Filing Receipt

Received - 2022-04-11 08:34:08 AM
Control Number - 52373
ItemNumber - 362

Project No. 52373

Review of Wholesale Market Design	§ § §	Public Utility Commission of Texas

COMMENTS ON CHAIRMAN LAKE'S LSE OBLIGATION PROPOSAL

TO THE HONORABLE PUBLIC UTILITY COMMISSION OF TEXAS:

Appreciative of the PUC's efforts to address the reliability of the Texas electric grid, I offer a proposal that seeks to balance the PUC's obligation to regulate using "competitive rather than regulatory methods . . . to the greatest extent feasible," narrowly tailored so as to "impose the least impact on competition."[1] I have drawn my proposal from my recent article published in the Texas Law Review, "Texas Wind Energy and the Missing Money Problem."[2]

A Market-Based Approach to Compensating Capacity

An ideal solution would combine the capacity market approach's requirement that wholesale purchasers proactively secure expected future capacity needs with the pure market approach's emphasis on decentralized decision-making. Specifically, this approach would require wholesale purchasers to lock in commitments from producers to generate enough electricity to cover expected demand many months (or even years) in advance—with financial incentives put in place to encourage an accurate estimate of demand and generation capacity. This could be achieved by creating a market for "generation rights"—i.e., privately negotiated contracts between generators and purchasers. The agreements would take the form of a commitment from a generator to produce

[1] UTIL. § 39.001(d) (Westlaw).
[2] Brad Bowen, *Texas Wind Energy and the Missing Money Problem*, 100 TEXAS L. REV. 771 (2022).

a set amount of electricity at a set time in the future at either (1) a negotiated price or (2) existing market prices when the generation commitment comes due.

In return for the commitment, the generator would receive cash, based on the then-prevailing market price for the generation right. Generators would also receive a guarantee that they would be able to sell their electricity into the market before any generator not a party to such a generation right agreement. This would ensure that generators that invest the capital to meet their future electricity generation commitments are allowed to sell their electricity into the market before another generator that just happens to have electricity to sell into the market on a given day (for example, a wind generator—not a party to a generation right agreement—on a windy day). On the other hand, a generator failing to meet its commitment would have to make the generation right purchaser whole at then-prevailing market prices, plus penalties imposed.

Purchasers, for their part, would be naturally incentivized to accurately estimate their expected electricity demand, because penalties would be imposed for purchasing electricity in excess of generation rights held by a purchaser (that is, for underestimating demand). In this system, there would be no need for *ex ante* regulatory oversight of purchasers' demand estimates. Instead, the presence of a penalty for purchases exceeding generation rights holdings would act as a sort of self-enforcing regulation. In this system, there is also no need for long-term prognostication of future electricity demand by a centralized grid operator. Instead, the appropriateness of wholesale purchasers' demand estimates will be determined based on what the actual demand turned out to be—a much more objective and practical measure. ERCOT, with all its technical and grid-management expertise, would serve as the administrator of the generation rights market—a kind of stock exchange for the generation rights. That is, ERCOT would serve as an independent

clearinghouse for generation rights transactions, settling transactions and assessing penalties between the various counterparties based on market rules and individual contracts.

Penalties imposed under this system could be used for a variety of purposes. First, the penalties might go toward helping "innocent" generators or purchasers whose counterparties did not live up to their commitments. For example, penalties imposed on generators that did not produce enough to meet their commitments under previously sold generation rights might go toward helping electricity purchasers purchase electricity on the spot market. Alternatively, penalties could go to ERCOT for use in procuring backup or "ancillary" generation or for other reliability-enhancing measures like winterization. Ultimately, lawmakers could choose between these various proposals, or they could leave it to ERCOT or the PUC's discretion. The main point of the penalties, though, is to provide the incentives to market participants that ultimately enhance the grid's reliability.

A brief illustration may be helpful in explaining the mechanics of this proposal. Assume that at time period 0, a wholesale electricity purchaser estimates that electricity demand at time periods 1–3 will be 100, 105, and 110 megawatts (MWs), respectively. As a result, the generator purchases generation rights to cover exactly this expected demand for time periods 1–3 at prevailing market prices. Now assume that actual demand for time periods 1–3 is 105, 103, and 109 MWs, respectively. This means that the purchaser underestimated demand by 5 MWs at time period 1 and overestimated demand by 2 and 1 MWs at time periods 2 and 3, respectively. These results are shown in the table below.

