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PROJECT NO. 52373

REVIEW OF WHOLESALE ELECTRIC MARKET DESIGN	**§ §**	**PUBLIC UTILITY COMMISSION OF TEXAS**

EXECUTIVE SUMMARY OF POTOMAC ECONOMICS' MARKET REDESIGN PROPOSALS

Potomac Economics (Potomac), the Independent Market Monitor ("IMM") for the wholesale market in the Electric Reliability Council of Texas, Inc. ("ERCOT") region, proposes the following modifications to the ERCOT market design:

1. **Forward Shortage Energy Hedge**: a forward hedging mechanism where ERCOT would facilitate mandatory forward procurement of a seasonal hedging product on its shortage adder settlements, ensuring nearly complete hedging and smooth year-to-year changes in revenues, reducing volatility, and improving incentives to invest in ERCOT. Load serving entities could self-supply in lieu of purchasing the hedging product through ERCOT.

2. **Changes to the Operating Reserve Demand Curve and the System-Wide Offer Cap**: decrease the SWCAP and cap the total system price at a lower value in the range of $5,000/MWh; decrease the Minimum Contingency Level (MCL) to 1,430 MW; and increase the Value of Lost Load (VOLL) to a higher value in the range of $20,000/MWh.

3. **A New Uncertainty Ancillary Services Product**: a 2- to 4-hour Ancillary Service that can be deployed when uncertainty results in tight real-time conditions.

Potomac also recommends that implementation of Real-Time Co-optimization remain a top priority, as it improves both reliability and efficiency:

- Lower overall costs of satisfying the system's energy and AS needs
- Efficient prices during both shortage and non-shortage conditions
- More effective congestion management (reducing congestion costs and regulation service usage)
- Fewer Reliability Unit Commitments and other manual operator actions
- More timely, reliable, and economic scheduling of AS in Real-Time
- Less frequent operating reserve shortages

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REVIEW OF WHOLESALE	**§**	**PUBLIC UTILITY COMMISSION**
ELECTRIC MARKET DESIGN	**§**	**OF TEXAS**

POTOMAC ECONOMICS' MARKET REDESIGN PROPOSALS

Potomac Economics (Potomac), the Independent Market Monitor (IMM) for the wholesale market in the Electric Reliability Council of Texas, Inc. (ERCOT) region, appreciates the opportunity to file these proposals in Project No. 52373, *Review of Wholesale Electric Market Design*.

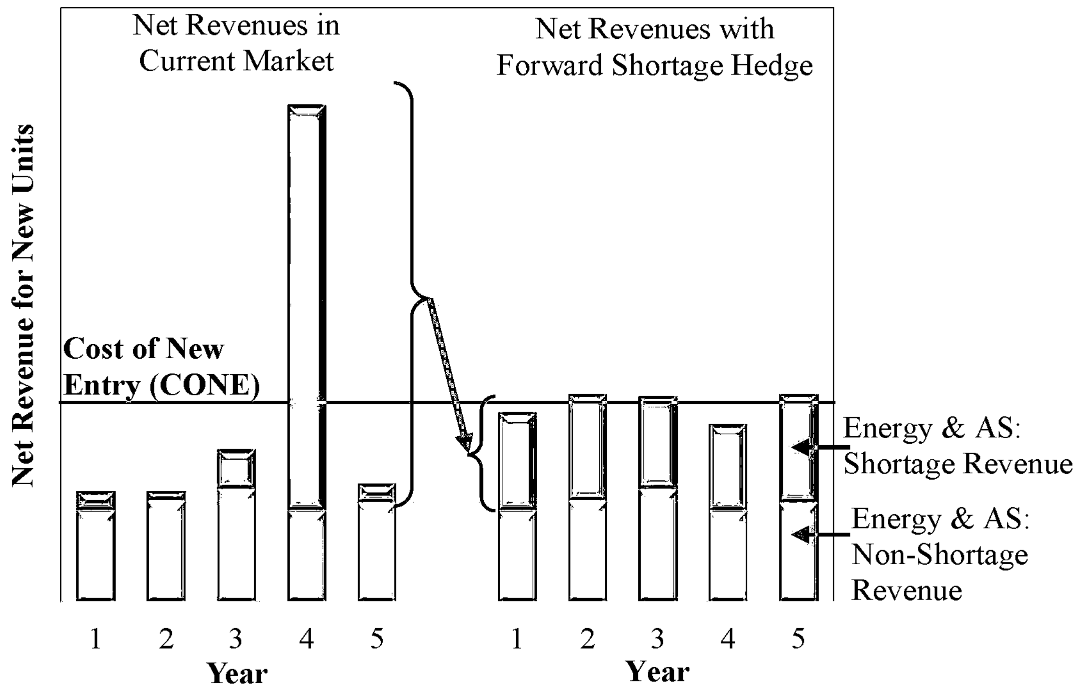
PROPOSAL NO. 1 - FORWARD SHORTAGE ENERGY HEDGE

Recent events have illustrated how volatile the costs and revenues can be under ERCOT's energy-only market design. For participants that are not fully hedged, this volatility can have catastrophic effects. This volatility can also affect long-term investment and retirement decisions as participant must quantify the probability of deep and/or extended shortages that may underly high-cost investment decisions. This proposal discusses changes the Commission could consider that would reduce the volatility of these revenues and costs without fundamentally departing from the energy-only market.

