

PUTTING DUCT TAPE ON NORTH AMERICA'S LAST ENERGY-ONLY MARKET: ERCOT

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Overview

The Electric Reliability Council of Texas (ERCOT) market relies merely on market forces to provide incentives for the investment necessary to ensure long-term reliability. ERCOT remains the only organized wholesale electricity market in North America that does not have a capacity market or resource adequacy requirements, and is similar to the Australian market in that respect.

While an operating reserves demand curve (ORDC) was introduced in June 2014 to raise wholesale prices during times of scarcity (Hogan, 2013), it has had a very minor impact on wholesale electricity prices to date. Concern over a projected reserve margin for the summer 2019 of 8.1% – far below the 11.5% target level – has prompted the Public Utility Commission of Texas (PUCT) to take actions to dramatically raise the ORDC to provide greater revenues to generators when operating reserves decline. While there remains no capacity market or resource adequacy requirement, the introduction of this administrative mechanism was found necessary, thus suggesting that market forces alone weren't getting the job done.

In this paper, we will revisit an old problem in light of new evidence from Texas. ERCOT's recent experience brings to memory what DuPuis (1844) and Hotelling (1938) argued many years ago – in a very capital intensive industry with high fixed costs, using short-run marginal costs to set prices may not provide sufficient revenues to suppliers. Though certainly not everyone is convinced that a capacity market or some administrative intervention is necessary in order to keep the lights on (Kielsing and Kleit, 2009; Biggar and Hesamzaden, 2014).

Methods

This paper first reports on the present resource adequacy situation in Texas and efforts by the PUCT to improve long-term reliability by changing the ORDC. The ORDC mechanism shall be described, and its effects on wholesale prices since its introduction in 2014 shall be reported.

We also contribute insight into the question: Why have ERCOT's wholesale energy prices recently been too low to attract sufficient investment? We provide a summary of recent and on-going research by the authors examining how renewables have lowered wholesale market prices via economic merit order effects in this market (Woo et al, 2011a; Woo et al, 2011b; Woo et al, 2012; Zarnikau et al 2016; Zarnikau et al 2019a; Zarnikau et al 2019b). Additionally, we explore how relatively-low natural gas prices and other factors have contributed to the situation.

Results

The ORDC provided \$81 million and \$739 million in revenues to generators in 2017 and 2018 (through the end of October), respectively. This is a fairly small amount in the market where about \$10 to \$12 billion of energy is transacted annually. Many of the proposals presently before the PUCT to modify the ORDC mechanism would increase these revenues by billions of dollars. (Note: The PUCT plans to vote on this issue on December 20, 2018, thus the paper will analyse the plan approved by the PUCT.)

In our most recent studies, we find that each additional GWh of wind energy generation lowers market-wide prices by \$1.8/MWh (Zarnikau et al, 2019a) or \$1.6/MWh (Zarnikau et al, 2019b). Our earlier research found that the impacts of wind generation on prices tends to be the greatest in ERCOT's West and North zones (Zarnikau et al, 2016; Woo et al, 2011a; Woo et al, 2011b). Interestingly, our earlier estimates using earlier estimation periods tended to estimate much higher economic merit order effects (Woo et al, 2011a).

A review of planned resource additions for the ERCOT market suggests that Texas' reliance on wind and solar generation is likely to increase, and thus low market prices may persist in future years during periods when there is no scarcity of capacity.

Conclusions

In Texas, policy makers have been uncomfortable in seeing reserve margins slip to “market equilibrium” levels of around 10.25%. “Economically-optimal” levels of around 9% (The Brattle Group, 2018) are viewed as even more problematic. Thus a projected reserve margin for the summer of 2019 of a mere 8.1% has prompted a bold response from regulators.

It is quite plausible that an energy-only market will result in reserve margins which are adequate from an economic perspective, which considers the cost that consumers are willing and able to pay for electricity and the cost of resource additions. Consequently, we have some sympathy for the arguments set forth by Biggar and Hesamzaden (2014) and others. But, market forces alone may be insufficient to achieve a “politically-optimal” level of resource adequacy. That is, the loss-of-load expectation associated with a market equilibrium level of reliability (perhaps 0.5 events per year, per Brattle’s calculations) or with an economically-optimal level (0.8 events per year, again using Brattle’s calculations) won’t suffice for a risk-averse regulator who the media is likely to blame for any reliability problems.

Thus, it is time to get out the duct tape to patch-up the ERCOT market as low market prices persist in the face of continued growth in renewable energy generation and political resistance to establishing a capacity market or resource adequacy requirements.

The actions taken to ensure resource adequacy in ERCOT may prove instructive to the design and redesign of other markets.

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