



**2023 Winter Weather
Readiness Workshop**

for

Transmission Service Providers

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Antitrust Admonition

ANTITRUST ADMONITION

ERCOT strictly prohibits market participants and their employees who are participating in ERCOT activities from using their participation in ERCOT activities as a forum for engaging in practices or communications that violate the antitrust laws. The ERCOT Board has approved guidelines for members of ERCOT Committees, subcommittees and working Groups to be reviewed and followed by each market participant attending ERCOT meetings. If you have not received a copy of these Guidelines, please review the document at [https://www.ercot.com/files/docs/2022/07/14/Antitrust Admonition and Disclaimer June 2016 update .pdf](https://www.ercot.com/files/docs/2022/07/14/Antitrust_Admonition_and_Disclaimer_June_2016_update_.pdf)

Please remember your ongoing obligation to comply with all applicable laws, including the antitrust laws.

Disclaimer

- Slides throughout the ERCOT's presentations shared today may contain paraphrased summaries of some of the rule's requirements. In case of a conflict between the information in this presentation and the rule, the rule prevails.

Contents

- Overview of Summer 2023 - the first summer of ERCOT weatherization inspections under the PUC Weather Emergency Preparedness rule
- Review of new winter requirements “Beginning in 2023” - for additional detail please see the slide deck “2023 Initial Winter Weatherization Workshop 2023-07-28” available at <https://www.ercot.com/gridinfo/generation/winterready>

How can cold wind impact critical components?

- It increases the rate at which heat is removed from equipment
- A component that tolerates a certain cold temperature in still air or in a low wind condition may malfunction at that same temperature when exposed to higher wind speeds
 - Cabinet heaters add heat to control cabinets at rates intended to protect against specific conditions
 - Cold temperatures combined with wind can create conditions that remove heat more quickly than heaters can add heat, ultimately resulting in the potential for control equipment failures

Summer 2023 Overview

- 2023 was the second hottest summer on record behind 2011 with mean temps of 84.5 and 84.6 respectively
- September 2023 was the hottest September on record
- 550 weatherization inspections were completed
- 16 total cure periods assigned, all remedied within 45 days

Cure Periods were assigned for 5 types of Compliance Deficiencies

- Failure to review staffing plans
- Failure to train personnel
- Failure to create a hot weather critical components (HWCC) list
- Failure to maintain HWCCs
- Failure to monitor HWCCs

	Generation Resource Inspections	Transmission Facility Inspections
June	58	44
July	56	98
August	52	99
September	<u>42</u>	<u>101</u>
TOTAL	208	342

Beginning in 2023, . . .

- Two provisions of the Weather Emergency Preparedness rule become effective 12/1/23:
 - 16 TAC § 25.55(f)(1)(B), Implement additional weather emergency preparation measures that could reasonably be expected to ensure sustained operation at the 95th percentile minimum average 72-hour wind chill temperature reported in ERCOT’s historical weather study for the weather zone in which the TSP facility is located.
 - 16 TAC § 25.55(f)(1)(E), Create a list of all cold weather critical components, review the list at least annually prior to the beginning of the winter season, and update the list as necessary.

ERCOT issued an interpretation letter on July 13, 2023 and it was accepted at the PUC open meeting on July 20, 2023.

PUC staff issued a memo on the same day as the meeting memorializing items from the discussion, including the ERCOT letter, found at:

<https://interchange.puc.texas.gov/search/documents/?controlNumber=54444&itemNumber=44>



Summary of 20 July 2023 PUC Memo Directives

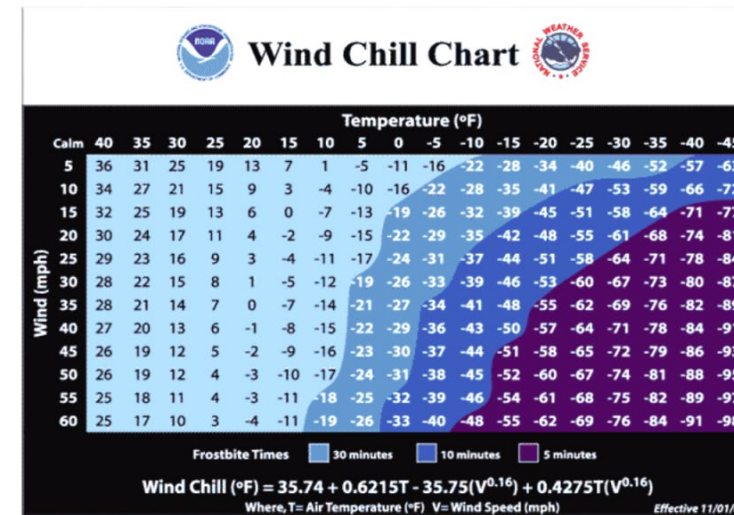
- Commissioners directed Commission Staff to file a memorandum summarizing a decision related to ERCOT's proposed plan to implement the wind chill value weather preparation standard.
- Commissioners unanimously supported concepts and implementation plan in ERCOT's 7/13/23 memorandum and directed ERCOT to implement that plan beginning 12/1/23.
- Commissioners directed ERCOT to:

