Item 4.2: Operations Report
(July – August 2017)

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President & CEO
ERCOT

Board of Directors Meeting

ERCOT Public
October 17, 2017

Summary – July 2017

Operations

- The preliminary Settlements hourly peak demand of 69,496* MW on July 28 was lower than the day-ahead mid-term load forecast peak of 70,239 MW for the same operating hour.
  - The operational instantaneous peak demand was 69,695 MW (telemetry).
- Day-ahead load forecast error for July was 2.27%
- ERCOT issued 7 notifications:
  - Four Advisories issued due to Physical Responsive Capability being below 3,000 MW
  - Three OCNs issued for projected Reserve Capacity shortages

Planning Activities

- 323 active generation interconnection requests totaling 67,939 MW, including 30,279 MW of wind generation, as of July 31, 2017. Seventeen additional requests and an increase of 381 MW from June 30, 2017.
- 19,512 MW wind capacity in commercial operations as of August 1, 2017.

*Per Demand and Energy Report as of 09/11/17

Summary – August 2017

Operations

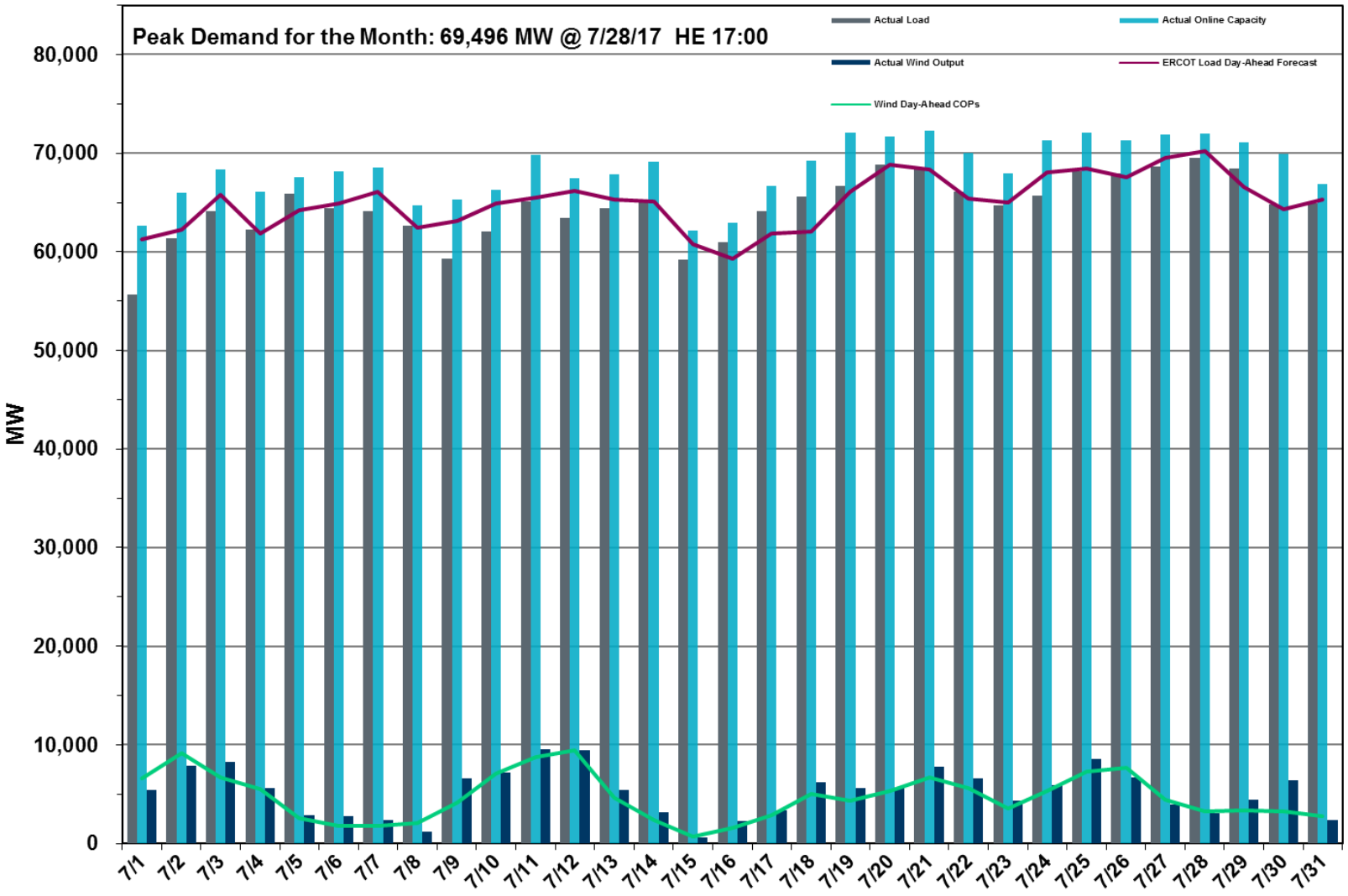
- The preliminary Settlements hourly peak demand of 67,873* MW on August 16 was higher than the day-ahead mid-term load forecast peak of 67,749 MW for the same operating hour.
  - The operational instantaneous peak demand was 68,171 MW (telemetry).
- Day-ahead load forecast error for August was 2.77%
- ERCOT issued 24 notifications:
  - One Emergency Notice issued due to Hurricane Harvey having an adverse impact on the ERCOT System due to transmission line outages
  - One Watch issued due to the Eagle Pass DC Tie tripping
  - Two Watches issued due to the Laredo DC Tie tripping
  - One Watch issued for Hurricane Harvey in the Gulf of Mexico expecting landfall near the Corpus Christi area
  - One Watch issued for the Eagle Pass DC Tie due to reliability issues
  - Nine Advisories issued due to Physical Responsive Capability being below 3,000 MW
  - One Advisory issued for Tropical Storm Harvey in the Gulf of Mexico projecting an impact to the ERCOT Region
  - One Advisory issued due to ERCOT's Voltage Security Assessment Tool unavailability
  - Four OCNs issued for projected Reserve Capacity shortages
  - One OCN issued for future tropical storm Harvey
  - One OCN issued due to ERCOT developing a new Generic Transmission Constraint
  - One OCN issued for unplanned transmission outages that may impact reliability

