Texas Clean Air Matters

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Advocating for healthier air and cleaner energy in Texas through public education and policy influence.

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Texas Grid Survives Heat, but Could Use More Energy Efficiency and Demand Response

By JOHN HALL | BIO | Published: AUGUST 26, 2015

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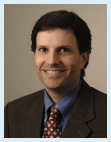
This month Texans have been at the mercy of some extreme, shoe-melting heat. Yet, despite the heat wave and resulting high demand in electricity, the state's main grid operator, the Electric Reliability Council of Texas (ERCOT), has barely broken a sweat. Demand even passed the previous record-high mark twice in one afternoon, but ERCOT has not called for a single system emergency.

How is ERCOT able to handle this massive stress on the grid, even as Texas' population continues to rise at an impressive rate? Although some new generation has come online to meet increased electricity needs in the state, two key resources are working "behind the grid" to lower demand. Energy efficiency and demand response, a way to



incentivize people to conserve energy when the electric grid is stressed, are both essential tools in preventing blackouts during the hottest months of the year, while maintaining Texas' commitment to a clean energy future.

The good news is, Texas has significant potential to grow these resources, and two utilities are already showing how the state can better harness both energy efficiency and demand response.

The cheapest energy is the kind we don't use in the first place

To put it plainly: Saving energy is more affordable than building additional power plants.

For example, researchers at Lawrence Berkeley Laboratory concluded the average cost of energy saved by energy efficiency measures is 4.4 cents per kilowatt hour (KWh), compared to the 9.5 cents per KWh for the cost of electricity generated by coal. The total cost of saved energy is not only less than half that of dirty coal, but it eliminates the need for cooling water, which is required to cool the steam produced by power plants. This is an additional cost that is not often factored in.

Similarly, the National Academy of Sciences found the average cost of conserved electricity in residential and commercial buildings is 2.7 cents per KWh. This finding is particularly relevant in Texas, as residential and commercial air conditioning comprises a significant proportion of peak summer load.

In 2012, Texas' own Austin Energy launched various energy efficiency efforts and, in 2014, the Brattle Group reviewed the resulting programs, finding:

- Energy efficiency programs saved two to five dollars for each one dollar invested;
- These programs have enabled its residential customers to use 900 kWh of electricity per month, compared to a statewide average of 1,200 kWh per month;
- Energy efficiency programs accounted for roughly 15 percent of statewide savings in 2012, even though the utility's service area accounts for only four percent of the state's total electricity sales; and
- Multiple efficiency programs can be extended across ERCOT, which would reduce peak growth of electricity within ERCOT during 2014-2032 from 17 GW to 10 GW, a 41 percent reduction.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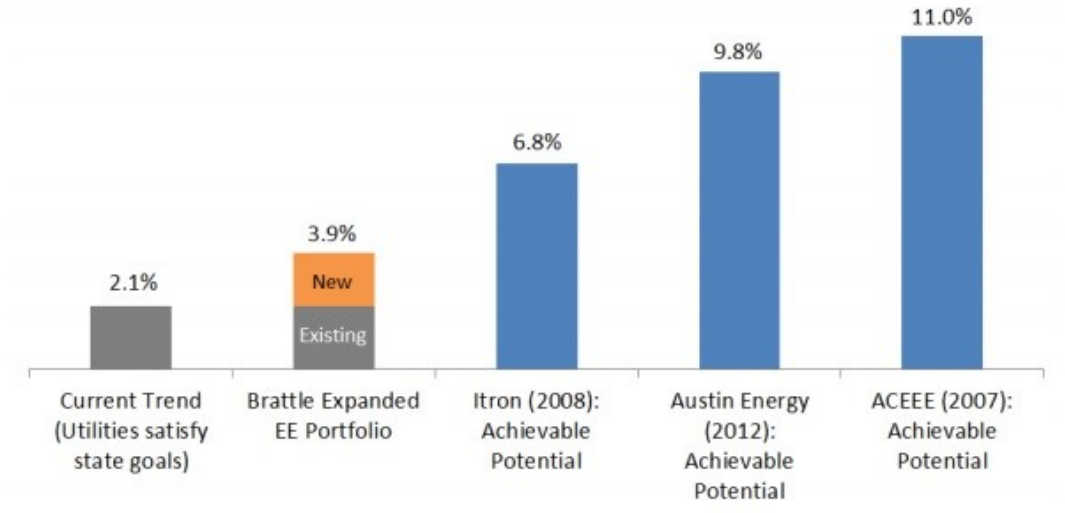
Brattle also took into account and compared several scenarios demonstrating the energy savings potential in Texas, beyond the current 2.1 percent. The group concluded that an expanded energy efficiency portfolio in ERCOT could bring savings up to nearly four percent by 2032, but that's a modest prediction. As demonstrated below, in 2008 Itron found 6.8 percent achievable reductions by 2018, while the American Council for an Energy-Efficient Economy (ACEEE) concluded in 2007 that 11 percent in energy savings were achievable over a 15 year period. Moreover, expanding Austin Energy's low-cost energy efficiency measures to the rest of the state could significantly increase energy savings – up to nearly 10 percent total.

