Item 8.2: Operations Report
(November – December 2016)

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President & CEO
ERCOT

Board of Directors Meeting

ERCOT Public
February 14, 2017

Summary – November 2016

Operations

- The preliminary Settlements hourly peak demand of 49,994* MW on November 2, was greater than the day-ahead mid-term load forecast peak of 48,833 MW for HE17 on November 1.
  - The operational instantaneous peak demand was 50,198 MW (telemetry)
- Day-ahead load forecast error for November was 2.26%
- ERCOT issued two notifications:
  - One Advisory issued due to DAM timeline deviation
  - One Watch issued due to SCED failure

Planning Activities

- 247 active generation interconnection requests totaling 59,527 MW, including 26,643 MW of wind generation, as of November 30, 2016. Nine additional requests and an increase of 1,601 MW from October 31, 2016.
- 17,150 MW wind capacity in commercial operations on November 30, 2016.

*Per Demand and Energy Report as of 01/09/17

Summary – December 2016

Operations

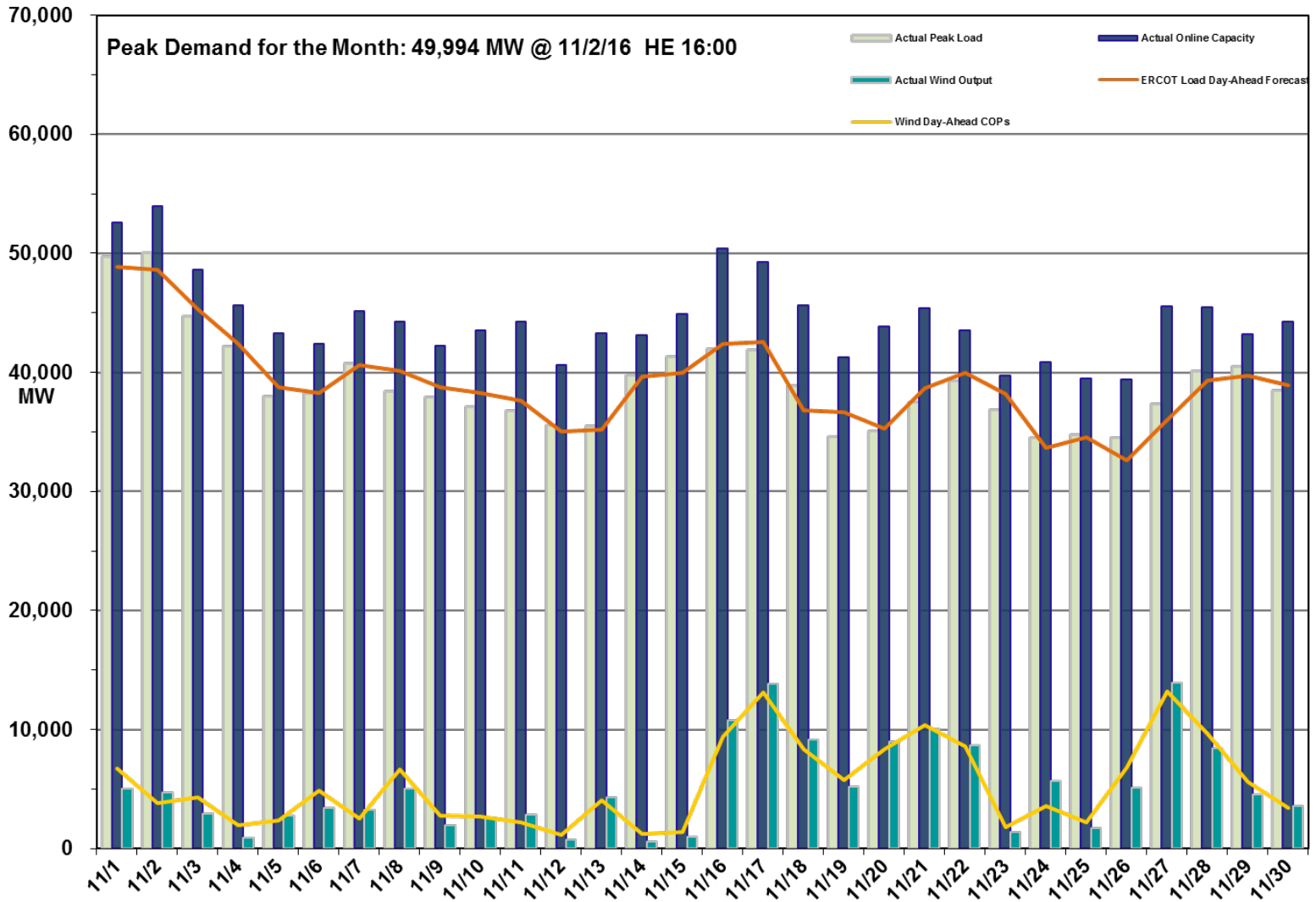
- The preliminary Settlements hourly peak demand of 57,924* MW on December 19, was lower than the day-ahead mid-term load forecast peak of 58,546 MW for the same operating hour.
  - The operational instantaneous peak demand was 58,142 MW (telemetry).
- Day-ahead load forecast error for December was 2.62%
- ERCOT issued five notifications:
  - Two OCNs issued due to freezing temperatures
  - Two Advisories issued due to Physical Responsive Capability being below 3000 MW.
  - One Advisory issued due to extreme cold weather

