

# Winter Storm Power Outages and Pathways to a Stronger, More Resilient Grid

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Houston-Galveston Area Council

April 9, 2021

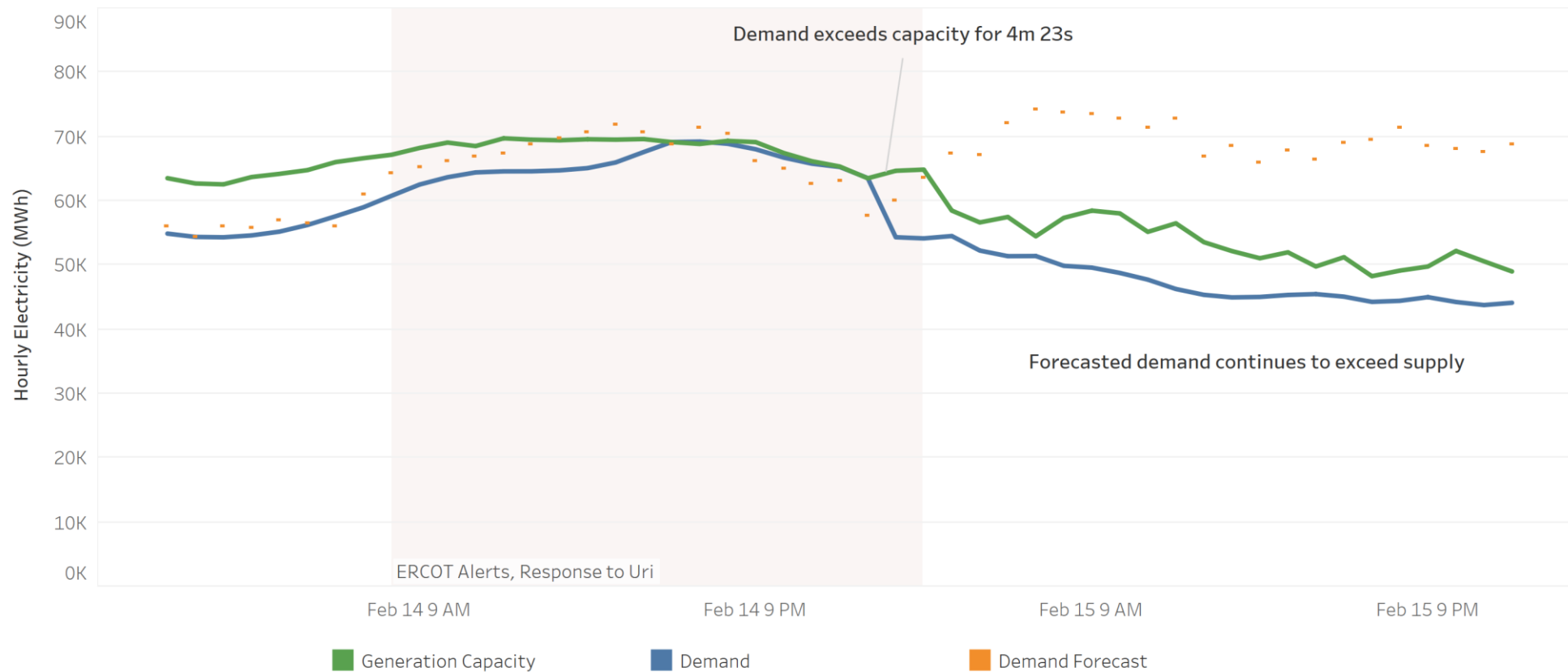


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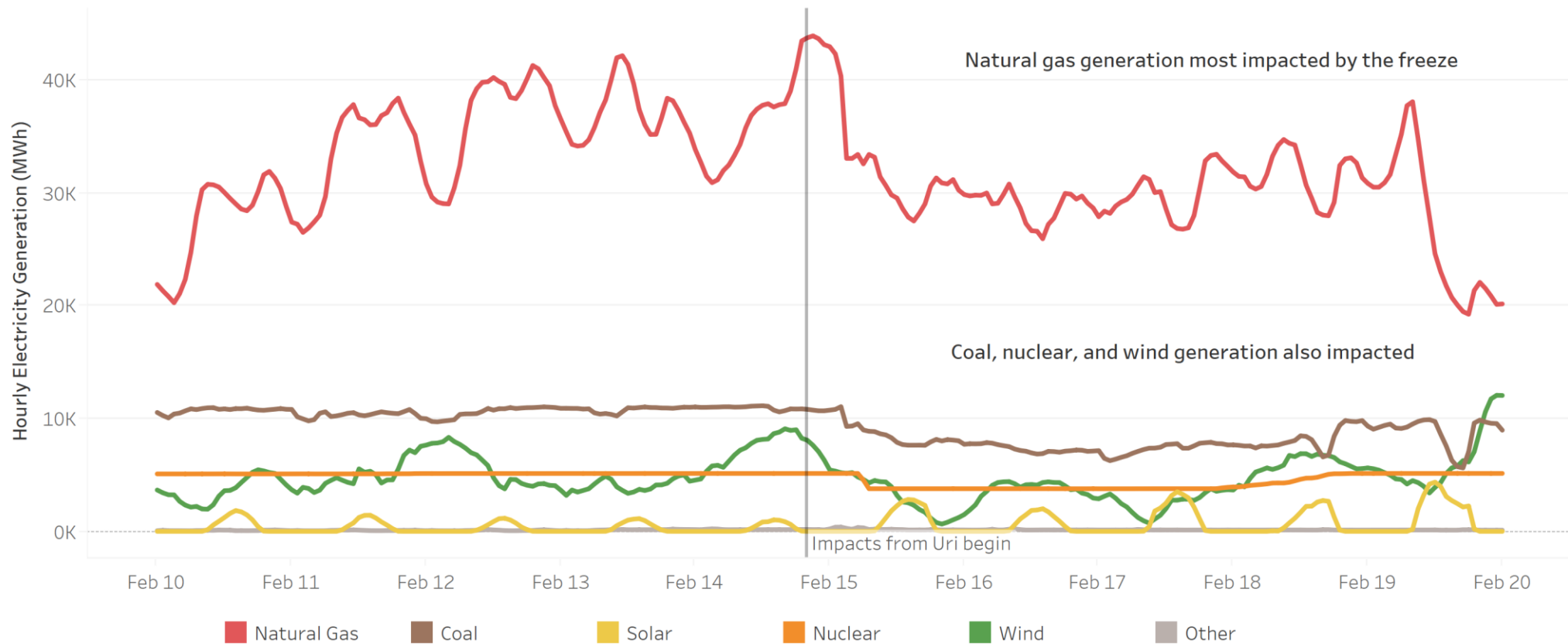
# Early Feb. 15: cascading power failures leads to mass power outages

