

Critical Infrastructure Weatherization

Keeping Generation Reliable During Extreme Weather

Todd Jonas, Senior Vice President – Operations



A Little About Tenaska ...

- ▶ Privately held company established in 1987
 - Ranked #53 of largest private companies according to *Forbes*

- ▶ 8,000 MW of generation across the country
 - 3,000 MW in deregulated ERCOT (Texas) Market
 - Plants in Texas and Oklahoma (dual grid serving multiple markets)
 - 1,900 MW in deregulated PJM Market (Virginia and Pennsylvania)
 - 1,800 MW in regulated SERC (Alabama and Georgia)
 - Includes gas fired, solar and wind generation

- ▶ Tenaska Affiliates
 - #2 gas marketing organization in North America
 - Leading energy management company in US

February 2011 vs February 2021

Lessons Learned

- ▶ We learn from every event
 - Generators have weatherized plants for decades
 - No two events are the same
 - 2011 failures did not reoccur in 2021 (whack-a-mole)
 - 2021 failures are not likely to reoccur during next extreme weather event
- ▶ Each extreme weather event is unique
 - Not just temperature-related
 - Wind speed, wind direction, precipitation and duration are just some of the many considerations and factors
- ▶ Root cause analyses
 - Deep dive analysis performed on failures/near misses
 - Lessons learned shared; corrective actions taken

2011 Event & Post-2021 Expectations

- ▶ All levels of regulatory entities have been reviewing plant performance following a severe weather event for decades
 - Federal Energy Regulatory Commission (FERC) and North America Electric Reliability Organization (NERC)
 - Regional Transmission Organizations (RTOs) & Independent System Operators (ISO's) (ERCOT, SPP, MISO, PJM, etc.)
 - State legislatures (Texas, etc.)

- ▶ In Texas, ERCOT has been reviewing plant performance after a severe weather event for over a decade – didn't just start in 2021
 - More structured and formalized after Texas Legislation
 - SB 2
 - SB 3

What Happened Between 2011 - 2021?

- ▶ Reports were generated
 - FERC/NERC Southwestern US Cold Weather Report (Aug. 2011)
 - TX Public Utility Commission (PUCT) Sep. 2012 Quanta Report

- ▶ Limited or non-existent regulatory/legislative response to 2011 extreme weather events
 - Some recommendations implemented by TX Public Utility Commission
 - NERC cold weather reliability standard not implemented until AFTER 2021 event

- ▶ Issues in 2011 did not reoccur in 2021

What About Generators?

- ▶ Generators seek to be reliable during extreme weather events
 - Incented to do so in open, deregulated markets
 - Always assess and implement lessons learned
 - Ongoing investment in weatherization upgrades
 - Upgrades are costly and have been made at generator expense

How Do Generators Prepare for Extreme Weather?

- ▶ We have a plan
 - Plan reviewed before and after each event to assess what worked, what didn't

- ▶ We work the plan
 - Inspections
 - Training and drills
 - Restock supplies
 - Implement temporary measures based on weather forecast
 - Enclosures for equipment
 - Additional operations/maintenance staff on-site
 - On-site contractors
 - Top off consumables (water treatment chemicals, industrial gases, etc.)

What Have We Done?

- ▶ Capital improvements
 - More insulation, more heat tracing, more enclosures, more monitoring
 - Use technology to provide early warning of pending problems
 - Temperature monitoring/alarming of enclosures, transmitter boxes
 - Monitoring heat trace circuit operation
- ▶ Asset hardening studies to identify weak spots in the armor
- ▶ Tenaska has spent millions of dollars on weatherizing just our ERCOT plants over the past 18 months
- ▶ Texas independent generators have spent over \$120M collectively since Uri on weatherization improvements

New Regulations Are Costly

- ▶ New regulations are based on temperature criteria
 - TX Public Utility Commission
 - Phase Two Weatherization
 - NERC/FERC
 - New NERC reliability standard (EOP-012-1)
 - Both based on new cold weather “design” temperature
 - Plant systems must be modified to meet new design temperature

- ▶ Improves reliability for all generators
 - Mandatory compliance vs market incentive
 - Makes for more “winners” but total opportunity not increased

- ▶ Unintended consequence
 - The more you “winterize” plant systems, the more vulnerable they become to hot summer weather

Who should pay for plant weatherization?

- ▶ Plants in deregulated markets?
 - Opportunity from energy sales is finite, based on energy demand and available supply
 - With high levels of scarcity pricing, a combined cycle gas plant in ERCOT makes 99% of revenue in 1% of hours in a calendar year
 - Plant budgets are not infinite
 - Funds paid to weatherize a plant are funds not invested to improve plant performance (reliability and capacity)

- ▶ Plants in regulated markets?
 - Ratepayers pay weatherization costs for rate-based utility plants
 - Independent plants in regulated markets are disadvantaged as they aren't compensated

Who should pay for plant weatherization costs?

- ▶ Beneficiary of the weatherization should bear the cost
- ▶ Energy consumer is primary beneficiary
 - Higher overall reliability benefits the consumer
 - Lower risk of rolling blackouts
 - Less volatile energy pricing
 - #2 recommendation in FERC/NERC Feb 2021 report: generators should be compensated for weatherization costs
 - Weatherization costs should be paid for by consumers through legislative/regulatory initiative

Summary

- ▶ Generators have been preparing for extreme weather for decades
- ▶ Each extreme weather event is different (whack a mole)
- ▶ Lessons learned implemented from every weather event
- ▶ Generators implement detailed weatherization plans and preparations
- ▶ Generators have spent millions upgrading their fleets
- ▶ New regulations are changing the design temperature for plants at significant cost

Who Should Pay for Weatherization?

The group that most benefits from increased reliability ...

The Energy Consumer

Thank you!