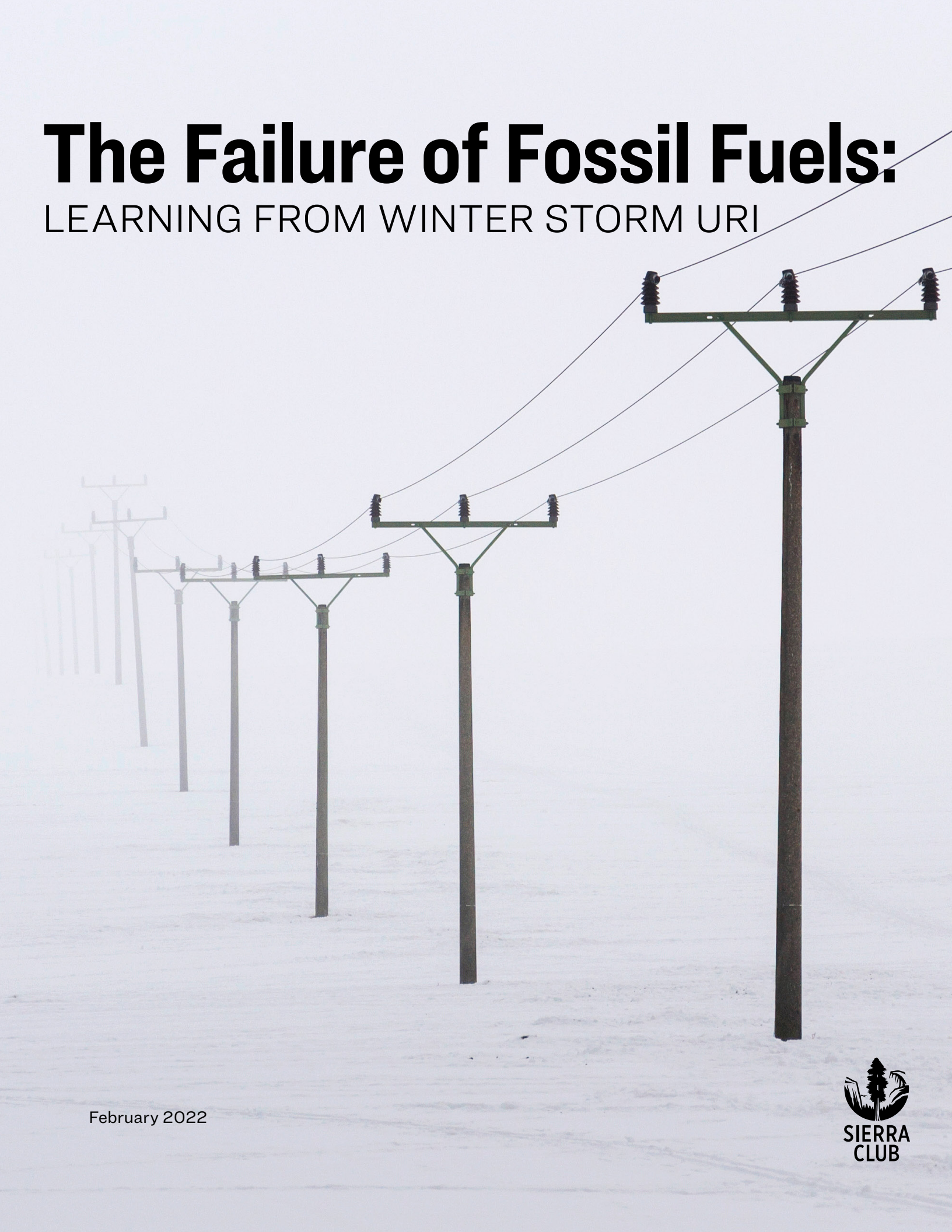
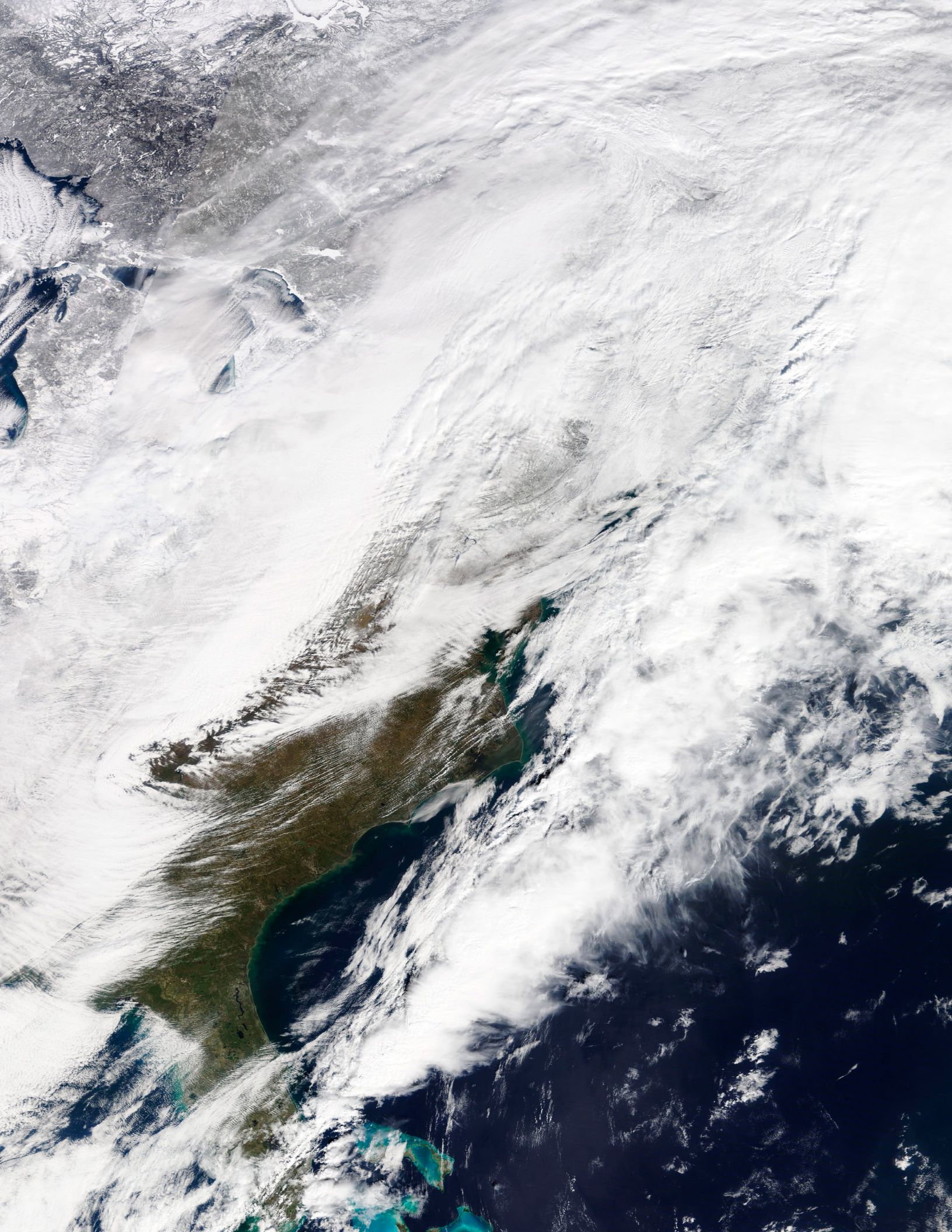
The Failure of Fossil Fuels:

