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# 2021 Cold Weather

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RELIABILITY | RESILIENCE | SECURITY




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# More Widespread than Texas

- Texas - ERCOT
  - Total load shed 20,000 MW at peak
  - Load shed request duration: 70.5 hours
  - Customer outage across Texas: 3.7M
  - Lowest Frequency: 59.3 Hz
  - Installed capacity out of service: 52,277 MW
    - Natural Gas generation offline: 26,000 MW
    - Wind generation offline due to icing: 14,000 MW
- Midwest to Louisiana - MISO
  - Load shed: 1,430 MW
  - Installed capacity out of service: 59,000 MW
- Dakotas to Southern Plains - SPP
  - Load shed: 3,443 MW
  - Installed capacity out of service: 25,000 MW

**Additional load shedding in Northern parts of Mexico due to natural gas shortage*

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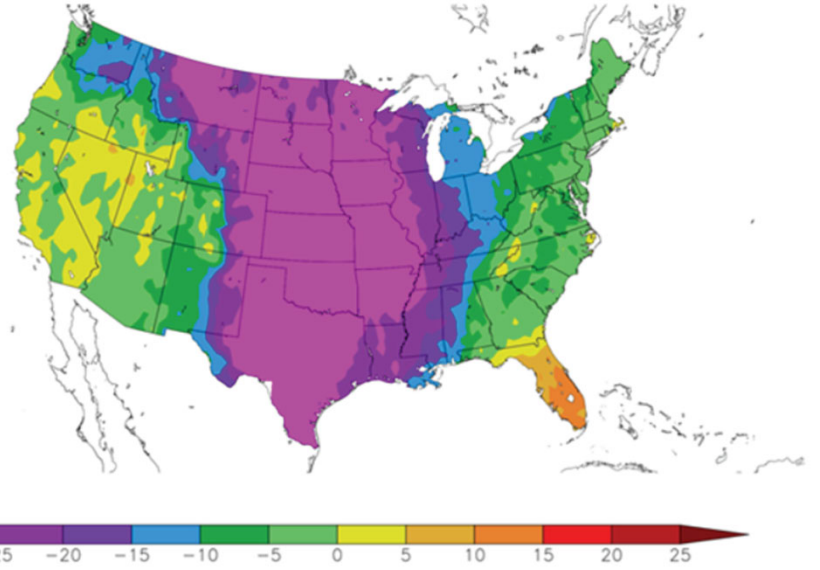
# Prologue

- ERCOT's Role:
  1. Administers the market based on stakeholder process
  2. Operates the BPS to ensure reliability (Frequency/Voltage remains within stability limits)
- No capacity commitment in ERCOT market
- Price-sensitive loads and optimized summer peak generation performance has been key to Texas' success in serving demand
- Voluntary weatherization efforts
  - No on-site winterization reviews due to pandemic
- Nearly 9 GW of retired conventional generation since 2011
- Natural Gas deliveries to Generators are based on mix of Firm and Non-Firm