Table 1: Purchaser Example

Time period	Expected Demand (MW)	Generation Rights Purchased (MW)	Actual Demand (MW)	(under)/over estimate of demand (MW)
1	100	100	105	(5)
2	105	105	103	2
3	110	110	109	1

Because of its 5 MW underestimate of demand for time period 1, the purchaser will be subject to a penalty for that time period. That is, the purchaser did not lock in enough generation rights commitments (100 MWs) to cover its actual demand (105 MWs) for time period 1. And notably, other purchasers would have priority over this purchaser who is seeking to purchase the 5 MWs for which it did not purchase generation rights in advance (subject to grid operational security). The penalty imposed on the underestimating wholesale purchaser would be calculated as follows:

$$\text{Penalty} = \begin{matrix}\text{underestimate}\\ \text{of demand}\end{matrix} \times \begin{matrix}\text{wholesale}\\ \text{electricity spot price}\end{matrix} \times (1 + \text{penalty rate})$$

Because the purchaser had sufficient generation rights to cover its actual demand for time periods 2 and 3, it would not be subject to penalties for those time periods under the proposal.

Under this arrangement, the inclination by purchasers to significantly over-procure to avoid the penalties would be at least partially negated by their own profit incentives. That is, purchasers would not want to buy significantly more electricity than needed to avoid penalties if the cost of the excess electricity exceeded the potential under-procurement penalties. This risk of over-procurement could be managed through the fine-tuning of the penalty rate imposed. And in any case, as a purchase date draws nearer, a purchaser realizing it had over-procured electricity for that

day could sell its excess generation rights (including to a generator that had realized it would be unable to meet its generation commitments under generation rights it had previously sold).

Similarly, in the dynamic market contemplated in this proposal, a purchaser that realized it did not have sufficient generation rights for an upcoming date could go to the market to purchase additional generation rights for that time period. In doing so, however, the purchaser would have to pay the now-prevailing (and probably higher) market prices for these generation rights because of the little advance notice to the generator. This too would incentivize the purchaser to lock in sufficient generating capacity in advance.

But at the same time, generators with more volatile capacity like wind generators—who might be more hesitant to aggressively sell generation rights for time periods far in advance with no long-range forecast of wind speeds—could step in and sell additional generation rights on short notice, with the added security of high wind speeds in the short-term forecast. Thus, this proposal would incentivize purchasers to lock-in enough generation capacity to meet their expected demand far in advance but would also allow non-traditional generators like wind and solar generators to be available to step in on short notice and sell their excess capacity—perhaps even at premium prices. In this way, the market for generation rights effectively forces the demand and supply side of the markets to secure sufficient generation in advance. And in the long-term, it discourages market participants from assuming a given day will be windy (with the incremental wind generation capacity that comes with a windy day), while also providing wind generators a way to capture the excess generating capacity of a windy day in the short-term market for generation rights.

Next consider the generation side of the preceding example. At time period 0, a generator believes it can realistically generate 100, 105, and 110 MWs at time periods 1, 2, and 3, respectively. It therefore sells generation rights equal to its expected output at these time periods

at prevailing market prices. This guaranteed cash helps the generator invest in its generation facilities to ensure it can live up to its future generation commitments. Importantly, it also reduces the uncertainty of its future revenue stream, since it has locked in a commitment to sell a given amount of electricity in the future. This reduction in uncertainty also promotes long-term investment in generating capacity. At time periods 1–3, the generator actually generates 100, 99, and 115 MWs at time periods 1, 2, and 3, respectively. This means that the generator produced enough electricity at time periods 1 and 3 to meet its commitments under the generation rights it previously sold. But at time period 2, the generator fell short of its prior commitments and would be subject to a penalty imposed by the grid operator. These results are shown in the following table:

Table 2: Generation Example

Time period	Generation rights sold (MW)	Electricity generated (MW)	(under)/over generation (MW)
1	100	100	0
2	105	99	(6)
3	110	115	5