LEARNING FROM WINTER STORM URI



February 2022

SIERRA CLUB



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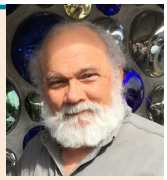
1.0 INTRODUCTION

For almost a week from February 13 through February 17, 2021, a winter ice storm — unofficially named Winter Storm Uri — slammed North America. The storm started in the Pacific Northwest, advanced across the southern United States and northern Mexico, and finally curved northward to hit the midwest and northeast United States and southeast Canada.

COMMUNITY VOICES



DR. CRAIG MORRIS NAZOR
AUSTIN, TEXAS

It was a shocking experience to live through. All you could do is sit there in the dark and think about the situation. There was no power and you didn't want to be on the phone because there was only so much battery life. It gave you a lot of time to think about this planet.

By the time Uri had dissipated, more than 170 million people across the United States had experienced some sort of winter weather alert, and almost ten million people in the United States and Mexico had lost power.[1] The storm caused almost $200 billion dollars worth of damage, making it the most expensive natural disaster to ever hit the United States. It killed hundreds of people, making it the deadliest winter storm in almost 30 years.[2] And while the state of Texas found that approximately 250 people died as a result of Uri, an independent analysis estimates as many as 700 people lost their lives due to the storm.[3,4]

While many public officials were quick to blame the power outages on wind and solar, later analysis showed that the gas system was the primary source of the grid's failures. The price of gas sailed to astronomical highs during the storm, forcing utilities and homeowners to incur massive debts, and prompting investigations into price gouging by pipeline operators. Millions of Americans will be paying higher gas bills for decades to come due to the gas system's failures during this period.

COMMUNITY VOICES

JOE THE BARBER
TEXAS

We get reports that things are going to get bad. My sons and I start doing things like filling up the bathtub with water, pitchers that have lids — all the safety things were told to do. I didn't sleep for three days.

I remember being scared. The only time I was more scared was receiving mortar fire in Iraq. [During Winter Storm Uri, my] daughter was just over a year old. My sons are 8 and 13. I watched everyone sleep - doing everything I could for them.

I had a legitimate mental breakdown toward the end. The first night was terrifying, feeling the temperature drop around us. Holding your children in your arms knowing that it's only going to get colder.

Climate change means extreme weather events— particularly extreme heat, extreme cold, and extremely powerful storms like Uri — are becoming increasingly common.[5] And the cost of Winter Storm Uri — the damage to buildings and infrastructure, the people left without power for days or weeks, the people who lost their lives — could have been avoided with better planning, communication, and preparation at the local, state, and federal level.

In particular, this report identifies six key ways that public officials could address the failings that allowed Winter Storm Uri to cause such extensive damage:

1. **Increase Energy Efficiency**, to allow the same amount of electricity to go further;
2. **Implement Demand Response,** to intelligently shift when and where electricity is used;
3. **Protect and Improve the Grid,** to create a smarter energy system, ensure existing power generation can coexist with clean and distributed energy sources, and ensure that localized issues (such as outages due to extreme weather events) don't spread across the entire grid;
4. **Increase Access to Clean Energy,** to ensure that all communities can enjoy its benefits;
5. **Foster More Public Input,** to guarantee that individuals and communities (not just utilities and large corporations) have a voice in any and all regulatory decisions; and
6. **Learn from Past Mistakes,** so that the lessons learned from Winter Storm Uri — as well as from past extreme weather events like those in 2011 and 1989 — are used to create a cleaner, more resilient grid.

Far from simple bad luck, Winter Storm Uri demonstrates the cost of climate inaction and an energy system that is overly dependent on gas. It offers a taste of what's to come if regulators, policymakers, and public officials continue to ignore what is increasingly obvious: The climate crisis is real, it's here, and — without real and substantive action — the cost of complacency will continue to rise.

COMMUNITY VOICES

DANIELA SILVA
AUSTIN, TEXAS

I volunteer with an organization called Community Resilience Trust, and when the storm first hit, we organized to get unhoused people into hotels, get them food and water, and get them mental health services. When there was no governmental support, we eventually had to extend our organizing to the city at large, getting food and water to people, transportation, rescuing them from places where they had no power and no water, getting diapers, baby formula, dog food to everyone who needed it.

A NOTE ON LANGUAGE

NATURAL GAS, FRACKED GAS, FOSSIL GAS, AND METHANE GAS

Did you know that gas, natural gas, fracked gas, fossil gas, and methane gas all refer to basically the same thing? So-called "**natural gas**" gets its name because it's a fossil fuel, formed *naturally* over millions of years from the fossilized remains of plants and animals; because of this, natural gas is also sometimes called **fossil gas**.

But "natural" doesn't always mean "good" or "clean"! In fact, natural gas is mostly methane, a potent greenhouse gas that contributes to climate change.[6] Sometimes, people use the term **methane gas** to more clearly indicate the connection between natural gas and climate change.

Finally, since fracking — a method of injecting chemicals into the ground to drill for otherwise-inaccessible fossil fuels — is the source of about two-thirds of natural gas drilled in the United States, some people talk about natural gas as **fracked gas**.[7]

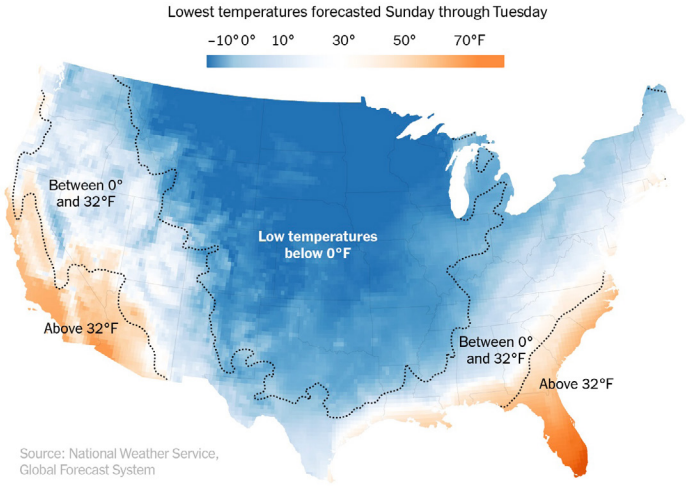
This report simply uses the term **gas** to refer to this fossil fuel.[8]

See the Glossary at the end of this report for more information on specific terms and definitions.

