Market Profile: ERCOT

By Bentham Paulos
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ERCOT is the regional transmission organization (RTO) for Texas. It operates one of the few "energy-only" power markets in the world, where producers are paid only for the energy they sell, not for committing to supply capacity in the future. Stakeholders recently went through a vigorous debate over market design.

Texas is the most power-hungry state by far, using 10 percent of the US total and almost 50 percent more than second-place California. The Electric Reliability Council of Texas (ERCOT) manages the flow of power to 24 million customers in Texas, representing 85 percent of the state's load.

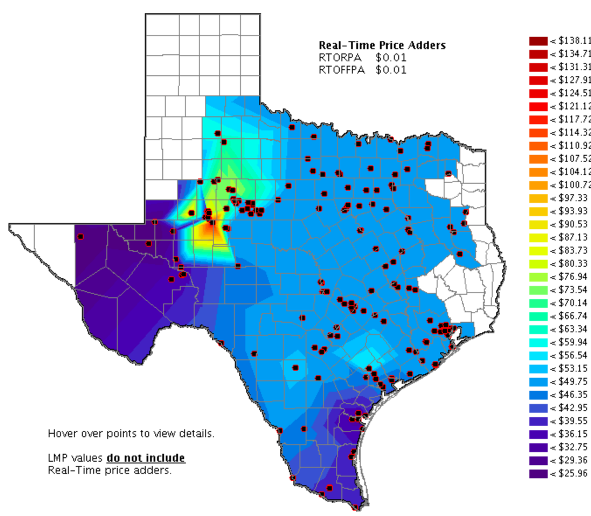
As the independent system operator, ERCOT schedules power among 550 generation units and performs financial settlement for the competitive wholesale power market. The Texas market has been deregulated since 2002. Municipal and cooperative utilities are not subject to competition, such as Austin and San Antonio. Because ERCOT operates entirely within Texas and is not synchronized with neighboring systems, it is not subject to regulation by the Federal Energy Regulatory Commission (FERC).

ERCOT facts

Runs the power market for 24 million customers in Texas.

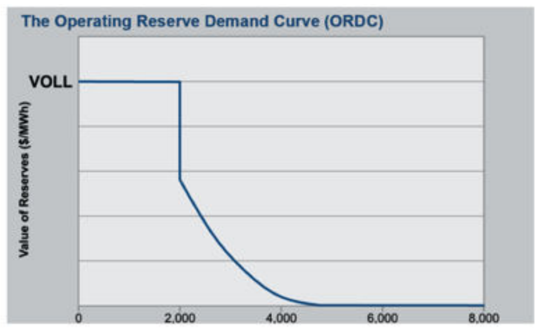
Known for its energy-only market, where producers are paid only for energy delivered, not for future capacity.

Large and growing amounts of wind power.



Texas is the largest wind producer in America, with almost 13 GW of installed capacity. Thanks to a recently completed $7 billion expansion of transmission lines to the west and north, Texas has over 7 GW of new wind under construction, slated to be online before the end of 2015. New lines have ended most curtailment of wind farms and periods of negative pricing. In 2012, Texas got half of its power from natural gas and one-third from coal, with wind and nuclear each at 9%.

ERCOT's new ORDC



ERCOT offers day-ahead and real-time markets for electricity, differentiated by time and place using locational marginal pricing (LMP). ERCOT provides a map of LMP prices in real time.

ERCOT does not have a capacity market. Due to concerns about a declining reserve margin after blackouts in the winter of 2011, there was a vigorous debate about whether to adopt a capacity market.

Generation companies largely supported the idea of a capacity market, especially TXU Energy, the largest generation company in the state with a number of coal plants. TXU has filed for bankruptcy due to high debt load from a leveraged buy out and low power prices from natural gas and wind generators, and saw capacity payments as way to survive. Power prices have fallen by almost half since 2007 and natural gas fuel prices are at record lows thanks to the US boom in hydraulic fracturing, or "fracking."

But capacity markets were strongly opposed by consumer groups, especially those of oil and gas, industrial, and municipal customers. "A capacity market would have an unmistakable chilling effect on economic growth in the state with a tremendous, long-term negative impact on Texas energy consumers," said Tony Bennett, president of the Texas Association of Manufacturers.

As part of their investigation, the Texas Public Utilities Commission (PUC), the state's appointed regulatory body, commissioned research by the Brattle Group, a consultancy, on reserve margins and market structures. Brattle calculated that an "economically optimal" reserve margin would be 10.2 percent, while one based on standard engineering rule of thumb (a once-in-ten-years loss of load event) would be 14.1 percent. The direct net cost difference of maintaining higher margins would be about $100 million a year, on a system with more than $35 billion in total sales (about 0.28 percent). While higher margins would cost more, they would reduce the incidence of price spikes due to scarcity.

Brattle estimated that ERCOT's current energy-only market would maintain an 11.5 percent reserve margin, causing a risk of interruptions once every three years, when 1600 MW of load (out of a peak load of approximately 60,000 MW) would need to be curtailed for 2.6 hours.

