Item 4.2: Operations Report
(March – April 2017)

Bill Magness
President & CEO
ERCOT

Board of Directors Meeting

ERCOT Public
June 13, 2017

Summary – March 2017

Operations

- The preliminary Settlements hourly peak demand of 47,094* MW on March 20 was higher than the day-ahead mid-term load forecast peak of 45,994 MW for the same operating hour.
  - The operational instantaneous peak demand was 47,645 MW (telemetry).
- Day-ahead load forecast error for March was 2.18%
- ERCOT issued four notifications:
  - Two Advisories issued due to Physical Responsive Capability being below 3000 MW
  - One Advisory issued due to VSAT being unavailable
  - One Watch issued due to issued due to North to Houston Interface

Planning Activities

- 266 active generation interconnection requests totaling 60,948 MW, including 26,565 MW of wind generation, as of March 31, 2017. Six additional requests and an increase of 681 MW from February 28, 2017.
- 18,589 MW wind capacity in commercial operations as of April 1, 2017.

*Per Demand and Energy Report as of 05/09/17

Summary – April 2017

Operations

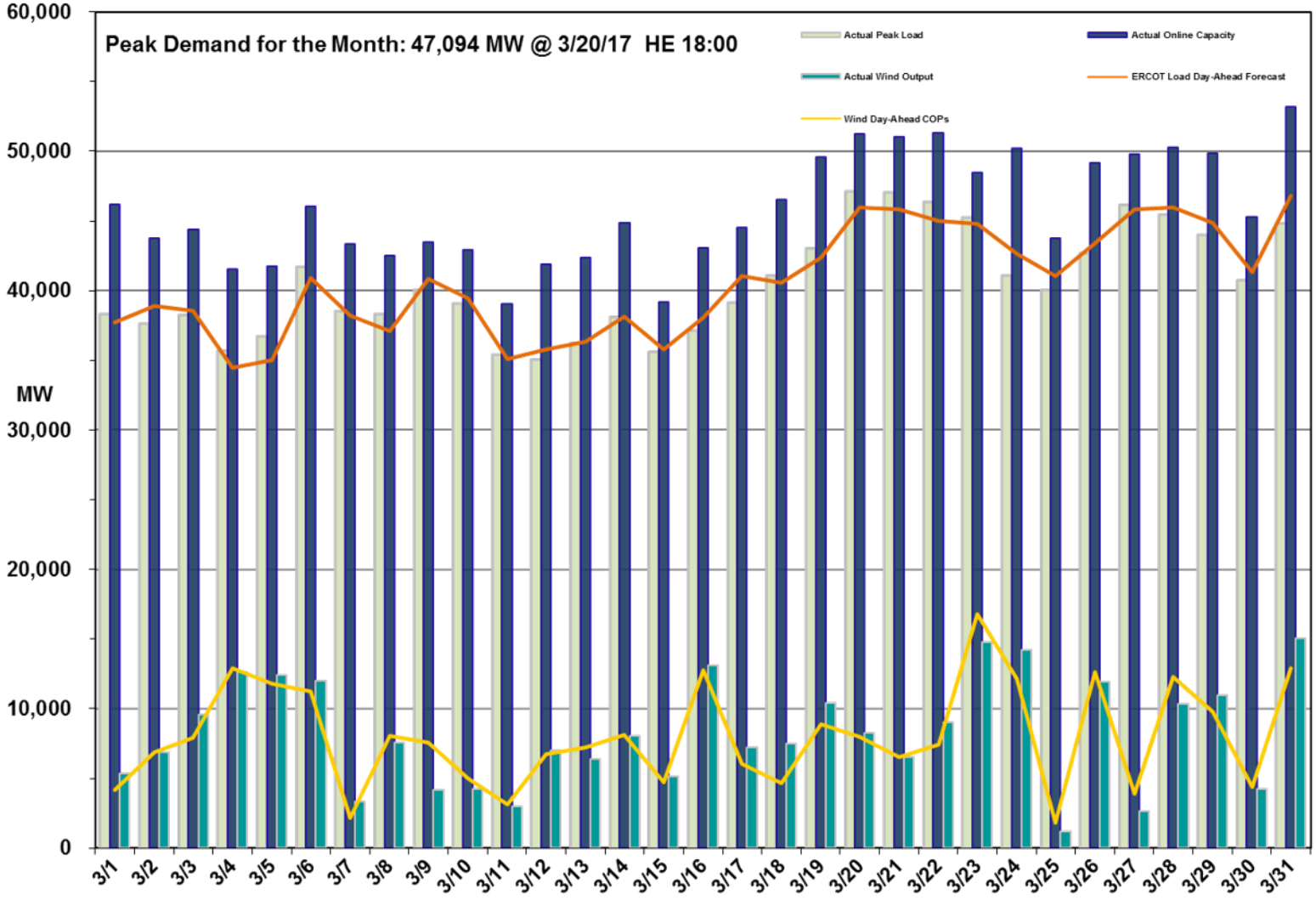
- The preliminary Settlements hourly peak demand of 53,420* MW on April 28 was higher than the day-ahead mid-term load forecast peak of 53,190 MW for the same operating hour.
  - The operational instantaneous peak demand was 53,661 MW (telemetry).
- Day-ahead load forecast error for April was 2.54%
- ERCOT issued one notification:
  - One Advisory issued due to Physical Responsive Capability being below 3000 MW

