



## Filing Receipt

**Received - 2021-08-04 11:42:54 AM**  
**Control Number - 51840**  
**ItemNumber - 62**

**PROJECT NO. 51840**

**RULEMAKING TO ESTABLISH                      §            PUBLIC UTILITY COMMISSION**  
**ELECTRIC WEATHERIZATION                      §                                      OF TEXAS**  
**STANDARDS**

**COMMENTS OF ALISON SILVERSTEIN**  
**ALISON SILVERSTEIN CONSULTING**

COMES NOW Alison Silverstein and offers these late-filed Comments on the Staff Weatherization Rule Strawman filed in this proceeding on July 19, 2021.

**Executive Summary**

These comments address the following points:

- The Staff Draft proposes development of a weather study that informs a weather reliability service standard, but it needs to offer specific guidance on how the weather parameters identified should be translated into weatherization requirements.
- The Draft addresses asset weatherization but does not address fuel supply readiness.
- The Staff Draft does not specify whether weather studies should be based upon historic or projected weather and extreme weather conditions. Given the rate of change in weather due to climate change, climate-informed weather projections and scenarios (specifically from the CMIP5 model at this time) should be used for the weather studies because these projections are more likely to reflect future weather threats.
- Tail event probabilities for extreme weather conditions and events are difficult to estimate and easy to game. The weather study might better use professionally constructed scenarios rather than tail-end probabilities.
- The Texas State Climatologist should certify each ERCOT weather study as acceptable before the study is used as the basis for a weather reliability service standard.
- The rule needs more clarity with respect to the timing of weather study updates and the translation of those updates into reliability standards.
- The rule needs more clarity with respect to compliance timing requirements and how often an asset owner must update its weatherization investments and practices.
- ERCOT should monitor and report on whether assets that have been weatherized to a particular standard actually perform to the weather level expected, and also whether weatherization changes the output of summer and winter production enough to merit adjusting future seasonal fleet performance expectations.

## Comments

### No guidance for standard preparation

The Staff Draft proposes that ERCOT file a weather study with probabilities of future weather conditions to be used as the basis for asset owner weather preparation to perform reliably under future weather conditions. However, the Draft does not indicate how the weather study should be translated into a “weather reliability service standard” nor who (Commission, ERCOT or asset owners) should be responsible for creating the various levels (basic, enhanced, black start) of that standard.

It would be helpful if the Commission’s next draft offers guidance on how a weather forecast should turn into transmission or generation weatherization requirements. Such guidance should reflect industry best practices and expert guidance such as the FERC-NERC 2011 outage report weatherization findings and the Quanta Technology report prepared for this Commission after the 2011 winter outages. While the rule should not specify every detail of weatherization preparations, it should identify minimum performance requirements and elements for each readiness level (at minimum to give ERCOT some basis for conducting future inspections) and should not leave excessive discretion to asset owners.<sup>1</sup>

The Staff Draft addresses power plant and transmission weatherization but does not address the issue of fuel supply readiness, which both the 2011 and 2021 winter outage events revealed as generators’ Achilles’ heel. No amount of winter weatherization can cure a lack of fuel, so the Commission should determine how it will address that issue and point to that resolution in this rule.

### Weather study data and model sources

Staff asked for sources of statistically reliable weather information such as ASHRAE and NOAA. ASHRAE climate data and standards are based on 20 to 30 years of historic weather conditions,<sup>2</sup> so that data source may not protect ERCOT power plants and the Texans who depend on them against increasingly adverse extreme weather conditions.

The Draft rule does not indicate whether Staff believes that the weather study and weatherization requirements should be based on historic weather conditions and events or on future events that reflect the effects of climate change upon the likelihood and severity of both extreme weather events and “normal” weather conditions. Note that the sequence of NOAA’s

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<sup>1</sup> Texas power plants don’t have a good track record and credibility as to their ability to identify and implement appropriate weatherization methods for particular weather design requirements. Note that the University of Texas Texas Freeze study, prepared for the Commission, indicates that most of the generators that failed in the February winter outages failed at temperatures well above their design minimum temperature rating (not recognizing ice, wind and other adverse conditions – see pp 35-36) – in other words, it seems unlikely that actual plant performance under extreme weather conditions will match or exceed paper-based design and compliance expectations or that we should count on such performance without validation.

<sup>2</sup> See, e.g., <https://www.aiche.org/sites/default/files/community/199496/aiche-community-site-event/231811/ashraeclimaticdataactivities.pdf>.

U.S. Climate Normals, calculated and released every ten years, shows that the country has warmed by 1.7 degrees Fahrenheit since the early 20<sup>th</sup> century, with much of the nation warming by 2-4 degrees F.<sup>3</sup> NOAA and the daily news document that more frequent and more harmful extreme weather events such as heat domes and hurricanes are occurring each year,<sup>4</sup> and that Texas experiences more of these events than any other state.<sup>5</sup> Thus, if the intent of the weatherization study and weather readiness standard is to ensure that Texas power assets perform reliably under adverse weather conditions, then basing the weather parameters on historical events is unlikely to ensure such performance.