Planning Activities

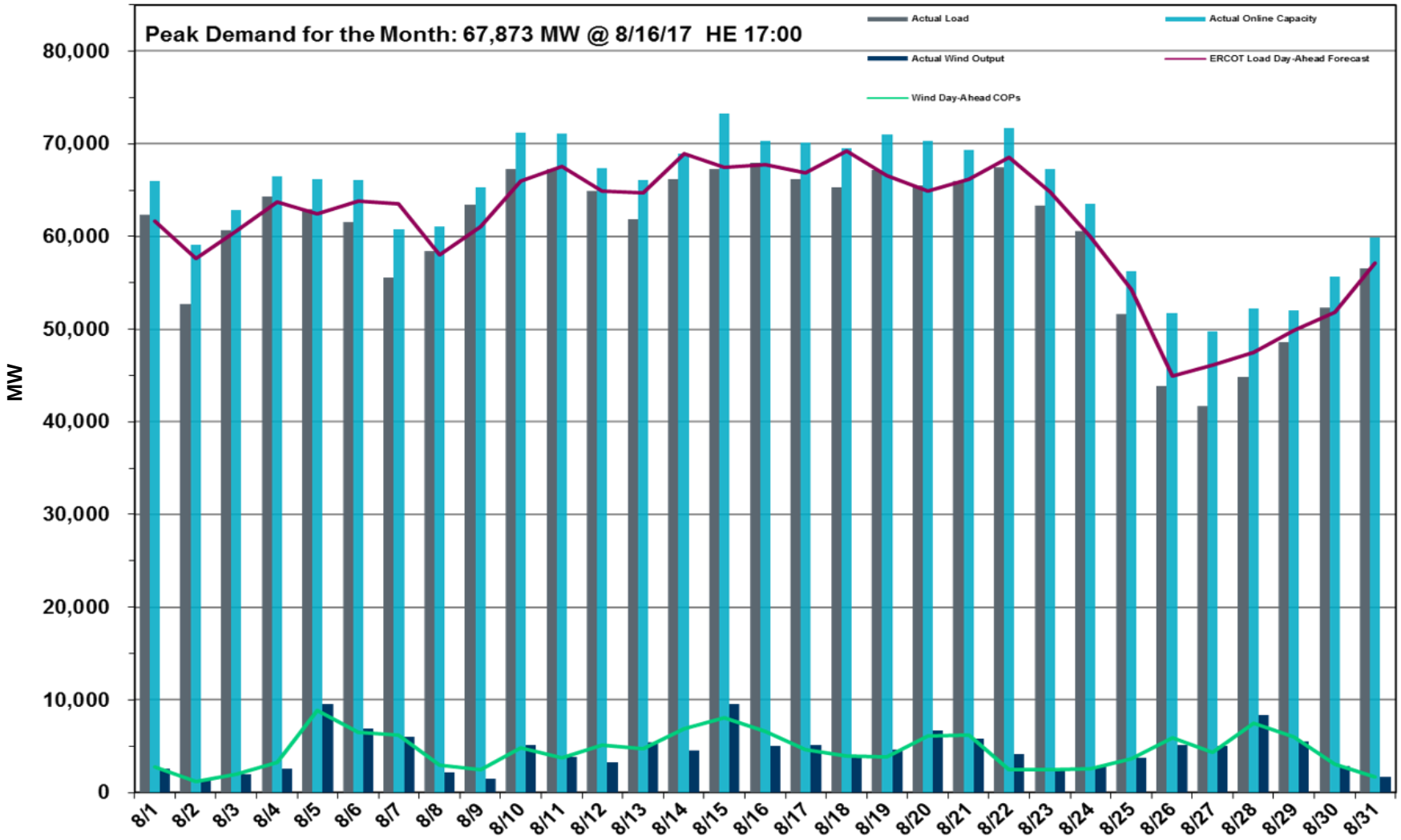
- 321 active generation interconnection requests totaling 66,842 MW, including 28,605 MW of wind generation, as of August 31, 2017. Two fewer requests and a decrease of 1,097 MW from July 31, 2017.
- 19,565 MW wind capacity in commercial operations as of September 1, 2017.

