



Item 4.2: Operations Report (September – October 2017)

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Board of Directors Meeting

ERCOT Public
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Summary – September 2017

Operations

- The preliminary Settlements hourly peak demand of 63,634* MW on September 20 was higher than the day-ahead mid-term load forecast peak of 63,449 MW for the same operating hour.
 - The operational instantaneous peak demand was 63,831 MW (telemetry).
- Day-ahead load forecast error for September was 1.69%
- ERCOT issued 14 notifications:
 - One Watch issued due to HRUC not completing
 - Six Advisories issued due to Physical Responsive Capability being below 3,000 MW
 - Seven Advisories issued for geomagnetic disturbance

Planning Activities

- 336 active generation interconnection requests totaling 67,736 MW, including 29,566 MW of wind generation, as of September 30, 2017. Fifteen additional requests and an increase of 894 MW from August 31, 2017.
- 19,565 MW wind capacity in commercial operations as of October 1, 2017.

Summary – October 2017

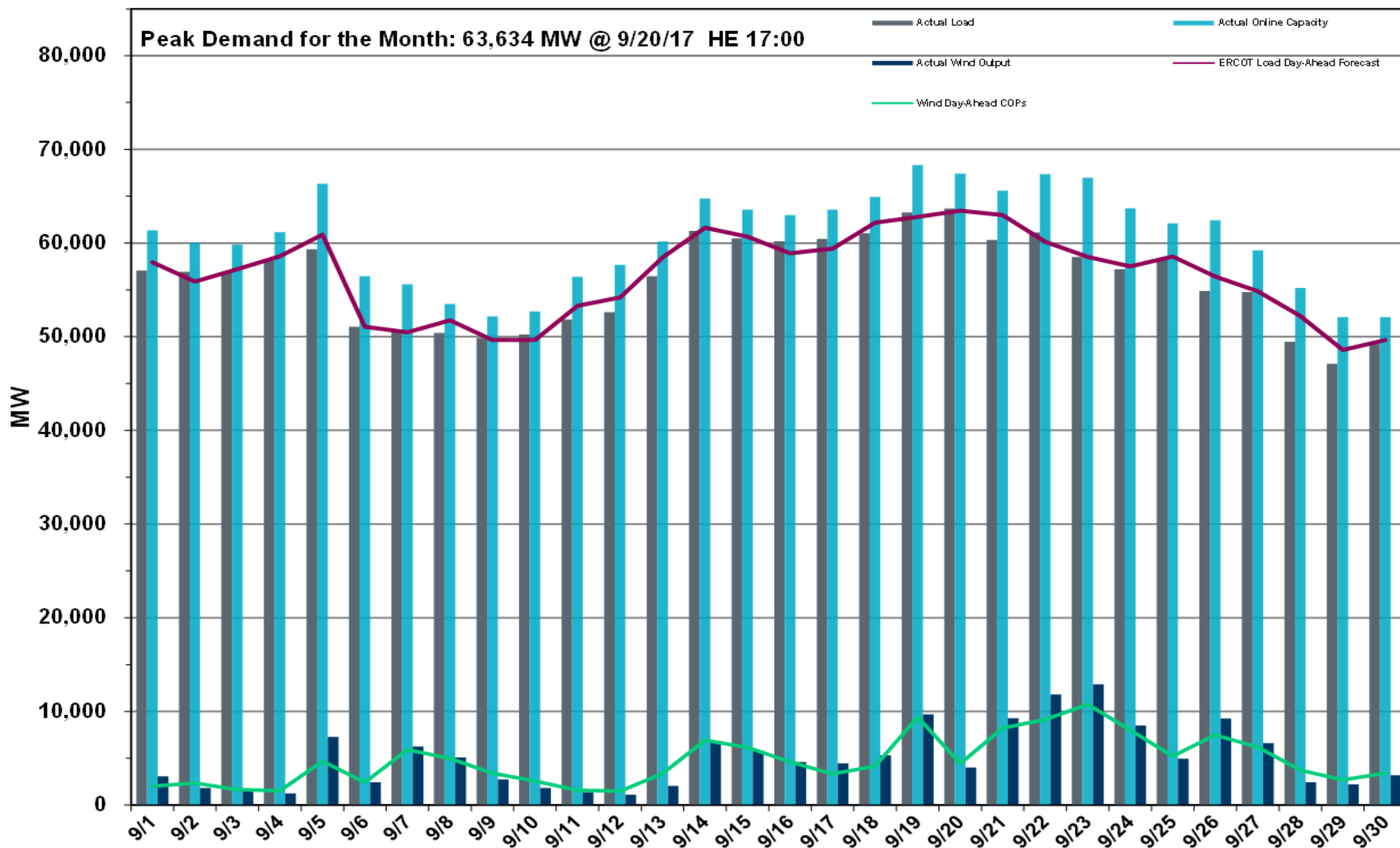
Operations

- The preliminary Settlements hourly peak demand of 62,181* MW on October 9 was higher than the day-ahead mid-term load forecast peak of 60,795 MW for the same operating hour.
 - The operational instantaneous peak demand was 62,461 MW (telemetry).
- Day-ahead load forecast error for October was 2.50%
- ERCOT issued 2 notifications:
 - One Watch issued for the Railroad DC Tie due to transfer capability
 - One Advisory issued due to Physical Responsive Capability being below 3000 MW

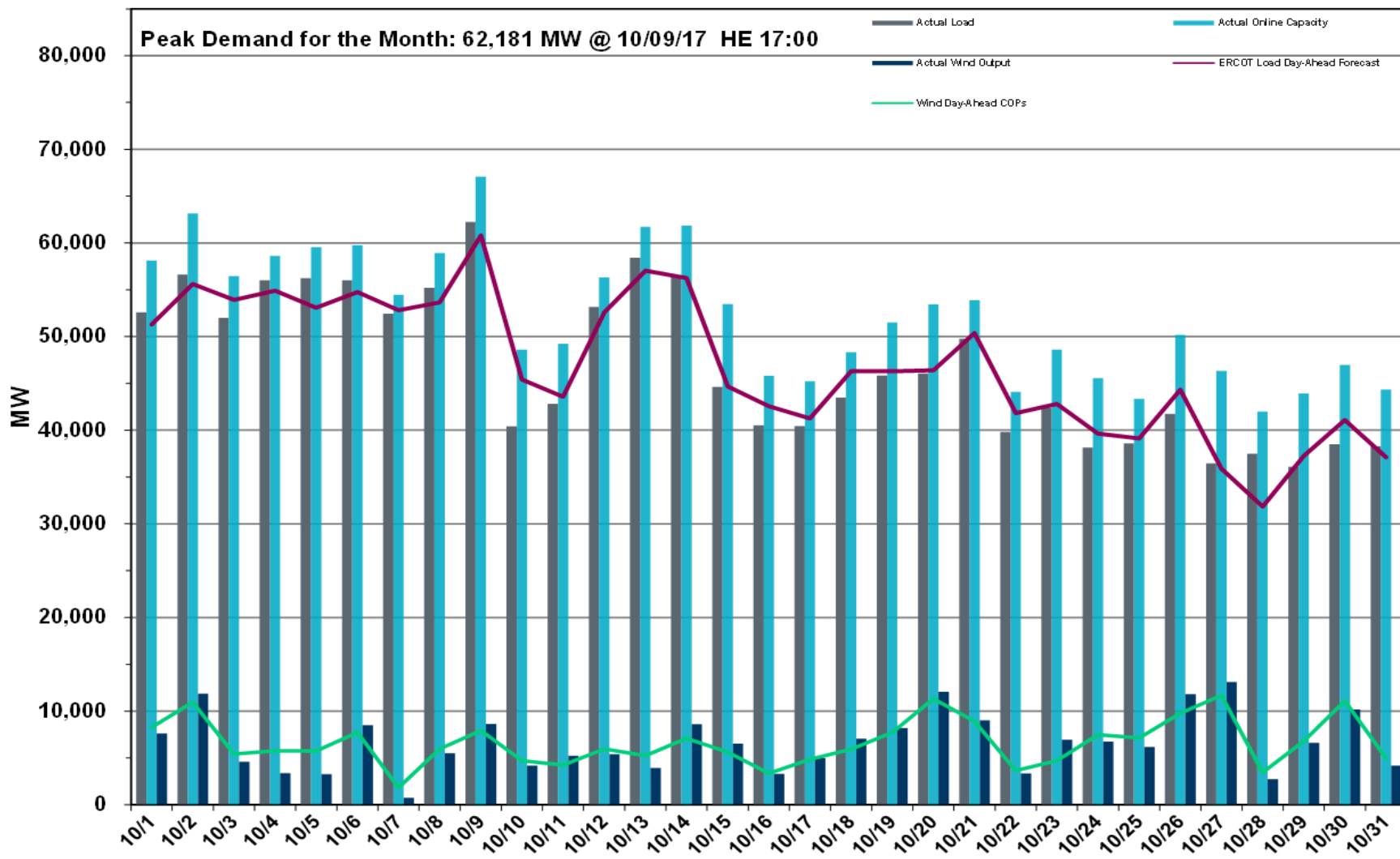
Planning Activities

- 339 active generation interconnection requests totaling 69,020 MW, including 30,092 MW of wind generation, as of October 31, 2017. Three additional requests and an increase of 1,284 MW from September 30, 2017.
- 19,947 MW wind capacity in commercial operations as of November 1, 2017.

