

Public Utility Commission of Texas

Memorandum

TO: Chairman Donna L. Nelson

FROM: Commissioner Kenneth W. Anderson, Jr.

DATE: July 18, 2013

RE: **Open Meeting of July 19, 2013, Agenda Item Nos. 16 & 17**

Project No. 41061 -- *Rulemaking Regarding Demand Response in the ERCOT Market*

Project No. 40000 -- *Commission Proceeding to Ensure Resource Adequacy in Texas*

First, let me thank the Chairman for overseeing a methodical and thorough process for evaluating the various proposals. That process has improved the information available to us and has greatly influenced my thinking on the issue and the proposal that I am laying out in this memorandum.¹ This Commission has had before it in one form or another, an Operating Reserve Demand Curve (ORDC) since the fall of last year, when it was originally proposed by Dr. William Hogan.² For over the last six months we have been reviewing, considering, analyzing and otherwise studying the merits of implementing various iterations of the ORDC, most recently in the form of “interim solution B+”.³ I believe it is now time to make a decision and to help with this process I am going to offer two proposals for consideration.

I. DECISIONS TO BE MADE.

I will not repeat here all of the advantages of the ORDC. They have been set out at great length in the many filings and presentations. Before laying out my recommendations, however,

¹ I also want to express my appreciation to Dr. William H. Hogan, Raymond Plank Professor of Global Energy Policy at the John F. Kennedy School of Government, Harvard University, Cambridge, Massachusetts, for his critical and ongoing help and advice throughout this process. He always made himself available to respond to concerns raised by the parties, not to mention regulators.

² Dr. William W. Hogan, *Electricity Scarcity Pricing through Operating Reserves: An ERCOT Window of Opportunity*, November 1, 2012.

³ The form of the ORDC before us is so named because Dr. Hogan’s original paper assumed that the ERCOT real-time energy market was fully co-optimized, which is not the case. Consequently, the proposed ORDC went through several iterations to reflect the ERCOT settlement systems and processes. “Interim” reflects that further changes and enhancements to the ORDC to gain additional market efficiency can be made if and when ERCOT’s real-time market is fully co-optimized.

it may be helpful to understand the principles that underlie my recommendations. The adopted ORDC should be consistent (or at least not unduly inconsistent with) “First Principles”.⁴ It should not materially and adversely affect resource revenue in the energy market. The compensation should be consistent with a “pay for performance” incentive and not create peculiar or perverse incentives. It is with these strictures that I offer two possible ways to implement the ORDC.

There are three (3) threshold policy decisions that need to be made in order to implement the ORDC. First, what value of lost load (VOLL) should be used in calculating the value of operating reserves (the product obtained by multiplying the VOLL by the loss of load probability (LOLP))? Second, what is the minimum contingency level (or X)—the point at which the LOLP is considered to be 100%, solely for purposes of calculating the value of operating reserves? Third, whether the shape of the curve is the “piecewise linear approximation” used by ERCOT or the continuous curve generated by the cumulative distribution function method recommended by the Independent Market Monitor (IMM) and certain other parties commenting in this project? Finally, in response to concerns raised about the appropriate minimum contingency level, I am offering a mechanism that uses the value of non-market actions (VNMA) as an alternative to setting X at a level above 1375 MW, the details of which are discussed below.

VOLL: After reviewing the Value of Lost Load Literature Review⁵ and other pertinent literature in this area, I believe that \$9,000 is the appropriate VOLL to be used in calculating the value of operating reserves, at least for now. It appears to be on the low end of the VOLL for small commercial customers and also reflects price exposure in ERCOT by June of 2015.⁶ If necessary we can always revisit the value if additional studies indicate that VOLL at \$9,000 is too low.

VALUE OF NON-MARKET ACTIONS: The VNMA would place an additional value on the operating reserves necessary to avoid going into Energy Emergency Alert Level 1 (EEA 1), which occurs when reserves drop below 2300 MW. It is worth noting that when this occurs, ERCOT operators abandon relying on the market to maintain system reliability, and take various out-of-market actions that have a real economic cost. At the workshop I had a discussion with the IMM about the concept of a supplemental calculation that would reflect the VNMA. During the course of the conversation the IMM conceded that there was value, but that the value should

⁴ William W. Hogan, *ERCOT ELECTRICITY SCARCITY PRICING WITH AN OPERATING RESERVE DEMAND CURVE “Interim B+”*, COMMISSION PROCEEDING TO ENSURE RESOURCE ADEQUACY IN TEXAS, PROJECT NO. 40000, June 27, 2013, at 13.

⁵ London Economics International LLC, *Estimating the Value of Lost Load*, COMMISSION PROCEEDING TO ENSURE RESOURCE ADEQUACY IN TEXAS, PROJECT NO. 40000, Item 427, June 17, 2013.

⁶ It also seems nonsensical to have a system wide offer cap, which will be \$9,000 in 2015, and which will create price/risk exposure, that is higher than a notional VOLL.

relate to the costs imposed on the system because of the status.⁷ At least one party, however, argued using EEA1 was not appropriate because:

“I think when you look at the actions that the ISO has available to him to take the incremental steps that he can take once he gets to 2300 – the first step of EEA – they are basically market notifications. He’s not really doing anything material to price formation.”⁸

As a result of the dialog at the workshop, the next day I spent considerable time on the phone with ERCOT staff discussing exactly what actions occur at EEA 1 and the resulting economic consequences, if any. Despite the attempt of some to minimize the tangible effects of EEA 1, it turns out that there are real economic costs that occur in EEA 1; costs that ultimately are uplifted to load serving entities and the retail customers that they serve. In addition to “market notifications” in EEA 1, ERCOT operators stop all exports of power over the DC ties with other power regions and begin importing power, if available. Under current arrangements, that power very likely is priced at the system wide offer cap (SWOC) (because by EEA 1 ERCOT is using Responsive Reserves, the energy of which now is priced at the SWOC). Furthermore, in EEA 1 ERCOT will use its Reliability Unit Commitment (RUC) authority to order all remaining available generation, if any, to come on line. Again, the energy from units that are RUC’d is priced at the SWOC under current ERCOT protocols. Therefore, it seems to me that the SWOC, as then in effect, is a reasonable approximate value for VNMA.

