



*Promoting Clean Energy and Economic
Opportunity for All Texans*

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Brattle Report Shows Natural Gas and Renewable Energy to Dominate ERCOT Market in Coming Decades

Phase III of TCEC-led study finds adoption of expanded energy efficiency and demand response programs could reduce 40 to 50 percent of projected peak demand growth across the system

AUSTIN – Natural gas and renewable energy will continue to dominate the Texas electric supply additions over the next 20 years, while adoption of expanded energy efficiency and demand response programs could reduce *40 to 50 percent of projected* peak demand growth across the system, economists with The Brattle Group find in a new report prepared for the Texas Clean Energy Coalition (TCEC).

Released today, “Exploring Natural Gas and Renewables in ERCOT, Part III: The Role of Demand Response (DR), Energy Efficiency (EE), and Combined Heat and Power (CHP),” was authored by economists at Brattle, a global economic and financial consulting firm, using state-of-the-art modeling to integrate EE, CHP, and DR scenarios into ERCOT’s future.

TCEC Chairman Kip Averitt, a former state senator and chairman of the Senate Natural Resources Committee, said the report combines a model that simulates the decisions of market-driven developers of a wide range of new electric resources with a model that simulates the minute-by-minute operation and control of the grid by ERCOT.

By combining these two perspectives, the modeling system finds future trajectories that represent, for any given scenario, a realistic set of resources the market is willing to build and that can be integrated and managed by ERCOT to yield adequate and reliable electric power for Texas electric customers, Averitt said.

“The research indicates that substantial amounts of gas and renewable energy are likely to be developed in Texas over the next 20 years, with gas prices, carbon and renewable policies, and renewable price reductions serving as the most important drivers,” Averitt noted. “In addition, the results show that expanded energy efficiency and demand response programs can be highly economical for Texas energy customers.”

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Among the key findings in the report:

- **Natural gas and renewables dominate the supply additions across all scenarios.** Natural gas and renewable additions dominate the supply picture, with gas providing both low-cost base load energy and ancillary services that integrate wind and solar energy. The original forms of complementarity discussed in prior reports for the TCEC continue to occur, albeit in a more nuanced manner with the introduction of the increased options of EE, DR, and CHP.
- **Energy efficiency and demand response provide substantial opportunities to displace future capacity additions and lower overall electricity costs.** The program portfolio was designed to be moderate in size and use well-established approaches primarily driven by ERCOT energy prices. Nonetheless, 3 GW of peak reduction could be achieved by new EE programs and 2 to 4 GW of new DR programs are identified as economically achievable in the report's modeling scenarios.
- **Large CHP units are very economical, but not small CHP units.** New large CHP installations at petrochemical facilities are very economical and the simulation indicates that the full potential of these opportunities will be realized by 2032 in all scenarios. However, the high capital costs and rapid payback required of smaller CHP units prevent any further CHP adoptions in the scenarios.
- **Real energy prices remain within the band of prices actually experienced in ERCOT between 2010 and 2012.** The highest annual average price for a converged year is about \$67/MWh for the Strong Federal Carbon Policy/high gas price scenario. However, even this extreme scenario price is \$3/MWh lower than its counterpart scenario in the Phase II study.
- **Carbon emissions are slightly reduced by the addition of DR and EE.** The combined effects of higher gas prices, lower load growth, enhanced DR and CHP installations lower CO₂ emissions about 4% by 2032 versus the Phase II Reference Case, or about 143 million metric tons. This is the equivalent of closing one 600 MW coal plant for 30 years. The energy efficiency programs alone reduce CO₂ emissions by 10 million metric tons/year by 2032. These lower emissions are the net effect of reduced sales (including from EE programs) and higher renewables penetration, offset by reduced retirements of inefficient older capacity.

In June 2013, TCEC released a Brattle study, "Partnering Natural Gas and Renewables in ERCOT," that analyzed the complementary nature of renewable energy and natural gas and their potential to displace dirtier fuels, such as coal. In December 2013, TCEC released the second installment of the Brattle research, "Exploring Natural Gas and Renewables in ERCOT, Part II: Future Generation Scenarios for Texas."

"The research found that natural gas and renewables can both play substantial roles in ERCOT and provide all new generation needed to respond to higher energy demands driven by growth in

the state's population," said Dr. Peter Fox-Penner, a principal and past Chairman of The Brattle Group. "While Texas currently ranks as the largest carbon emitter in the country, our research proves that Texas is in a position to build a cleaner, more affordable, more water-lean and more reliable electricity sector than ever before – all while to keep power economical for Texas electric customers."

In this report, co-author Dr. Ira Shavel noted that Brattle continued its research by refining the economic model they built for last year's research to simulate, as accurately as possible, the interaction between renewable and gas generators on the ERCOT system through 2032. More concretely, this means estimating the amount of power plant capacity by type (gas, solar, wind, coal, etc.) that is either added or retired within ERCOT over the study period, and the amount of new demand response, energy efficiency, and CHP that is added as well.

Dr. Shavel notes, "These scenarios, most of which would require state policy and/or market changes, provide a more complete answer to our original motivating question, which is what are the possible range of outcomes for the full set of electricity resource options in the future Texas power grid? What are the drivers of these futures, and how much impact do they have on electricity prices, greenhouse gas emissions, and other important factors? How much of the future depends on policy choices versus the inexorable tide of market forces?"

The complete report is available on the TCEC website at www.texascleanenergy.org.

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About the Texas Clean Energy Coalition

The Texas Clean Energy Coalition is an alliance of business and economic development groups, faith-based organizations, the Latino and African-American communities, labor, and academia dedicated to building a clean energy economy that creates jobs and economic growth in the Lone Star State. Its goal is to educate Texans and support a state energy policy that promotes clean energy markets, job growth, energy security and Texas' energy leadership in the U.S. and around the world. For more information, visit the coalition Web site at www.texascleanenergy.org.