Item 8.2: Operations Report (November – December 2018)

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Board of Directors Meeting

ERCOT Public
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Summary – November 2018

Operations

- The preliminary Settlements hourly peak demand of 56,247* MW on November 14 was lower than the day-ahead mid-term load forecast peak of 60,040 MW for the same operating hour.

    - The operational instantaneous peak demand was 56,900 MW (telemetry).

- Day-ahead load forecast error for November was 2.91%

- ERCOT issued two notifications:

    - Two OCN issued for projected reserve capacity shortage

Planning Activities

- 443 active generation interconnection requests totaling 86,517 MW, including 40,283 MW of wind generation, as of November 30, 2018. Fourteen additional requests and a increase of 3,068 MW from October 31, 2018.

- 21,550 MW wind capacity in commercial operations as of December 1, 2018.

*Per Demand and Energy Report as of 1/08/19
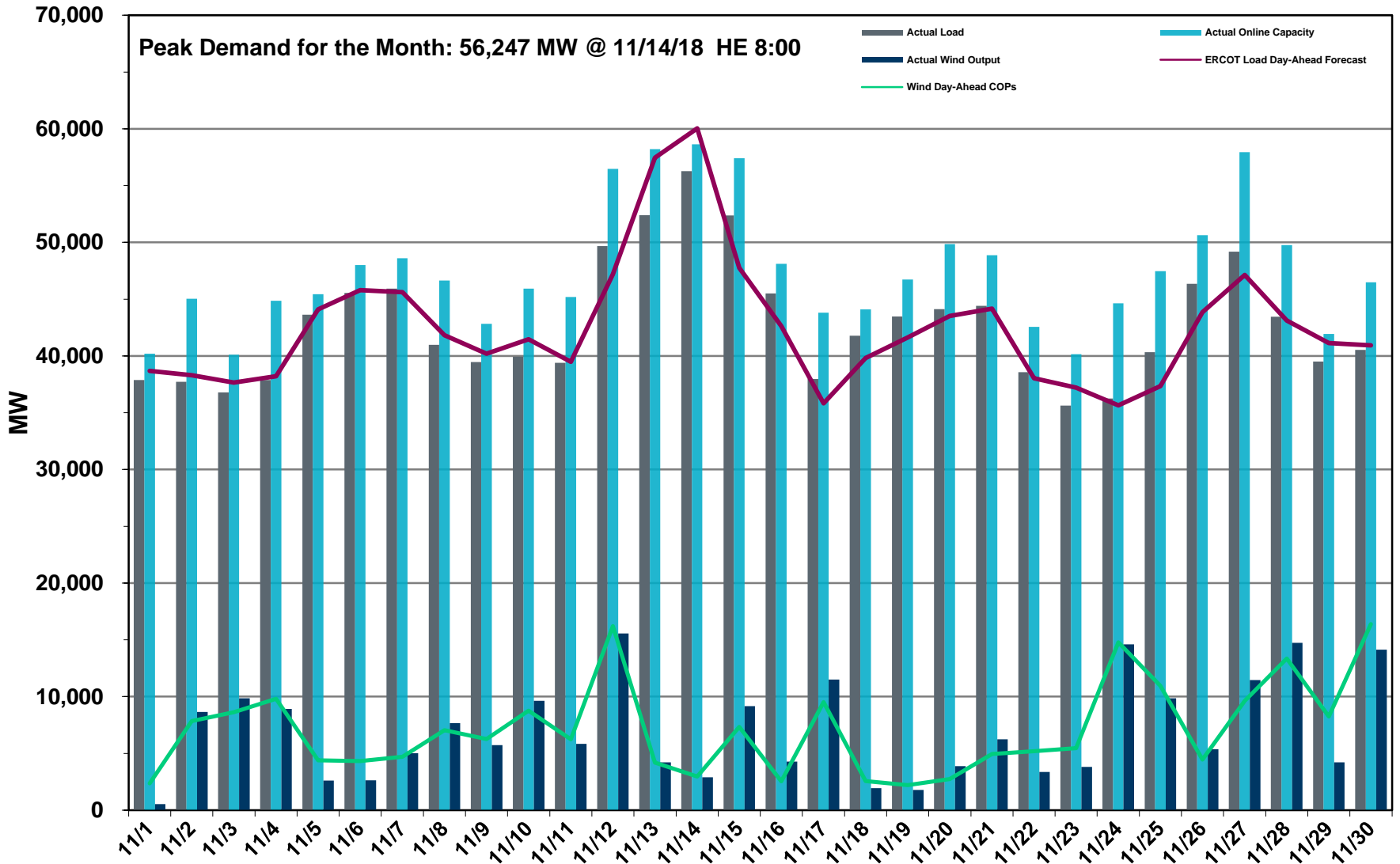
Summary – December 2018

Operations

- The preliminary Settlements hourly peak demand of 51,934* MW on December 10 was higher than the day-ahead mid-term load forecast peak of 50,574 MW for the same operating hour.

