



**Generator Winter  
Weatherization Workshop**  
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# PUCT Regulatory Requirements for Generator Preparedness

- §25.53. Electric Service Emergency Operations Plans.
  - (c)(1)(H) A plan for the inventory of pre-arranged supplies for emergencies.
  - (c)(1)(I) A plan that addresses staffing during severe weather events.
  - (c)(2)(A) A plan that addresses severely cold and severely hot weather.
  - (c)(2)(B) A plan that addresses any known critical failure points, including any effects of weather design limits.
  - (c)(2)(G) Checklists for generating facility personnel to address emergency events.
  - (c)(2)(H) A summary of alternate fuel and storage capacity.
  - (c)(2)(I) A plan for alternative fuel testing if the facility has the ability to utilize alternative fuels.
  - (c)(2)(d) A Market entity shall conduct or participate in one or more drills annually to test its emergency procedures if its emergency procedures have not been implemented in response to an actual event within the last 12 months.

# Plant spot checks winter season 2019/2020 results

- 80 units spot checked
  - ✓ The purpose of spot checks is to verify plant personnel are following their weatherization plan.
  - ✓ As necessary, plant personnel are left with a recommendation(s) based on PUCT requirements, lessons learned or best practices observed.
  - ✓ Company senior management is emailed results.
- Fuel types spot checked
  - 71 gas fired units (conventional and combined cycle).
  - 3 coal fired units.
  - 6 gas fired black start contracted units.
- 23 units agreed to improve preparations and/or records management and will be scheduled early in 2020 to verify improvements.
- 57 units had no observed deficiencies in their plan or records management.

## Four coldest days in the past nine years

	EEA3 – 4000MW firm load shed	EEA2	Normal Operations	Normal Operations
	<b>2/2/2011</b>	<b>1/6/2014</b>	<b>1/7/2017</b>	<b>1/17/2018</b>
<b>Dallas</b>	13°/20MPH	15°/9MPH	14°/6MPH	13°/5MPH
<b>Houston</b>	21°/16MPH	27°/16 MPH	21°/11 MPH	19°/13 MPH
<b>San Antonio</b>	19°/25MPH	27°/15 MPH	20°/6 MPH	23°/10 MPH
<b>Austin</b>	18°/26 MPH	20°/13 MPH	19°/10 MPH	18°/10 MPH
<b>Brownsville</b>	32°/26 MPH	37°/17 MPH	30°/27 MPH	30°/14 MPH
<b>Abilene</b>	7°/16 MPH	11°/5 MPH	9°/3 MPH	8°/5 MPH
<b>Midland</b>	6°/16 MPH	14°/12 MPH	10°/4 MPH	28°/7 MPH

