



Exploring Natural Gas and Renewables in ERCOT Part IV: The Future of Clean Energy in ERCOT

Executive Summary

Since 2013, the Texas Clean Energy Coalition (TCEC) has released a series of studies by The Brattle Group that analyze how natural gas and renewable energy might interact in the Electric Reliability Council of Texas (ERCOT) grid in future years, depending on a range of market and regulatory factors. The second phase of this research, released in December 2013, found that over the next 20 years, all new power plants built in ERCOT will use either natural gas or renewable energy from wind and solar power. This reinforces a similar finding by ERCOT that natural gas and renewable energy can provide all the new electric power that Texas will need in the future.

Thanks to past actions by state leaders, Texas is expanding its historic energy leadership into the 21st century. The deregulation of the Texas electric market and other initiatives, such as adopting one of the first Renewable Portfolio Standards (RPS) and investing in the Competitive Renewable Energy Zones (CREZ) for new transmission lines to bring renewable power to Texas cities, have laid the foundation for the ongoing transition to clean energy.

TCEC's latest study, Part Four in the series, looks at how market forces can create a cleaner ERCOT grid that relies on Texas-produced natural gas, wind and solar power without raising electric prices for customers. The study looks at the Texas electric generation mix over the next 20 years and forecasts how market and regulatory factors will affect future electricity generation in ERCOT, how much it will cost, and how much CO₂ will be emitted. The study examines market factors including the availability of low-cost, abundant natural gas and the falling cost of utility-scale¹ PV solar technology (PV); and regulatory factors such as enhanced energy efficiency programs.

If current market trends are allowed to work unimpeded, natural gas prices remain low (<\$4/MMBtu)² and solar PV prices continue to drop³, over the next 20 years ERCOT will see a cleaner grid that relies on Texas-produced natural gas, wind and utility-scale PV solar power. And wholesale electricity prices will remain virtually flat in real dollar terms.

¹ Due to a lack of available data, the study does not analyze the impact of rooftop solar installations. The study also does not examine additional high voltage transmission that might be needed for large amounts of new solar power.

² Near-term (2016-19) natural gas price assumptions are based on NYMEX gas futures; longer-term assumptions for natural gas are based on the ERCOT LTSA "Low" forecast.

³ Utility-scale PV price forecasts are based on the ERCOT 2016 LTSA base case projection.

Among the highlights of our findings with low natural gas prices and low solar PV cost:

- **Market Forces Drive The Transition:** The price of natural gas is driving change in the ERCOT grid, much more than any other factor.
- **Natural Gas Displaces Older Coal Plants:** Persistently low natural gas prices could cause the retirement of sixty percent (12 GW) of ERCOT's current fleet of coal-powered plants by 2022.
- **Natural Gas, Wind and Solar PV Will Largely Power ERCOT:** By 2035, about 85% of ERCOT power generation will come from natural gas, wind and solar power, with NGCC plants providing the lion's share of new generation.
- **Wind and Solar PV Will Grow:** Both wind and large-scale solar PV power will see swift, major additions of new generating capacity even with low natural gas prices – 9 GW for wind by 2019 and 13 GW for solar by 2021.
- **ERCOT Will Get Much Cleaner:** As the low natural gas price drives ERCOT away from coal and toward Texas-produced clean fuels, annual CO₂ emissions in ERCOT will drop by an average of 28% below 2005 levels – an average of 61 million tons less of CO₂ in Texas air every year.⁴
- **A Cleaner ERCOT Grid Will Cost The Same As Today:** Wholesale electricity prices will stay around \$41/MWh, similar to 2014 prices – virtually no price increase (other than for inflation).
- **Currently Proposed Environmental Regulations Will Be Largely Irrelevant:** Market forces will reduce CO₂ emissions in ERCOT below the requirements of proposed new standards in the EPA's controversial Clean Power Plan through 2035. Likewise, the EPA's Regional Haze Rule (if implemented) would have only a marginal impact (<15%) on projected coal plant retirements through 2022.
- **Energy Efficiency Can Save Money, Cut Carbon Pollution:** By accounting for enhanced energy efficiency to reduce demand for electricity an additional 5% by 2035, the need for electric plants on the ERCOT grid could be reduced by 4.7 GW, cutting CO₂ emissions and holding down power prices.

Taken together, the ongoing Brattle-TCEC research is designed to provide state decision makers with reliable third-party data on how market forces can drive the transition to a cleaner, affordable and more reliable electric grid that relies on Texas-produced energy.

⁴ A 2014 report by CNA quantified the protected water savings that would also come as market forces drive the ERCOT grid toward clean fuels. https://www.cna.org/CNA_files/PDF/IRM-2014-U-009083.pdf

We hope these findings will enable state leaders to better understand the market forces at work in the Texas electric market and prevent market distortions that could interfere with the transition to a cleaner electric grid or drive up electric prices for Texas consumers and businesses.