In a typical forward energy contract, the expected value of the spot market prices will determine the forward contract price. In this way, a participant can hedge the substantial volatility in shortage energy revenues by "locking-in" the forward contract price (by serving its load with its own contracted generation). Forward contracting is currently voluntary, so some loads and generation settle at real-time prices during extreme shortages. The economic displacements that result could be mitigated through more comprehensive forward contracting.

One way to accomplish this is for ERCOT to facilitate a mandatory forward procurement of a product that would provide a hedge on the Operating Reserve Demand Curve (ORDC) and Reliability Deployment Price Adder (RDPA)-based shortage settlements. Under such an approach, ERCOT could conduct a seasonal or annual procurement of such a forward shortage product, buying on behalf of its load serving entities (LSEs). LSEs that own generation or have contracted for supply that would cover this forward product could self-supply in the ERCOT procurement and not have to settle with ERCOT.

The figure below illustratively shows the market revenues that a new generating resource would earn in the ERCOT market when the market is near a long-run equilibrium. When the market is near such an equilibrium, a new resource would expect to earn “net revenues” in excess of its operating costs that would cover its annualized entry costs (i.e., the “Cost of New Entry” or CONE) on average. The figure shows that both the current market and a market with the forward shortage hedge would deliver average expected revenues equal to CONE. However, the year-to-year fluctuations in revenues would be much higher under the current market than in a market with a mandatory forward shortage hedge because such a product would smooth these fluctuations. The revenues with such a product would still fluctuate as the generation margin and participants’ expectations of shortages change. However, it would substantially mitigate the effects of having unhedged load buying in the spot market during extended or deep shortages.



The key considerations in designing this Forward Shortage Energy Hedge product would include:

- Developing rules governing generators' offers to sell the hedge. Such rules must balance mitigating market power with not compelling suppliers to sell the hedge below its value;
- Establishing the quantity of hedges to be procured (or self-supplied), and managing imbalances from a financial perspective;
- A mechanism to address changes in loads served by competitive retailers; and
- Determining effect on credit/collateral needed to be held by ERCOT.

PROPOSAL NO. 2 – PRICE FORMATION DURING SHORTAGES

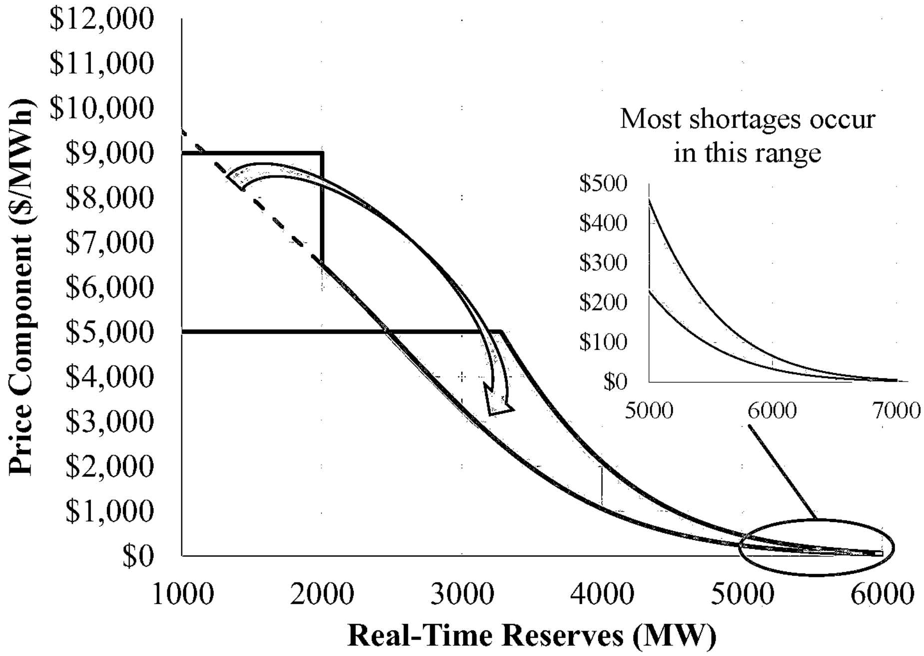
The pricing of operating reserve shortages (i.e., "shortage pricing") is essential to support the performance of the ERCOT market in both the short-term (providing strong incentives for generators to be available) and the long-term (providing incentives to build and retire units efficiently). Proposals #2 and #3 (below) are two key changes that can be made to maintain a higher total capacity margin and a higher quantity of flexible generation, while reducing the risks associated with extended outages. These changes are also intended to improve the alignment between ERCOT's operating requirements and the market. While real-time co-optimization should remain among ERCOT's highest priorities, these changes improve pricing in the ERCOT market and long-term incentives in ERCOT.

