



Item 4.2: Operations Report (May – June 2018)

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Board of Directors Meeting

ERCOT Public
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Summary – May 2018

Operations

- The preliminary Settlements hourly peak demand of 67,236* MW on May 29 was higher than the day-ahead mid-term load forecast peak of 66,305 MW for the same operating hour.
 - The operational instantaneous peak demand was 67,493 MW (telemetry).
- Day-ahead load forecast error for May was 2.14%
- ERCOT issued 12 notifications:
 - Three Transmission-related Watches
 - Six DC Tie-related Watches
 - Three Resource-related OCNs

Planning Activities

- 369 active generation interconnection requests totaling 75,207 MW, including 33,799 MW of wind generation, as of May 31, 2018. Twenty additional requests and an increase of 3,587 MW from April 30, 2018.
- 21,190 MW wind capacity in commercial operations as of June 1, 2018.

Summary – June 2018

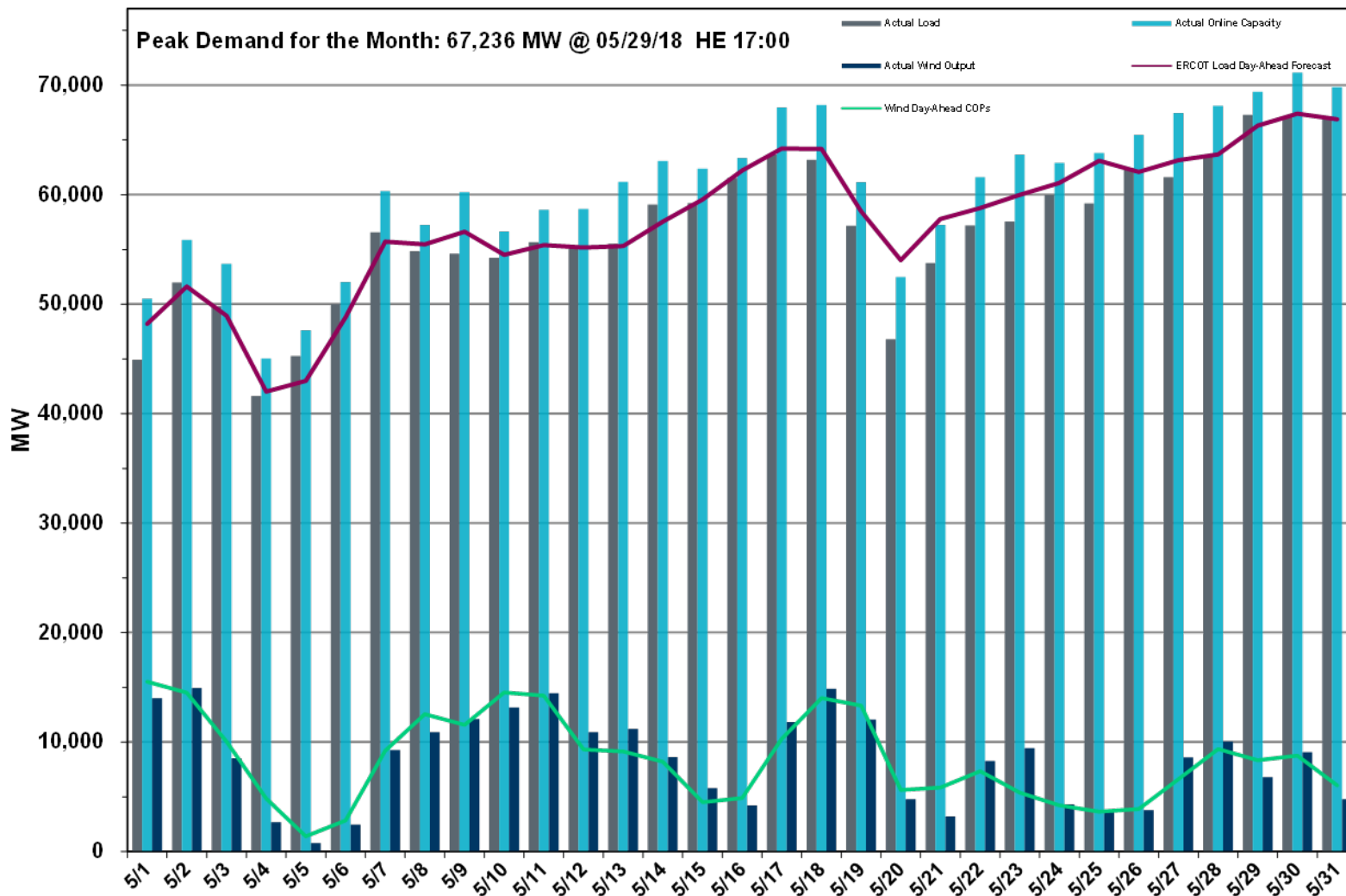
Operations

- The preliminary Settlements hourly peak demand of 69,102* MW on June 27 was lower than the day-ahead mid-term load forecast peak of 69,223 MW for the same operating hour.
 - The operational instantaneous peak demand was 69,226 MW (telemetry).
- Day-ahead load forecast error for June was 1.65%
- ERCOT issued 17 notifications:
 - Two Advisories issued due to Physical Responsive Capability being below 3000 MW
 - Three DAM-related Advisories
 - One Advisory issued due to ERCOT's Voltage Security Assessment Tool / RTCA unavailability.
 - Nine DC Tie-related Watches
 - Two Transmission-related Watches