Daily Peak Demand: Hourly Average Actual vs. Forecast, Wind Day-Ahead COPs & On-Line Capacity at Peak – September 2017



Daily Peak Demand: Hourly Average Actual vs. Forecast, Wind Day-Ahead COPs & On-Line Capacity at Peak – October 2017



Market Statistics – September 2017

Market Statistics	September 2016	September 2017	2016 Average	2017 YTD Average
Percentage of Real-Time load hedged in Day-Ahead Market	117.52%	118.28%	122.49%	122.53%
Average 'ERCOT Hub Average 345 kV Hub' Settlement Point Price in Day-Ahead Market (\$/MWh)	29.25	25.79	24.56	27.44
Average 'ERCOT Hub Average 345 kV Hub' Settlement Point Price in Real-Time (\$/MWh)	30.03	25.92	23.51	27.26
Average East Houston Fuel Index Price (\$/MMBtu)	2.93	2.94	2.45	3.01

Market Statistics – October 2017

Market Statistics	October 2016	October 2017	2016 Average	2017 YTD Average
Percentage of Real-Time load hedged in Day-Ahead Market	121.38%	123.58%	122.49%	122.63%
Average 'ERCOT Hub Average 345 kV Hub' Settlement Point Price in Day-Ahead Market (\$/MWh)	27.84	26.39	24.56	27.34
Average 'ERCOT Hub Average 345 kV Hub' Settlement Point Price in Real-Time (\$/MWh)	25.48	27.91	23.51	27.32
Average East Houston Fuel Index Price (\$/MMBtu)	3.08	2.93	2.45	3.00

Operational Performance Measures – September & October 2017

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 – September & October 2017

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.
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 – September & October 2017

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.8 resources committed in September to resolve congestion1 resource committed in October 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 not deployed in September and October.
Congestion Revenue Rights Price Convergence	No	<ul style="list-style-type: none">Recent trends in CRR show day-ahead values significantly above auction costs in October. Higher-than-expected congestion in the Day-Ahead Market is the main driver.

Operational Dashboard – September 2017

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 September 2017.
Settlement Dollars	Yes	<ul style="list-style-type: none"> As of settlement of Operating Day 09/30/2017, the daily average settlement dollars for September 2017 are \$13.22M, which is down from \$15.09M in August 2017 and down from September 2016, which had an average of \$14.94M.
Revenue Neutrality	Yes	<ul style="list-style-type: none"> As of settlement of Operating Day 09/30/2017, Revenue Neutrality uplift is a charge of \$4.68M, which is up from a \$1.46M charge in August 2017 and up from a \$0.97M credit in September 2016.
Market-Based Uplift to Load	Yes	<ul style="list-style-type: none"> As of settlement of Operating Day 09/30/2017, the market-based uplift to load is a credit of \$1.88M, as opposed to a \$12.58M credit in August 2017 and a charge of \$9.84M in September 2016.

Operational Dashboard – October 2017

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"> 99.0% 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 October 2017.
Settlement Dollars	Yes	<ul style="list-style-type: none"> As of settlement of Operating Day 10/31/2017, the daily average settlement dollars for October are \$15.02M, which is up from \$13.22M in September 2017 and up from October 2016 which had an average of \$13.58M.
Revenue Neutrality	No	<ul style="list-style-type: none"> As of settlement of Operating Day 10/31/2017, Revenue Neutrality uplift is a charge of \$10.45M, up from September 2017, which was a charge of \$4.68M and up from October 2016, which was a charge of \$3.50M. The main driver for this was the overselling of PTPs in the DAM due to the fact that DAM does not include PUN loads. This cause has been resolved with changes to the LDF methodology and NPRR831, both effective November 2, 2017.
Market-Based Uplift to Load	Yes	<ul style="list-style-type: none"> As of settlement of Operating Day 10/31/2017, the market-based uplift was a charge of \$11.13M, as opposed to a credit of \$1.88M in September 2017 and a charge of \$19.05M in October 2016.