Generation Capacity vs. Demand in the ERCOT Region, February 2021



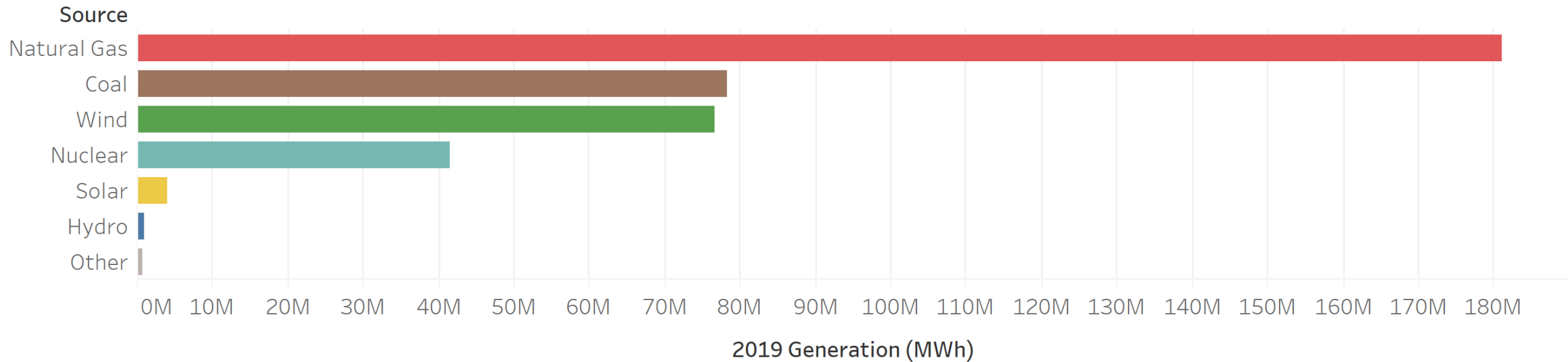
# All types of power plants experience outages, mainly natural gas