2.0 ZOOMING IN ON THE DEEP FREEZE

Winter Storm Uri stretched across North America, but the "deep freeze" — meaning the days-long stretches of below-freezing temperatures, coupled with dangerous wind chill and heavy snowfall — hit Texas and the Southern Plains hardest. The storm left millions of people without power for days or weeks, resulting in billions of dollars in damages and hundreds of deaths.

> Winter Storm Uri was a major coast-to-coast storm that spread snowfall and damaging ice from the Northwest into the South, Midwest and Northeast Feb. 12-16, 2021. The storm was followed by the coldest temperatures in decades in the south-central states.
>
> — *Winter Storm Uri Spread Snow, Damaging Ice From Coast-to Coast, Including the Deep South (Recap),* Weather.com, February 16, 2021



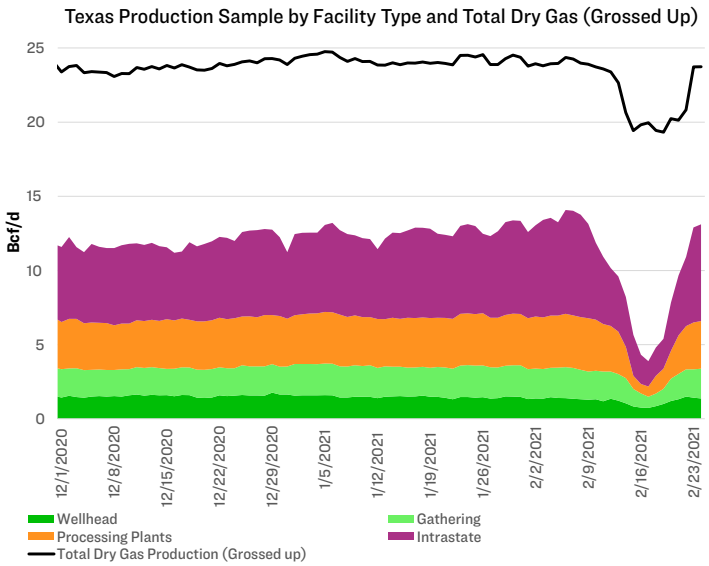
If you're most interested in responding to specific myths and misconceptions about Winter Storm Uri (including the false claims about the blackouts and renewable energy) skip ahead to the Debunking Myths and Falsehoods section near the end of this report.

2.1 The Trouble with Gas

Winter Storm Uri's blackouts were caused by damage to all forms of electricity production, but gas infrastructure was hit particularly hard.[9] The gas system in Texas and the Southern Plains includes gas acquisition (mining and drilling), production (storage and processing facilities), transportation (gathering and transmission pipelines), and energy production (gas-fired power plants). Almost none of it was adequately winterized, and freezes or shutdowns in one part of the system had ripple effects across the entire region.[10]

A report prepared for the Texas Oil and Gas Association found that about one in four gas production sites had some sort of equipment freeze during Winter Storm Uri, indicating an overall lack of cold-weather preparation in the gas system. The same report found that more than half of Texas gas producers lost power at their production sites during the storm.[11] In many cases, key gas production facilities were not registered as critical electricity loads, which puts facilities first in line for any available gas, so they were vulnerable to blackouts. An analysis by the Electric Reliability Council of Texas (ERCOT) identified a list of problems including freezing temperatures, supply issues, equipment failures, and many plants simply being unavailable because they chose that period for maintenance activities[12]. These local problems cascaded across the region, leaving homes, businesses, and even power plants without gas.

In the days leading up to Winter Storm Uri, gas production dropped and gas prices began to rise — in Oklahoma, gas prices had already doubled by February 11, 2021, and peaked on February 15 at almost 300 times their pre-storm costs.[13] See elsewhere in this report for an examination of who profited from these high prices.

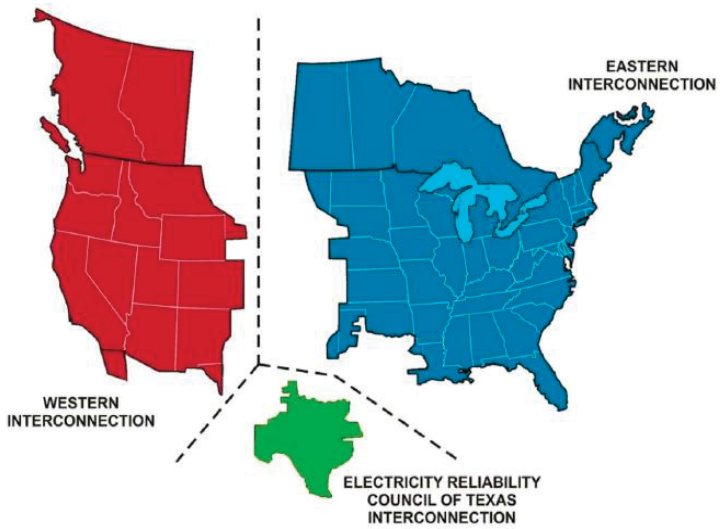


These supply and demand problems were made worse as temperatures started to drop below freezing: Many companies continued to export gas to Mexico or to chemical processing facilities, not to Texas power plants. In some cases, power plants were actually the last in line for gas, a recipe for disaster.[14]

2.2 Why Did Texas Fare Worse than Neighboring States?

> Lawmakers and regulators, including the PUC [Public Utility Commission] and the industry-friendly Texas Railroad Commission, which regulates the oil and gas industry, have repeatedly ignored, dismissed, or watered down efforts to address weaknesses in the state's sprawling electric grid, which is isolated from the rest of the country.
>
> — *"Power companies get exactly what they want": How Texas repeatedly failed to protect its power grid against extreme weather,* The Texas Tribune, February 22, 2021

The lower 48 states have three primary electrical grids: The Eastern Interconnection, which broadly covers everything east of the Rocky Mountains, the Western Interconnection, which broadly covers everything west of the Rocky Mountains, and the Texas Interconnection, which covers most of the state of Texas.