A 10-year forecast released in early 2014 showed reserves exceeding 13.75 percent through 2019, thanks to flat electricity demand and increasing capacity from wind and gas plants.

In response to the Brattle analysis and the lower load forecast, the PUC did not adopt a capacity market. "Our energy market seems to be healthy," said Commissioner Brandy Marty at a hearing in April 2014.

Instead, the PUC raised the System Wide Offer Cap to $9000 per MWh, encouraged demand response, and implemented an Operating Reserve Demand Curve (ORDC) starting in June 2014.

The ORDC administratively raises the real-time energy price through an adder to the energy price based on the value of lost load (VOLL) and the loss of load probability (LOLP) at different levels of operating reserves.

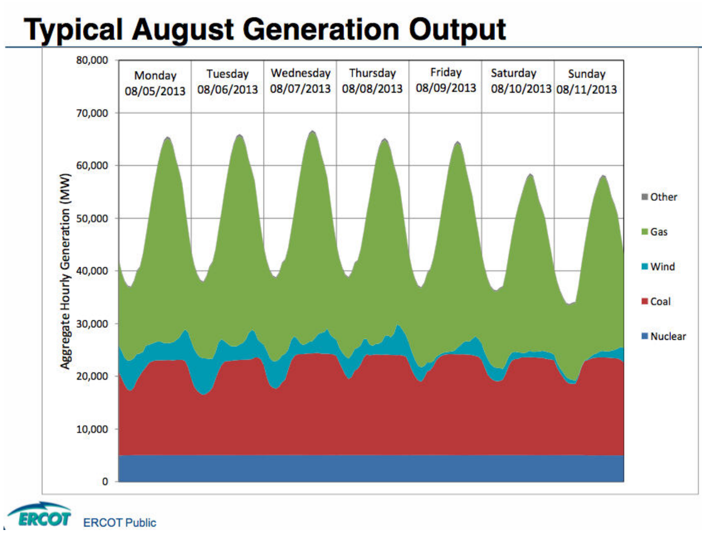
The Commission set the value of lost load at

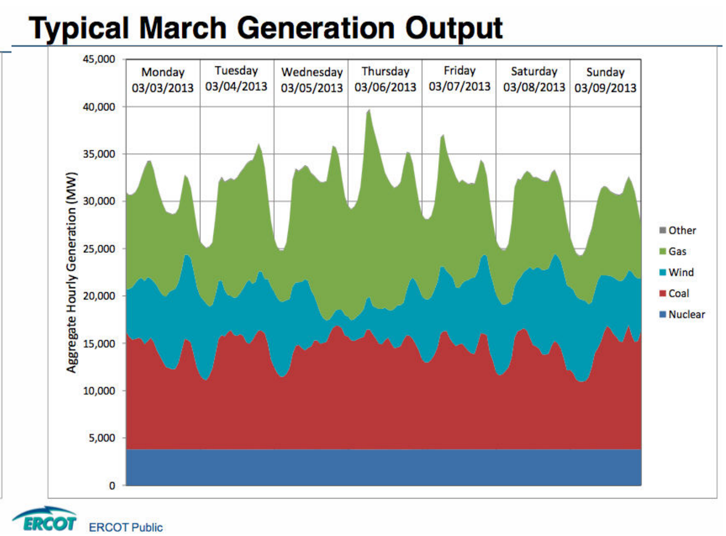
$9,000/MWh. So if the loss of load probability at a certain level of reserves is 10 percent then the ORDC would add $900 ($9,000 X 10 percent) to the real-time energy price. If reserves fall to 2000 MW or less, then the real-time energy price will be set at the value of lost load, which is also the price cap.

In essence, the ORDC acts as a "rumble strip" as margins grow tight, giving an early warning before limits are reached and prices suddenly shoot up. Without the early warning, market participants would be largely unable to react fast enough in response to the price spike. The ORDC may also reduce these "needle peaks," thus lowering peak expenditures overall.

William Hogan, research director of the Harvard Electricity Policy Group, was instrumental in the adoption of the ORDC, providing the basic research for the PUC and ERCOT.

Texas Industrial Energy Consumers (TIEC) has proposed a "Supplemental Reserve Service," (SRS) instead of a capacity market. Under this plan, ERCOT "would determine the amount of additional power that needs to be purchased [to meet shortfalls] and would provide payments only to those generators who provide the additional power." The service is "a form of longer-term ancillary service that is only purchased when an actual reserve margin shortfall is predicted. SRS is more effective, narrowly tailored, and less costly approach than a mandated forward capacity market." The TIEC estimates it would cost approximately $2.2 billion over 20 years, while a mandated capacity market would cost between $25 billion and $46 billion.





The Power Markets Project studies and promotes market policies that align with clean energy goals. It is a project of PaulosAnalysis, with financial support from the Heinrich Böll Foundation, the Cynthia and George Mitchell Foundation, and the Rockefeller Brothers Fund.

For more information on the project and on power market issues, see www.powermarkets.org.