



## Summary of Key Research: Natural Gas and Renewables in ERCOT

### TCEC and Brattle Explore the Future of the ERCOT Grid

#### BACKGROUND

In 2013 and 2014, the Texas Clean Energy Coalition (TCEC) released a series of three studies by The Brattle Group, a respected international research firm that also does work for the Texas Public Utility Commission (PUC) and the Electric Reliability Council of Texas (ERCOT), which manages 90% of the state's electric load. The Brattle studies analyze how using more power from natural gas and renewable energy could contribute to a cleaner, reliable electric grid for Texas, and how this development might be affected by market and policy factors like the price of different energy sources, the structure of the ERCOT market, national energy policy and other key market drivers.

#### Summary of Brattle Findings:

1. Brattle I (June 2013) -- Natural gas and renewables can work together to create a cleaner power grid in Texas, depending on market and policy factors such as long-term natural gas prices, the cost of renewable energy technologies, electricity market rules, and state and federal energy policy. The full report is at <http://www.texascleanenergy.org/2013-research.php>.
2. Brattle II (December 2013) – 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. While the actual mix of natural gas, renewable energy and other fuels is likely to vary based on price and other factors, ERCOT's grid can accommodate any of the likely combinations of natural gas and renewables without sacrificing reliability. The full report is at <http://www.texascleanenergy.org/2013-research.php>.
3. Brattle III (June 2014) – Clean energy from renewables and natural gas, combined with expanded energy efficiency (EE) and demand response (DR) programs, could cut the projected growth of peak electric

demand in ERCOT by up to 50% over the next 20 years. Peak demand is the most intense use of electric power on hot summer afternoons or during a winter ice storm. By reducing the growth in our maximum power demand, EE and DR can help the ERCOT grid become cleaner and more reliable over time, even without additional federal emission policies. The full report is at <http://www.texascleanenergy.org/2014-research.php>.

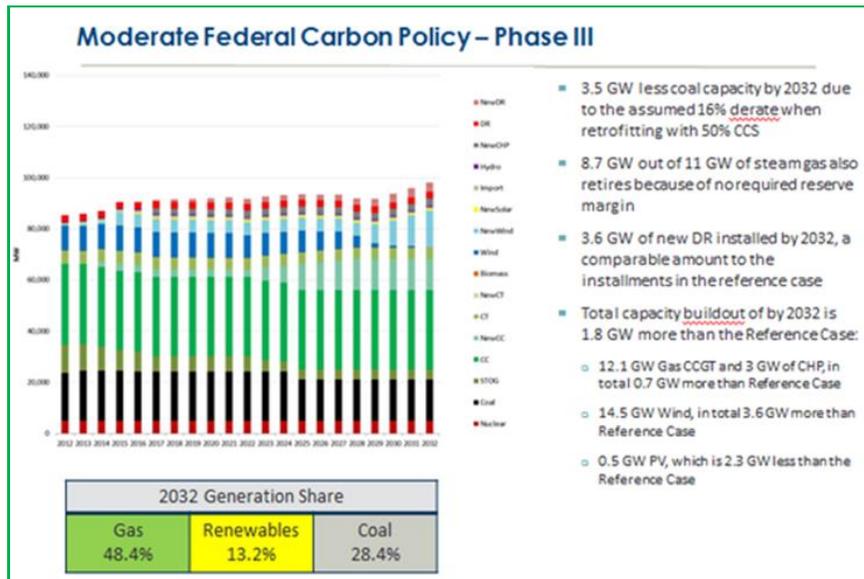
#### ABOUT THE TEXAS CLEAN ENERGY COALITION

*The TCEC supports a clean energy economy in Texas based on affordable and reliable clean technologies including energy efficiency, renewable energy and the broader use of natural gas as a way to help Texas achieve its full economic potential in a manner that is available to all Texans.*

*Since 2009, the Cynthia and George Mitchell Foundation and other generous funders have supported TCEC to provide original, Texas-specific research to inform the state policy discussion of clean energy on renewables, natural gas and energy efficiency.*

*As the global leader of the traditional energy industry, Texas has enormous technical, financial and educational expertise in energy exploration, production and marketing. Now is the time to harness our state's energy expertise so that we emerge as the leading clean energy economy in the United States and the world. Doing so will create additional jobs and economic growth for Texas, secure an affordable and reliable domestic energy supply and ensure opportunity for future generations of Texans.*

*Please contact us at [info@texascleanenergy.org](mailto:info@texascleanenergy.org) to share your ideas or to learn more about our efforts.*



### TCEC RESEARCH IN DEPTH: HIGHLIGHTS OF BRATTLE III

Brattle III, released in June 2014, built on their previous research for TCEC to explore the interaction between natural gas, renewable energy and demand-side market factors like energy efficiency (EE), demand response (DR)<sup>1</sup> and combined heat and power (CHP)<sup>2</sup>.

To make reliable predictions about the future of the ERCOT grid, Brattle’s research team worked closely with ERCOT and used ERCOT’s own long-term planning and operating data, supplemented by selected additional items from Brattle’s research. By combining market forces and the real-time operation of the ERCOT grid, Brattle identified scenarios that represent various realistic mixes of power generation that are economically viable and would maintain reliability in the grid.

In the Brattle III report, researchers looked deeper into how increased use of demand-side factors like EE, DR and CHP would interact with natural gas and renewables in ERCOT over the next 20 years, with or without a federal carbon policy. The study found that EE and DR, as well as large-scale CHP, could help reduce the growth in peak electric demand by up to half, and contribute to a cleaner Texas power grid that still supplies reliable power at an affordable price.

<sup>1</sup> Demand response, or DR, is a shorthand term for arrangements in which consumers are compensated for reducing their electric use at times of peak demand, such as homeowners who agree to raise their thermostats on hot summer afternoons or factories that reduce or suspend their operations to save power during a winter ice storm.

<sup>2</sup> Combined heat and power, or CHP, describes a system that uses a power station to simultaneously generate electricity and useful heat.

### Key Brattle III Findings:

- The Moderate Carbon Policy scenario in Brattle III (please see figure above; full discussion on pps. 67-71 of the report) aligns well with the standards in the new proposed EPA guidelines under Section 111(d) of the Clean Air Act. The new proposed EPA carbon guidelines would require Texas to cut carbon emissions from existing power plants by 24% by the year 2030, while the Moderate Carbon Policy scenario in our report would cut carbon emissions by 23% by 2032. The report provides a starting point to examine various paths to a cleaner electric grid.
- To make things more interesting, Brattle III predicts that retail electric prices in the Moderate Carbon Policy scenario would increase by a modest 5-10% by 2032, less than the projected increase in future energy prices.
- Carbon emissions would be reduced by using more clean energy and more demand-side programs like EE, DR and CHP. Even without new federal carbon policies, adding more DR and CHP could lower carbon emissions by 4% by 2032. EE programs alone could reduce carbon emissions by 10 million metric tons/year by 2032.

While none of these results are intended to be TCEC’s or Brattle’s definitive prediction of the most likely future path for the Texas power marketplace or explicit policy recommendations, TCEC hopes that this research can illustrate how various market and policy factors could affect development of a cleaner electric grid. For more information, please visit our website at <http://www.texascleanenergy.org/>.