Generation by Source in the ERCOT Region, February 2021



# ...because Texas relies heavily on natural gas

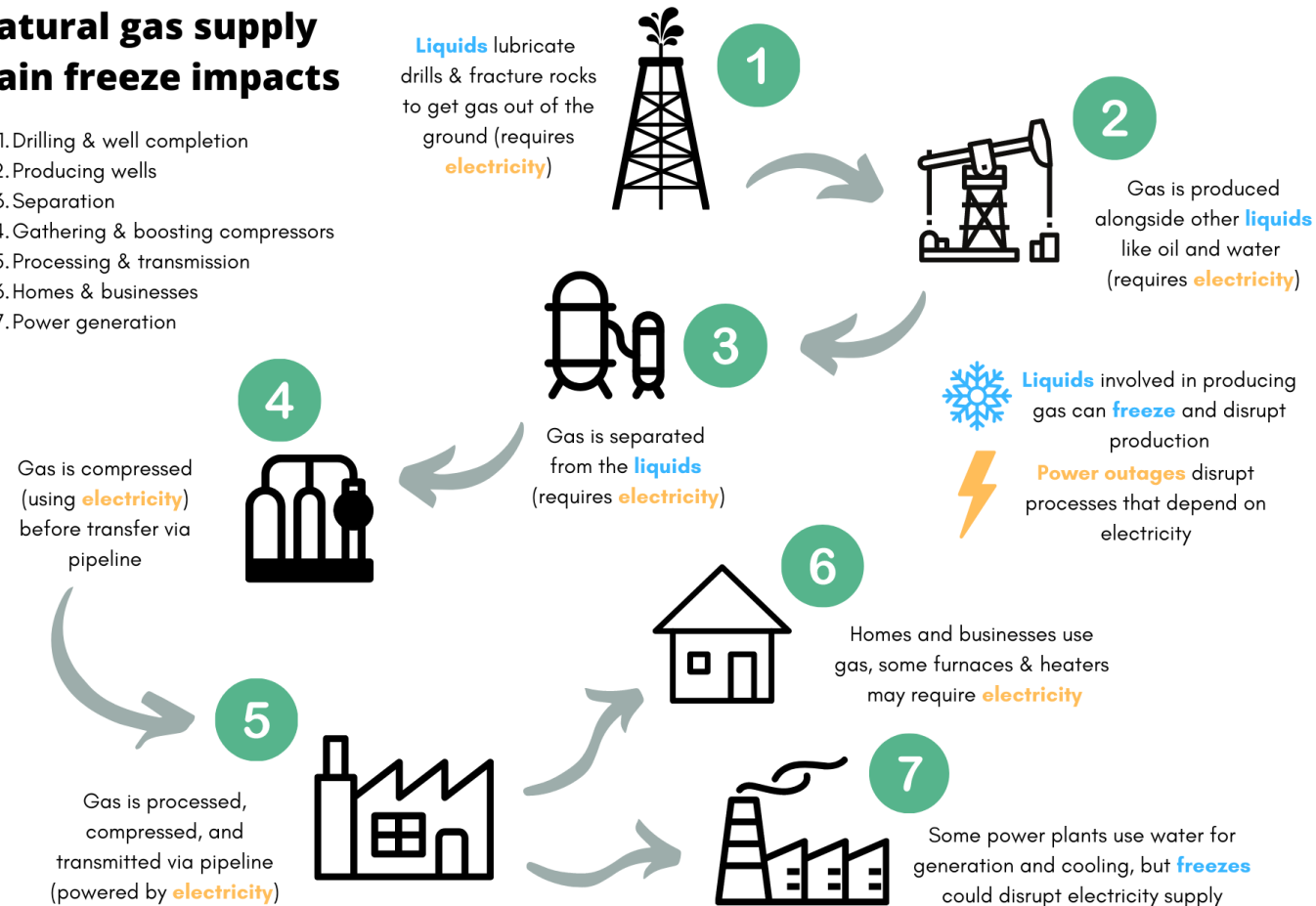
Electricity Generation in the ERCOT Region in 2019 by Source



# ...and there were failures in the supply chain

## Natural gas supply chain freeze impacts

1. Drilling & well completion
2. Producing wells
3. Separation
4. Gathering & boosting compressors
5. Processing & transmission
6. Homes & businesses
7. Power generation