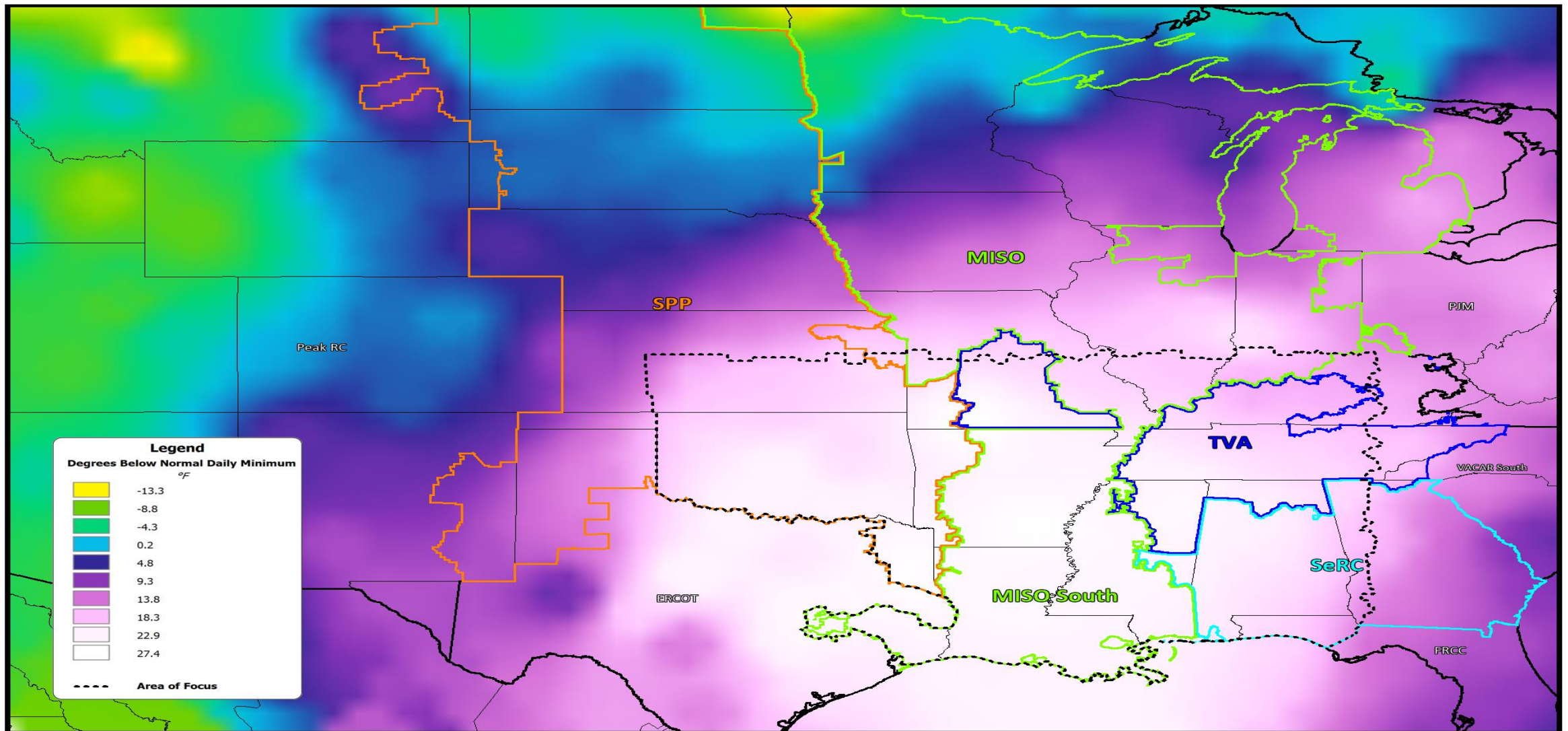
Source: Chris Coleman, ERCOT

## Hours at and below freezing (32 DegF or less) during four coldest days in ERCOT in the past nine years.

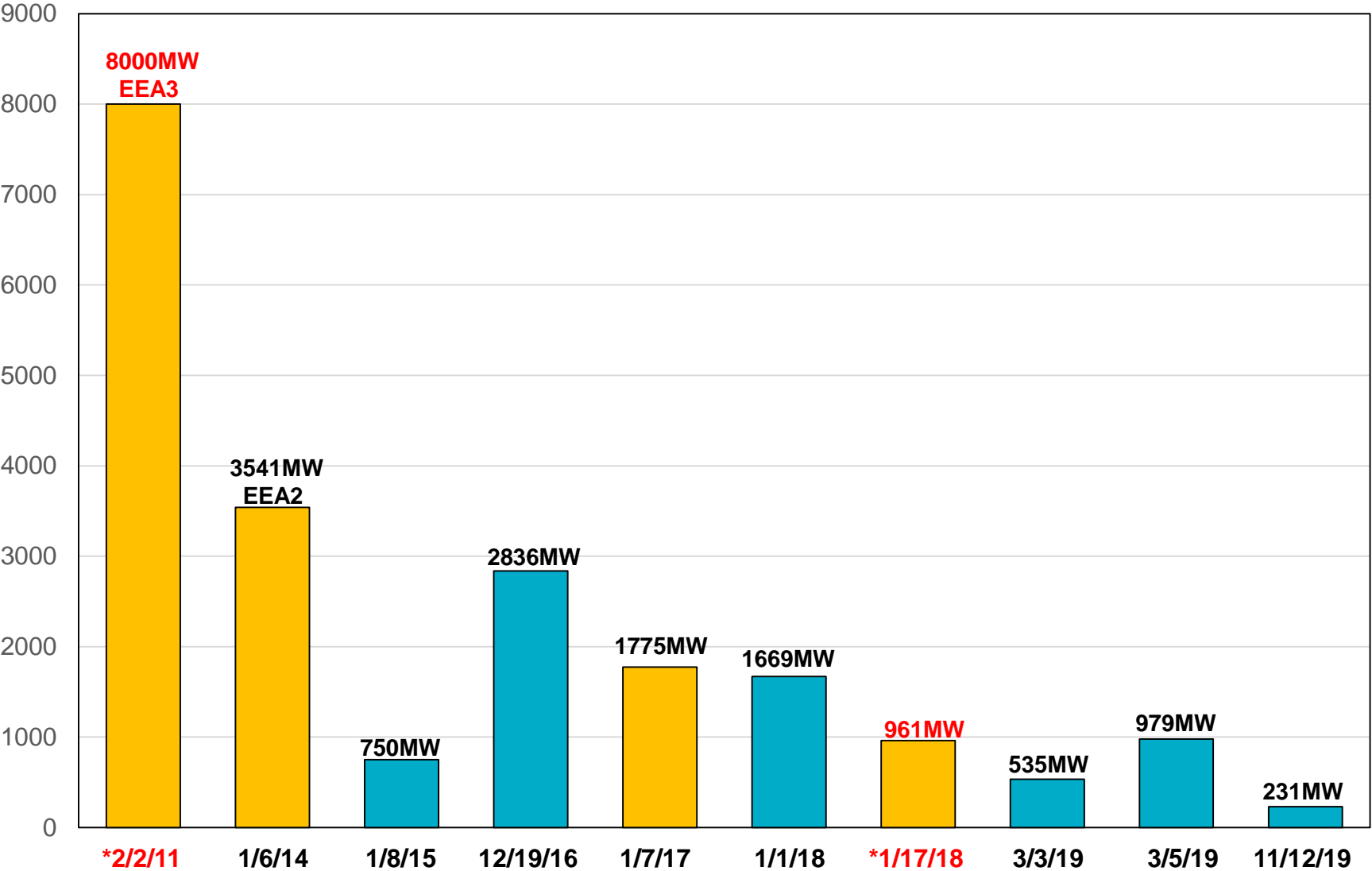
	EEA3 – 4000MW firm load shed	EEA2	Normal operations	Normal operations
	2/2/2011	1/6/2014	1/7/2017	1/17/2018
<b>Dallas</b>	24	22	19	19
<b>Houston</b>	14	18	13	18
<b>San Antonio</b>	24	14	14	12
<b>Austin</b>	24	20	16	20
<b>Brownsville</b>	0	0	5	10
<b>Abilene</b>	24	24	16	19
<b>Midland</b>	24	24	15	10