Planning Activities

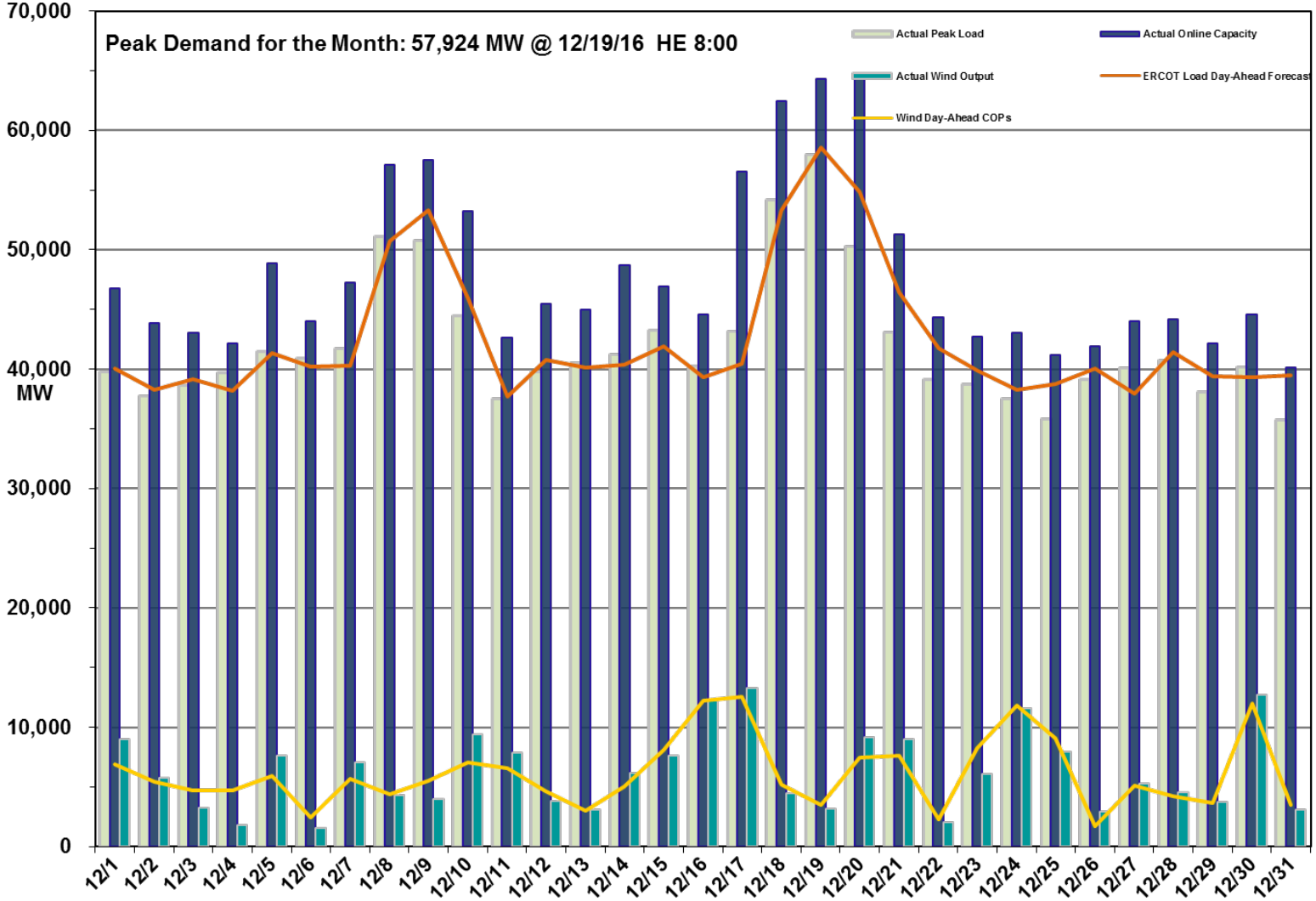
- 254 active generation interconnection requests totaling 59,896 MW, including 26,732 MW of wind generation, as of December 31, 2016. Seven additional requests and an increase of 369 MW from November 30, 2016.
- 17,604 MW wind capacity in commercial operations on December 31, 2016.

