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PUC PROJECT NO. 40000

COMMISSION PROCEEDING TO	§	PUBLIC UTILITY COMMISSION
ENSURE RESOURCE ADEQUACY IN	§	
TEXAS	§	OF TEXAS

Comments of Frontier Utilities Regarding The Value of Lost Load In The Operating Reserve Demand Curve

On October, 18, 2013, GDF Suez submitted comments criticizing the use of a "real" (read "actual") representation of the Operating Reserve Demand Curve (ORDC) and suggested replacing it with a piecewise linear approximation. They went on to say that they believed the $9000/MWh Value of Lost Load (VOLL) was too low and recommended a value of $25,000/MWh instead.

Frontier Utilities desires to participate substantively in the public discussion of the ORDC solution, particularly with regards to its fairness, objectivity, and minimal price distortion.

The development of the ORDC by Prof. Hogan depends critically on the VOLL and the Loss of Load Probability (LOLP).[1] Naturally, if the ORDC were established, then setting proper values for these inputs would be of great importance to market participants.

The shape of the ORDC comes from the LOLP. This probability has been demonstrated by the ERCOT staff to be easily implemented in spreadsheet form. We see no justification for a piecewise linear approximation which, by its nature, is not only an approximation, but is greater than or equal to the reference value at all points of the curve.

The choice of VOLL is arguably the most difficult part of the process. A report by London Economics International gives an overview of various methodologies used to estimate VOLL and the range of values obtained using those methodologies.[2] Unfortunately, the results are wildly inconsistent.

While the estimation of VOLL is valuable as an academic pursuit and for certain policy formulation, VOLL does not represent an actual good. The good in question here is Operating Reserves and what we seek to determine using VOLL is its demand curve, the ORDC.

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[1] Hogan, William W., Electricity Scarcity Pricing Through Operating Reserves: An ERCOT Window of Opportunity, 2012.

[2] London Economics International, Estimating the Value of Lost Load, 2013.

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So even though we may have poor estimates for VOLL, we can still apply some "first principles" to the determination of the demand for operating reserves. A key factor in construction of any demand curve is the price of substitutes, and in this case an almost perfect substitute for system reserves exists with clearly established prices, that is owned generation. We know that the demand curve for any good with a perfect substitute cannot exceed the price of the substitute.[3] While an entire power plant can be constructed for under $1,000/MW, even smaller scale generation is quite cost effective compared to the upper values suggested for VOLL. A home or small business can be equipped with an onsite natural gas fired generator at a cost of $250,000/MW.[4] One of these units would have to run for only one hour per year (a very conservative assumption for coastal areas or areas with frequent distribution outages) to provide replacement power for $10,000/MWh over its life.

The literature refers to various determinates of VOLL including frequency, advance warning, duration, and the actual time of day or year of the outage.[5] A key advantage of onsite generation is that it guards against lost load in far more circumstances than system reserves, which protect only against outages due to system capacity constraints. Such events usually occur with at least several hours advanced warning and are extremely rare and relatively short-lived. All of these are characteristics which tend to lessen the VOLL.

There are also mitigating factors in valuing reserve capacity. Even a single customer may not value all of his electrical loads the same, and there are many options for protecting the most valuable loads against loss, such as battery backup systems for critical information systems and emergency lighting. Those who value reliability the most have for the most part already secured reliability on their own, and those who wish to can do so for prices very near the current $9,000/MWh.

For these reasons we recommend adopting $9,000/MWh as the ERCOT standard VOLL for all future implementations of ORDC unless or until credible research provides a more suitable value.

Proponents of the ORDC have gone to a great deal of effort to establish a credible economic justification for its inclusion in the ERCOT market, but that implies its parameters must also be legitimate representations of their model concepts. Without this discipline a parameter such as VOLL simply becomes a political football and the function of the market as a whole would surely suffer. Using extreme parameter values to distort the final price is bad science and undermines the efficacy of the entire system. If the necessary result cannot be obtained through the proper use of the ORDC, that calls to question its appropriateness as a solution.

The ORDC is an attempt to increase the supply of reserves by increasing the price of energy. There is a clear danger of price distortion if the price of energy has to be raised too much to produce the desired increase in capacity. The long term result will be a lower consumption of energy in ERCOT due to artificially high prices and a lower economic output than would otherwise be achieved. This is clearly the opposite of what is intended with the increase in reserve margin.

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[3] Varian, Hal R., *Microeconomic Analysis, 3rd Ed.*, pp. 57-8, 1992.
[4] Based on prices for natural gas fired generators taken from the Home Depot website.
[5] Cramton, Peter and Jeffrey Lien, Value of Lost Load, 2000.

We would also warn of the unintended consequences of a market design with extreme price spikes. The electricity market is already highly volatile for reasons well known. But the ORDC triggers additional prices at the offer cap by design, not simply raising energy prices, but volatility as well. This drastically increases the capital requirements of retail electric providers in ERCOT to support the increased volume and price risk they would be exposed to under such a system, and could undo a decade of progress that competition has achieved in Texas.

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