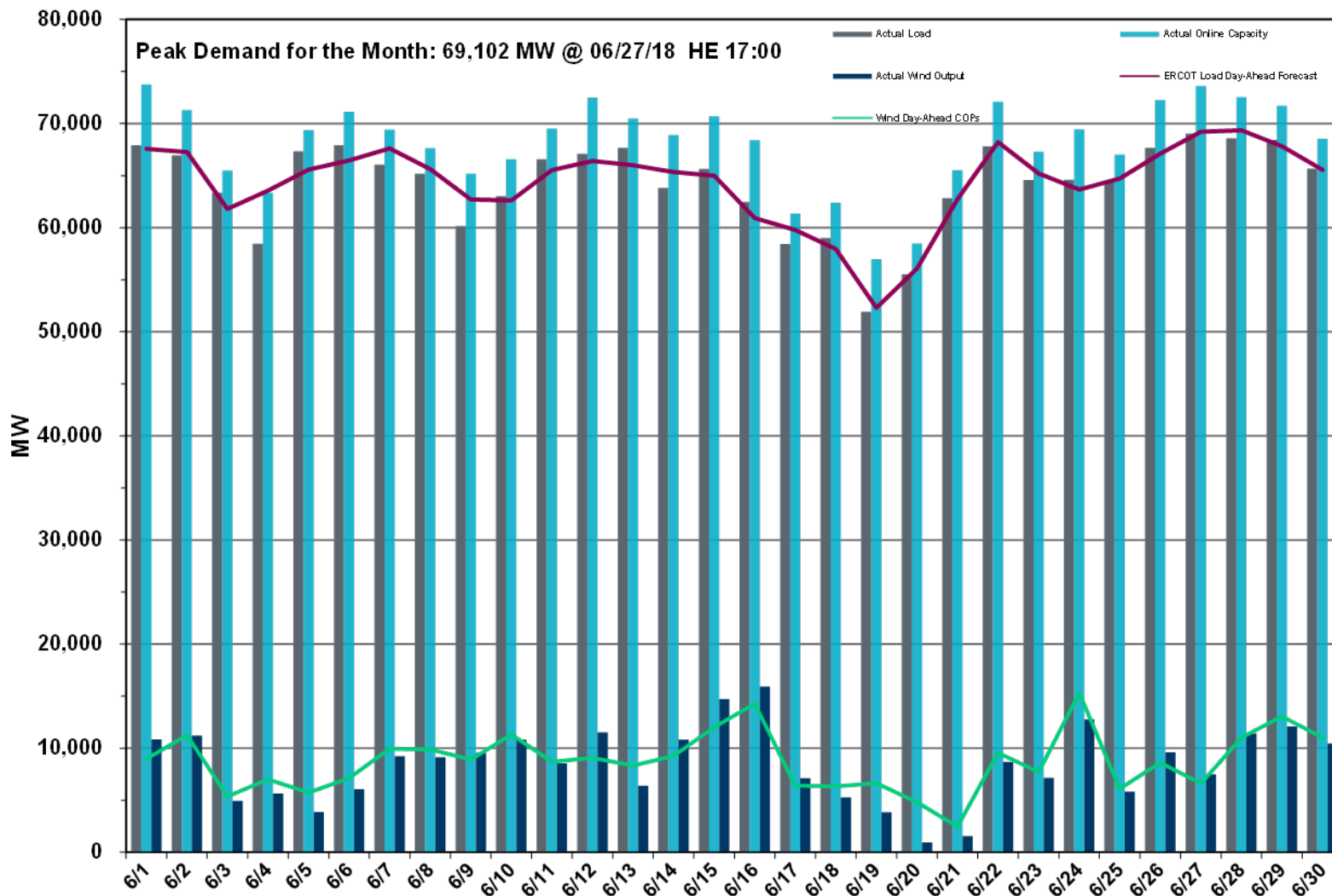
Planning Activities

- 379 active generation interconnection requests totaling 77,020 MW, including 34,376 MW of wind generation, as of June 30, 2018. Ten additional requests and an increase of 1,813 MW from May 31, 2018.
- 21,190 MW wind capacity in commercial operations as of July 1, 2018.

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



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



Market Statistics – May 2018

Market Statistics	May 2017	May 2018	2017 Average	2018 YTD Average
Percentage of Real-Time load transacted in the Day-Ahead Market ¹	87%	85%	90%	89%
Average 'ERCOT Hub Average 345 kV Hub' Settlement Point Price in Day-Ahead Market (\$/MWh)	27.12	36.87	26.63	30.69
Average 'ERCOT Hub Average 345 kV Hub' Settlement Point Price in Real-Time (\$/MWh)	32.73	31.37	26.61	27.77
Average East Houston Fuel Index Price (\$/MMBtu)	3.24	2.81	2.98	3.05

¹ 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 – June 2018

Market Statistics	June 2017	June 2018	2017 Average	2018 YTD Average
Percentage of Real-Time load transacted in the Day-Ahead Market ¹	91%	88%	90%	89%
Average 'ERCOT Hub Average 345 kV Hub' Settlement Point Price in Day-Ahead Market (\$/MWh)	30.25	31.71	26.63	30.90
Average 'ERCOT Hub Average 345 kV Hub' Settlement Point Price in Real-Time (\$/MWh)	28.71	32.56	26.61	28.76
Average East Houston Fuel Index Price (\$/MMBtu)	3.05	3.00	2.98	3.04

¹ 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 – May & June 2018

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

Operational Dashboard – May & June 2018

Metric	Trending as Expected	Further Information
Day-Ahead Schedule	Yes	<ul style="list-style-type: none"> • Normal level of market activity and liquidity • Loads appear to have hedged against exposure to Real-Time prices • The calculation method for the load hedging metric was updated starting in November 2017