*Per Demand and Energy Report as of 09/11/17

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



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



Market Statistics – July 2017

Market Statistics	July 2016	July 2017	2016 Average	2017 YTD Average
Percentage of Real-Time load hedged in Day-Ahead Market (%)	114	118	122	124
Average 'ERCOT Hub Average 345 kV Hub' Settlement Point Price in Day-Ahead Market ($/MWh)	29.29	34.17	24.56	27.33
Average 'ERCOT Hub Average 345 kV Hub' Settlement Point Price in Real-Time ($/MWh)	27.29	30.83	23.51	27.25
Average East Houston Fuel Index Price ($/MMBtu)	2.71	2.97	2.45	3.04

Market Statistics – August 2017

Market Statistics	August 2016	August 2017	2016 Average	2017 YTD Average
Percentage of Real-Time load hedged in Day-Ahead Market (%)	116	120	122	123
Average 'ERCOT Hub Average 345 kV Hub' Settlement Point Price in Day-Ahead Market ($/MWh)	34.50	29.52	24.56	27.66
Average 'ERCOT Hub Average 345 kV Hub' Settlement Point Price in Real-Time ($/MWh)	32.36	28.50	23.51	27.44
Average East Houston Fuel Index Price ($/MMBtu)	2.73	2.86	2.45	3.02

Operational Performance Measures – July & August 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 – July & August 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 – July & August 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. • 6 resources committed in July to resolve congestion and system capacity • 11 resources committed in August to resolve congestion, system capacity and voltage stability
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 July or August.
Congestion Revenue Rights Price Convergence	*Yes*	• Price convergence has returned to a more normal trend, indicating a good ability of market participants to estimate the value of hedges.

Operational Dashboard – July 2017

Metric	Trending as Expected	Further Information
Retail Transactions	*Yes*	• Seasonal variations in transaction volumes trending as expected
Advanced Metering	*Yes*	• 99.1% 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 July 2017
Settlement Dollars	*Yes*	• As of settlement of Operating Day 07/31/2017, the daily average settlement dollars for July 2017 are $15.51M, which is down from $17.23M in June 2017 and up from July 2016 which had an average of $14.44M.
Revenue Neutrality	*Yes*	• As of settlement of Operating Day 07/31/2017, Revenue Neutrality uplift is a charge of $1.45M, which is down from a $10.36M charge in June 2017 and down from a $2.51M charge in July 2016.
Market-Based Uplift to Load	*Yes*	• As of settlement of Operating Day 07/31/2017, the market-based uplift to load is a credit of $13.63M, as opposed to a $13.22M credit in June 2017 and a charge of $12.65M in July 2016.

Operational Dashboard – August 2017

Metric	Trending as Expected	Further Information
Retail Transactions	*Yes*	• Seasonal variations in transaction volumes trending as expected
Advanced Metering	*Yes*	• 99.0% 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 August 2017
Settlement Dollars	*Yes*	• As of settlement of Operating Day 08/31/2017, the daily average settlement dollars for August are $15.09M, which is down from $15.51M in July 2017 and down from August 2016 which had an average of $15.57M.
Revenue Neutrality	*Yes*	• As of settlement of Operating Day 08/31/2017, Revenue Neutrality uplift is a charge of $1.46M, which is up from July 2017 which was a charge of $1.45M and up from August 2016 which was a charge of $0.92M.
Market-Based Uplift to Load	*Yes*	• As of settlement of Operating Day 08/31/2017, the market-based uplift was a credit of $12.58M, as opposed to a credit of $13.63M in July 2017 and a charge of $15.36M in August 2016.

