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PROJECT NO. 54584

RELIABILITY STANDARD FOR THE ERCOT MARKET	**§ §**	**PUBLIC UTILITY COMMISSION OF TEXAS**

TEXAS INDUSTRIAL ENERGY CONSUMERS' REPLY COMMENTS

I. INTRODUCTION

As explained in previous comments, Texas Industrial Energy Consumers (TIEC) members are energy-intensive businesses that depend on a continuous and reliable supply of electricity. Not only do outages result in plant shutdowns and loss of productivity, but many TIEC member facilities are extremely sensitive to system disruptions and can suffer significant damage and financial losses from voltage fluctuations and grid instability. As such, TIEC strongly supports appropriate measures to enhance reliability and appreciates the opportunity to work with the Commission as it conducts a thoughtful and transparent process to formulate an appropriate reliability standard to assist in this process.

While system reliability is TIEC's number one priority, that does not mean that the Commission should establish a reliability standard without reference to how much it would cost customers to achieve. However, comments from ERCOT and generation interests appear to support a procedure that is divorced from a cost-benefit analysis and impervious to an ex-post cost-benefit review.[1] Specifically, ERCOT proposes defining an arbitrary set of bright-line caps on the frequency, duration, and magnitude of outages, then repeatedly running the Strategic Energy & Risk Valuation (SERVM) model with increasing amounts of generation until the model satisfies all of those criteria.[2] The output of that modeling exercise would provide an aggregate recommendation for additional capacity, without detailed information regarding the specific

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[1] *See e.g.*, ERCOT Comments at 2 (March 29, 2023) (outlining a process that would include duration, frequency, and magnitude limitations devoid of a cost-benefit analysis); Vistra Comments at 2-4 (March 29, 2023) (recommending a risk aversion framework that includes minimum requirements); LCRA Comments at 3 (March 29, 2023) (supporting a standard that limits the magnitude, frequency, and duration of any single loss-of-load event, regardless of the cost).

[2] ERCOT Comments at 1-2.

drivers of those recommendations.[3] Because ERCOT's proposed approach will attempt to avoid certain limits on the duration, magnitude, and frequency of outages, it is likely to overstate the impact of extreme events and lead to excessively conservative (and expensive) recommendations. Rather than selecting inflexible policy outcomes and determining how much extra capacity would be needed to reach them (regardless of cost), the Commission should develop a reliability standard that is grounded in economic principles and allows the Commission and the stakeholders to visualize the economic tradeoffs being made to achieve varying levels of reliability. As explained in prior comments, TIEC recommends setting a reliability standard in reference to an economically optimal reserve margin (EORM), which can be derived using an Expected Unserved Energy (EUE) metric in conjunction with the Value of Lost Load (VOLL). As explored below, such a system will help ensure reliability without losing sight of what is fair and cost-effective for consumers.

Additionally, when establishing a reliability standard, the Commission should keep in mind that incentivizing additional generation capacity is not its only, or even its best, tool to promote grid reliability. To address extreme events, seasonality, and deliverability, the Commission should rely on other, more targeted tools, like firm fuel requirements, weatherization standards, expanded ancillary services, and robust transmission buildout. For example, simply increasing payouts to existing generators through a mechanism like the PCM could potentially increase installed thermal capacity, but that would not protect against prolonged extreme cold weather events like Winter Storm Uri, given that thermal generation units have failed to perform in extreme cold weather conditions in the past, both in Texas[4] and other regions.[5] Rather than simply increasing the amount

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[3] *Id.* ("Scenario outputs will be compared for incremental amounts of additional dispatchable resources required to meet the three reliability parameters, overall system costs, and cost to the market. The initial runs will provide an output to inform further discussion. The parameters used in the framework and the results produced will be discussed with the ERCOT Board of Directors, the Commission, and stakeholders.").