Planning Activities

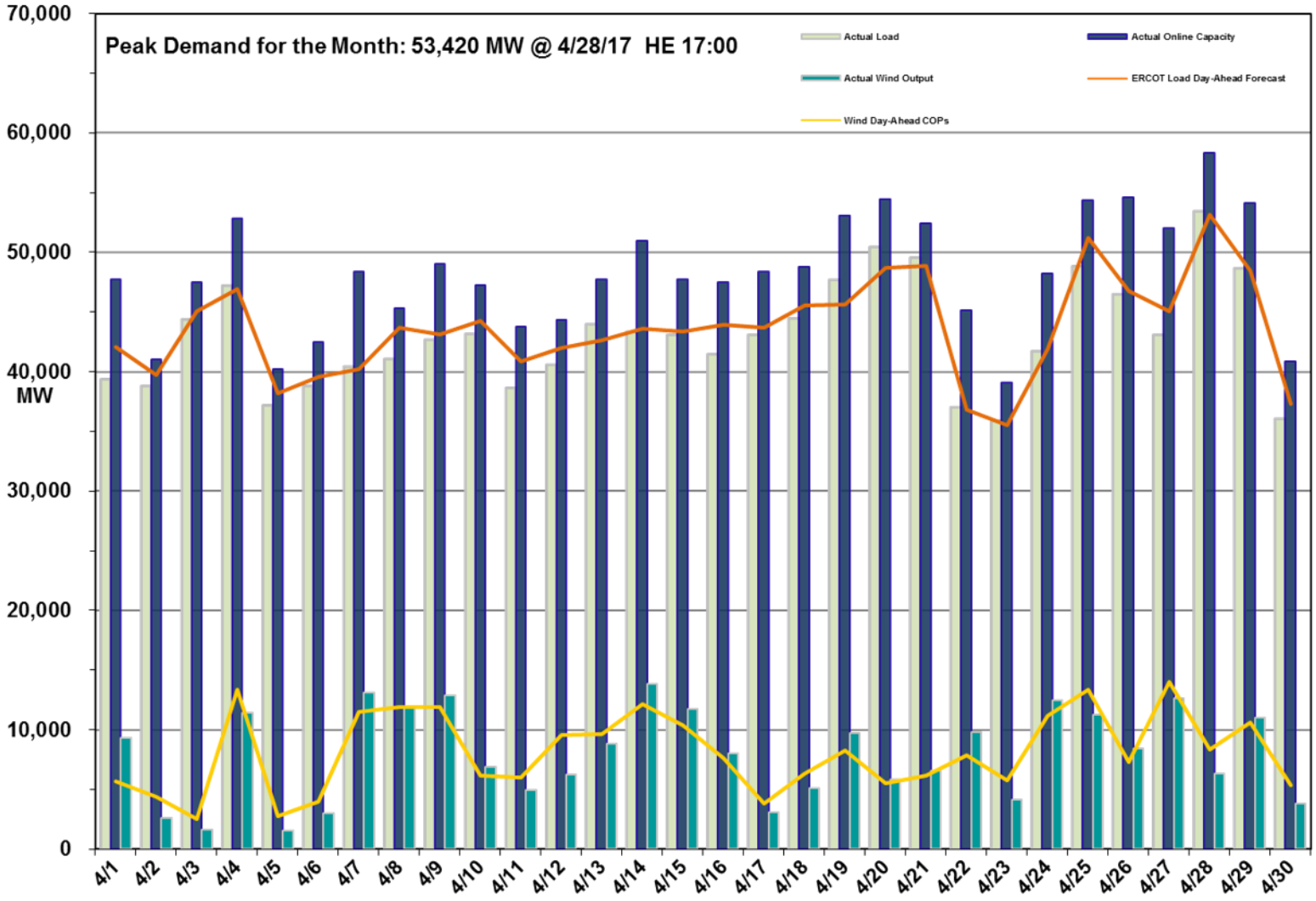
- 284 active generation interconnection requests totaling 64,840 MW, including 28,440 MW of wind generation, as of April 30, 2017. Eighteen additional requests and an increase of 3,892 MW from March 31, 2017.
- 18,916 MW wind capacity in commercial operations as of May 1, 2017.

