

2018 ERCOT ELECTRICITY MARKET OUTLOOK

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EXECUTIVE SUMMARY

Texas continues to experience an unprecedented transformation in its energy industry. The state saw record wind energy production in 2017 and will continue to see wind growth through 2018. ERCOT Board endorsed two large transmission projects with an estimated cost of over \$580 million in 2017 in connection to load growth including oil and gas load growth. More than \$1.44 billion was spent in transmission improvements in 2017. New import and export capabilities are on the horizon, such as through the integration of Lubbock Power & Light and the possible Southern Cross transmission project.

These conditions intensify the challenge to model the system, especially considering unknowns in transmission development, intermittent resources, and a greater focus on ancillary services. At the same time, and for the same reasons, getting a good picture of 2018 and beyond is increasingly important to all ERCOT stakeholders.

LCG Consulting (LCG) has completed a comprehensive hourly simulation of the ERCOT market for 2018 to help stakeholders tackle uncertainties in future ERCOT operations. The simulation discussed in this report relies on the expected demand growth, changes in the makeup of active generation capacity, transmission infrastructure and market operation. It outlines future operation of the ERCOT nodal market, including Locational Marginal Prices (LMPs), load zone prices, hub prices and expected congestion. LCG can further customize the report to drill down into details of this market study, such as individual generator performance, hourly LMPs, Congestion Revenue Rights (CRRs), and other information of interest to market participants.

All nodal market simulations were performed using LCG's proprietary UPLAN Network Power Model (NPM) and PLATO-ERCOT data model. UPLAN simulations provide a realistic projection of future physical and financial operations in any electricity market and have been used extensively to model ERCOT. Given the pace of development in ERCOT, simulation of the ERCOT nodal market requires detailed, hourly, node-specific information about generation, transmission, and loads, as well as the economic and engineering parameters. Generator engineering and economic parameters are continuously and meticulously verified and updated in LCG's PLATO-ERCOT data model. Generation expansion and retirement assumptions were based on ERCOT publications. ERCOT publications and other public and private data sources provided electricity demand, transmission network topology including transmission upgrades, list of contingencies analyzed, list of monitored elements, interface definitions and limits.

Some key findings from the ERCOT 2018 simulation include:

- The lowest prices are expected in the West zone, a result consistent with recent trends.
- Congestion on the Blue Mound to Wagley Robertson 138 kV line in North Texas and on the Panhandle interface are expected to be significant factors in the ERCOT market in 2018.
- Wind curtailment is expected to remain low in 2018, maintaining average monthly curtailment of 0.7% for all months through November. However, a significant uptick in curtailment is expected in December as a large amount of capacity is scheduled to come online during that month.
- Wind growth is expected to continue to increase its share of overall generation reaching 19.9% in 2018.
- Electricity generation in ERCOT is expected to continue to be supplied primarily from fossil fuels in 2018.

1. INTRODUCTION

Texas energy industry and ERCOT market continue to undergo unprecedented transformation. With the record amount of wind production in 2017, ERCOT remains as a worldwide leader in wind power generation. Over \$1.4 billion was spent for upgrading transmission system in 2017. ERCOT Board endorsed the West Texas Transmission project with estimated cost of \$336 million to address future reliability concern in connection to load growth in Far West Texas. The Freeport area upgrade to address the oil and gas activities, a \$246.7 million transmission project, was also endorsed by ERCOT Board in 2017. Several potential import and export capabilities such as the integration of Lubbock Power & Light and Southern Cross transmission project are on the horizon.

These conditions intensify the challenge to model the system, especially considering unknowns in transmission development, intermittent resources, and a greater focus on ancillary services. At the same time, and for the same reasons, getting a good picture of 2018 and beyond is increasingly important to all ERCOT stakeholders.

Financial and physical operations of the entire grid under the ERCOT nodal market protocols were simulated to forecast the future operation of the ERCOT nodal market. This report summarizes the modeling methodology, input assumptions, and results of hourly nodal network simulations of the 2018 ERCOT nodal market performed by LCG Consulting (LCG). More detailed input assumption data and output results can be acquired upon request.

1.1 METHODOLOGY AND ASSUMPTIONS

The nodal market simulations for this study were performed using LCG's proprietary UPLAN Network Power Model (NPM) and PLATO-ERCOT data model utilizing hourly dispatch method. UPLAN-NPM is a full network model designed for electricity market simulation. It replicates the engineering protocols and market procedures of a system operator. It also captures the commercial activities, such as bidding, trading, hedging, and contracting, of all players in a deregulated nodal power market. The model performs coordinated marginal (opportunity) cost-based energy and ancillary service procurement, congestion

management, full-fledged contingency analysis with Security Constrained Unit Commitment (SCUC) and Security Constrained Economic Dispatch (SCED) replicating those used by the ERCOT ISO. The model prepares a rolling, hourly unit commitment and hourly dispatch while integrating generators' economic and operating characteristics, the 2017 SSWG summer network for 2018 published in October 2017, and ERCOT standard planning contingencies. An overview on the UPLAN-NPM is provided in the Appendix – Section A.1. The PLATO data model validation overview is provided in Appendix – Section A.2.

Generation expansion and retirement assumptions were based on ERCOT publications. In addition, ERCOT publications and other public and private data sources provided electricity demand and transmission network topology assumptions including transmission upgrades, list of contingencies analyzed, list of monitored elements, interface definitions and limits.

LCG's 2018 ERCOT hourly load shapes are based on 2016 RTP Economic Case load profiles, published September 2016. Monthly peak loads were modified based on ERCOT Long-Term Daily Forecast published January 2018. Electricity market modeling incorporated over 800 generators, including existing facilities – based on the ERCOT Capacity Demand and Reserves report – and future units that have a Standard Generation Interconnection Agreement – using ERCOT Monthly System Planning reports and LCG assumptions. LCG produces proprietary natural gas price forecasts, as well as sub-bituminous and lignite coal prices, with data from EIA's Annual Energy Outlook. The study used the 17SSWG Summer Peak Power Flow Case for 2018 published October 2017 by ERCOT SSWG group for the transmission network. Transmission upgrades for the entire year was added based on the Transmission Project Information Tracking (TPIT) file, published October 2017.

If you are interested in receiving the full report, please contact us at Julie.chien@energyonline.com.



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