[4] *See, e.g.,* ERCOT, *Severe Weather Events One Pager* (February 8, 2011) (available at: https://www.ercot.com/files/docs/2011/02/08/severe_weather_events_one_pager_2_8_11.pdf) (explaining that there were over 7,000 MW of forced outage from dispatchable units); University of Texas Energy Institute, *Events of the February 2021 Texas Electric Grid Blackouts* at (February 25, 2021) (available at: https://www.puc.texas.gov/agency/resources/reports/utaustin_(2021)_eventsfebruary2021texasblackout_(002)final_07_12_21.pdf) (showing over 25,000 MW of thermal forced outages); ERCOT, *Item 7: Review of Winter Storm Elliott* at 9 (available at: https://www.ercot.com/files/docs/2023/02/21/7-Review-of-Winter-Storm-Elliott.pdf) (showing that there were over 4,000 MW of gas fuel and cold weather related outages).

[5] *See e.g.*, Paul Arabje, THE EQUATION, *Storm Elliott Knocked Out Fossil-Fuel Power* (January 24, 2023) (available at: https://blog.ucsusa.org/paul-arbaje/storm-elliott-knocked-out-fossil-fuel-power-weve-been-here-

of thermal generation on the system, it would be more effective and cost efficient for the Commission to address extreme events by setting weatherization requirements, developing firm fuel products, and procuring additional ancillary services. Similarly, to the extent there are deliverability or locational reliability issues on the system, the Commission should manage those issues by using its control over transmission planning to ensure robust transmission buildout.

II. REPLY COMMENTS

A. Consistent with the Legislature's direction, the Commission should establish a reliability standard, not a reserve margin mandate

As a preliminary note, the Commission should ensure that it remains focused on establishing a reliability target that will guide policy decisions rather than a mandated reserve margin that will control them. From deregulation up until a few years ago, ERCOT maintained a reliability standard that allowed the Commission to set a target reserve margin, and that target was used to track whether the market was incentivizing sufficient generation capacity to site in the state. TIEC supports continuing to calculate a reliability standard for purposes of assessing the health of the market, but opposes any movement toward establishing reserve margin mandate. Some market participants' comments conflate establishing a reliability standard with a reliability mandate.[6] However, a reserve margin target or a reliability standard is not the same as a reserve margin mandate, which is a precursor to a capacity market. As Shell explained in its comments, in Senate Bill 3 (S.B. 3) the Texas Legislature directed the Commission to "establish[] requirements to meet [ERCOT's] reliability needs"[7] while working within the existing energy-only market structure by "***procur[ing] ancillary or reliability services*** to ensure appropriate reliability."[8] Notably, the Legislature simultaneously rejected a bill that would have created a

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before) (explaining that during Winter Storm Elliott there were over 30,000 MW of natural gas outages in PJM and over 20,000 MW of natural gas outages in MISO).

[6] STEC Comments at 3 (March 29, 2023); LCRA Comments at 2 ("The ERCOT region has long been an outlier by not targeting a specific reliability standard. The Commission's reliability standard must be sufficiently robust to support continued economic growth in Texas and provide assurance to businesses and end-use consumers that ERCOT is, and will remain, among the most competitive and reliable electric grids in the country.").

[7] Shell Comments at 2 (March 29, 2023) (quoting PURA § 39.159).

[8] PURA § 39.159.

forward capacity market in favor of S.B. 3,[9] so it would not have directed the Commission to establish a reliability standard that was contrary to an energy-only market design. Importantly, part of the essential "bargain" of deregulation was that generators would receive customer-subsidized transmission interconnections in ERCOT in exchange for their shareholders bearing the risk associated with owning and operating generation units in a competitive marketplace. A mandated reserve margin and/or a capacity market would shift those risks to customers by requiring them to pay generators for their capacity, even when they are not actually called on to perform. The Commission should follow this legislative mandate and reject attempts to drastically shift risk and costs to customers by adopting a reserve margin mandate.

B. The Commission should set the reliability standard using a transparent, consumer-focused process that considers both the costs and benefits of additional generation.

i. The Commission should set the reliability standard using an EUE metric in conjunction with the VOLL rather than stacking arbitrary reliability metrics on top of one another.