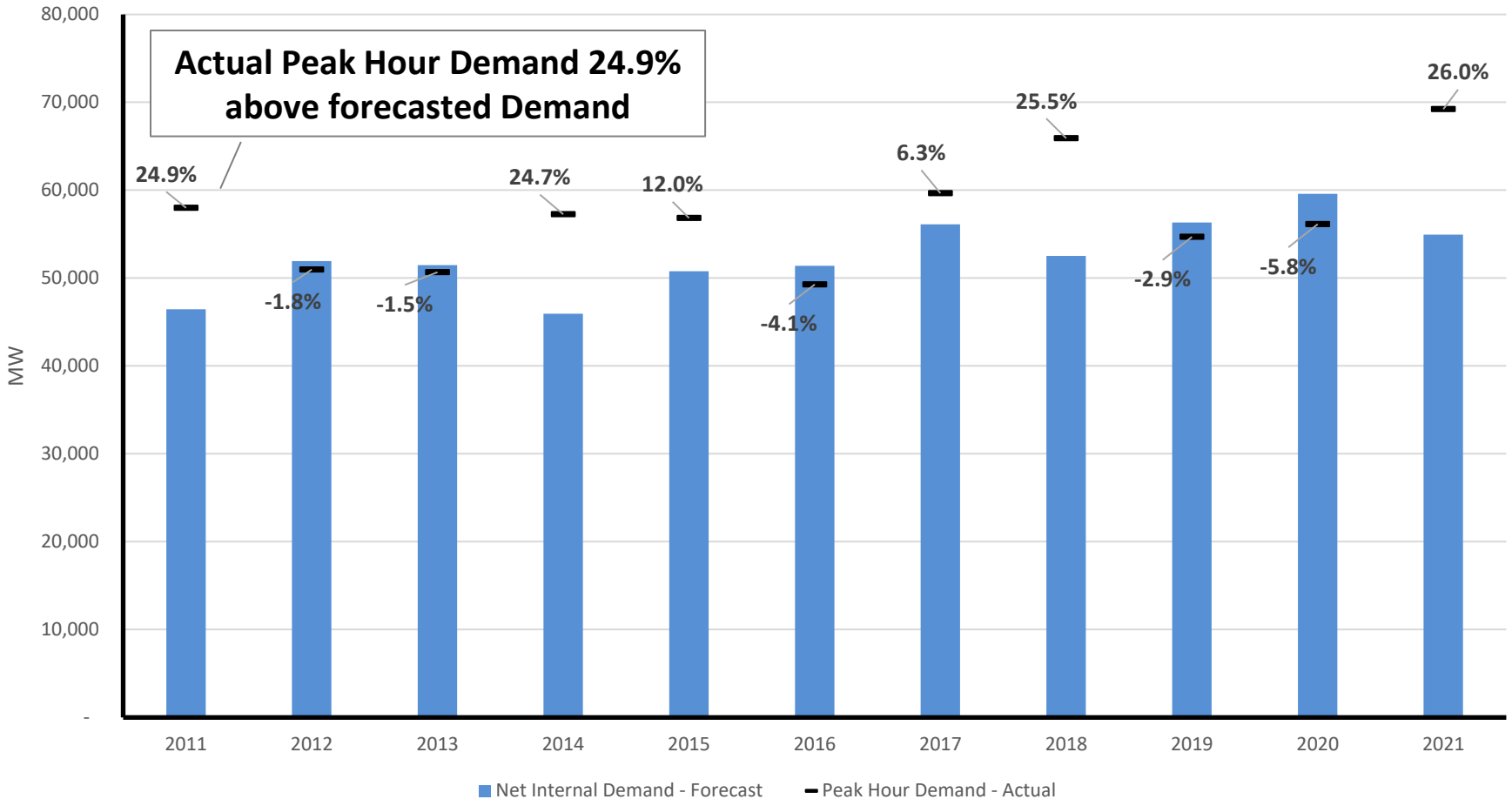
# Texas Weather and Electricity Demand

- Unique Demand Factors in 2021
  - Historically significant cold weather
    - Coldest 3-day stretch on record; -2 degrees at DFW; 162 consecutive hours below freezing in Austin)
  - Significant population increase
    - ~20% increase in last decade
  - Use of electric heat pumps and strip heating
    - More than 55% of homes
  - Families and workers at home due to pandemic
  - Empty office buildings, but remained heated



# Actual vs. Forecast

ERCOT Winter Forecast Demand compared to Actual (2011-2021)