Day-Ahead Electricity And Ancillary Service Hourly Average Prices	Yes	<ul style="list-style-type: none"> • Hourly average prices correctly reflect the opportunity cost of energy
Day-Ahead vs Real-Time Load Zone Settlement Point Price (Hourly Average)	Yes	<ul style="list-style-type: none"> • Day-Ahead & Real-Time prices for different Load Zones reflect relative transmission congestion
Day-Ahead vs Real-Time Trading Hub Settlement Point Price (Hourly Average)	Yes	<ul style="list-style-type: none"> • The average energy price across the system reflects marginal offers and scarcity pricing impacts
Day-Ahead Reliability Unit (DRUC) Commitment Monthly Summary	Yes	<ul style="list-style-type: none"> • Capacity committed by the DRUC process indicates the level of out of market activity needed Day-Ahead to maintain reliability • No resource was committed in DRUC in this period

Operational Dashboard – May & June 2018

Metric	Trending as Expected	Further Information
Hourly Reliability Unit Commitment (HRUC) Monthly Summary	Yes	<ul style="list-style-type: none"> Capacity committed by the HRUC process indicates the level of out of market activity needed during the Operating Day to maintain reliability 13 resources were committed in May to resolve congestion and voltage issues 5 resources were committed in June to resolve congestion
Supplemental Ancillary Service Market Monthly Summary	Yes	<ul style="list-style-type: none"> Normal trend indicates that deliverability was not a major concern
Non-Spinning Reserve Service Deployment	Yes	<ul style="list-style-type: none"> Non-Spin was deployed in May (5/1, 5/2, 5/3) due to congestion and voltage support.
Congestion Revenue Rights Price Convergence	No	<ul style="list-style-type: none"> In May and June, CRRs continued the recent trend of having significantly higher DAM values than auction costs. Higher than-expected congestion in the Day-Ahead Market was the main driver.