Figure V-4: Achievable ERCOT Energy Savings Potential Estimates



Notes:
Impact of existing EE assumes state target is exactly met in each year
Impacts in the potential studies are annual impacts for the final year of their respecive forecasts.
The impact of our expanded DR portfolio is shown for 2020
Each estimate is incremental to a baseline projection that accounts for known/planned efficiency improvements

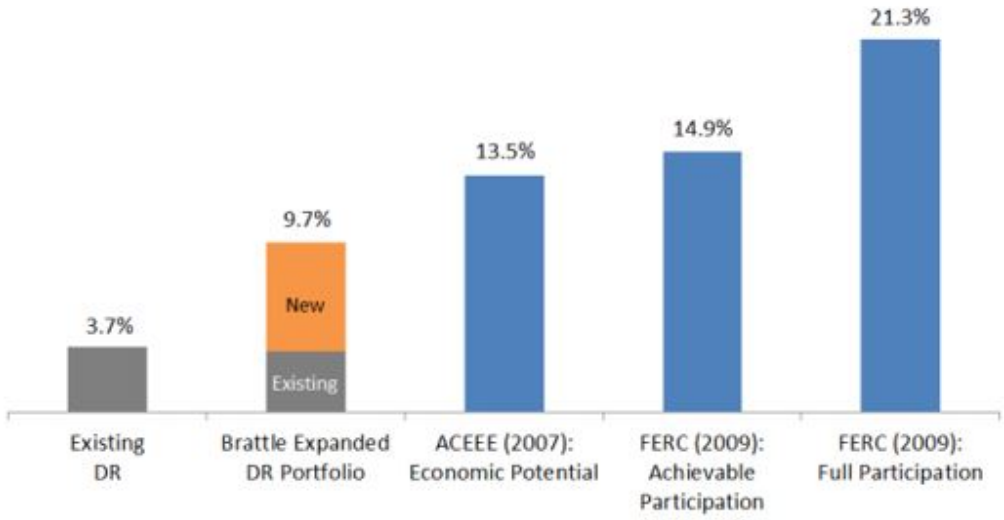
Demand response and ERCOT's budding relationship

Unlike energy efficiency, which reduces consumption year-round, demand response focuses on reducing demand during peak energy-use hours or times of system emergency. For example, if everyone comes home from work on a hot, Texas summer day and turns on their AC at the same time, utilities can alert customers enrolled in demand response programs to switch off non-essential appliances (reducing their overall energy use) for an incentive, usually in the form of a credit on their bill. This is in addition to the money they'll already be saving by cutting back on energy use. ERCOT has begun to depend on this clean energy resource – its existing programs currently have roughly 2,500 MW of peak reduction capability, which is about four percent of the electricity demand during system peak.

Demand response programs are particularly valuable because they are able to respond quickly in times of need. ERCOT acknowledges the role these programs can play in cutting peak demand and ensuring the grid remains reliable. For example, demand response helped ERCOT avoid rolling blackouts on two different occasions in 2014 by providing more than 600 MW of power to the electric grid within 45 minutes.

In their study, Brattle included an expanded portfolio forecast that would more than double the current peak reduction capability, but several other studies project far higher capabilities. For example, the ACEEE study determined peak demand could be reduced by 13.5 percent through cost-effective demand response programs. And the Federal Energy Regulatory Commission (FERC) estimated demand response could shave peak energy use in ERCOT between 14.9 and 21.3 percent – an enormous jump from where we are now.

Figure IV-1: ERCOT Peak Demand Reduction Capability as Reported in Various Studies



Notes:
Impact of existing DR is shown for 2014.
Impacts in the potential studies are shown for the final year of their respecive forecasts.
The impact of our expanded DR portfolio is shown for 2020
Expanded portfolio impacts are based on moderate incentive payment levels

Brattle also evaluated three existing demand response programs implemented by Austin Energy and San Antonio's CPS Energy, concluding they could be expanded across Texas with the potential to increase ERCOT's demand response to 6,350 MW, nearly twice as much as current levels. The report notes how such an expansion would be "economically achievable."

In addition to alleviating stress on the grid, energy efficiency and demand response are water- and carbon

emissions-free. That means the growth and development of these resources will bring Texas closer to achieving its carbon emissions reduction goal for the newly announced Clean Power Plan – the nation's first-ever limits on carbon pollution from existing power plants – while saving much-needed water.

Energy efficiency and demand response are critical assets in the Texas clean energy mix that help keep the grid stable, even in the extreme August heat. Both can – and should – be expanded in Texas. As a start, ERCOT can look to existing programs from Austin Energy and CPS Energy to show the way.

Graphs source: The Brattle Group

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