  – The operational instantaneous peak demand was 52,428 MW (telemetry).

- Day-ahead load forecast error for December was 2.11%

- ERCOT issued two notifications:

  – One OCN issued for potential extreme cold weather
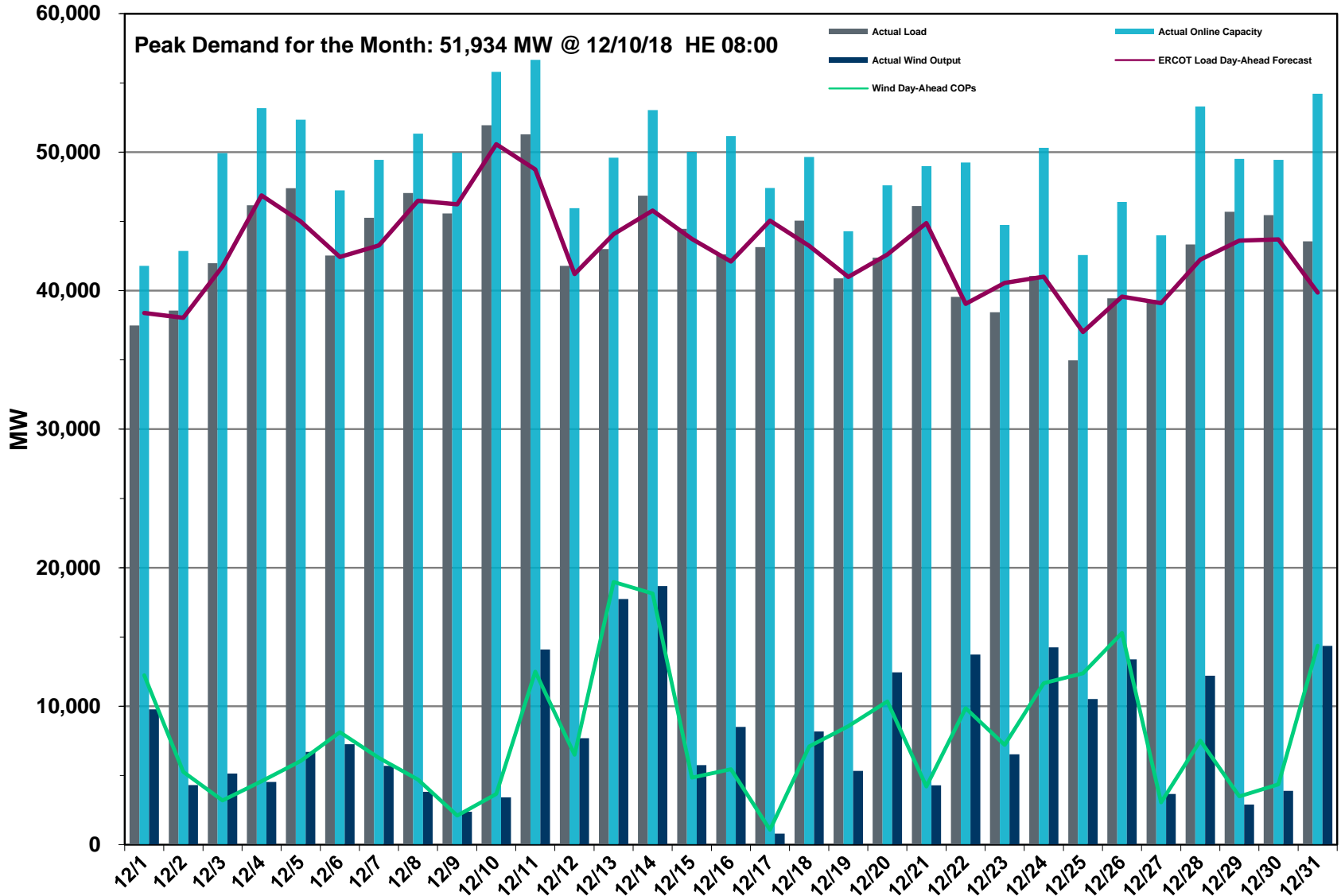 – One Advisory issued for DAM timeline deviation

Planning Activities

- 465 active generation interconnection requests totaling 91,921 MW, including 39,596 MW of wind generation, as of December 31, 2018. Twenty-two additional requests and an increase of 5,404 MW from November 30, 2018.