There is a broad consensus that LOLE is insufficient to set a reliability standard because it only accounts for the frequency of outages, not their duration or magnitude.[10] However, that does not mean that the optimal way to arrive at a reliability standard is to simply set three separate maximum tolerances for the anticipated frequency (LOLE), duration, and magnitude of individual outages, as commenters like ERCOT and Vistra suggest.[11] As discussed in TIEC's initial comments, selecting the threshold for metrics like LOLE necessarily requires the Commission to

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[9] *See* House Bill 4378, "Relating to the supply of power and the financial stability of the competitive wholesale and retail electricity markets."

[10] *See e.g.* NRG Comments at 1 ("LOLE does not distinguish between a day with a single load shed event and a day with multiple load shed events; it does not account for the expected duration (combined number of loss of load hours ["LOLH"]) or magnitude (size [MWhl) of load shed events over a defined period of time. Therefore, NRG recommends a reliability standard that incorporates frequency, duration, and magnitude requirements."); OPUC Comments at 4 ("All three identified metric measures (Magnitude, Frequency, and Duration) are important when considering reliability standards."); CPS Comments at 2-3 ("CPS Energy believes the metrics to measure magnitude, frequency, and duration are appropriate because they evaluate system performance in multiple dimensions and help to gauge the severity of problems that may occur among different scenarios."); LCRA Comments at 3 ("LCRA supports the Commission and ERCOT's consideration of a more robust standard that covers additional dimensions of a loss-of-load event-specifically, one that limits the magnitude of any single loss-of-load event and the frequency of loss-of-load events and the duration of any single loss-of-load event.").

[11] ERCOT Comments at 1-2; Vistra Comments at 4.

make arbitrary policy choices—*e.g.*, that it is unacceptable to have more than one outage (no matter how small/short) every ten years. The same is true of setting bright line thresholds for the maximum duration (no matter how infrequent) or magnitude (no matter how short/infrequent) of single outages. Considering those three inherently arbitrary metrics in conjunction with one another does not change the fact that ***they are all divorced from any rational economic underpinning***, leaving the Commission to simply guess at what maximum thresholds for outage frequency, duration, and magnitude will result in the best outcome for customers. Further, if the Commission "adopt[s] minimum requirements across all three dimensions" of frequency, duration, and magnitude, as Vistra suggests,[12] that would have the effect of setting the Commission's reliability standard at the most conservative result recommended by any of those three metrics—a result that is likely to benefit competitive generators at substantial customer expense.

Rather than stacking inherently arbitrary reliability metrics on top of one another, the Commission should focus its analysis on EUE. As Shell explained in its comments,[13] in addition to measuring the correlation between ERCOT's identified metrics, EUE can independently measure the frequency, duration, and severity of an outage.[14] Every outage will necessarily impact EUE, and if any one of the frequency, duration, or magnitude of projected outages increases, so will EUE.[15] Importantly, Commission should pair an EUE metric with an economic analysis of the VOLL to determine what EUE level is economically optimal for consumers, and use that

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[12] Vistra Comments at 4.

[13] Shell Comments at 4.

[14] Using an EUE metric would also allow the Commission to meaningfully compare ERCOT's reliability performance against other systems. *See* Brattle, *Estimating the Economically Optimal Reserve Margin in ERCOT* at 42 (Jan. 31, 2014) (available at: https://www.brattle.com/wp-content/uploads/2017/10/6098_estimating_the_economically_optimal_reserve_margin_in_ercot_revised.pdf) ("We recommend adopting normalized EUE as a preferred reliability metric for setting the reliability standard because it is a more robust and meaningful measure of reliability that can be compared across systems of many sizes, load shapes, and other uncertainty factors. Such a cross system comparison is not meaningful for either LOLE or LOLH because neither metric considers the MW size of the outage endured nor the size of the system itself.").

