EESI
Environmental and Energy Study Institute

Materials will be available at:
www.eesi.org/022026winter
Post about the briefing:
#eesitalk @eesionline

Rapid Readout
Frozen Infrastructure
Winter Storm Impacts on Communities and the Power Grid

Friday, February 20, 2026

Policymaker Education

Congressional Briefings

Live, in-person and online public briefings, archived recordings, and written summaries

Climate Change Solutions and The Climate Conversation

Bi-weekly newsletter with everything policymakers need to know, complemented by podcast episodes about a wide range of topics

Congressional Round-Up

Weekly tracking of legislation and relevant hearings held by House and Senate hearings

Fact Sheets and Issue Briefs

Timely, objective, in-depth coverage of environmental, clean energy, and climate change topics

Social Media (@EESIonline)

Active engagement on Bluesky, LinkedIn, Facebook, X, and YouTube

Up Next:

Understanding Load Growth and Energy Affordability
Thursday, February 26
3:30 - 5:00 pm
Rayburn Gold Room (2168)

Igniting Innovation: Progress and a Path Forward for Wildfire Policy
Tuesday, March 3
3:00 - 4:30 pm
Russell Senate (SR-385)

Strategies to Lower Utility Bills Now for Households and Small Businesses
Thursday, March 12
3:00 - 4:30 pm
Rayburn Gold Room (2168)

EESI
Environmental and Energy Study Institute

What did you think of the briefing?

Please take 2 minutes to let us know at:
www.eesi.org/survey

***Materials will be available at*:**
www.eesi.org/022026winter

***Post about the briefing*:**
#eesitalk @eesionline

Friday, February 20, 2026

WINTER STORM IMPACTS ON THE POWER GRID

Houston Advanced Research Center

February 20th, 2026

HARC

Our Core Focus Areas

We're an independent, nonpartisan sustainability nonprofit providing energy and water solutions and the solutions to the intersection of these areas.

Our Team

HARC brings together leading experts in air, energy, water, community and climate resilience to address pressing sustainability challenges.

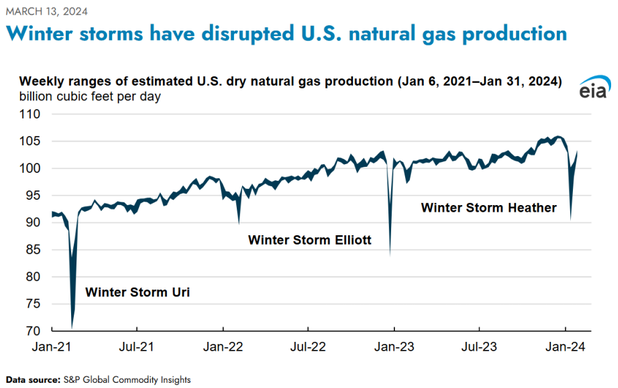
Our team of innovators, scientists, thought leaders, and bridge builders leverage research to develop and implement effective and impactful solutions.

With longstanding collaborations spanning state and federal agencies, universities, community organizations, and private companies, we deliver comprehensive expertise that drives meaningful change.

WINTER STORM IMPACTS ON THE POWER GRID

Grid Vulnerability to Extreme Cold

- **Operations of Power Generation and T&D assets**
  - ✓ Mechanical Equipment Issues
  - ✓ Cooling Systems Issues.
  - ✓ Instrumentation & Sensing Failures.
  - ✓ Non-favorable operating conditions.
  - ✓ Natural gas-electricity supply interdependence.
- **Assets Redundancy and/or Capacity Available as Operating Reserve**
- **Physical Access to the Assets for Repairs**
- **Interconnections with other Grids/Systems**