*Per Demand and Energy Report as of 05/09/17

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



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



Market Statistics – March 2017

Market Statistics	March 2016	March 2017	2016 Average	2017 YTD Average
Percentage of Real-Time load hedged in Day-Ahead Market (%)	129	126	122	129
Average 'ERCOT Hub Average 345 kV Hub' Settlement Point Price in Day-Ahead Market ($/MWh)	17.26	24.14	24.56	23.17
Average 'ERCOT Hub Average 345 kV Hub' Settlement Point Price in Real-Time ($/MWh)	18.81	21.48	23.51	22.41
Average East Houston Fuel Index Price ($/MMBtu)	1.68	2.88	2.45	2.97

Market Statistics – April 2017

Market Statistics	April 2016	April 2017	2016 Average	2017 YTD Average
Percentage of Real-Time load hedged in Day-Ahead Market (%)	119	122	122	127
Average 'ERCOT Hub Average 345 kV Hub' Settlement Point Price in Day-Ahead Market ($/MWh)	19.23	25.91	24.56	23.87
Average 'ERCOT Hub Average 345 kV Hub' Settlement Point Price in Real-Time ($/MWh)	18.24	27.91	23.51	23.81
Average East Houston Fuel Index Price ($/MMBtu)	1.86	3.12	2.45	3.00

Operational Performance Measures – March & April 2017

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 – March & April 2017

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
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 – March & April 2017

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 • 5 resources were committed in March to resolve congestion • 6 resources were committed in April to resolve congestion
Supplemental Ancillary Service Market Monthly Summary	*Yes*	• Normal trend indicates that infeasibility was not a major concern
Non-Spinning Reserve Service Deployment	*Yes*	• Non-Spin was deployed on March 27 from 1600-1800 for the reliability margin on the North to Houston Generic Transmission Constraint • Non-Spin was not deployed in April
Congestion Revenue Rights Price Convergence	*Yes*	• Normal trend indicates good ability of market participants to estimate value of hedges

Operational Dashboard – March 2017

Metric	Trending as Expected	Further Information
Retail Transactions	*Yes*	• Seasonal variations in transaction volumes trending as expected
Advanced Metering	*Yes*	• 98.8% 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 March 2017.
Settlement Dollars	*Yes*	• As of settlement of Operating Day 03/31/2017, the daily average settlement dollars for March 2017 are $13.34M, which is up from $9.51M in February 2017 and up from March 2016 which had an average of $8.68M.
Revenue Neutrality	*No*	• As of settlement of Operating Day 03/31/2017, Revenue Neutrality uplift is a charge of $26.24M, which is up from a $5.73M charge in February 2017 and up from a $6.83M charge in March 2016. PUN net loads not being included in Load Zone price calculations is the main driver of this trend.
Market-Based Uplift to Load	*Yes*	• As of settlement of Operating Day 03/31/2017, the market-based uplift to load is a charge of $34.14M, as opposed to a $21.48M charge in February 2017 and a charge of $29.52M in March 2016.