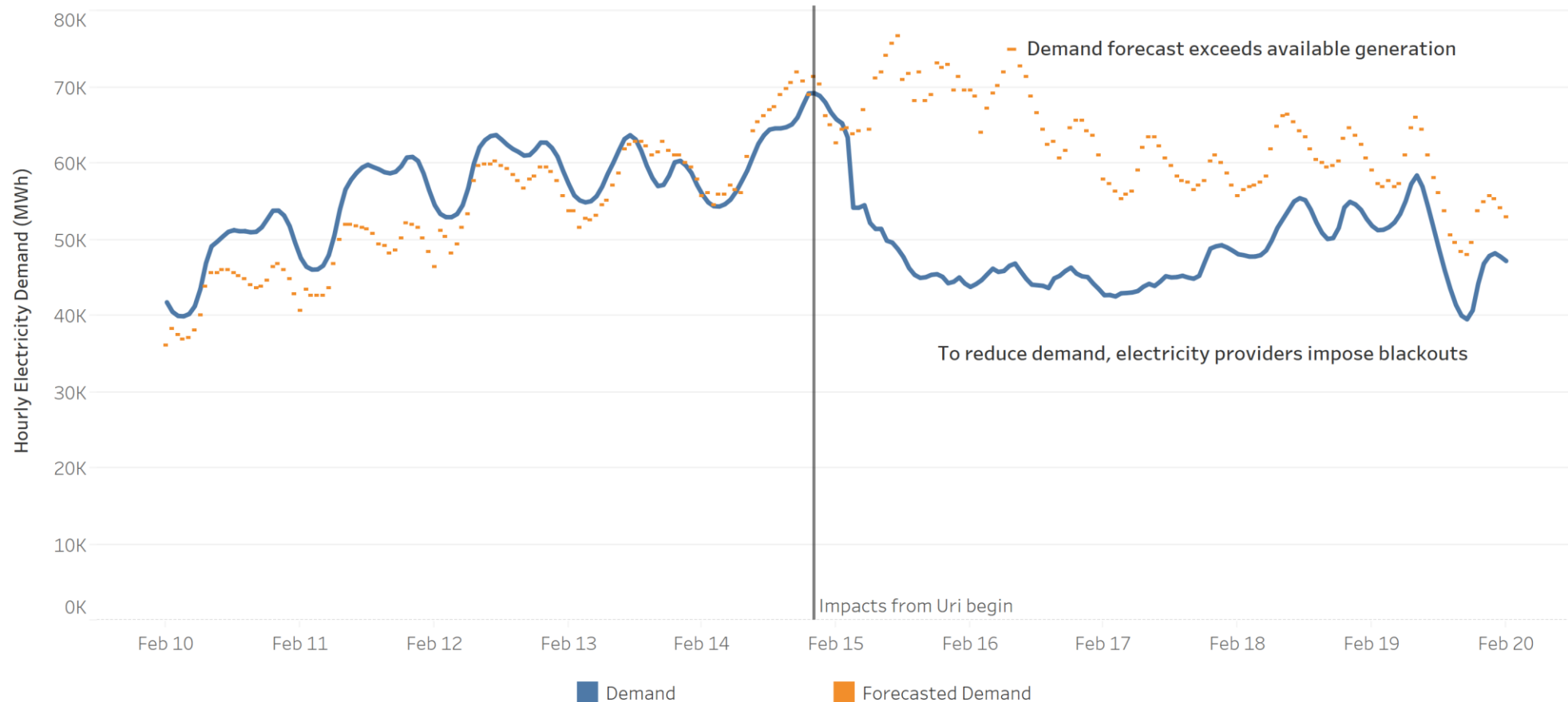


does not include underground storage, distribution (mains, regulators, and meters), or industrial users