SHAPE OF LOLP CURVE: Whichever option below is used, on balance, I prefer the piecewise linear approximation used by ERCOT. While I am somewhat flexible on this point, I believe that this curve is easier for market participants to model when managing their risk analysis. It is also consistent with my “guiding principle” that any interim solution not reverse resource revenue. If and when the real-time market is co-optimized (or some other external resource adequacy construct is adopted), the shape of the LOLP curve can be adjusted to reflect a more idealized and economically pure construct.

MINIMUM CONTINGENCY (X): Some of the filed comments, and during the last workshop, several parties, including the IMM, expressed concern with any X that was higher than 1375 MW. I appreciate these concerns and under a perfect economic model 1375 MW might well be the appropriate value for X. However, keeping in mind my guiding principle that the ORDC as implemented should not have the effect of reducing materially resource revenue, the interim ORDC should reflect that objective. As a result of the concerns raised, Professor

⁷ Open Meeting Tr. at 77, 80 – 88 (June 27, 2013).

⁸ *Id.* at 131 – 132.

Hogan suggested the concept of VNMA⁹; that there was a value to avoiding the actions (and resulting costs) ERCOT operators must take whenever operating reserves get below certain levels. Working with ERCOT, the concept was developed and is being offered below as an alternative to an X above 1375 MW. If and when the real-time market is co-optimized (or some other external resource adequacy construct is adopted), the ORDC can be adjusted to recognize a more idealized and economically pure construct.

II. ALTERNATIVE PROPOSALS.

OPTION ONE:

- VOLL= **\$9,000**
- X = **1950 - 2000MW** (Option One uses this number as a rough proxy for the VNMA, which I believe exists for the reasons previously discussed)

OPTION TWO (preferred option):

- VOLL= **\$9,000**
- X = **1375 MW**
- Implement a VNMA = **SWOC** then in effect

One final point, whichever alternative is adopted, ERCOT should as soon as reasonably practical, begin publishing the non-binding prices resulting from the selected ORDC. If it can be done by hour it would be best, but at the very least a daily accretion to the average real-time price must be done. It must be done to provide market participants with the information necessary to enable them to adjust their pricing and risk management practices. Furthermore, it will help to inform the forward and secondary markets and thus improve price formation.

Whichever alternative is adopted, if we can reach consensus on the ORDC, it is my desire that ERCOT work to implement it as soon as possible, preferably before the spring of 2014. With that season's erratic weather and planned power plant outages for maintenance, it is during the spring months that the ORDC adds both reliability and economic value. ERCOT has stated in filings that it believes that it can be accomplished in six to eight months.¹⁰ The sooner we

⁹ While I wish that I could take credit for the idea, that would be both foolish and untrue.

¹⁰ ERCOT IMPACT ANALYSIS ESTIMATING COST AND TIMELINE FOR IMPLEMENTATION OF ORDC B+ PROPOSAL at 3 (May 17, 2013).

adopt the concept, the sooner it can be completed, thereby providing increased reliability to retail customers.

It is also important to reiterate, that adopting the ORDC does not preclude any additional actions that may be necessary, including additional resource adequacy actions. There really is no good reason not to move forward expeditiously with implementation.

III. OTHER RELATED ISSUES.

EMERGENCY RESERVE SERVICE (ERS): I will be filing a memorandum at the next open meeting that lays out what I think should be done with ERS. As I have stated in other venues, increasingly I am unhappy with the current form of ERS. If the current pilot regarding a 30-minute service demonstrates value, the whole program should be converted into a day-ahead product. ERS could also be merged with the non-spinning reserve service with appropriate adjustments to recognize load. In addition to their capacity bids, ERS providers would provide an “energy bid” that would reflect the price at and above which they would curtail their consumption. As long as the price was at or above their bid price they would remain curtailed. This mechanism would provide better price formation to the market and provide providers of curtailment services more flexibility as to when and how often they want to be curtailed.

ECONOMIC RESERVE MARGIN STUDY: Yesterday, the ERCOT Board of Directors deferred a decision on ERCOT’s target reserve margin. I agree with their decision because I, too, have questions around many of the inputs into the calculation. In my view, a piece missing from all of this discussion is the question of just what is the “economic” reserve margin? That is to say, at what point does the law of diminishing returns make incremental additions to capacity exceed the value of incremental reliability? In a presentation to the Commission, Brattle has implied that that margin may be between 14% and 15%, but to be fair, they have never been asked to do a formal ERCOT-specific analysis. I believe that such a study should be conducted using VOLL at \$9,000.

NODAL PROTOCOL REVISION REQUEST 544: NPRR 544 is designed to require providers of spinning reserves to submit their energy bids along a linear curve beginning at the online non-spin floor of \$120, and running up to \$3,000. While not perfect or a panacea, I believe that this NPRR should probably be adopted and remain in place until the ORDC is implemented. It certainly should be implemented if, for some reason, the ORDC is not adopted.

I look forward to discussing all of these issues at the open meeting.