- (1) Require each generation entity and transmission service provider to file with its declaration of winter weather preparedness the ambient temperature and wind speed design values for each resource or facility under that entity's control;²
- (2) Assess, in part, a resource's or facility's winter weather preparedness on the 95th percentile, minimum average 72-hour wind chill values included in ERCOT's 2021 weather study as Table 72;
- (3) Inspect documents verifying the design criteria and the entity's efforts to prepare its resource or facility to that design criteria, as needed; and
- (4) Evaluate actual temperature and wind speed experienced at a resource or facility that suffers an outage or deration during winter weather conditions, as described by the rule.

² If a generation entity or transmission service provider does not have access to original or current design criteria for ambient temperature or wind speed, the entity must devise those values based on the entity's experience operating the resource or facility.

Adequacy of Preparation Measures

Weather Zone	95th Percentile Minimum Average 72-hour Wind Chill
North	-5.0°
North Central	-0.5°
West	0.3°
Far West	1.3°
East	4.4°
Coast	18.1°
South Central	8.4°
Southern	16.3°
Valley	20.0°
Panhandle	-17.6°



Market participants must provide the temperatures and wind speed design values for the current *thermal* (not *structural*) design of existing generation resources and transmission facilities (“facilities”).

Associated Wind Chill temperature can be calculated using the NOAA/NWS Wind Chill Chart equation:

$$Wind\ Chill\ (°F) = 35.74 + 0.6215T - 35.75(V^{0.16}) + 0.4275T(V^{0.16})$$

where T is temperature (°F) and V is wind speed (mph) used in the thermal design.

This calculated wind chill can be compared to the chart values shown above.

Adequacy of Preparation Measures

- Per NOAA, The wind chill Formula only works for temperatures at or below 50°F and wind speeds above 3 mph.
 - ERCOT recommends to document temperatures at or below 50°F and wind speed value at or above 3 mph in the winter declaration.
 - When the wind speed is less than 3 mph, the value of $V^{0.16}$ becomes very small and the formula becomes unreliable. As a result, the calculated wind chill value may not be accurate or meaningful.
 - Without wind, there is no additional heat loss beyond the normal radiative and convective heat loss at that temperature. Therefore, the wind chill at 0 mph is essentially the same as the air temperature itself.

The screenshot shows the NOAA website's Wind Chill Calculator. The page includes a search bar, navigation links (HOME, FORECAST, PAST W), and a 'Local forecast by' section. The main content area features a 'Wind Chill Calculator' section with a warning message: 'The wind chill calculator only works for temperatures at or below 50 ° F and wind speeds above 3 mph.' The calculator form includes fields for temperature (15) and wind speed (15), with options for Fahrenheit/Celsius and mph/knots/m/s/k/h. A 'Convert' button is visible at the bottom of the form.

https://www.weather.gov/epz/wxcalc_windchill

Appendix A Revisions

Two New Columns have been added

NOTE: The only authorized modification to this document is adding new rows. Other modifications will result in ERCOT rejecting the document and requiring you to resubmit it.

Instructions:

- Every row requires a response.
- Existing rows cannot be deleted.
- Rows can be added by right-clicking on the row number and selecting "Insert".

Appendix A: Winter - Transmission Service Provider Declaration of Weatherization Preparedness							
Transmission Service Provider: <TSP>							
Transmission Substations/Switchyards covered by this declaration	Substation/Switchyard Description	If a Transmission Substation or Switchyard is not covered by this declaration, please indicate the reason below and explain in the Comments column.	Design Basis Cold Temperature (°F)	Design Basis Wind Speed (mph)	Minimum Experienced Ambient Temperature (°F)	Activities to Complete the requirements of 16 TAC §25.55(f)(1)	Comments

Added new columns for Design Basis Cold Temperature (°F) and Design Basis Wind Speed (mph) - use thermal design basis, not structural design basis for wind