[15] Effectively, determining the economically optimal level of EUE creates imputed maximum thresholds for the frequency, duration, and magnitude of projected outages. To illustrate, assume that economically optimal EUE is 100 MWh/year. In that scenario, even in the unlikely event that all of the projected load shed is crammed into a single outage that occurs across a single fifteen-minute interval, the largest tolerable load shed event would be 400 MW.

information to make an informed policy choice on an appropriate reliability standard.[16] This will allow the Commission to make rational, economically grounded decisions when choosing between various policy options to achieve its reliability goals. As explained in previous comments, the Commission could take a more conservative approach and incentivize a greater level of reliability than is economically optimal by transparently performing sensitivities based on different VOLLs. Then, at least, the Commission will have an objective basis to weigh the tradeoffs between additional reliability and cost to consumers. Especially if the reliability standard will be used to support a PCM or any similar capacity market requirement, it is essential that customers are receiving appropriate value for the additional charges and not paying exorbitant cost increases for little to no incremental reliability improvement.

ii. The Commission should not set limits on the maximum duration, magnitude, and frequency parameters when modeling reliability because doing so will skew the results.

In their comments, ERCOT and Vistra both support placing limits on the maximum outage duration, magnitude, and frequency of probabilistic events, without regard to the potential cost impact of such a solution.[17] However, creating a reliability standard based around such arbitrary thresholds will likely result in false alarms about resource adequacy. It appears that ERCOT plans to rerun the modeling software adding additional capacity to completely avoid violating bright-line parameters for duration, magnitude, and frequency, even if those events are extremely unlikely to occur. For example, a simulation based on ERCOT's existing resource mix may show that there is an extremely low probability (i.e. 0.000001%) that 75% of the generation in ERCOT will go out at the same time and cause a 4-hour load shed event. If ERCOT seeks to eliminate any possibility of this event, *ERCOT would have to add up to 75% more capacity to the system*.[18] While hypothetical, this situation illustrates how unreasonable it would be to set a reliability standard by determining how much capacity would be necessary to eliminate ***any*** chance of certain events occurring, no matter how unlikely they are or how much it would cost ratepayers to incentivize

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[16] (Magnitude of Outage in MW) * (Duration of Outage in Hours) * (VOLL in $/MWh) = Economic Cost of Outage

[17] ERCOT Comments at 1-2; Vistra Comments at 4.

[18] Shell Comments at 4.

that capacity to locate in ERCOT. Accordingly, the Commission should not place any hard limits on the model's parameters without considering the cost-benefit of avoiding low-probability events. Instead, the Commission should use the results of the unaltered SERVM to determine the potential EUE and use that information to derive an appropriate reliability standard.

iii. Over-emphasizing unlikely or extreme "tail" events will skew modeling results, so the Commission should instead conduct sensitivity analyses using multiple VOLLs.

Vistra and London Economics both recommend using the "Conditional Value at Risk" (CVaR) framework to measure the risk of "tail events."[19] In short, this approach is the equivalent of using an intricate analysis to put various "thumbs on the scale" to deviate from an objective, risk neutral evaluation of the reliability standard. Moreover, using the CVaR framework would add unnecessary complexity to the analysis that may skew the modeling. Extreme events will already be probabilistically factored into ERCOT's SEVRM modeling. However, as discussed above in relation to ERCOT's proposal to set maximum limits on outage duration, magnitude, and frequency, if certain low-probability tail events are identified and prevented by adding additional generation capacity, it will lead to a risk-averse reliability standard that places no weight on increased costs to consumers. Additionally, selecting the particular events to be evaluated using the CVaR methodology, as well as the amount of risk to assign to them, will necessarily be an arbitrary exercise akin to selecting thresholds for outage duration, magnitude, or frequency.

Instead of relying on CVaR or other arbitrary approaches, the Commission should factor extreme events into its modeling using transparent methods and assumptions that are grounded in economics and easy for market participants to understand and evaluate. Specifically, the Commission should use EUE in conjunction with the VOLL to conduct transparent sensitivity analyses in establishing the reliability target. First, the Commission would need to establish an economically optimal reserve margin using the actual, probabilistic VOLL in conjunction with the EUE determined by SEVRM. Then, the Commission could run sensitivities based on higher assumed VOLLs. As explained in initial comments, this would yield a more conservative

[19] London Economics Comments at 11-13 (March 29, 2023); Vistra Comments at 1-4.