Operational Dashboard – May 2018

Metric	Trending as Expected	Further Information
Retail Transactions	Yes	<ul style="list-style-type: none"> Seasonal variations in transaction volumes trending as expected.
Advanced Metering	Yes	<ul style="list-style-type: none"> 98.8% of ERCOT load settled with 15-minute interval data. 7.1M Advanced Metering System (AMS) Electric Service Identifier (ESIID)s included in settlement as of May 2018.
Settlement Dollars	Yes	<ul style="list-style-type: none"> As of settlement of Operating Day 05/31/2018, the daily average settlement dollars for May 2018 are \$26.88M, which is up from \$13.73M in April 2018 and up from May 2017 which had an average of \$17.19M.
Revenue Neutrality	Yes	<ul style="list-style-type: none"> As of settlement of Operating Day 05/31/2018, Revenue Neutrality uplift is a charge of \$18.40M, which is up from a \$2.10M charge in April 2018 and up from a \$8.76M charge in May 2017.
Market-Based Uplift to Load	Yes	<ul style="list-style-type: none"> As of settlement of Operating Day 05/31/2018, the market-based uplift to load is a charge of \$15.07M, as opposed to a \$1.07M credit in April 2018 and a charge of \$12.09M in May 2017.

Operational Dashboard – June 2018

Metric	Trending as Expected	Further Information
Retail Transactions	Yes	<ul style="list-style-type: none"> Seasonal variations in transaction volumes trending as expected.
Advanced Metering	Yes	<ul style="list-style-type: none"> 98.9% of ERCOT load settled with 15-minute interval data. 7.1M Advanced Metering System (AMS) Electric Service Identifier (ESIID)s included in settlement as of June 2018.
Settlement Dollars	Yes	<ul style="list-style-type: none"> As of settlement of Operating Day 06/30/2018, the daily average settlement dollars for June are \$25.47M, which is down from \$26.88M in May 2018 and up from June 2017 which had an average of \$17.23M.
Revenue Neutrality	No	<ul style="list-style-type: none"> As of settlement of Operating Day 06/30/2018, Revenue Neutrality uplift is a charge of \$30.46M, which is up from May 2018 which was a charge of \$18.40M and up from June 2017 which was a charge of \$10.36M. The driver for this uplift is congestion in the Far West caused by the fast growing load in that region.
Market-Based Uplift to Load	Yes	<ul style="list-style-type: none"> As of settlement of Operating Day 06/30/2018, the market-based uplift was a charge of \$21.52M, as opposed to a charge of \$15.07M in May 2018 and a credit of \$13.22M in June 2017.

Select Project Highlights – (as of 07/20/2018)

Project	Trending as Expected	Further Information
<p>CRR Framework Upgrade – Improves the ability to support and maintain the CRR system by upgrading the User Interface framework and its related components to current versions</p>	No	<p>The project is in Execution and not tracking to schedule.</p> <ul style="list-style-type: none"> • The team continues to address the outstanding defects and production readiness activities that delayed the production go-live. <ul style="list-style-type: none"> ◦ The delay is caused by increased time for defect resolution and retest cycles. Vendor has added staff and new roles to mitigate risk. ◦ The team is currently working with the vendor to address defects and achieve a stable release. • ERCOT has defined stability criteria that must be met before we declare readiness for go-live. ERCOT will provide the market with at least 60 days notice prior to the production release once the stability criteria are met. • Board to be provided with additional information during Executive Session with both ERCOT and vendor representatives.
<p>2015 CMM NPRRs and Tech Refresh – Combines CMM NPRRs, a technical refresh into a single project to gain efficiencies</p>	No	<p>The project is in Execution and Phase 1B is not tracking to schedule or budget.</p> <ul style="list-style-type: none"> • Phase 1B is in Execution and includes delivery of the technical refresh along with related in-scope NPRRs. (NPRRs 519, 620, 660, 741, and 755). • December 2018 Go-live is at risk due to missed requirements and complexity of certain technical requirements. The team is identifying mitigation measures and assessing the schedule impact to determine the new Go-Live date. <p>Phase 1A is complete (NPRRs 648, 683, 743, 760 and 800 via the existing CMM application).</p>
<p>SCR781 RARF Replacement – 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)</p>	Yes	<p>The project is in Execution and the project schedule is being modified in alignment with the Digital Engagement Strategy (DES) delivery roadmap. The following project activity will continue:</p> <ul style="list-style-type: none"> • The staffing plan has been defined and is in progress. • Critical architecture work (e.g. data architecture, technical architecture) is in progress and on schedule. • Activity planning in alignment with the DES roadmap is in progress.