*Per Demand and Energy Report as of 01/09/17

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



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



Market Statistics – November 2016

Market Statistics	November 2015	November 2016	2015 Average	2016 YTD Average
Percentage of Real-Time load hedged in Day-Ahead Market	132.91%	127.20%	131.26%	122.43%
Average 'ERCOT Hub Average 345 kV Hub' Settlement Point Price in Day-Ahead Market ($/MWh)	19.82	20.19	28.38	24.39
Average 'ERCOT Hub Average 345 kV Hub' Settlement Point Price in Real-Time ($/MWh)	19.21	22.35	26.05	23.47
Average East Houston Fuel Index Price ($/MMBtu)	2.05	2.47	2.57	2.35

Market Statistics – December 2016

Market Statistics	December 2015	December 2016	2015 Average	2016 YTD Average
Percentage of Real-Time load hedged in Day-Ahead Market	132.05%	123.22%	131.26%	122.49%
Average 'ERCOT Hub Average 345 kV Hub' Settlement Point Price in Day-Ahead Market ($/MWh)	18.74	26.47	28.38	24.56
Average 'ERCOT Hub Average 345 kV Hub' Settlement Point Price in Real-Time ($/MWh)	17.37	23.98	26.05	23.51
Average East Houston Fuel Index Price ($/MMBtu)	1.92	3.47	2.57	2.45

Operational Performance Measures – November & December 2016

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 2016

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.
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. • Higher average Day-Ahead energy prices reflect the risk premium between Day-Ahead and Real-Time.
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 2016

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. • 2 resources in November were committed to resolve congestion and 0 resources in December were committed.
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 deployed on 11/29 for 1.4 hours due to transmission congestion. • Non-Spin was not deployed in December.
Congestion Revenue Rights Price Convergence	*Yes*	• Normal trend indicates good ability of market participants to estimate value of hedges.

Operational Dashboard – November 2016

Metric	Trending as Expected	Further Information
Retail Transactions	*Yes*	• Seasonal variations in transaction volumes trending as expected
Advanced Metering	*Yes*	• 98.9% of ERCOT load settled with 15-minute interval data. • 7.0M Advanced Metering System (AMS) Electric Service Identifier (ESIID)s included in settlement as of November 2016.
Settlement Dollars	*Yes*	• As of settlement of Operating Day 11/30/2016, the daily average settlement dollars for November 2016 are $11.24M, which is down from $13.58M in October 2016 and up from November 2015 which had an average of $8.26M.
Revenue Neutrality	*Yes*	• As of settlement of Operating Day 11/30/2016, Revenue Neutrality uplift is a charge of $3.89M, which is up from a $3.50M charge in October 2016 and up from a $0.31M credit in November 2015.
Market-Based Uplift to Load	*Yes*	• As of settlement of Operating Day 11/30/2016, the market-based uplift to load is a charge of $24.65M, as opposed to a $19.05M charge in October 2016 and a charge of $20.40M in November 2015.

Operational Dashboard – December 2016

Metric	Trending as Expected	Further Information
Retail Transactions	*Yes*	• Seasonal variations in transaction volumes trending as expected
Advanced Metering	*Yes*	• 98.9% of ERCOT load settled with 15-minute interval data. • 7.0M Advanced Metering System (AMS) Electric Service Identifier (ESIID)s included in settlement as of December 2016.
Settlement Dollars	*Yes*	• As of settlement of Operating Day 12/31/2016, the daily average settlement dollars for December are $11.7M, which is up from $11.24M in November 2016 and up from December 2015 which had an average of $8.18M.
Revenue Neutrality	*Yes*	• As of settlement of Operating Day 12/31/2016, Revenue Neutrality uplift is a charge of $0.18M, which is down from November 2016 which was a charge of $3.89M and down from December 2015 which was a charge of $1.27M.
Market-Based Uplift to Load	*Yes*	• As of settlement of Operating Day 12/31/2016, the market-based uplift was a charge of $35.43M, as opposed to a charge of $24.65M in November 2016 and a charge of $25.20M in December 2015.