The origins of the Texas-only electrical grid date back almost a century, to the Federal Power Act of 1935, and to the classic Texan desire to stay free of federal regulations. With the Federal Power Act of 1935, President Roosevelt called on the Federal Power Commission to oversee interstate electricity sales, but the Commission only had authority to regulate utilities that were transmitting electricity across state lines. While the Texas grid has grown significantly since 1935, and technically has small connections to Mexico and Oklahoma, Texas has generally kept its grid isolated from the rest of the country and avoided federal oversight.[15]

Then, in 1999, Texas passed Senate Bill 7, deregulating most of the Texas energy market. The law went into effect in 2002, and "removed controls on wholesale electricity prices and worked toward eliminating tightly regulated local monopolies."[16] The argument from conservatives was that deregulation would spur investment and lower prices, but the *Wall Street Journal* describes the reality:

> *Power providers can reap rewards by supplying electricity to Texas customers, but they aren't required to do it and face no penalties for failing to deliver during a lengthy emergency. That led to the fiasco that left millions of people in the nation's second-most-populous state without power for days.*[17]

Finally, gas-fired power is the single largest source of electricity in Texas.[18] As discussed elsewhere in this report, gas infrastructure was hit particularly hard by Winter Storm Uri, from production to transportation to availability for use at power plants and people's homes.[19]

Winter Storm Uri snowballed into an expensive and deadly disaster for Texas because its grid was isolated and deregulated, and because it was powered by a gas-heavy electric sector vulnerable to cold weather. Uncertainty and poor communication (including confusion about how to file the correct regulatory paperwork) made existing structural problems even worse.[20]

An analysis by the University of Texas at Austin's Energy Institute identified almost a dozen factors that contributed to the statewide blackouts, including:

- Weather forecasts that underestimated the severity of Winter Storm Uri;
- Electricity demand estimates that underestimated how much electricity Texans would need;
- Power plants that were not adequately prepared for cold weather; and
- Failures within the production, storage, and distribution system that provides fuel to gas-fired power plants.[21,22]

> Grid conditions deteriorated rapidly early in [sic] February 15 leading to blackouts. So much power plant capacity was lost relative to the record electricity demand that ERCOT was forced to shed load [meaning to reduce how much electricity was being generated] to avoid a catastrophic failure.
>
> — *The Timeline and Events of the February 2021 Texas Electric Grid Blackouts,* The University of Texas at Austin Energy Institute, July 2021

As discussed later in this report, Texas's winter storms in 1984, 1989 and 2011 had already revealed many of these issues, as well as the need for additional reliability and weatherization measures to strengthen the grid. But Texas regulators failed to respond to the problems uncovered by these previous storms.

From noon on February 14, 2021, to noon on February 15, 2021, Texas lost more than 24,000 megawatts (MW) of generation capacity as power plants shut down. Most of this lost capacity was due to offline gas, coal, and nuclear power, although there were wind and solar outages as well. [23] As a result, more than two out of three Texans lost their power at some point during Winter Storm Uri, averaging more than 40 hours without power.[24]

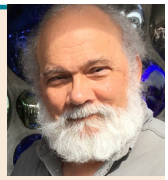
> After the blackouts began, [Governor Abbott] appeared on Fox News to falsely assert that wind turbines were the driving force behind the outages.
>
> Wind turbines were a factor, but only a small one. Wind in Texas doesn't produce as much power in the winter, and regulators don't typically rely on wind turbines to provide significant amounts of power. Instead, regulators anticipated that natural gas and coal power plants would meet demand.
>
> — *Texas gov knew of natural gas shortages days before blackout, blamed wind anyway,* ArsTechnica, May 21, 2021

Unfortunately, just as generation capacity was dropping, demand for electricity was skyrocketing: "The peak [demand] was 11,000 MW above what ERCOT, Texas's electric grid operator, was projecting and planning for as of November [2020]."[25] In comparison to many other states, however, Texas does not have many energy efficiency programs or programs to encourage Texans to use less electricity, either of which could have helped lower demand during the storm.

While it's difficult to say exactly how many homes one megawatt of electricity can power — after all, no two homes use exactly the same amount of electricity — the Texas power outage ultimately left more than 10 million people in the dark.[26] Because the Texas grid is not truly connected to the rest of the United States, it was not possible for Texas utilities to bring in electricity from neighboring states.

Many Texans' pipes froze or burst during the storm, leaving them without access to fresh water, or their water utility literally began to run out of water, so water pressure dropped and the remaining water was placed under a "boil water notice," meaning the water needed to be boiled before being consumed. But for the Texans without gas or electricity, these boil water notices were impossible to follow during the power outages.[27]

COMMUNITY VOICES



DR. CRAIG MORRIS NAZOR,
AUSTIN, TEXAS

I was in a situation that was better than people around me. We didn't have electricity for four-and-a-half days. Our water went down to a trickle because it was freezing. I bought a house during the Obama stimulus and invested in my house. I bought a metal roof, upgraded my HVAC, and bought triplepane windows even though most people said I only need double pane windows. My house never got below 55° F, whereas my neighbors' houses were below freezing and they had to move out because of frozen pipes. I had switched to all rechargeable batteries and LEDs. I had a box of recharged batteries and a solar cell that helped recharge the batteries during cold/sunny days. These small things I did to save me money on AC during hot summer months helped my family survive the freeze.

For those who still had working electricity, deregulation meant that there was often no cap on what utilities were allowed to charge individual customers — and some had rate structures that mirrored the wholesale rates, which are only subject to the very high price cap of $9,000 per megawatt hour (MWh). This led to astronomically high bills: Some Texans who usually paid a few hundred dollars a month for electric power received bills for tens of thousands of dollars (or, in one case, more than $120,000), all for the privilege of not freezing in their homes.[28,29]

As one study from the Rockefeller Foundation found, the impact of Winter Storm Uri was not felt evenly across Texas: "[Communities of color] were more than four times as likely to suffer a blackout than predominantly white areas."[30] While there have not been racial or demographic analyses of how Winter Storm Uri impacted other residents in the region, existing wealth and housing disparities[31,32] make it likely that communities of color were hit hardest.

In Houston, local environmental groups said that neighborhoods like Acres Homes, a predominantly Black and Latino neighborhood in the northwest of the city, were among the first to lose power. "The pipes are freezing. They're out of water and electricity," said Ana Parras, co-executive director of Texas Environmental Justice Advocacy Services, or Tejas, a community group that serves local communities of color.

Many of the city's hardest-hit communities already have poor infrastructure. "The houses there don't have much insulation," she said.