Source: Chris Coleman, ERCOT

# The South Central United States Cold Weather Event – January 17, 2018



Generation (MW) tripped or de-rated due to frozen instrumentation



\*2/2/11 and \*1/17/18 were the two coldest days this decade.  
Salmon colored are the four coldest days in last nine years.

# Resistance temperature detector (RTD) failure – lesson learned

- During the cold front on November 12, 2019 a CT experienced a trip due to transition steam flow showing a high reading.
- Inspection of the transmitter box showed that the heater and heat trace was not energized.
  - I&C technician found that the RTD that senses the ambient temperature for the heat trace panel had failed.
  - RTD measures ambient temperature to energize heat trace circuits.
  - Manufacturer default for a RTD failure is to de-energize heat trace circuits.
- It was also discovered that the thermometer that measures inside transmitter box temperature was reading 15DegF higher than enclosure temperature. This temperature is recorded by operators on rounds and gave the operator a false reading.
- Corrective action:
  - RTD replaced on all heat trace panels of this type.
  - All heat trace panels of this type were re-programmed to energize heat trace circuits for an RTD failure.
  - All transmitter box thermometers that measure the inside temperature have been replaced.
  - During the spring 2020 outage, GMS was upgraded to telemeter internal box temperatures for all critical transmitters into the control system for monitoring by the control room operators.
- Lessons learned shared with the remainder of company fleet.



# Heat trace panel – resistance temperature detector (RTD) failure



## Common causes of transmitter manifolds and/or sensing lines freezing

- Tripped heat trace circuit breaker.
- Blown fuse in heat trace panel.
- Contractor error when terminating heat trace after testing.
- Insulating contractor damage to heat trace.
- Section of heat trace not functioning.
- Incorrect heat trace for application.
- Heat trace open ended and not grounded.
- Transmitter cabinet heater not functioning.
- Poor or lack of wind break measures.
- Transmitter(s) exposed to the elements.
- Gaps in insulation.

## Closing comments.....

- ✓ ERCOT assists generators in preparing for winter operations with spot checks, sharing lessons learned, best practices, recommendations and the annual fall workshop.
- ✓ Recent history has shown us that for every extreme cold weather event, a small amount of generation will experience freeze related derates or trips.
- ✓ For winter 2020/2021, spot checks will begin November 16, 2020 and will conclude February 26, 2021.
- ✓ Due to COVID-19, the majority of the spot checks will be table top WebEx with some on-site visits.

***Thank you generator owners, operators and plant staff for your efforts on winter weatherization!***