In the mirror image to the wholesale purchaser, the generator will be subject to a penalty when it produces less electricity than it had previously committed to generate through its sale of generation rights. Specifically, at time period 2, the generator in this example would be subject to a penalty for the difference between its actual generation (99 MWs) and the electricity it committed to generate by selling generation rights (105). This penalty would be calculated as follows:

$$\text{Penalty} = \begin{matrix}\text{Generation} \\ \text{shortfall}\end{matrix} \times \begin{matrix}\text{wholesale} \\ \text{electricity spot price}\end{matrix} \times (1 + \text{penalty rate})$$

Conversely, for time periods 1 and 3, the generator would not be subject to a penalty because it generated at least as much electricity as it had previously committed to produce through its sale of generation rights. For these time periods, the generator could attempt to sell additional generation rights in the days preceding time periods 1 and 3 if it knew of its excess capacity. As discussed above, this is a feature of the dynamic market under the proposal—as opposed to a capacity market that does not allow for additional capacity transactions after the capacity auction has concluded (months or years in advance).

Alternatively, the generator could sell the excess capacity into the spot market at time periods 1 and 3 at prevailing spot prices (without having previously sold generation rights). Similar to wholesale purchasers, though, a generator transacting in the spot market without a corresponding generation right would be prioritized below a generator selling under a corresponding generation right. That is, a generator selling without a corresponding generation right would only be able to sell into the market after transactions executed under a generation right had cleared the market (again, subject to grid security considerations). ERCOT would make rules about this aspect of the market and would oversee its execution in practice.

Like wholesale purchasers, generators can avoid the imposition of penalties by taking proactive measures. Specifically, if a generator suspects that it will not be able to meet its electricity production commitments prior to the relevant time periods, the dynamic market considered by the proposal would allow the generator to attempt to transfer its generation rights to another generator—or buy generation rights held by a purchaser—at prevailing market prices. As discussed above in the context of the wholesale purchaser, prices for generation rights closer to their "maturity date" would likely be much higher, resulting in a financial loss to the generator

seeking to transfer generation rights that it cannot expect to honor. But in doing so, the generator can avoid the penalties imposed on generators that do not produce enough electricity to meet the commitments resulting from the generation rights they sold. In this way, the proposed system enables market participants to self-correct. And by engaging in this proactive self-correction, the proposal helps avoid the kinds of short-term supply and demand shocks that result in price spikes and blackouts for consumers. This is because suppliers and wholesale purchasers would be continuously monitoring whether their prior estimates align with current market conditions and retail demand—making proactive adjustments to account for any unforeseen developments. By doing so, they both avoid financial penalties and efficiently maintain the reliability of the grid.

As the example shows, the proposal as applied to generators would: (1) provide the guaranteed cash necessary to invest in electricity generation infrastructure needed for the future, (2) incentivize generators to commit to produce only what they could reasonably expect to generate for a given time period, (3) provide flexibility to generators to sell excess capacity in the near term, and (4) incentivize generators and wholesale purchasers to be proactive in adjusting to changing market conditions to avoid financial penalties and thereby help ensure grid reliability.

This proposed system would also give non-wind generators the longer-term view needed to justify substantial capital outlays necessary to ensure the grid's long-term reliability. This long-term view would incentivize the kinds of winterization improvements that must be mandated by the legislature in the current system in response to Winter Storm Uri. This is because generators would seek to avoid the penalties imposed for failing to meet their future generation commitments (including for weather-related reasons) under the generation-rights system. The proposed system would also allocate value to the reliability aspect of electricity generation—a real and valuable

asset. This value would be assigned by the forces of supply and demand in the market and would retain the traditional informational role of prices that is lacking in the capacity market model.

Importantly, this approach aims to solve the missing money problem in a way that leaves the decision of how much electricity to procure to entities with skin in the game rather than a regulatory body whose chief incentive is to keep the lights on: Reliability is important, but the grid design should not facilitate waste at the expense of everyday consumers. Furthermore, this solution would introduce accountability into the system that would help reduce the risk that the market is materially affected by variations in wind patterns. While wind generators—like every other generator—would be able to sell generation rights, they would be incentivized to only commit to what they could reliably produce in light of the inherent variability in wind speeds (both seasonal and daily). On the other hand, as discussed above, the dynamic shorter-term market offered by the proposed system would give non-traditional generators the flexibility to sell their excess capacity and to step in and fill short-term supply gaps.

Thank you for your consideration and for your efforts to address grid reliability issues in Texas.

Sincerely,
/s/ Brad H. Bowen