Major Project Highlights – (as of 11/24/2017)

Project	Trending as Expected	Further Information
CRR Framework Upgrade Project – Improves the ability to support and maintain the CRR system by upgrading the User Interface framework and its related components to current versions	Yes	<ul style="list-style-type: none"> The project is in the Execution phase and tracking to approved schedule and budget. Go-live is scheduled for January 2018. Integration testing continues; cyber security testing scheduled for early December. MOTE Go Live (Market Requalification) commenced on 9/18/2017; as of 11/17/2017, 77% of registered Market Participants have successfully requalified on new CRR system. Client Services is communicating actively with unqualified MPs to assess their intention to requalify.
2015 CMM NPRRs and Tech Refresh – Combines CMM NPRRs, a technical refresh and new Treasury functionality into a single project to gain efficiencies	Yes	<ul style="list-style-type: none"> Phase 1 is in Execution and includes delivery of the CMM technical refresh along with the majority of the Credit-related NPRRs. <ul style="list-style-type: none"> Phase 1A will deliver NPRRs 648, 683, 743, 760 and 800 via the existing CMM application. Go-live is scheduled for February 2018. FAT testing is underway and integration testing will start in December. This phase is tracking to schedule and budget. Phase 1B will continue to focus on delivery of the technical refresh, along with delivery of the full scope of NPRRs in Phase 1. Development cycles continue on track, and parallel FAT testing is occurring in tandem. The team continues to assess schedule impacts to confirm the go-live date, but has tentatively targeted a go-live in Q4 2018. Work on Phase 2 (Financial Transfer functionality and additional Credit/Treasury efficiencies) and Phase 3 (remaining low-priority scope) has been put on hold to allow the team to focus on successful delivery of Phase 1 scope. This work will be picked up again after delivery of Phase 1A and additional progress on Phase 1B development.
PR106-01 SCR781 RARF Replacement – Allow Market Participants to electronically submit, review, and make online changes to data ERCOT requires. 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	<ul style="list-style-type: none"> The project is in the Planning phase. It is tracking slightly behind schedule but remains on budget. Data Analysis & Sorting activities kicked off in October 2017 and are nearing completion for planning. ERCOT will begin to engage Market Participants for feedback and input starting in Q1 2018.

Major Project Highlights – (as of 11/24/2017) – continued

Project	Trending as Expected	Further Information
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.	Yes	<p>All DC4 projects have been started, and 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) – Awaiting delivery of the new control room phone systems and recorder systems. Finalizing the procurement of the hotline systems. Production deployments begin next year. • 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 (Execution) – the load balancing solution has been deployed for the global network. Moving to Closing. ◦ Stage 2 (Planning) – awaiting the delivery of the new network logging solution. ◦ Stage 3 (Planning) – finalizing the procurement of a new network analysis tool. The local network load balancing solution is in planning, and deployments are being planned. • Application Migration Project – An eight-stage migrating 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 (Execution) – physical-to-virtual (P2V) system migrations are 86% complete. ◦ Stage 3 (Execution) – applications migrations that require IP address changes are 84% complete. ◦ Stage 4 (Execution) – SQL database cluster builds, with their associated database migrations, are 40% complete. ◦ Stage 5 (Planning) – systems that require a new build on the converged infrastructure are underway, with system builds and the migrations currently being planned. ◦ Stage 7 (Execution) – production network attached storage file system migrations are planned to begin in December. ◦ Stage 8 (Execution) – remaining project migrations that are not part of the first 7 stages are scheduled, and these migrations will begin at the end of November. ◦ Overall, 76% of the these applications are now running on the new converged infrastructure systems.

Major Project Highlights – (as of 11/24/2017) – continued

Project	Trending as Expected	Further Information
Data Center 4.0 Optimization (DC4) Program (continued) – 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.	Yes	<p><i>Continues from previous slide</i></p> <p>All DC4 projects have been started, and the remaining active DC4 projects are tracking to the approved schedule and budget:</p> <ul style="list-style-type: none"> Storage-DB Install and Migration – includes the purchase and deployment of database storage hardware and the migration of databases and file systems: <ul style="list-style-type: none"> Stage 1 (Execution) – a majority of the database storage has been deployed, with the deployment of the new Grid database storage completing in December. The new backup database appliances have been deployed, and the upgrades to the existing tape backup system are also underway. Stage 2 (Execution) – migration of all databases and files systems is currently underway, with more than 57% of the databases migrated. Remote Access (Execution) – testing of the remote access system, on the new converged infrastructure, is underway. The remote access production is also underway. Telecom-Corporate Voice System (Planning) – the procurement of the voice firewall systems is underway. The purchase of the voice-over IP solution will occur Q2 of next year. Telecom-Data Center Connectivity (Planning) – planning for the replacement all of the hardware responsible for connecting the fiber channel network between data centers is underway.

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