The Staff Draft seeks a weather study that includes statistical probabilities for extreme weather scenarios that include, at a minimum, high and low temperatures, wind, humidity, precipitation and duration of the adverse weather events. The Draft overlooks sea level rise, storm surge, drought and wildfires, which could affect numerous Texas power plants and transmission lines as well as communities and their loads.

Most climate modelers do not predict particular weather conditions or events, but rather develop scenarios based upon differing levels of carbon in the atmosphere (Representative Concentration Pathway - RCP); current emissions levels are trending toward the high RCP8.5 pathway of carbon concentration in the year 2100.<sup>6</sup> Climate models cannot predict routine wind levels but can project the number and magnitudes of hurricanes, sea-level rise, storm surge and inundation, and heat/cold events. These extreme weather events are critical for power plant weatherization as well as overall power system resilience.

The most useful and credible source of weather projections are the CMIP5 models, developed by the Intergovernmental Panel on Climate Change (IPCC) and World Climate Research Programme for use in the IPCC's Fifth Assessment Report.<sup>7</sup> The next set of climate models, CMIP6, is currently being processed and should replace CMIP5 when available. The most appropriate and mischief-free way to get CMIP5 projections prepared for an ERCOT weather study would be for ERCOT or the Commission to hire climatologists at Texas Tech Climate Science Center (Dr. Katherine Hayhoe's group) or comparable experts at Texas A&M College of Geosciences to run the model, tailored for the ERCOT weather zones, to develop a common, consistent set of geographically down-scaled forecasts for this purpose.

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<sup>3</sup> See <https://www.wmcactionnews5.com/2021/05/21/breakdown-why-noaa-has-released-new-climate-normals/> and <https://www.ncdc.noaa.gov/news/defining-climate-normals-new-ways>.

<sup>4</sup> See <https://www.ncdc.noaa.gov/billions/time-series>.

<sup>5</sup> See <https://www.ncdc.noaa.gov/billions/mapping> and <https://www.ncdc.noaa.gov/billions/events/TX/1980-2021>.

<sup>6</sup> The convention for RCP scenarios comes from the Fifth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC) in 2014; see, for instance, "[What are the RCPs?](#)" and "[Primer to Climate Scenarios: Mitigation](#)".

<sup>7</sup> [http://www.ipcc-data.org/sim/gcm\\_monthly/AR5/](http://www.ipcc-data.org/sim/gcm_monthly/AR5/). The CMIP6 model and climate data will not be ready for public access until after release of the 2021 IPCC Sixth Assessment Report. See <https://www.carbonbrief.org/cmip6-the-next-generation-of-climate-models-explained>.

### Specific weather condition probabilities are unavailable and not credible

The Draft calls for the weather study to indicate the 95<sup>th</sup>, 98<sup>th</sup> and 99<sup>th</sup> percentile probabilities of particular extreme weather conditions or scenarios occurring five years out. Weather science is not good at assigning probabilities for future weather events; even forecasts for conditions tomorrow only assign decile probabilities at best. Climatology forecasts are even broader and less certain, assigning many degree ranges and wide regional outlooks rather than intra-state regions with deep specificity as to humidity, temperatures, precipitation types, etc. Therefore, any weather studies that assert probabilities such as 95% or 99% for future long tail weather conditions are based on questionable forecasting sources at best and are susceptible to being gamed for the proposer's advantage. In light of the potential liability penalties of \$1 million per day per violation and the costs to Texans' health, safety, and economy from grid failure, such arbitrary and unreliable standards are not appropriate.

Absent credible probabilities for future extreme weather conditions, the Commission could achieve the goal of tying levels of weatherization readiness to rising adverse weather threat levels by developing scenarios of increasing weather severity for each of the Basic, Enhanced and Black Start Service levels. The Commission and ERCOT would work with climate modelers to specify alternative future weather scenarios associated with reasonable RCPs and associate specific levels of extreme weather events to each scenario. For instance, set the Basic Weather Study parameters to include actual historic weather events such as a multi-year 2011 drought, Winter Storm Uri, 3 hurricanes and a 7-day Arizona-type heat dome over all of ERCOT for RCP8.5 in 2026. Then use higher RCP levels and/or more adverse weather events and parameters in lieu of the 98<sup>th</sup> and 99<sup>th</sup> percentiles proposed. Since the number and severity of extreme weather events and the speed of atmospheric warming attributed to climate change have accelerated in recent years, these Extreme and Black Start conditions could be identified by pulling forward CMIP5 forecasts in time – e.g., use the CMIP5 2031 RCP8.5 forecast for the 2026 Extreme scenario and the CMIP5 2035 RCP8.5 forecast for the 2026 Black Start scenario.