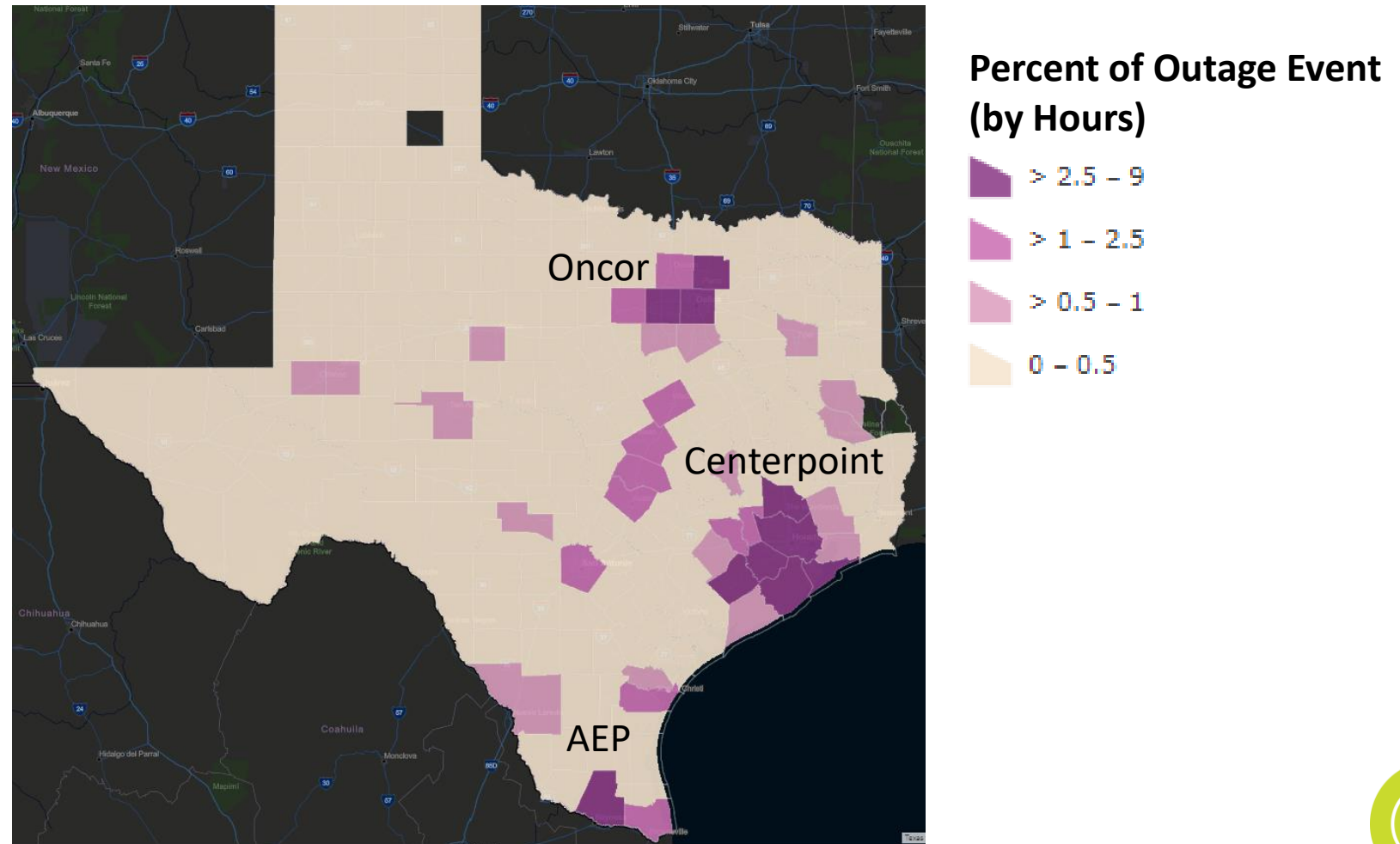


# Power failures caused a large disparity between demand forecasted and demand met

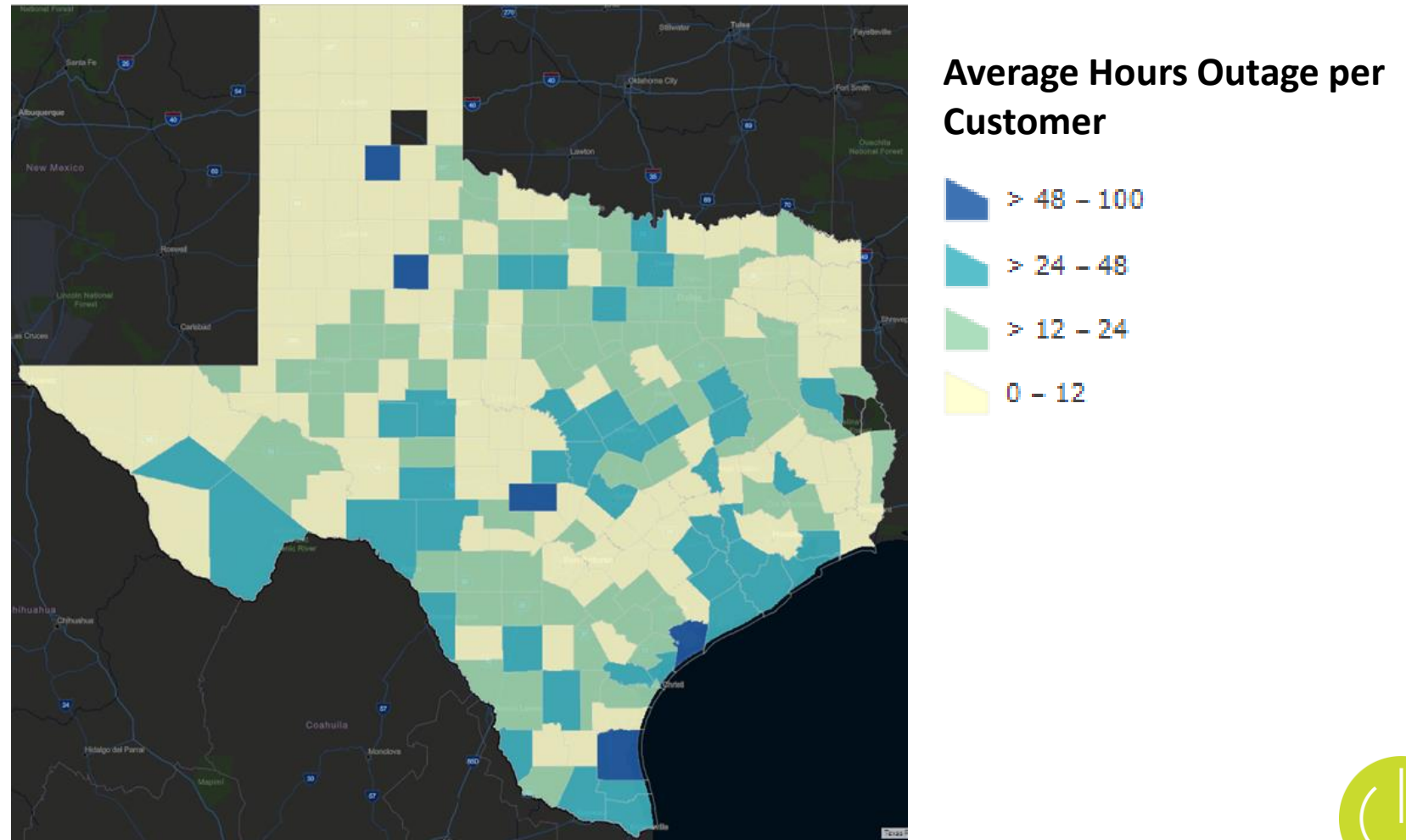
Forecasted Demand vs. Demand in the ERCOT Region, February 2021