— *Texas Blackouts Hit Minority Neighborhoods Especially Hard,* The New York Times, February 16, 2021

Adding to the frustration of many Texans, Winter Storm Uri was not the first time the Texas electric system has faced similar challenges: Texas utilities were warned that cold weather could cause widespread damage following extreme cold weather in 1989, 2003, and 2011.[33] Indeed, the Federal Energy Regulatory Commission (FERC) and the North American Electric Reliability Corporation (NERC) released a 200-page report following the 2011 cold weather event, identifying more than two dozen steps Texas could take to prevent future cold weather electrical problems.[34] Texas officials and regulators ignored most of the recommendations, and even the few that were adopted were never properly enforced.[35]

Ultimately, the researchers at UT Austin found that Texas "managed to avoid a catastrophic failure of the electric grid" during Winter Storm Uri, meaning the blackouts that did occur were relatively controlled, and restoring power took days or weeks, rather than months or years.[36] But while this may technically count as "avoiding catastrophic failure of the electric grid," Winter Storm Uri — and the electric grid's many problems throughout the storm — were absolutely catastrophic to the millions of Texans who were without heat or electricity, particularly the hundreds of Texans who lost their lives due to the storm.[37]

Almost a year after that historic power failure, the state's natural gas system has been tested by a far milder cold spell. Some energy experts say it did not pass the test.

According to estimates from Bloomberg and other industry analysis, Texas gas production dropped by around 20% as the cold front arrived last weekend. It was the largest decrease in supply since February's winter storm. The reason, according to documents filed with the Texas Commission on Environmental Quality, includes equipment breaking down in the freezing temperatures.

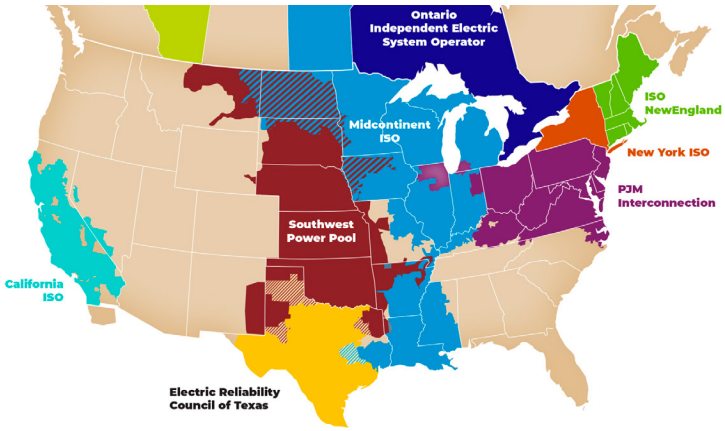
— *Texas gas supply plummeted during last weekend's cold snap. That spells trouble for the grid.* KERA, January 7, 2022

A brief cold snap in December 2021 resulted in many of the same gas supply problems that occurred during Winter Storm Uri, albeit at a much smaller scale. Several power plants couldn't function at all due to lack of a supply.[38] Likewise, as this report is being finalized in early February 2022, cold weather has reduced gas supplies and left tens of thousands of Texans without power, despite Governor Abbott's promises in late 2021 that there would be no outages this winter.[39,40]

It's clear that Texas still has a long way to go towards building a clean, safe, and reliable electric grid.

2.3 What Happened in the Southwest Power Pool (SPP) and the Midcontinent Independent System Operator (MISO)?

While Texas bore the brunt of Winter Storm Uri, neighboring states were not immune to the storm's impacts. In particular, states within the Southwest Power Pool (SPP) and the Midcontinent Independent System Operator (MISO) struggled throughout the storm. Both SPP and MISO are regional electrical grids, part of the larger Eastern Interconnection that provides electricity to the eastern half of the United States.



SPP serves all of Kansas and Oklahoma, as well as portions of New Mexico, Texas, Arkansas, Louisiana, Missouri, South Dakota, North Dakota, Montana, Minnesota, Iowa,

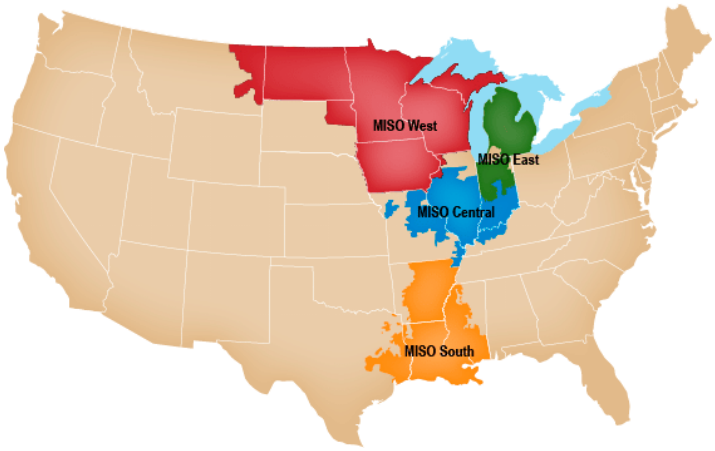
Wyoming, and Nebraska, while MISO serves most of the midwest United States, Manitoba, Canada, and most of Arkansas, Mississippi, and Louisiana.

Within SPP, the storm caused an almost 40 percent drop in available electricity generating capacity, requiring brief blackouts in Oklahoma and neighboring states.[41] From February 8 and 20, over a thousand individual generating units — more than half of which were gas-fired power plants — experienced over 4,000outages, derates[42], or failures to start. Of those outages, derates, and failures to start, the vast majority were caused by either freezing or fuel issues.[43]

> "I got on and reported the outage but they never responded," [Eric Adkins from Muskogee, Oklahoma] said. "I finally got on Twitter and figured out it was a blackout. I had no idea."
>
> Adkins' grandmother lives in Porum, about 30 miles south of Muskogee, is on oxygen, and uses Cookson Hills Electric.
>
> "She called (them) and asked if they would get a warning before their power went off and she was told "'No, we can't give you a warning, it might happen or it might not.'"
>
> — *Oklahoma prepares for possibility of more power outages as winter storms push demand for electricity,* The Frontier, February 16, 2021

Unlike Texas, however, SPP was able to import energy from elsewhere in the Eastern Interconnection, meaning blackouts were much more limited within SPP than they were in most of Texas.[44] In fact, SPP's report on the winter storm identified the ability to draw power from neighboring states as "critically helpful assistance" during the storm.[45] Blackouts were also more limited in SPP because it isn't as reliant on gas power as Texas. Its SPP report notes that, "While most resource types had availability issues during the February 2021 winter weather event, at the very heart of the cold weather event, natural gas plants were unavailable to generate." Wind energy within SPP operated close to 95 percent of its accredited supply during the winter freeze, compared to gas only providing half of its accredited capacity during the coldest days.[46] SPP wind generation fared much better than ERCOT wind generation, in large part because of the "lack of winterization of [Texas] wind turbines."[47]

Still, the SPP report provided more than 20 recommendations to prevent problems in the future, including better resource planning and availability, thorough assessment of the minimum necessary capacity to prevent blackouts, better communication and coordination between utilities and with the general public, grid transmission improvements, and more.[48]