Select Project Highlights – (as of 07/20/2018)

Project	Trending as Expected	Further Information
<p>Training Facility – 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 and tracking to approved schedule and budget.</p> <ul style="list-style-type: none"> • Interior walls and ceilings is in progress • Exterior facade work is in progress • The team continues to work with the Building Architect and 3rd party vendors to finalize interior finishes • Technical team is focused on Audio Visual needs
<p>Identity & Access Management – Replaces the current identity and access management (IAM) system, improving access control and the user experience</p>	Yes	<p>The project is in Execution phase and is tracking to approved schedule and budget.</p> <ul style="list-style-type: none"> • Integration with Workday is at risk • Database integration are in progress • Currently loading meta and user data in testing environment • Functional testing is in progress • User Interface updates are on track
<p>IT Change and Configuration Management Phase 2 – Identify and address critical improvements of 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 in the Execution Phase and tracking to the revised schedule and budget.</p> <ul style="list-style-type: none"> • Operations support alignment with production deliveries is in progress • Operating systems and software discovery for data center environments is ongoing • Integration between the Change Management and Configuration Management applications is in progress • Development and functional testing for change management workflows are complete • Development and functional testing for data management workflow are in progress • Report development and delivery are at risk • Full solution integrated testing, user acceptance testing, and system cutover planning is in progress • Actively monitoring risk of key milestone completion for go-live

Select Project Highlights – (as of 07/20/2018)

Project	Trending as Expected	Further Information
<p>Data Center 4.0 Optimization (DC4) Program – 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"> • Telecom-Control Room & Grid Ops Project (Execution) – Control Room cutovers to the new Control Room phones and hotline system are scheduled to occur by the end of August. • Network-Command & 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"> ○ Stage 1 (Closing) – the load balancing solution has been deployed for the global network. ○ Stage 2 (Execution) – the deployment of the new logging system is underway, with the Go-Live occurring in late August. ○ Stage 3 (Execution) – the local network load balancing solution Go-Live will be completed in mid-November. The deployment of the new network analysis tool is going through issue resolution, with the Go-Live occurring by the end of November. • 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"> ○ Stage 1 (Closing) – virtual-to-virtual (V2V) system migrations for this stage have been completed. ○ Stage 2 (Closing) – physical-to-virtual (P2V) system migrations for this stage have been completed. ○ Stage 3 (Closing) – application migrations that require IP address changes under this stage have been completed. ○ Stage 4 (Closing) – SQL database cluster builds and database migrations for this stage have been completed. ○ Stage 5 (Closing) – Legacy Linux systems that require P2V migrations for this stage have been completed. ○ Stage 6 (Execution) – All MSE related applications have been migrated to new hardware. A possible re-alignment of MSE applications is being discussed and will need to be planned, if included in this project. ○ Stage 7 (Closing) – network attached storage file system migrations have been completed. ○ Stage 8 (Execution) – this stage includes any remaining project migrations that are not included in the first 7 stages. All migrations for this stage have been completed. All system decommissions from this project are still underway, but this stage is scheduled to Close in late August.

Select Project Highlights – (as of 07/20/2018)

Project	Trending as Expected	Further Information
<p>Data Center 4.0 Optimization (DC4) Program – 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"> • Remote Access (Closing) – Production cutovers to the new remote access system have been completed successfully. • 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"> ○ Stage 1 (Closing) – the voice firewall systems deployment has been completed. ○ Stage 2 (Planning) – this stage includes the purchase and deployment of the voice over IP solution and will be in planning until mid November. • Telecom-Data Center Connectivity (Execution) – the final delivery of the hardware connecting the fiber channel network between data centers is expected in July. The configuration and testing of this equipment will occur at the vendor's site in August. • MV90 Hardware Refresh (Execution) – this project is scheduled for a test environment installation of the new MV90 smart meter telemetry system by early September. After the testing is complete, deployment into production will occur in Q1 2019.

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