<u>Reshaping the ORDC to Shift Revenues Away from Extreme Shortages</u>

Virtually all shortages in electricity markets are shortages of operating reserve products. When an ISO/RTO is short of reserves, the reliability value of the foregone reserves should set the clearing price for reserves and be embedded in the price of energy. This value is reflected in ERCOT's ORDC. The ORDC should reflect the marginal reliability value of reserves at any shortage level, which equals to the expected value of lost load:

*Net value of lost load (VOLL) * the probability of losing load*

Since the probability of losing load rises as the shortage deepens, the ORDC curve should rise as reserves become more scarce. The current ORDC shown in the figure below is peculiar in that it jumps to $9,000 per MWh at a minimum contingency level (MCL) of 2,000 MW reserve level even though the probability of shedding load does not jump to 100% at that level. A curve more consistent with the equation above is shown by the dashed line where the MCL is set at the actual reserve level that would prompt ERCOT to begin shedding load (~1,430 MW).



The Commission has expressed a desire to reduce the peak price of $9,000 per MWh. In order, to preserve long-term price signals provided by the ERCOT markets, it is important to offset this decrease in revenues during extreme shortages with higher revenues in other hours. One way to do this in a manner that is economically sound is to:

- Decrease the system-wide offer cap (SWCAP) and cap the total system price at a lower value. $5,000 per MWh is shown in the figure above;
- Decrease the MCL to 1,430 MW; and
- Increase the VOLL used to calculate the ORDC to a higher level.

The green line in the figure above is based on a VOLL of roughly $20,000 per MWh. Such a VOLL is reasonable based on relevant studies and is much less than the VOLL implied by a 1-day-in-10-year reliability standard. This approach would shift expected revenues from the infrequent hours exhibiting deeper shortages to the more frequent hours with modest shortages.

The Commission should not mandate a 1-in-10 reliability standard because it is unjustified based on any reasonable VOLL (we have estimated it implies a $200,000 VOLL). Dictating such a standard creates a capacity market – although it may be decentralized through bilateral contracts in some proposals.

PROPOSAL NO. 3 – UNCERTAINTY ANCILLARY SERVICE PRODUCT

If ERCOT continues to commit additional resources under some (or all) conditions to account for uncertainty, ERCOT should create a reserve product to reflect this uncertainty. We have recommended other ISOs/RTOs create a 2- to 4-hour reserve product (i.e., a new Ancillary Service) that can be deployed when uncertainty results in tight real-time conditions. The necessity for this product increases as uncertainty associated with fluctuations in intermittent output and load increases.

Key aspects of such a product include:

- It would be accompanied by a modestly-priced reserve demand curve that is also calculated based on VOLL;
- It would be procured in the day-ahead market and co-optimized with energy and the other current Ancillary Services;
- It can be deployed to start up longer lead-time units when ERCOT detects operating conditions are departing from expected conditions; and
- Since this product is less costly than holding excessive amounts of 30-minute reserves, ERCOT could reduce its Non-Spin requirement back to pre-July 2021 levels.

This product would offer substantial market benefits because it would:

- Allow all of ERCOT's prices to more fully reflect the costs of managing uncertainty;
- Set more efficient prices as the system begins to become tight and becomes short of these uncertainty reserves;

- Reduce ERCOT's reliance on out-of-market actions, such as Reliability Unit Commitments (RUC) because such reserves would be procured through the market; and
- Reduce uplift costs associated with ERCOT's out-of-market actions.

REAL-TIME CO-OPTIMIZATION

Potomac continues to recommend that implementation of Real-Time Co-optimization remain a top priority, as it improves both reliability and efficiency:

- Lower overall costs of satisfying the system's energy and AS needs
- Efficient prices during both shortage and non-shortage conditions
- More effective congestion management (reducing congestion costs and regulation service usage)
- Fewer Reliability Unit Commitments and other manual operator actions
- More timely, reliable, and economic scheduling of AS in Real-Time
- Less frequent operating reserve shortages

CONCLUSION

Potomac appreciates the opportunity to share these proposals and looks forward to further participation in the market redesign effort.

Respectfully submitted,

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