Operational Dashboard – April 2017

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 April 2017.
Settlement Dollars	*Yes*	• As of settlement of Operating Day 04/30/2017, the daily average settlement dollars for April are $15.39M, which is up from $13.34M in March 2017 and up from April 2016 which had an average of $8.73M.
Revenue Neutrality	*Yes*	• As of settlement of Operating Day 04/30/2017, Revenue Neutrality uplift is a charge of $9.88M, which is down from March 2017 which was a charge of $26.24M and up from April 2016 which was a charge of $2.75M.
Market-Based Uplift to Load	*Yes*	• As of settlement of Operating Day 04/30/2017, the market-based uplift was a charge of $25.76M, as opposed to a charge of $34.14M in March 2017 and a charge of $18.28M in April 2016.

Major Project Highlights – (as of 05/31/2017)

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	*Yes*	• Project went live on May 8 and is currently in stabilization through early August; it is tracking to the approved schedule and budget.
		  ◦ The first model created from the upgraded system went live May 23.
		  ◦ Two stabilization releases are planned to address deferred defects and any post go-live issues. The first of these releases is scheduled for early June and the second stabilization release will occur in mid-July.

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 late January 2018. • Onsite Factory Acceptance Test cycle at ERCOT concluded successfully in May 2017. • A three-month market trials/requalification period will commence in September 2017; Market Participant Training to coincide with Market Trials.
Load Forecast Enhancements – Provide for higher availability of Load Forecast data feeds to EMS environment, additional column in EMS to import internal Short Term Load Forecast (STLF), provide Mid-Term Load Forecast (MTLF) tuning and training along with Itron software upgrade	*Yes*	• The project is in the Execution Phase and is tracking to approved schedule and budget. • Integration test 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 or early June 2017.

2015 CMM NPRRs and Tech Refresh – Combines CMM NPRRs, a technical refresh and new Treasury functionality into a single project to gain efficiencies	*Yes*	• This project will deliver in three phases – the phases are in Planning/Execution and tracking to approved schedule and budget.
		  ◦ Phase 1 is in Execution and will deliver the CMM technical refresh along with the majority of the Credit-related NPRRs. This phase will go live in May 2018. The team is currently addressing departure of two key team resources and taking actions to mitigate impacts to the planned delivery date. The team is developing risk mitigation proposals to ensure the NPRR target dates will be prioritized and met.
		  ◦ Phase 2, which continues in Planning, 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 Phase 2.

Major Project Highlights – (as of 05/31/2017) – 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*	• 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: ○ Compute-DB Install and Migration Project – Successfully installed and migrated from the POWER7 to POWER8 for the large Database Servers. Final decommissioning occurs in June. ○ Network-Core Network Project – Successfully completed all network cutovers and will close in June. ○ Telecom-Control Room & Grid Ops Project – Planning phase for the phone systems (PC/NICE, Forum, and Avaya) to be replaced and fully integrated. Testing and delivery of the Operating Training System phone system is targeted for mid-July. ○ Network-Command & Control Project – Stage 1–Execution phase, the project is completing a proof-of-concept, to determine the best solution for load balancing. Stage 2-Planning phase, for planning and conducting a proof-of-concept, to determine the best solution for a new network logging system (Syslog). Stage 3-Planning phase, for the purchased and deployment of the local load balancing and network analysis tool. ○ Compute-x86 Base Install Project – In Closing phase. The project has successfully completed the deployment of the converged infrastructure application servers to all environments and datacenters.. ○ Application Migration Project – in Stage 1–Closing phase, having completed migrations of the virtual-to-virtual (V2V) systems in all environments and datacenters. Stage 2-in Execution phase, the physical-to-virtual system migrations have just begun and will be conducted over several months. Stage 4-in Planning phase, will be planning the rebuilding of all SQL database clusters in the new converged infrastructure. Over 65% of the applications are running on the new systems. ○ Storage-DB Install and Migration – In Planning phase. Completed the procurement for all large storage systems. Additional purchases are underway for the storage monitoring system (Virtual Instruments). The systems are being installed while data migration planning is underway. ○ Remote Access – In Planning phase. The development environment build is underway. Planning of the migrations for remote access systems is 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/)