reliability standard that is verifiable by market participants and grounded in economic principles. By using this method to set the reliability standard and target reserve margin, the Commission would have a "cushion" reserve margin to ensure reliability across extreme events. Additionally, performing sensitivities with various VOLLs will help the Commission keep the costs to consumers central to the analysis. For example, if it is economically optimal to have an EUE of 60 MWh/year, but a marginally higher VOLL would result in an optimal EUE of only 20 MWh/year, then the Commission could determine for policy reasons that such a marginal increase is worth the increase in reliability. Conversely, an analysis could show that to increase the EUE from 60 MWh/year to 5 MWh/year would only be possible if the VOLL increased by 100x. In this scenario, the marginal decrease in the EUE may not be worth the added cost to consumers. Such an approach ensures the Commission does not set overly conservative (and overly expensive) reserve targets.

C. The reliability standard should be updated every three years to keep the standard current, while providing market stability.

TIEC cautions the Commission against updating the reliability standard calculation too frequently. Some commenters advocate for a yearly or seasonal update of the reliability standard,[20] but updating the reliability standard too often may negatively impact reliability because it could interfere with regulatory certainty and undermine potential investment decisions, both by customers and generators. As Cities/TCAP explained, it would be difficult to achieve market and regulatory certainty if the Commission routinely updated the calculation for the requirements to meet the reliability standard.[21] Further, while the changes to the reliability standard may be minor year over year, it could result in a large amount of money shifting between generators and consumers simply due to incremental modeling disparities. As such, TIEC recommends the Commission only update the standard when there have been significant changes to the modeling inputs, such as shifts in generation mix or variations in load forecast. This would result in updating

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[20] OPUC Comments at 9 (March 29, 2023); TAEBA Comments at 4-5 (March 29, 2023); STEC Comments at 6, and ERCOT Comments at 5-6.

[21] Steering Committee of Cities Served by Oncor and Texas Coalition for Affordable Power Comments (Cities/TCPA) at 4 (March 29, 2023).

the standard roughly once every three years to strike the appropriate balance between keeping the standard fresh and providing the market with a certain level of stability.

D. The Commission should rely on tools other than the reliability standard to address operational and transmission issues.

A reliability standard is intended to be a measure of the market's health that allows the Commission to set a target reserve margin that will guide policy decisions related to incentivizing additional generation capacity to locate in ERCOT. While such incentives may result in more resources being committed and available in real-time, they are at best an inefficient tool for solving the most pressing issues facing ERCOT. Importantly, generation availability and fuel-supply are ***operational issues***, and deliverability is a ***transmission issue***. Rather than attempting to resolve these challenges by tweaking a reliability standard to promote more and more installed capacity, the Commission should rely on more targeted operational tools, such as weatherization requirements, the creation or expansion of ancillary services, and transmission planning to address these issues in a more direct and cost-effective manner.

i. A comprehensive reliability standard that protects against intervals of high net peak load will ensure resource adequacy across all seasons.

TIEC disagrees with NRG's proposal to set different reliability standards during the winter and summer seasons.[22] While NRG is correct that winter and summer present different operating challenges, a comprehensive reliability standard will ensure reliability throughout the year, regardless of what season it is when the tightest days occur. Based on recent experience, ERCOT's reliability risk that is related to capacity is not driven by seasonality, but instead centers on intervals with high net peak load, meaning a large amount of demand in excess of intermittent generation output. As explained in TIEC's initial comments, if a reliability standard proves sufficient to satisfy the grid's needs during the highest net peak load interval, that will necessarily ensure there are adequate resources during other intervals. Ensuring that those resources are available and ready to operate is an operational matter that is independent of whether there is sufficient installed capacity. In other words, navigating seasonal challenges may not require installing additional

[22] NRG Comments at 4.

generation, but simply requiring existing generation to operate more effectively using targeted tools such as weatherization requirements or ancillary services to navigate operational or unit commitment issues.

ii. The Commission should address locational or deliverability issues through the transmission planning process.