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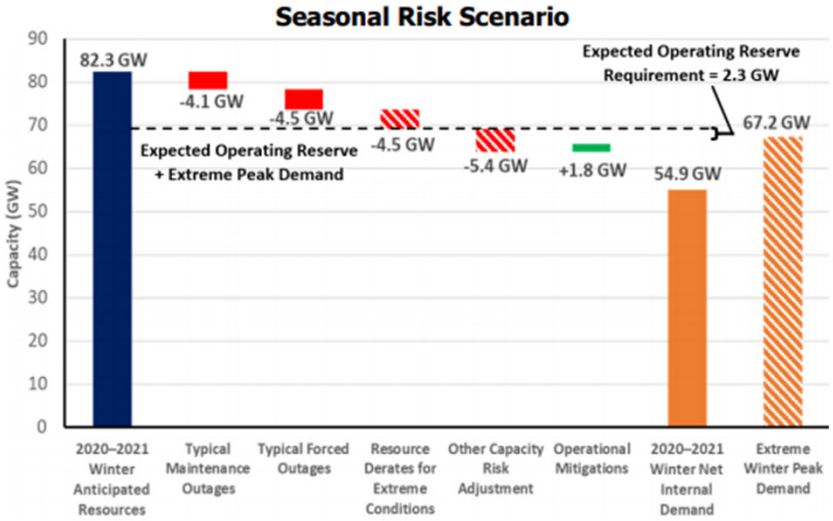
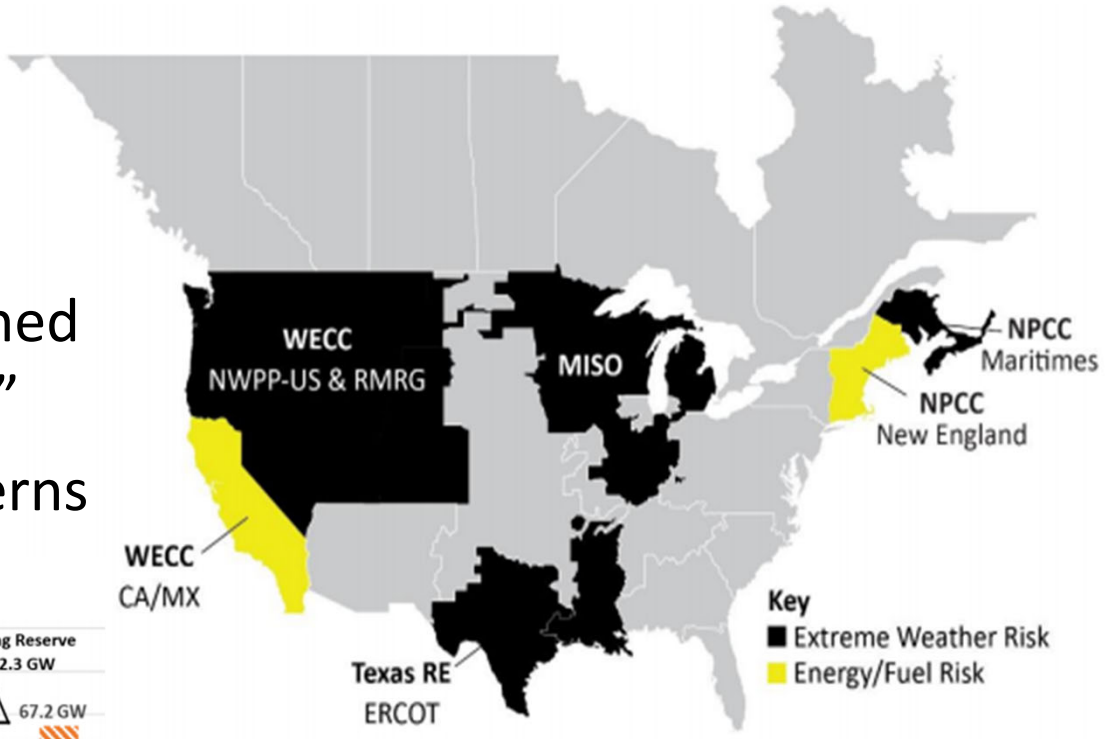
# 2020/2021 Winter Reliability Assessment