# Outages spanned the state but focused in areas served by the deregulated power market

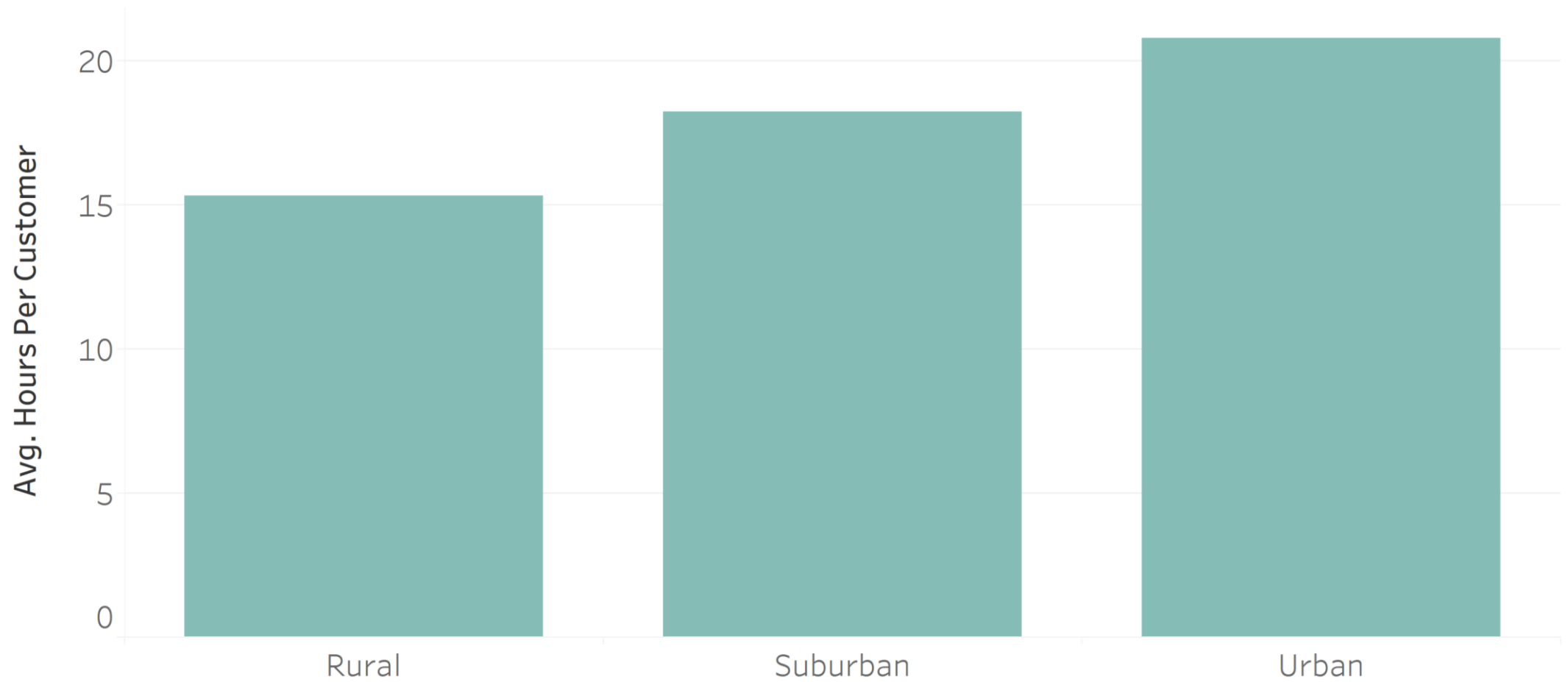


# The longest outages occurred in suburban and rural areas





...but average outage time was longer in urban areas



Impacts to the power sector become impacts to the water sector

**water  
is used  
for  
energy**



**energy  
is used  
for  
water**



# Power outages and freezes caused drinking water and wastewater problems

**Cut back water use now to avoid crisis, Waco mayor pleads**

**City of Clyde asks for help thawing pipe at water treatment plant**

**Over 14 million Texans are still without safe water as officials grapple with crisis**

**of gallons this week**

**Emergency aid for burst pipes: Mayor calls for fund to help residents with expenses amid thaw** (San Antonio, TX)

**City, county say tens of thousands of buildings have burst pipes; true toll won't be known for weeks** (Houston, TX)



# Water outages persisted for weeks for some

**Over a million Texans are still without drinking water. Smaller communities and apartments are facing the biggest challenges.**

Plumbers and supplies to fix broken pipes are in high demand, but apartment complexes also present more difficulties than single-family homes when it comes to repairs.

BY REESE OXNER AND JUAN PABLO GARNHAM FEB. 24, 2021 6 PM CENTRAL

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## Forty-seven Days Without Running Water After the Winter Storm—and Counting