Major Project Highlights (as of 09/30/2017)

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*	• The project is in the Execution phase and tracking to approved schedule and budget. Go-live is scheduled for January 2018. • Operational readiness milestone achieved on 9/8: Market training materials posted. • MOTE Go Live (Market Requalification) commenced on 9/18/2017; as of 9/29/2017, 38 Market Participants had successfully re-qualified on new CRR system.
2015 CMM NPRRs and Tech Refresh – Combines CMM NPRRs, a technical refresh and new Treasury functionality into a single project to gain efficiencies	*Yes*	• Phase 1 is in Execution and includes delivery of the CMM technical refresh along with the majority of the Credit-related NPRRs. ◦ Phase 1A will deliver NPRRs 648, 683, 743, 760 and 800 via the existing CMM application. The estimated completion date is targeted for Q1 2018. 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 continues on track and FAT testing started in August. The team continues to assess schedule impacts to confirm the go-live date. • Phase 2 will deliver Financial Transfer functionality and additional Credit/Treasury efficiencies. Team continues to document Requirements and User Interface designs and workflows. The go-live date will be set after Phase 1B efforts are confirmed. • 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.
PR106-01 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)	*Yes*	• The project is in the Planning phase and tracking to approved schedule and budget. • Business Requirements definition activities continue. Team conducted a business process definition workshop on 9/25/2017, which firmed up Scope and Users; delivery approach under review and to be confirmed. • Data Analysis & Sorting kickoff to start in October 2017 along with discovery workshops to define how ERCOT will engage Market Participants for feedback and input.

Major Project Highlights (as of 09/30/2017) – 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*	All DC4 projects have been started, and the remaining active DC4 projects are tracking to the approved schedule and budget:
		• Compute-DB Install and Migration Project – Successfully completed
		• Network-Core Network Project – Successfully completed
		• Telecom-Control Room & Grid Ops Project (Execution) – Finalizing the procurement of the new production Control Room phones systems, recorder systems, and hotlines
		• Network-Command & Control Project – Includes the purchase and deployments of network load balancing appliances, network logging systems, and a network analysis tool:
		  ○ Stage 1 (Execution) – The load balancing solution has been purchased and deployed for the global network.
		  ○ Stage 2 (Planning) – A new network logging solution has been chosen, and procurement process is starting.
		  ○ Stage 3 (Planning) – A new network analysis tool has been chosen, and procurement process is starting. The local network load balancing solution is in planning.
		• Compute-x86 Base Install Project – Successfully completed
		• Application Migration Project – An eight-stage migrating project, where application and databases from legacy systems are migrated to the new converged infrastructure systems:
		  ○ Stage 1 (Closing) – Virtual-to-virtual (V2V) system migrations have been completed.
		  ○ Stage 2 (Execution) – Physical-to-virtual (P2V) system migrations are underway.
		  ○ Stage 3 (Execution) – Applications that require IP address changes are currently being migrated.
		  ○ Stage 4 (Execution) – SQL database cluster builds, with their associated database migrations, are underway.
		  ○ Stage 5 (Planning) – Systems that require a new build are being determined, and migrations are being planned.
		  ○ Stage 7 (Execution) – Network attached storage file system migrations are underway.
		  ○ More than 72% of the applications are running on the new systems.

Major Project Highlights (as of 09/30/2017) – 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*	All DC4 projects have been started, and the remaining active DC4 projects are tracking to the approved schedule and budget:
		• Storage-DB Install and Migration – Includes the purchase and deployment of database storage hardware and the migration of databases and file systems:
		  ○ Stage 1 (Execution) – All of the new Commercial database storage has been deployed. The deployment of the new Grid database storage is underway. Deployment of the new backup database appliances is also underway, as well as the upgrades to tape backup system.
		  ○ Stage 2 (Execution) – Migrations of all databases and file systems are currently underway, with more than 35% of the databases migrated.
		• Remote Access (Execution) – The build-out of the remote access system in the Test environment of the new converged infrastructure is underway.
		• Telecom-Corporate Voice System (Initiation) – Will replace the current corporate PBX telecommunications system to a voice-over data network platform. This project has been initiated.
		• Telecom-Data Center Connectivity (Initiation) – Will replace all of the hardware responsible for connecting the fiber channel network between data centers. This project has been initiated.

Appendix

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