MISO South, which covers most of Louisiana, Mississippi, and Arkansas, as well as parts of eastern Texas, was also hit by Winter Storm Uri, and experienced both increased demand and reduced generating capacity. Some MISO customers experienced blackouts, although not nearly as extensive as those in the parts of Texas where the grid is governed by ERCOT.[49]

> Though temperatures are no longer below freezing in Baton Rouge, thousands remain without power and dangerously cold temperatures continue to pose a threat.
>
> In East Baton Rouge Parish alone, nearly 10,000 are still awaiting power restoration as of Thursday (Feb. 18) morning at 6:15 a.m., according to Entergy's outage map.
>
> On Wednesday, Governor John Bel Edwards requested a presidential emergency declaration due to the severe winter weather.
>
> — *Louisiana among numerous states reeling under harsh weather, massive outages,* WBRZ, February 18, 2021

A report issued by MISO included similar recommendations to those suggested by SPP, including winterizing the energy system, modernizing the grid to increase transmission capacity, improving data collection and communication, and increasing the focus on reliability.[50]

In the end, both SPP and MISO South avoided one of Texas's biggest challenges: Their grids are connected to the rest of the United States, and were able to bring power in from elsewhere when local generating capacity dropped. That said, there are still numerous improvements to be made within both SPP and MISO, something that will be covered later in this report.

2.4 From Low Temperatures to High Profits

Who pays when a natural disaster hits? Who profits? For Winter Storm Uri, the answer seems to be "everyday people pay, big fossil fuel corporations profit."

It was clear trouble was on the horizon: Earlier in February, 2021, before Winter Storm Uri officially arrived, natural gas prices were already rising. Low temperatures froze gas infrastructure, which meant that the gas system was already stretched thin by February 13, especially since previous recommendations for winterization (discussed elsewhere in this report) had been ignored.

The drop in gas supply meant that gas-fired power plants had to scramble to find fuel and if they did, it was at unheard-of prices. Meanwhile, the Public Utility Commission of Texas (PUCT) decided to allow market prices to rise to the very high cap of $9,000 per MWh during the freeze, even though many power plants were not able to run. That decision, combined with the design of Texas's energy market, meant that wholesale power prices remained maxed out for days even when there was no power to buy.

Many electric power providers, including member-owned co-ops and municipal utilities, lost a lot of money, while gas suppliers and pipeline companies raked in record profits. According to Thomas Coleman, Chief Technical Advisor at NERC, gas suppliers claimed they couldn't meet contracted (but less profitable) demand during Winter Storm Uri, only to turn around and make huge profits on the open (and, during Winter Storm Uri, sky-high) energy market.[51] One CEO even crowed that the winter storm "was like hitting the jackpot at some of these incredible prices."[52]

> Windfall profits [following Winter Storm Uri] included $2.4 billion for Energy Transfer of Dallas, $1.1 billion for Kinder Morgan of Houston and more than $1 billion for BP from its natural-gas trading business, according to the Chronicle's Paul Takahashi, citing company filings and analyst estimates.
>
> — *Bitter chill, bitter bill. Why are Texans paying for billions in industry profits from winter storm?* The Houston Chronicle, August 5, 2021

As recently as December 2021, Texas Governor Greg Abbott was meeting with energy companies like NRG, Vistra, and Phillips 66 — many of whom stand to gain from a fossil fuel-friendly market design or have already profited handily from Winter Storm Uri — to discuss "grid reliability," while leaving consumer advocacy groups and everyday Texans out of the conversation.[53]

The legislation that has come out of Austin so far has focused on allowing gas distribution companies, electric cooperatives, electric utilities and retail electric providers that owed billions of dollars to ERCOT markets or to natural gas suppliers to "securitize" the debt through long-term bonding. But none of this financial relief helped Texas's many small businesses, nor was there any relief offered to individual ratepayers.[54] Similarly, efforts to pass legislation to improve and increase programs for individual homeowners through rate relief or more robust energy management and energy efficiency programs were stymied by lack of leadership. Legislation was introduced to allow customers to receive payment relief for high utility bills, utilizing Texas's multi-billion "rainy day fund" for payment assistance, as well as legislation that would have raised the energy efficiency goals that Texas utilities are required to meet, but neither bill made it out of committee.

In all, the Texas legislature passed only four securitization bills that were signed into law by Governor Abbott. These bills collectively allow various corporations to "securitize" their debts over time and avoid bankruptcies, and in many cases even make large profits, as ratepayers suffer through higher bills.

TEXAS LEGISLATION PASSED TO ADDRESS STORM COSTS

BILL	DESCRIPTION	ESTIMATED COST
S.B. 1580	Relating to the use of securitization by electric cooperatives to address certain weather-related extraordinary costs and expenses and to the duty of electric utility market participants to pay certain amounts owed	Allows electric cooperatives that choose to securitize costs and debts resulting from the storm and have ratepayers pay it back over time. Could lead to $2 to $3 billion in costs being paid back by Texas ratepayers that live in impacted cooperatives.
H.B. 1510	Relating to the response and resilience of certain electricity service providers to major weather-related events or other natural disasters; granting authority to issue bonds	Creates a securitization mechanism for costs incurred by utilities outside of ERCOT in the event of storms or extraordinary events. Does not set a certain limit on amount that can be securitized but is subject to PUC approval.
H.B. 1520	Relating to certain extraordinary costs incurred by certain gas utilities relating to Winter Storm Uri and a study of measures to mitigate similar future costs; providing authority to issue bonds and impose fees and assessments	Allows up to $10 billion in storm costs to be securitized and paid back by ratepayers over a 30-year period, though exact amounts subject to Railroad Commission decisions and bond terms. Analysts expect roughly $4.5 billion to be authorized for collection through this mechanism.
H.B. 4492	Relating to financing certain costs associated with electric markets; granting authority to issue bonds; authorizing fees	Includes financing through securitization both the "Short-Pay" default charges owed to ERCOT plus additional charges related to ancillary and price-adder payments. Approximately $2 billion in all.

CPS Energy, the biggest utility in San Antonio, was blunt in its assessment.

"Egregious natural price gouging," CEO Paula Gold-Williams said of Energy Transfer, the biggest winner to date. CPS claims the pipeline operator generated two years' worth of profits in the first quarter of 2021 and is suing to reclaim some of the $1 billion it lost during the storm.