- 21,751 MW wind capacity in commercial operations as of January 1, 2019.

*Per Demand and Energy Report as of 1/08/19

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

Peak Demand for the Month: 56,247 MW @ 11/14/18 HE 8:00

Legend:
- Actual Load
- Actual Wind Output
- Actual Online Capacity
- ERCOT Load Day-Ahead Forecast
- Wind Day-Ahead COPs

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

Peak Demand for the Month: 51,934 MW @ 12/10/18 HE 08:00

Legend:
- Actual Load
- Actual Wind Output
- Wind Day-Ahead COPs
- Actual Online Capacity
- ERCOT Load Day-Ahead Forecast

Market Statistics – November 2018

Market Statistics	November 2017	November 2018	2017 Average	2018 YTD Average
Percentage of Real-Time load transacted in the Day-Ahead Market[1]	86%	88%	90%	89%
Average 'ERCOT Hub Average 345 kV Hub' Settlement Point Price in Day-Ahead Market ($/MWh)	24.00	31.38	26.63	38.56
Average 'ERCOT Hub Average 345 kV Hub' Settlement Point Price in Real-Time ($/MWh)	22.58	36.73	26.61	33.27
Average East Houston Fuel Index Price ($/MMBtu)	2.93	4.11	2.98	3.16

[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 – December 2018

Market Statistics	December 2017	December 2018	2017 Average	2018 YTD Average
Percentage of Real-Time load transacted in the Day-Ahead Market[1]	90%	88%	90%	89%
Average 'ERCOT Hub Average 345 kV Hub' Settlement Point Price in Day-Ahead Market ($/MWh)	21.64	30.88	26.63	37.97
Average 'ERCOT Hub Average 345 kV Hub' Settlement Point Price in Real-Time ($/MWh)	22.80	28.16	26.61	32.88
Average East Houston Fuel Index Price ($/MMBtu)	2.85	3.92	2.98	3.22

[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 – November & December 2018

Performance Measure	Target Met	Further Information
Retail Transaction Performance *(Target 98%)*	*Yes*	• Retail transaction processing performance was near 100%.
Settlements Performance *(Target 99%)*	*Yes*	• 100% timely statement and invoice posting.

Operational Dashboard – November & December 2018

Metric	Trending as Expected	Further Information
Day-Ahead Schedule	*Yes*	• 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*	• Hourly average prices correctly reflect the opportunity cost of energy
Day-Ahead vs Real-Time Load Zone Settlement Point Price (Hourly Average)	*Yes*	• 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*	• The average energy price across the system reflects marginal offers and scarcity pricing impacts
Day-Ahead Reliability Unit (DRUC) Commitment Monthly Summary	*Yes*	• 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 – November & December 2018

Metric	Trending as Expected	Further Information
Hourly Reliability Unit Commitment (HRUC) Monthly Summary	*Yes*	• Capacity committed by the HRUC process indicates the level of out of market activity needed during the Operating Day to maintain reliability • 10 resources were committed in November to resolve congestion and system capacity shortage • 2 resources were committed in December to resolve congestion
Supplemental Ancillary Service Market Monthly Summary	*Yes*	• Normal trend indicates that deliverability was not a major concern
Non-Spinning Reserve Service Deployment	*Yes*	• Non-Spin was not deployed in November or December
Congestion Revenue Rights Price Convergence	*Yes*	• CRR value was greater than cost for November and December. However, this is following some months during which the opposite relationship was observed.

Operational Dashboard – November 2018

Metric	Trending as Expected	Further Information
Retail Transactions	*Yes*	• Seasonal variations in transaction volumes trending as expected.
Advanced Metering	*Yes*	• 99.2% of ERCOT load settled with 15-minute interval data. • 7.2M Advanced Metering System (AMS) Electric Service Identifier (ESIID)s included in settlement as of November 2018.
Settlement Dollars	*Yes*	• As of settlement of Operating Day 11/30/2018, the daily average settlement dollars for November 2018 are $17.6M, which is down from $18.14M in October 2018 and up from November 2017 which had an average of $12.73M.
Revenue Neutrality	*Yes*	• As of settlement of Operating Day 11/30/2018, Revenue Neutrality uplift is a charge of $0.39M, which is down from a $11.42M charge in October 2018 and down from a $1.03M charge in November 2017.
Market-Based Uplift to Load	*Yes*	• As of settlement of Operating Day 11/30/2018, the market-based uplift to load is a charge of $13.38M, as opposed to a $13.43M charge in October 2018 and a charge of $7.84M in November 2017.