HARCresearch.org

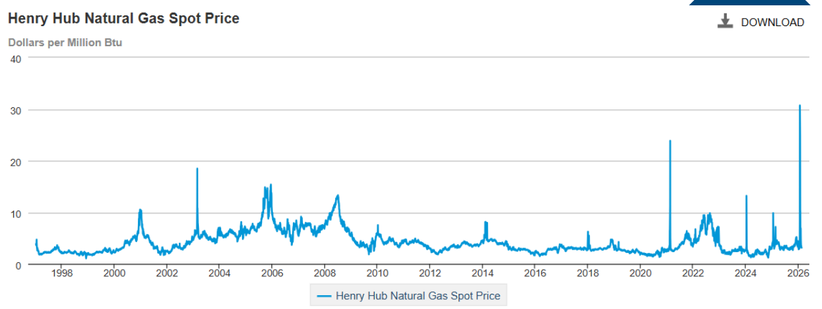
Grid Impacts of Winter Storms

Impact Category	Winter Storm Uri (2021)	Winter Storm Fern (2026)
Geographic Scope	Multi-state; severe impact in Texas (ERCOT), also OK, LA, AR, Midwest	Broad U.S. impact; Midwest, Northeast, Mid-Atlantic, parts of Texas
Customers Losing Power	~4.5 million in Texas alone; ~10+ million nationwide	~1–2 million nationwide (varied by day; less concentrated than Uri)
Load Shedding / Controlled Outages	Large-scale, prolonged controlled load shed in ERCOT (up to ~20+ GW shed)	Limited large-scale controlled load shed; mostly storm-related outages (ice, wind)
Generation Offline at Peak	61.8 GW at peak (gas, coal, nuclear, wind outages combined)	Primarily fuel-supply constraints and localized outages; not system-wide generation collapse
Electricity Prices	ERCOT hit price cap ($9,000/MWh at the time) for ~4 days; extreme wholesale volatility	Elevated prices in some markets (e.g., PJM, MISO), but no sustained price cap conditions like Uri
Duration of Extreme Cold	3–5+ days below freezing in Texas; 1–3 days below 0°F in North Texas	Multi-day cold wave; below-zero temps common in Midwest but less extreme in Texas
Fuel Supply and Cost Disruptions	Major natural gas freeze-offs; gas-electric coordination failures; compressor and wellhead issues	Some gas constraints and pipeline limitations, but improved winterization reduced systemic failures
Economic Impact	Estimated $100–130+ billion (Texas alone tens of billions)	Estimated in the billions nationally, but far below Uri
Human Impact	200+ deaths (official estimates vary); widespread water system failures	Limited fatalities relative to Uri; fewer water system collapses
Water & Infrastructure Impacts	Massive water main breaks; boil water notices affecting millions	Localized water disruptions; infrastructure impacts mainly from ice/snow
Regulatory / Market Aftermath	Texas grid reform legislation (SB 2, SB 3); winterization mandates; market redesign; securitization costs	Reinforced existing winter reliability standards; highlighted continued gas-electric coordination needs
Cost Assumed by Customers	Long-term securitization bonds added to ratepayer bills; retail bankruptcies; co-op defaults	Short-term elevated retail bills in some regions; no widespread financial system shock

Opportunities to Build Resilience

System Operator Level

- ✓ Mandatory weatherization standards power for generation, T&D, and gas infrastructure.
- ✓ Make power markets attractive for a diversified power generation and storage mix.
- ✓ Improved market operations: Real-Time co-optimized operations (RTC+B in ERCOT).
- ✓ Operational reserve requirements during the winter season.
- ✓ Reliability mechanisms like demand flexibility for large energy consumers.
- ✓ Strategic natural gas storage management and withdrawals.



Utility Company Level

- ✓ Build and maintain distribution assets with resilience in mind.
- ✓ Load flexibility for industrial, commercial, and residential end users.
- ✓ Protect and prioritize critical infrastructure circuits (water, hospitals)
- ✓ Support the deployment of microgrids at critical facilities (water/WWTPs, hospitals..)
- ✓ Support the deployment of DERs + battery storage for commercial and residential end users.

Thank You!

Carlos Gamarra, PhD, P.E.

Vice President Energy, Air, and Digital Solutions

cgamarra@harcresearch.org

HARC

Grid Impacts of Winter Storms

Winter Storm URI (2021) [0]

- >4.5 million customers lost power (over 10 million Texans impacted)
- ~20,000 MW of controlled load shed — largest in U.S. history (ERCOT)
- Electricity prices reached $9,000/MWh during emergency conditions [1]
  - Some residents received bills of more than $16,000 in the aftermath [2]
- ~61,800 MW of generation offline at peak (freeze-offs + fuel limits) [3}
- Economic impact estimated at $80–130+ billion in Texas.
- Consumers assumed $10 billion in grid restoration costs [4]
- Cascading impacts to water, telecom, and healthcare systems.

[0] https://experience.arcgis.com/experience/cc48fcfebfae414b99b3d18f86c72c27/page/HOME?views=TEXAS-POWER-GRID-101
[1] https://www.courthousenews.com/at-texas-high-court-energy-companies-fight-colossal-bills-from-winter-storm-uri/
[2] His Lights Stayed on During Texas' Storm. Now He Owes $16,752. - The New York Times
[3] https://www.forbes.com/sites/robertbryce/2022/08/24/texas-consumers-on-hook-for-10-billion-in-debt-incurred-during-winter-storm-uri