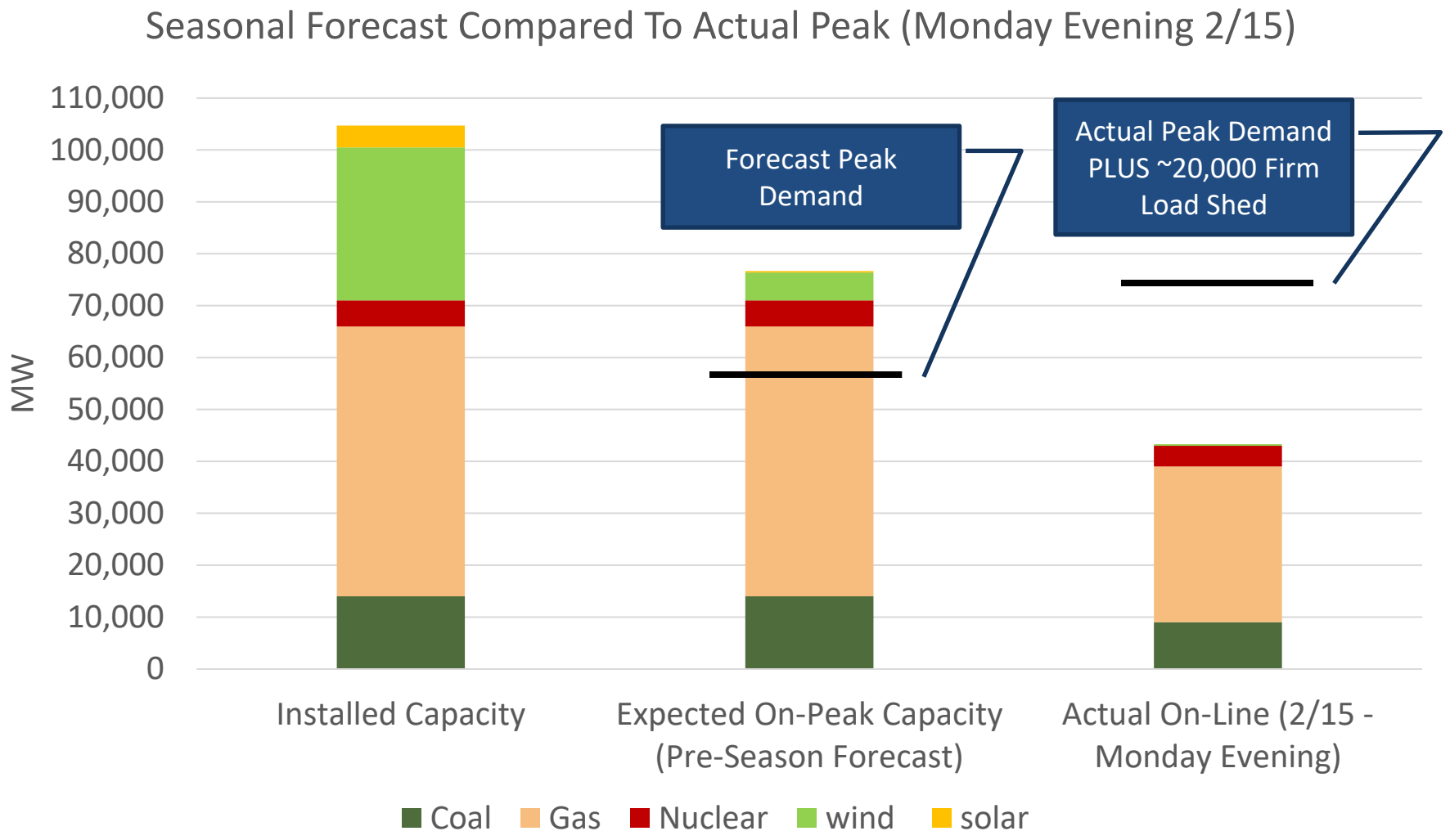
- Adequate Installed Capacity
- ERCOT and MISO highlighted for heightened "Extreme Weather Risk"
- Energy assurance concerns




**Areas with Reliability Risks during Extreme Weather Events and/or Fuel Supply Disruptions**

# ERCOT's Plan Compared to Actual



# Recommendations and Sound Practices from 2011 Cold Weather Event

- Generators to perform winterization activities to prepare for cold weather
- Awareness of generating units' specific limitations, such as ambient temperatures beyond limits
- Planners should develop and study scenarios to better prepare for extreme weather conditions
- Delineate summer and winter ratings for both normal and extreme conditions on transmission system

# Standard Activity

## Current draft

- EOP-011
  - TOP and BA emergency plans include cold weather impacts
  - GO have cold weather preparation plans
    - Appropriate freeze protection measures (self determined)
    - Annual inspection
    - Know operating limits
    - Awareness training on plans
- IRO-010 and TOP-003
  - RC and TOP data specifications to include requesting operating limits

## Future plans

- Implement actions from FERC/NERC inquiry
- Standard for RC and/or BA seasonal emergency energy management plans
- RC standard for rolling three week emergency energy management plan

# Next Steps on Mitigation

- Complete current Cold Weather Standard
- Partner with FERC and Regional Entities on the Inquiry.
- Target completion
  - Preliminary Findings/Recommendations: September 2021
  - Final Report: November 2021
- Deploy recommendations based on results of inquiry
  - Seasonal Energy Management Plan based on regional extreme weather scenarios
    - Includes weatherization
    - Assessed as part of NERC's seasonal assessments
    - Determine sources of energy and the degree of certainty with each source

# FERC/NERC/RE Joint Inquiry Design

- It is not a compliance audit or compliance investigation
- Focus on understanding what happened to support recommendations to improve reliability
- “One team” approach with FERC, NERC, and Regional Entities (REs; MRO, RF, SERC, Texas RE) with one joint report
- Sensitive to time, but thorough

# Inquiry Scope

- FERC, NERC, and RE staff (MRO, RF, SERC, Texas RE) will conduct a joint inquiry into the operations of the bulk-power system during the extreme winter conditions experienced by the Midwest and south-central states in February 2021
- The inquiry includes
  - Assessing what occurred during this event (inclusive of generation outages and causes, gas interdependencies, capacity issues, grid coordination and management, and emergency management)
  - Identifying commonalities with previous cold weather events
  - Any lessons that should be incorporated in the ongoing development by NERC of cold weather Reliability Standards
  - Making recommendations to avoid similar events to avoid similar events, and identifying best practices
- Inquiry *will not* focus on market issues

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# Questions and Answers