Operational Dashboard – December 2018

Metric	Trending as Expected	Further Information
Retail Transactions	*Yes*	• Seasonal variations in transaction volumes trending as expected.
Advanced Metering	*Yes*	• 99.3% of ERCOT load settled with 15-minute interval data. • 7.2M Advanced Metering System (AMS) Electric Service Identifier (ESIID)s included in settlement as of December 2018.
Settlement Dollars	*Yes*	• As of settlement of Operating Day 12/31/2018, the daily average settlement dollars for December are $15.33M, which is down from $17.6M in November 2018 and up from December 2017 which had an average of $11.72M.
Revenue Neutrality	*Yes*	• As of settlement of Operating Day 12/31/2018, Revenue Neutrality uplift is a charge of $7.25M, which is up from November 2018 which was a charge of $0.39M and up from December 2017 which was a charge of $7.18M.
Market-Based Uplift to Load	*Yes*	• As of settlement of Operating Day 12/31/2018, the market-based uplift was a charge of $16.58M, as opposed to a charge of $13.38M in November 2018 and a charge of $9.19M in December 2017.

Select Project Highlights – (as of 1/23/2019)

Project	Trending as Expected	Further Information
2015 CMM NPRRs and Tech Refresh – Combines CMM NPRRs and a technical refresh of the CMM application	Yes	The CMM Phase 1A project completed in February 2018. The CMM Phase 1B project is in Execution and is trending to revised schedule and budget. • Phase 1B scope includes delivery of the CMM technical refresh and a subset of credit-related NPRRs (NPRR519, NPRR620, NPRR660, NPRR741, NPRR755 • Changes have been made to roles, process, and governance to mitigate identified risks and challenges • The target Go-Live date is planned for June 2019 • Functional Acceptance Testing is underway and scheduled to conclude in mid February 2019
SCR781 RARF Replacement – Allow Market Participants to electronically submit, review, and make online changes to the Resource Asset Registration Form (RARF) data ERCOT requires of them.	*Yes*	With delivery of the GINR release in December 2018 for RE and TSP features, the effort to deliver RARF Replacement is gaining momentum. The following work streams and activities are underway to confirm the delivery approach and timeline in Q1 2019: • Data analysis and data modeling activities • Service blueprint activities to confirm "as is" and "to be" processes • User experience activities to document wireframes and associated process flow • Engagement with Market Participants on RARF Replacement via monthly Resource Integration workshops Parallel to the work above, the team continues to make progress in the following associated areas: • Delivery of a UI/UX Design System (which sets UI standards) on schedule for delivery by mid-March • Critical architecture work (e.g., data architecture, technical architecture) is in progress and on schedule

Select Project Highlights – (as of 1/23/2019)

Project	Trending as Expected	Further Information
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	*Yes*	The project is in Stabilization, trending to the approved budget and schedule. • The Operations Training team moved into the building in December • The first internal training activity in the new facility is underway • Teams are focused on facility readiness for the first Black Start Training • There have been no major issues • Completing remaining punch list items
Identity & Access Management – Replaces the current identity and access management (IAM) system, improving access control and the user experience	*Yes*	The project is in Execution and is tracking to schedule and budget with cutover preparation and readiness activities occurring throughout Q2 and go-live by June 2019. Current activities include: • End to End testing • Operational testing, readiness, and training • Cutover planning • Report delivery
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	*Yes*	The project went live on 12/17/18 and is in stabilization until 3/27. Current activity includes: • Defect resolution • Evaluation of deferred items

Select Project Highlights – (as of 1/23/2019)

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*	The remaining active DC4 projects are tracking to the approved schedule and budget: • Telecom-Control Room & Grid Ops Project (Closing) – Control Room cutovers to the new Control Room phones and hotline system are complete. Legacy decommissions are underway. Project will close in February. • Network-Command & Control Project – includes the purchase and deployments of network load balancing appliances, network logging systems, and a network analysis tool: o Stage 1 (Closing) – the load balancing solution has been deployed for the global network. o Stage 2 (Closing) – the new logging system is live. o Stage 3 (Execution) – the local network load balancing solution is live and the new network analysis tool will Go-Live at the end of February. • Telecom-Corporate Voice System – includes the purchase and deployment of the voice firewall systems and the enterprise voice over IP solution: o Stage 1 (Closing) – the voice firewall systems deployment has been completed. o Stage 2 (Execution) – the voice over IP vendor solutions has been narrowed down. The purchase and deployment of the solution will start in Q1 2019. • Telecom-Data Center Connectivity (Execution) – the data center connectivity hardware has been deployed and is live. Legacy hardware decommissions are underway. Closing activities will begin in February. • 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. • Vendor Hardware Refresh (Planning) – the hardware used for vendor application development is being refreshed. A determination of the hardware requirements and capacity is underway. Procurement for the hardware and services is also underway.

Appendix

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