**“ERCOT Investment Incentives and Resource Adequacy” prepared by The Brattle Group for the Public Utility Commission of Texas and ERCOT (June 1, 2012)**

[**http://www.ercot.com/content/news/presentations/2012/Brattle%20ERCOT%20Resource%20Adequacy%20Review%20-%202012-06-01.pdf**](http://www.ercot.com/content/news/presentations/2012/Brattle%20ERCOT%20Resource%20Adequacy%20Review%20-%202012-06-01.pdf)

**V. Review of Energy Market Design Elements**

 **A. Wholesale Pricing Mechanisms**

 **4. Locational Scarcity Pricing (Page 84)**

Resource adequacy can be a regional or sub-regional concern, depending on the nature of transmission constraints. Even if the overall RTO has sufficient generation supplies, this does not necessarily mean that all locations will achieve the reliability target because the system may have: (1) load pockets within which there is insufficient local generation or import capability to meet peak demands; or (2) generation pockets with excess supply but insufficient export capability to meet peak demands in other locations.

In markets with resource adequacy requirements, locational reliability concerns are directly defined and addressed, for example, through local capacity requirements within load pockets.167

In energy-only markets, it is more difficult to address locational resource adequacy concerns so directly, particularly in ERCOT, the first nodal energy-only market. Other energy-only markets have relied solely on system-wide prices as in Alberta or on zonal prices as in Australia.168 In a nodal energy-only market, it will be a challenge to achieve an effective scarcity pricing mechanism that is: (1) location-specific enough that it will attract investments to where incremental generation is most needed; and (2) not so focused on a small number of nodes that a more regional or sub-regional resource adequacy need fails to be reflected in the broader price.

The IMM highlighted this challenge in the 2008 State of the Market Report, which cautioned that the move to nodal pricing could focus scarcity pricing into too-small clusters of nodes.169

To date, ERCOT’s scarcity pricing mechanisms have not been developed in a way that explicitly considers the potential for locational resource adequacy concerns as opposed to system-wide resource adequacy concerns. We recommend assessing the need to revise these mechanisms for locational relevance. While a number of approaches could be used to achieve this result, one option would be to revise administrative scarcity pricing mechanisms around new “A/S Regions” that may or may not coincide with ERCOT’s current Load Zones. The mechanisms could be conceptually similar to the Reserve Zone approach implemented by MISO that expresses: (1) system-wide scarcity prices when depleting system-wide reserves; and (2) scarcity prices specific to that Reserve Zone when reserves drop below that location’s requirement.170

Implementing this type of concept in ERCOT might require the RTO to:

***Define A/S Regions —*** We recommend that in its LOLE study or transmission planning processes, ERCOT evaluate whether there are load pockets or generation pockets relevant for resource adequacy. Load pockets would be identified as regions within which LOLE is concentrated due to import constraints; generation pockets would be defined as regions with excess supply that is generally unavailable to the rest of the system during peaking conditions. While this question has not previously been analyzed in ERCOT, it appears that the Houston Load Zone is a candidate for evaluation as a potential load pocket relevant for locational resource adequacy; however, we note that such load or generation pockets would be defined based on transmission topology and would not necessarily coincide with a current Load Zone. For the purposes of our discussion here, we presume that the boundaries of these load and generation pockets would be equally relevant for defining new boundaries in the A/S markets and so we term these locations as “A/S Regions.”171 To the extent that no such A/S Regions are needed now or are expected within the coming years, we would not recommend pursuing any of the other following mechanisms at this time. However, if locational resource adequacy concerns are identified, then we recommend refining scarcity pricing mechanisms in a way that ensures that locational scarcity will be reflected in realized prices in those defined regions.

***Define A/S Penalty Curve by A/S Region —*** All supply resources in SCED, including the virtual resource represented by the PBPC, must be assigned to a specific node. The current PBPC is defined at the reference bus, meaning that it has a distributed “location” across all load nodes. This also means that scarcity pricing outcomes related to the PBPC will be tied to system-wide but not location-specific scarcity conditions. However, locational scarcity may be better reflected if each identified A/S Region had its own A/S Penalty Curve that affected prices only at the group of nodes defined within that region. However, system-wide shortages could still be reflected in scarcity prices driven by the system-wide PBPC.

***Evaluate Each Administrative Scarcity Mechanism for Locational Relevance —*** Several of the scarcity pricing mechanisms developed by ERCOT rely on administratively re-pricing certain types of resources and adding them into SCED, including RMR, RRS, Non-Spin, and RUC resources. Because each of these resources represents a real generation unit, they are all tied to a specific node and may have the effect of increasing prices in that location but not in others, depending on transmission constraints. It is not clear whether or under what circumstances these mechanisms are likely to introduce scarcity pricing signals where they are most needed. We recommend individually evaluating each mechanism for this purpose. For example, if a load pocket exhibits incremental A/S needs or requires an RMR for capacity, then we would recommend that any scarcity impacts all nodes in that A/S Region. Deploying these resources would only impact RTO-wide node prices in the case of an ERCOT-wide shortage.

***Align Load Settlements by A/S Region —*** Customer prices are defined based on Load Zone prices, which could create an economic disconnect for sub-zonal load pockets. This means that potential price-responsive demand within these small regions may go undeveloped due to uneconomically low load prices there; similarly, too much price responsive demand might be incented outside the load pocket where it is not helpful for resolving the transmission constraints. To the extent that such sub-zonal resource adequacy zones exist, we would recommend re-defining Load Zones and settlement according to the boundaries of that A/S Region. This would create the most efficient price for price-responsive loads to respond to for resource adequacy purposes.

***Align Real-Time Mitigation Procedures with A/S Regions —*** Under certain circumstances, ERCOT’s real-time mitigation procedures could prevent locational scarcity prices from materializing. For example, high offer prices in SCED from small fish, or administratively-priced RMR, RRS, Non-Spin, or RUC units could be re-priced down to marginal cost if those resources are behind a “non-competitive” constraint.172 We suspect that in many cases these mitigation procedures would not result in underpricing relative to locational resource adequacy needs because these units may still set locational scarcity prices to the extent that they are behind “competitive” constraints. However, we do recommend that ERCOT examine the extent to which the definitions of competitive and non-competitive constraints could prevent locational scarcity prices from materializing.

More generally, as ERCOT’s scarcity mechanisms are refined or revised, we recommend that they be developed in a way that explicitly considers how well they will perform to reflect both locational and system-wide resource adequacy shortages.