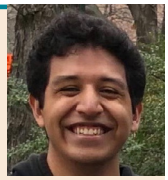
— Gas sellers made $11 billion while millions of Texans were without power in February, Fortune, July 9, 2021

Following these unprecedented price spikes, the attorneys general of Kansas[55], Oklahoma[56], Arkansas[57], and Texas[58] all vowed to investigate whether gas providers manipulated market prices by withholding the supply of gas. None have brought charges in the year since the event. The Federal Energy Regulatory Commission also probed gas suppliers' behavior during the crisis, and last November referred two cases to its investigations division, which can bring civil lawsuits for violations.[59] Finally, the Kansas legislature is considering a resolution against price gouging in response to Winter Storm Uri.[60]

If state or federal agencies do find evidence of market manipulation, it would not be the first time: In 2016, FERC issued a report in 2016 identifying numerous examples of gas market manipulation between 2005 and 2015,[61] and in 2019, Kansas reached a settlement with gas companies in 2019 to address illegally inflated gas prices.[62]

While legal battles play out, utilities are at different stages of raising their customers' rates to recoup their losses during the deep freeze. In many cases, customers will be paying higher energy bills for years to come — just to make up for a few days of higher costs in the aftermath of the storm.

COMMUNITY VOICES



RIC GALVAN
SAN ANTONIO, TEXAS

When the winter storm happened, I was staying with my family in San Antonio because of the pandemic. We were frozen, snowed in, had no power for several days when the storm happened. When we did have power, we had to boil our water because our pipes were no longer giving us clean water, and then we had to try to cook food as quick as we could within the five or eight minutes we had power. Now [utilities are] gonna charge us more for it? It's just not fair that we're gonna have to pay higher rates for our power after suffering through all those horrible things, and then little will be done to make sure this does not happen again.

Municipal utilities and electric cooperatives are able to quickly pass along rate increases to their customers, including those resulting from the high cost of gas. Investor-owned utilities have to receive approval from their state regulators before rates can increase, a process that is still unfolding in many places.

Examples of municipal utilities and electric cooperatives responding to Winter Storm Uri with price increases include:

- **In Iowa,** Emmetsburg Municipal Utilities paid $1,059,000 for gas in February 2021 compared to $109,000 in January 2021.[63] The utility covered half of the cost from its cash reserves while customers paid the rest in a lump sum payment on their March bill. The average customer paid an extra $184.89 on top of their average price of $100.98, for a total bill of $285.87.
- **In Missouri,** City Utilities instituted a rate increase that will have the average customer pay an extra $375 over two years.[64]
- **In Texas,** the largest electric cooperative — Pedernales Electric Cooperative — is charging consumers a temporary Winter Storm Uri surcharge to pay off its approximately $160 million of storm-related debt. For the average PEC residential member, the surcharge amounts to an increase of approximately $8.75 per month, based on an average 1,250 kilowatt hour of use. This amount will appear as a line item on members' monthly bills during the 24 month period beginning October 1, 2021. Since everyone's monthly electricity use is different, the surcharge will vary from member to member.
- **Also in Texas**, the electric cooperative most impacted by winter storm Uri was Brazos Electric Cooperative, which declared bankruptcy after receiving a bill from ERCOT for over $2 billion.[65] Because Brazos Electric Cooperative is the wholesale provider to 16 member cooperatives, the eventual impact to ratepayers is still being worked out through the courts and is likely to lead to securitizing the debts.

It generally takes longer for regulated utilities to pass along rate increases, including fuel adjustments, like higher gas costs during Winter Storm Uri. Some of these rate increases are not yet final:

- **In Missouri,** Spire customers will see monthly bills rise by more than $14 due to storm-related costs.[66]
- **In Texas,** Texas Gas Service incurred $3.4 billion in debt during the storm and is seeking to raise its customers' rates by $5 a month.[67]
- **In Oklahoma,** Oklahoma Natural Gas incurred $1.4 billion in debt and received approval from the Oklahoma PUC to charge its customers nearly $8 a month for the next 25 years for costs related to Winter Storm Uri.[68]
- **In Kansas,** Kansas Gas Service incurred $360 million in gas debts and will charge its customers up to $11 a month to cover the costs.[69] Some Evergy customers in Kansas could pay close to $3 more each month for the next 15 years.[70]
- **In South Dakota,** Black Hills Energy customers saw a more than $11 hike in their monthly bills.[71]
- **In Colorado,** Xcel Energy is seeking to raise its customers' rates by nearly $6 a month for the next 30 months.[72]
- **In Minnesota,** CenterPoint customers are paying nearly $5 more a month for the next five years.[73]

Customers are not only facing extra charges related to Uri; they're also seeing their utility bills rise as record gas exports reduce supply in the US, and fracking companies raise their prices to increase shareholder profits.[74], [75]

> As I would learn after we began to meet with him regularly, Albert lost two limbs after acquiring frostbite during Winter Storm Uri in February 2021 — not only the one leg I saw that day, amputated below the knee, but also eventually part of the foot on his other leg. He'd been laid up at Brooke Army Medical Center for months following the storm, and still had unhealed wounds on his arm from a skin graft. In that regard, Albert was one lesser-visible impact of a climate disaster that claimed hundreds of lives during statewide power and water outages that for millions lasted for days on end.
>
> — *'His Name Is Albert': Lessons from a Polar Vortex (1 of 3),* Deceleration, January 12, 2022

Overall, the Texas gas industry made over $11 billion during the five days of Winter Storm Uri, more than 75 times what the industry would typically bring in during a similar time period.[76] Texas also saw more than $50 billion in electricity sales during the five days of Winter Storm Uri, as much as the previous three years of sales combined.[77] A representative from the Texas utility Vistra went so far as to say that some suppliers were intentionally reducing the amount of electricity or gas they consumed during Winter Storm Uri so that they could resell it at a huge markup.[78]

The power outages and massive price hikes of February 2021, highlight the risk of building our energy systems around a volatile commodity like gas, which is in high demand during extreme weather and controlled by an overlapping series of profit-seeking companies, including oil and gas drillers, pipeline companies, and utilities. In many cases, these companies evade accountability and responsibility for ensuring energy is reliable and affordable. They keep profits when times are good, but force ratepayers to foot the bill when there's a crisis.

3.0 PREVENTING ANOTHER DEEP FREEZE

Climate change is making extreme weather events like Winter Storm more frequent, but we have the ability to prepare for future deep freezes. For an example, look no further than El Paso, Texas. The city was hit by Winter Storm Uri alongside the rest of Texas, but "less than 3,000 customers out of El Paso's population of 680,000 people lost power for less than 10 minutes" during the storm.[79] El Paso credits its success to lessons learned from previous cold weather, as well as being on a larger regional power grid, rather than the Texas-only grid that experienced so many outages during Winter Storm Uri.[80]

Of course, there's no one magic solution to preventing another deep freeze grid and infrastructure failure. Instead, it will involve a combination of improving our energy infrastructure, from transmission to power generation to buildings; expanding access to energy management, energy efficiency, storage, and renewable energy, improving communication; offering more opportunities for public input, and more. None of these changes are specific to Texas, SPP, or MISO South — most of them could apply to anywhere in the United States, or indeed the world.