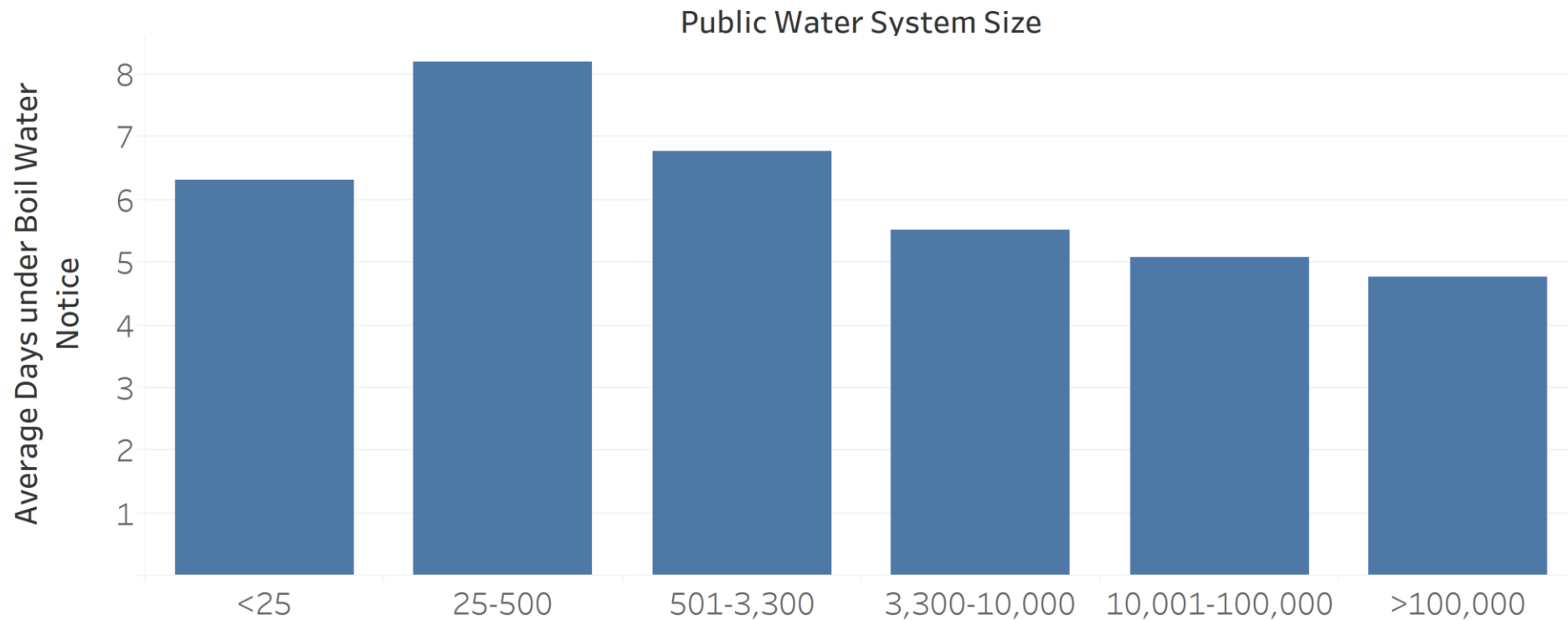
In Houston's Third Ward, where some residents' homes were extensively damaged, a fight for repairs has reached a breaking point.

By Peter Holley April 3, 2021 4

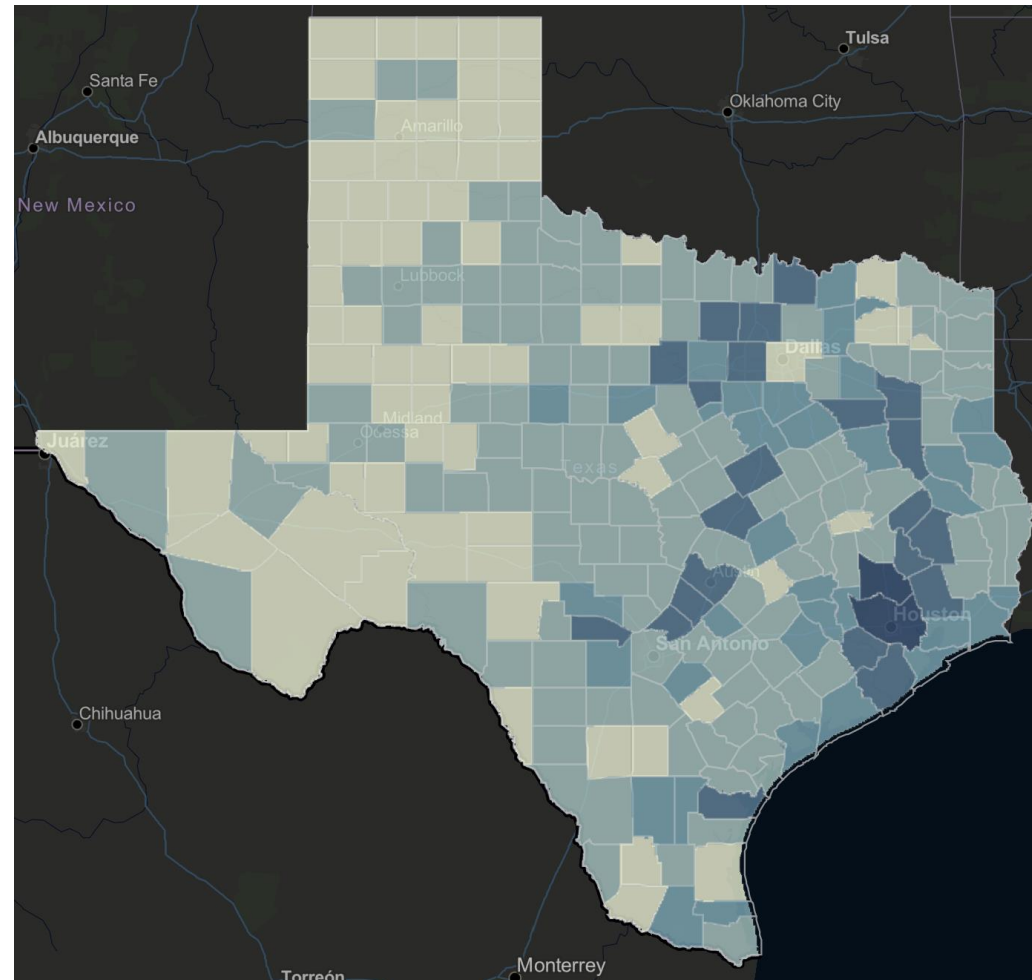


# Water quality issues spanned the state but disparately impacted smaller systems

Texas Public Water System Time under Boil Water Notice following Winter Storm Uri