The Texas State Climatologist should review and certify the acceptability of each formal weather study update.

### Timing for weather study updates

The Staff Draft requires preparation of an updated weather study every 5 years, and an update in between if real life delivers “changes to the weather that materially affect the ability of generation entities and transmission service providers to meet the weather reliability standards.” However, the Staff Draft does not offer any criteria for what constitutes such a change -- for instance, if a study had been filed and accepted in 2020, would Winter Storm Uri justify a study update? It would be helpful to specify relevant triggering event or condition criteria that would justify a weather study update, such as a heat event of x degrees lasting longer than y days or a winter storm colder and longer than Uri. Additionally, the rule should authorize the State Climatologist to notify the Commission if he or she believes that changes in actual weather conditions or forecast findings and capabilities justify an update to the weather study and the weatherization standard, and explain why.

The Staff Draft does not explicitly state whether an update to the accepted weather study – whether every 5 years or within the 5-year update cycle -- should trigger an update to the weatherization standards and requirements.

The Staff Draft does not address whether a revised weather study accepted in mid-cycle would trigger a change in generator and transmission weatherization requirements or whether it would restart the count for the 5-year weather study update cycle.

#### Asset owner compliance requirements

The Staff Draft specifies deadlines for generation and transmission asset owners to comply with the initial rule. It may be more appropriate to identify compliance deadlines after the initial weather study is accepted and the weatherization requirements have been identified – if the weatherization requirements are extensive it may not be feasible for asset owners to comply on such a short timeline.

The Staff Draft does not indicate whether asset owners will need to update and redo their asset weatherization every time the weather study and weatherization rule is updated. If weatherization investment requirements prove to be extensive and costly, updating those requirements even every 5 years could increase uncertainty about cost recovery, likely raise energy costs, and dissuade new capital investment in Texas. It would be appropriate to reduce such uncertainty by at least giving a plant or transmission owner complying with the rule a ten-year period before it is required to comply with the next generation or iteration of the weatherization standard; they still have the option of voluntarily upgrading weatherization during that period.

Some power plants (such as older wind turbines) may not be retrofit-capable for future extreme winter conditions. It may be appropriate to apply different weatherization standards or performance requirements and compensation plans to plants that cannot be retrofit.

#### Weatherization requirements, inspections and potential conflicts

Texas power plants and transmission lines need to perform well under both extreme cold weather and extreme hot weather or drought conditions and events. As NERC and the PUCT have documented, thermal plant weatherization requirements for severe winter conditions are different from those appropriate for high summer heat; specifically, physical preparations for winter protection can directly conflict with and compromise performance in summer heat. This issue is not reflected in the Staff Draft analysis and inspection requirements, which appear to view weatherization as permanent physical modifications that can be verified (whereas many winterization methods, such as pipe-wrapping and windscreens, are temporary installations).

ERCOT should be directed to monitor and assess whether winterization or summer preparations conflict or reduce plant performance and output under routine or extreme weather conditions. ERCOT should also monitor and report whether generators and transmission lines that are intended to perform under specific extreme weather parameters and events do in fact perform as intended when those events occur. Both of these analyses should be reported to the

Commission and public at regular intervals. ERCOT should use the findings to adjust seasonal capacity expectations accordingly, whether for individual assets or a full fleet of plants.

#### ERCOT inspection reports

This provision and the transmission inspection provision (p. 11 line 8 (1)(2)) direct ERCOT to inspect generation and transmission facilities to verify that they have conducted weatherization as required. These require ERCOT to give the inspection report to the asset owner but don't specify whether the reports will go to the PUCT or whether they are publicly accessible documents. These sections also do not specify whether the site should be reinspected if it fails the initial inspection for its reliability target level, or whether the facility can revise (lower) its reliability target level rather than reworking weatherization if it fails to comply with a higher readiness level.

#### Weather reliability standards for a transmission service provider

Since we all depend on the reliability and security of the entire ERCOT and Texas transmission networks to keep the entire grid working, it seems risky to allow each Texas transmission owner to develop and implement its own set of design specifications and weatherization modifications for its own facilities. It may be more appropriate for ERCOT or the Commission to hire a technical engineering firm with extensive transmission asset and extreme weather design experience to identify and specify technically sound weatherization best practices and requirements that can be applied to all Texas transmission assets (with reasonable modifications for weather zones). This would reduce potential variability and lack of clarity with respect to later compliance and inspection efforts and make weatherization violations and failures more obvious and supportable.

#### **Conclusion**

I appreciate the opportunity to provide these Comments and look forward to working with the Commission and other interested parties on these issues.

Respectfully submitted,



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