TIEC agrees with ERCOT's comments that the Commission does not need to include a locational or deliverability requirement in the reliability standard because the Commission can address locational considerations in transmission planning.[23] Other commenters suggest different locational requirements under the same reliability standard, such as regional demand curves or implementing regional constraints.[24] However, as TIEC explained in its comments, locational reliability requirements or different demand curves would necessarily balkanize the ERCOT grid by forcing customers in resource constrained areas to pay more to incentivize generation. Accordingly, those customers would no longer share equally in the benefits of funding a unified transmission system. Further, it's unlikely that increased payments would result in additional capacity in load pockets because the incumbent generators would be disincentivized from building if doing so would reduce prices, and generators may not be able to do so at all if the ability to get the necessary permits is restricted. Rather than including locational requirements in the reliability standard, the Commission should utilize its existing tools through transmission planning to ensure that ERCOT's regulated utilities continue to promptly build additional transmission as it becomes justified based on the reliability and economic thresholds described in PURA Chapter 37.[25] If that proves inadequate, the Commission may exercise its authority to directly order new, cost-effective transmission buildout.[26]

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[23] ERCOT Comments at 3-5.

[24] London Economic Comments at 5 (suggesting the market mechanism have different locational potentially with induvial demand curves for each transmission zone); TAEBA Comments at 3 (recommending a locational requirement); Constellation comments (recommends implementing a regional constraint or demand curve to reflect an elevated need for reserves in a subregion).

[25] *See* PURA § 37.056.

[26] *See* PURA § 39.203(e); *see also Project for Commission Ordered Transmission Facilities*, Project No. 52682, Order (Oct. 14, 2021) (exercising authority to order transmission buildout under PURA § 39.203).

III. CONCLUSION

TIEC appreciates the opportunity to provide these reply comments and looks forward to further discussion on developing a reliability standard in ERCOT.

Respectfully submitted,

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ATTORNEYS FOR TEXAS INDUSTRIAL ENERGY CONSUMERS

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- S.B. 3 directs the Commission to establish a reliability standard, not a mandate. The Texas Legislature rejected a bill that would have created a capacity market and instead passed S.B. 3. As such, the Legislature would not have directed the Commission to establish a reliability mandate, which is contrary to ERCOT's energy-only market design.

- The Commission should not set a reliability standard by establishing maximum thresholds for the frequency, duration, and/or magnitude of outages. The level at which those thresholds is set is necessarily arbitrary and divorced from the costs that ratepayers would incur to achieve them. Instead, the Commission should develop a reliability standard that is grounded in economic principles and will illuminate the economic tradeoffs being made to achieve varying levels of reliability. Specifically, TIEC recommends setting a reliability standard based on the economically optimal reserve margin (EORM), which can be derived using an EUE metric in conjunction with the Value of Lost Load (VOLL).

- ERCOT has proposed to model the market by adding more capacity into the model until it reaches certain predetermined thresholds for the duration, magnitude, and frequency of anticipated outages. However, completely eliminating the possibility of certain events will likely overstate the risk of extreme scenarios and lead to excessively conservative and expensive recommendations. Rather than stacking inherently arbitrary reliability metrics on top of one another, the Commission should focus its analysis on EUE, which will still allow the Commission to consider the duration, frequency, and magnitude of outages.

- The "Conditional Value at Risk" (CVaR) framework is the equivalent of putting a thumb on the scale to deviate from an objective, risk neutral evaluation of the reliability standard and add additional generation to solve for certain low-probability "tail events." Like selecting preordained thresholds for outage frequency, magnitude, and/or duration, selecting the particular events to be evaluated using the CVaR methodology, as well as the amount of risk to assign to them, will necessarily be an arbitrary exercise. Additionally, use of CVaR will lead to a risk-averse reliability standard that places no weight on increased costs to consumers.

- Updating the reliability standard too frequently may negatively impact reliability by interfering with regulatory certainty for both customers and generators.

- Incentivizing additional generation capacity is not the Commission's only tool to promote grid reliability. To address extreme events, seasonality, and deliverability, the Commission should rely on other, more targeted tools, like firm fuel requirements, weatherization standards, expanded ancillary services, and robust transmission buildout.