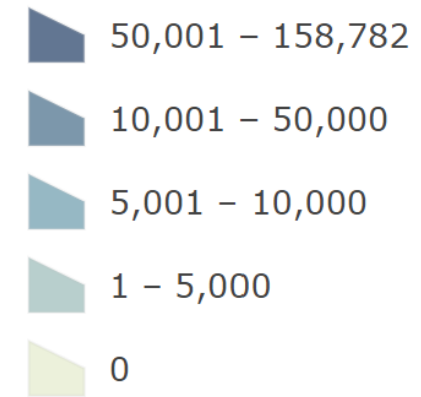


# The Houston-Galveston Area is served by many small water systems that issued BWNs



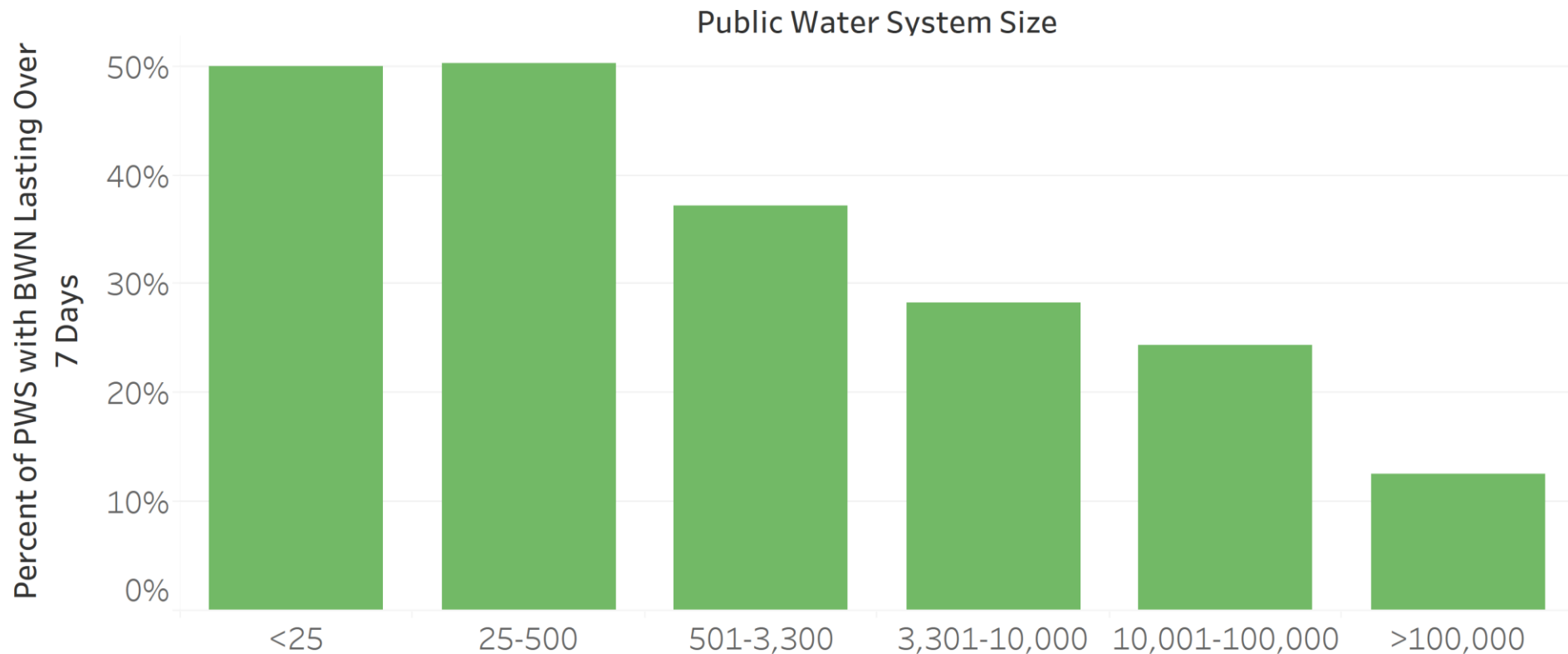
## Small Water Systems under Boil Water Notice

Population



# Half of all smaller systems that issued BWNs took longer than a week to recover

Percent of Boil Water Notices that Lasted Longer than 7 Days



# We need energy and water system resilience

- Weatherization for extreme weather
  - Power, fuel, transmission & distribution
  - Water and wastewater treatment & distribution
  - Not just winter... hurricanes/high winds, too
- Crisis planning
  - Better use of critical infrastructure form
- Transmission
  - Spanning more of the state
  - Connection to other grids





# We need energy and water system resilience

- Backup power supply
  - Batteries, generators, CHP
- Distributed solutions (islanding)
  - Microgrids, solar+storage
  - Distributed water treatment
- Even the outage burden
  - Smart meters
  - Smaller boundaries around critical infrastructure
  - Direct solutions to small water systems



# We need home resilience

- Weatherization + energy efficiency
  - We already have programs/funding available, not using enough
  - Helps even if an outage occurs
  - Saves money year round
- Better water and energy communication
  - Both directions: utility-to-resident, resident-to-utility
- Understanding the risks
  - Better understanding = better preparation



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