Major Project Highlights – (as of 01/31/2017)

Project	Trending as Expected	Further Information
NMMS Upgrade Project – Replace the current Siemens NMMS application with the next generation of model management software available from Siemens	*No*	• The project is in the Execution phase and is not tracking to approved schedule and budget. Although the project successfully met the targeted defect count and completed market participant training, the steering committee agreed that the system needs additional time before it is operationally ready. Specifically the development, operations, and business teams need to resolve some additional performance and stability issues and validate the model load process end-to-end. • The project team continues to test the NMMS product with the vendor to address the performance and stability issues as well as any remaining critical defects. • A new go-live date will be communicated after the plan is updated to include the performance and stability requirements and validate end-to-end model load process. The new date will account for necessary time to communicate to the Market, complete all ERCOT pre-production activities, and address any open operational readiness activities. • An extended stabilization period after go-live will include additional releases to address any post-production defects identified and deferred defects.
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*	• The project is in the Execution phase and tracking to approved schedule and budget. Go-live is scheduled for October 2017. • Development activities are underway with incremental software releases from the vendor to demonstrate system functionality and requirement fulfillment. • Factory Acceptance Testing (FAT) commenced in mid-January at the vendor's site and concluded in early February. Onsite FAT cycle at ERCOT will begin in mid February. • A three-month market trials/requalification period will commence in July 2017; Market Participant Training to coincide with Market Trials.
Load Forecast Enhancements – Provide for higher availability of Load Forecast data feeds to EMS environment, ability to to import internal Short Term Load Forecast to EMS and provide Mid-Term Load Forecast tuning and training	*Yes*	• The project is in the Execution Phase and is tracking to approved schedule and budget. • Integration test preparation and activities are currently underway. • The system is scheduled to go-live with the functional improvements and tool enhancements, in a high availability environment, in May 2017.

Major Project Highlights – (as of 01/31/2017) – continued

Project	Trending as Expected	Further Information
2015 CMM NPRRs and Tech Refresh – Combines several CMM NPRRs, a technical refresh and new functionality into a single project to gain efficiencies	*Yes*	• The project is in the Planning phase and is tracking to approved schedule and budget. This project will deliver in three phases. • Phase 1 will deliver the CMM technical refresh along with the majority of the Credit-related NPRRs. The Phase 1 go-live date will be set in March 2017 at the gate to the Execution phase. • Phase 2 will deliver Financial Transfer functionality and additional Credit/Treasury efficiencies. The go-live date will be set late Summer 2017. • Phase 3 will deliver any remaining low-priority scope. The go-live date for this phase will be addressed following completion of Planning for Phases 1 & 2.
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 DC4 Program projects are in Planning/Execution and are tracking to the approved schedule and program budget. The following projects are active under this program: o Compute-DB Install and Migration Project – in Stage 2–Execution phase and has successfully migrated the POWER8 Grid Test environment, with the decommission of the old systems in Bastrop and Taylor Production planned for early March. The POWER8 Grid Production migrations are planned for completion by the end of May o Network-Core Network Project – in Execution phase and has completed the Taylor MGMT, PROD, Internet, WAN, and Grid network cutovers, with the Taylor Core cutover scheduled for early February. The Bastrop network cutovers start in late February and run through mid-April o Telecom-Control Room & Grid Ops Project – in the Planning phase, with the build-out of the Operator Training System (OTS) and Transport Pod underway, as well as progress in planning and procuring the IPC and Hotline hardware for Production o Network-Command & Control Project – in Stage 1–Execution phase, preparing to deploy the replacement of the external network load balancers (GTM). Also in Stage 2–preplanning for initial preparation to deploy the network logging system (Syslog) o Compute-x86 Applications Base Install Project – in Execution phase, with FlexPod deployments completed in development and test environments, as well as Taylor production environment. The Bastrop production deployment of the FlexPods is scheduled for completion in mid-March o Application Migration Project – in Planning phase, having completed the proof of concept and migrated all virtual-to-virtual (V2V) systems in the development environments. Planning is underway for the V2V systems in the test and production environments. Migrations are expected to start in March. o Storage-DB Install and Migration – in Initiation phase, with the procurement of the DB Storage in progress, and the Commercial DB Storage and Grid DB Storage vendors having been selected, the SOWs/POs are now being created for these purchases. The backup architectural solution is being vetted and finalized with vendors, before the backup procurement is completed

Appendix

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