request (GINR) application and the replacement of the Resource Asset Registration Form (RARF).</li> </ul>

## Select Project Highlights – (as of 11/21/2018)

Project	Trending as Expected	Further Information
<p><b>Training Facility</b> – Construct and furnish the Training Facility. The scope of the project includes building construction, roads and walks, landscaping, IT infrastructure, telecommunications and furnishings</p>	Yes	<p>The project is in Execution, trending to the approved budget and readiness for 2019 Operator training and Blackstart training.</p> <ul style="list-style-type: none"> <li>• Substantial Completion was achieved and received Certificate of Occupancy in October.</li> <li>• All exterior and interior structure, major infrastructure (plumbing, electrical) are complete, and furniture are installed.</li> <li>• BARCO video wall is installed.</li> <li>• All network and AV cabling is installed.</li> <li>• Remaining work includes:               <ul style="list-style-type: none"> <li>◦ Terminations, patching into switches, and testing of Network, phone, and AV</li> <li>◦ Electrical connection of cubicles and install of office furniture/shelving in 'open office' area</li> <li>◦ Move and/or installation and test of office computers and phones</li> <li>◦ Final procurement and installation of ERCOT furnished artwork, furnishings, etc.</li> <li>◦ Functional move of Training Team in prep for Cycle-1 and Blackstart training</li> </ul> </li> </ul>
<p><b>Identity &amp; Access Management</b> – Replaces the current identity and access management (IAM) system, improving access control and the user experience</p>	Yes	<p>The project is in Execution and is trending to the approved budget and overall schedule. The team is closely monitoring for potential schedule impacts due to a slight delay in starting department role verifications.</p> <ul style="list-style-type: none"> <li>• Modular testing is in progress and due to complete by end of November.</li> <li>• Business Process testing in parallel with end to end testing in December.</li> <li>• User acceptance testing and training in Q1 2019, with the first of four cutovers by department beginning in Q2 2019.</li> </ul>
<p><b>IT Change and Configuration Management Phase 2</b> –Identify and address critical improvements to the initial IT Change and Configuration Management implementations to increase throughput, reduce complexity, and fulfill support for the remainder of ERCOT's non-NERC classified systems</p>	Yes	<p>The project is tracking to the December Go-Live date and the approved budget. Core development, configuration work and business process testing is complete. Current activity includes:</p> <ul style="list-style-type: none"> <li>• User acceptance testing.</li> <li>• Operational readiness and training.</li> <li>• Cutover planning and preparation.</li> <li>• Completion of remaining reports.</li> </ul>

## Select Project Highlights – (as of 11/21/2018)

Project	Trending as Expected	Further Information
<p><b>Data Center 4.0 Optimization (DC4) 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>	<p>Yes</p>	<p>The remaining active DC4 projects are tracking to the approved schedule and budget:</p> <ul style="list-style-type: none"> <li>• Telecom-Control Room &amp; Grid Ops Project (Execution) – Control Room cutovers to the new Control Room phones and hotline system are complete. Legacy decommissions will begin soon.</li> <li>• Network-Command &amp; Control Project – includes the purchase and deployments of network load balancing appliances, network logging systems, and a network analysis tool:             <ul style="list-style-type: none"> <li>○ Stage 1 (Closing) – the load balancing solution has been deployed for the global network.</li> <li>○ Stage 2 (Closing) – the new logging system is live and the legacy decommission are underway.</li> <li>○ Stage 3 (Execution) – the local network load balancing solution is live. The deployment of the new network analysis tool is underway, with Go-Live at the end of February.</li> </ul> </li> <li>• Application Migration Project – an eight stage migration project, where application and databases from legacy systems are migrated to the new converged infrastructure systems:             <ul style="list-style-type: none"> <li>○ Stage 1 (Closing) – virtual-to-virtual (V2V) system migrations for this stage have been completed.</li> <li>○ Stage 2 (Closing) – physical-to-virtual (P2V) system migrations for this stage have been completed.</li> <li>○ Stage 3 (Closing) – application migrations that require IP address changes under this stage have been completed.</li> <li>○ Stage 4 (Closing) – SQL database cluster builds and database migrations for this stage have been completed.</li> <li>○ Stage 5 (Closing) – Legacy Linux systems that require P2V migrations for this stage have been completed.</li> <li>○ Stage 6 (Execution) – All MSE related applications have been migrated to new hardware. This project will go into Closing at the end of November.</li> <li>○ Stage 7 (Closing) – network attached storage file system migrations have been completed.</li> <li>○ Stage 8 (Closing) – any remaining project migrations, not included in the first 7 stages, have been completed. All system decommissions, for the entire project are complete.</li> </ul> </li> </ul>

## Select Project Highlights – (as of 11/21/2018)

Project	Trending as Expected	Further Information
<p><b>Data Center 4.0 Optimization (DC4) 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>	<p>Yes</p>	<p>The remaining active DC4 projects are tracking to the approved schedule and budget:</p> <ul style="list-style-type: none"> <li>• Telecom-Corporate Voice System – includes the purchase and deployment of the voice firewall systems and the enterprise voice over IP solution:               <ul style="list-style-type: none"> <li>○ Stage 1 (Closing) – the voice firewall systems deployment has been completed.</li> <li>○ Stage 2 (Execution) – the project is reviewing vendor responses to the RFP. The purchase and deployment of the solution will start in Q1 2019.</li> </ul> </li> <li>• Telecom-Data Center Connectivity (Execution) – the data center connectivity hardware has been deployed and is live. Legacy hardware decommissions will begin in December.</li> <li>• MV90 Hardware Refresh (Execution) – the new MV90 smart meter telemetry hardware has been deployed in a test environment and testing will go through February. After the testing is complete, purchase and deployment of the production system will begin in Q1 2019.</li> <li>• Vendor Hardware Refresh (Initiation) – the hardware used for vendor application development is being refreshed. A determination of the hardware requirements and capacity is underway. The project will begin the Planning phase in December.</li> </ul>



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/>)