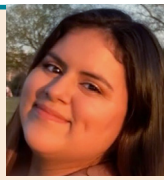
> The Final Report [on the February 2021 freeze] includes 28 formal recommendations that seek to prevent a recurrence of the failures experienced during the February 2021 cold weather event. These recommendations include important revisions to the NERC Reliability Standards surrounding generator winterization and gas-electric coordination.
>
> Additional recommendations are included regarding topics such as cold weather impacts on mechanical and electrical components, utilization of weather forecasts to better predict electric demand, and increasing the ability to rotate rolling blackouts, amongst other recommendations. The report also encourages additional study of the ERCOT system's reliability issues, guidance on identification of natural gas infrastructure for protection from rolling blackouts, and additional ways to address natural gas fuel supply shortfalls during extreme cold weather events.
>
> — *Final Report on February 2021 Freeze Underscores Winterization Recommendations,* FERC, November 16, 2021

Special time and attention should be focused on areas with a high level of energy burden, which is the percentage of household income that goes toward paying gas and electric bills. Because of the long, shameful, and ongoing legacy of discriminatory housing policies and racial segregation in the United States, Black and Hispanic individuals are more likely to live in older, less energy-efficient homes that burden them with higher energy costs.[81]

For example, a report issued by the Sierra Club and allied organizations found that households in predominantly Black

and Hispanic communities in Milwaukee were carrying nearly twice the energy burden of predominantly white neighborhoods.[82] It always costs more to heat a non-energy efficient home, and the skyrocketing electricity rates that followed Winter Storm Uri multiplied the burden such households face. Any improvements to our electric grid must prioritize communities with high energy burden so the next winter storm or heatwave does not result in debilitating debt and utility disconnections.

COMMUNITY VOICES



JACQUELINE SANTILLANA

I come from a low-income family, and events like [Winter Storm Uri] have the potential of killing us. I wasn't able to reach out to my family the first day, and I was worried my dad wouldn't be able to go to dialysis or that my mom would need her oxygen tank. I had power for three hours on the second day, and in that time I reached out to my friends and my family to let them know I'm safe. Every night I cried myself to sleep from the cold and the anxiety.

I ask that you address the equity concerns of where the power went out, that you listen to community organizations and community leaders that have been working for months to empower people, and that you expand public comment so that more college students like me can give their piece.

3.1 Increase Energy Efficiency

Energy efficiency means making improvements to homes, buildings, and energy infrastructure so they can do the same tasks with less energy. If you've ever replaced an old incandescent lightbulb with a new LED or CFL lightbulb, you've helped make your home or business more energy efficient. Likewise, replacing old, leaky windows with newer, more energy efficient windows will help keep a building cooler during a summer heatwave *and* warmer during a winter freeze. These types of energy efficiency upgrades are often helpful regardless of where you live — a more energy-efficient home will use less energy, save you money, and help your household be more prepared for extreme weather whether you're in Austin, Texas, or Anchorage, Alaska.

> "Electric demand is always going to go up when there's hot or cold weather, but it's a manageable problem if you have efficient houses," said Steven Nadel, executive director of ACEEE [American Council for an Energy-Efficient Economy] and lead author of the report [on expanding energy efficiency and demand response programs in Texas]. "Wasting electricity in Texas when power demand is peaking just doesn't make sense. Home efficiency upgrades and technology that shifts when electricity is used simply costs less than building new plants, and we have the numbers to prove it."
>
> — *Energy Upgrades in Texas Homes Could Avert Blackouts at Lower Cost than Proposed Gas Plants,* American Council for an Energy Efficient Economy, October 13, 2021

The American Council for an Energy Efficient Economy identified a number of opportunities to improve energy efficiency in Texas, all of which could be applied to the rest of the country. ACEEE's recommendations included:

- Replacing existing electric furnaces with more energy-efficient heat pumps;
- Insulating and sealing attics;
- Installing smart thermostats; and
- Replacing existing water heaters with more energy-efficient heat pump water heaters.[83]

Unfortunately, many energy efficiency upgrades have a high upfront cost, or are inaccessible to renters and residents of prefabricated homes and trailer parks. Many renters can't replace their thermostat, let alone install a new furnace or add insulation to a leaky attic or basement. For that reason, most energy efficiency programs are targeted to, and only accessible to, homeowners — who are more likely to be white.[84]

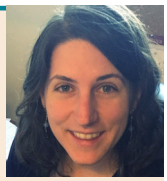
One study found that "multifamily rentals in 2009 had 34 percent fewer energy efficiency features on average than other housing types," pointing to a systemic difference in energy efficiency between owners and renters.[85] Ultimately, programs that encourage energy efficiency upgrades must focus on both owners and renters, and on residential, commercial, and industrial properties, to ensure that everyone benefits from safer, more secure housing and lower monthly utility bills.

While Texas was the first state in the nation to adopt an Energy Efficiency Resource Standard back in 1999, today Texas ranks dead last among the states that require utilities to meet certain energy efficiency goals. An easy solution to help Texans be better prepared for future winter storms and heat extremes would be to require Texas utilities to meet

expanded goals. Current Texas goals are well behind other states, and raising the Energy Efficiency Resource Standard in Texas is one of the most cost-effective ways to meet Texans' energy needs.

COMMUNITY VOICES

DR STEPHANIE THOMAS
HOUSTON, TEXAS



I'm angry, and as a Texan I have paid enough. Other Texans paid with their lives. You have to fix the grid by making homes energy efficient, because that would have saved lives during the winter storm. We need public input in these processes, and you need to hear from actual Texans. We need solutions that don't just pad the bottom lines of corporations, but save the lives of our neighbors and fellow Texans.

The 2021 Bipartisan Infrastructure Bill includes a historic $3.5 billion investment in the Department of Energy's Weatherization Assistance Program, which helps fund energy efficiency investments for low-income households.[86] President Biden's Build Back Better Act, which passed the House of Representatives and is awaiting a vote in the Senate, includes an additional $3.5 billion. Together these investments would nearly double the program's annual budget, and would begin to address the backlog of Americans that could benefit from weatherization. This support is desperately needed, as one study found less than one percent of low-income households are currently accessing weatherization assistance programs.[87]

3.2 Implement Demand Response

Demand response means "reducing or shifting [your] electricity usage during peak periods," usually as part of a utility program to charge less for energy during low-demand periods.[88] For example, many utilities charge less for energy at night, since fewer people are using it and demand is lower. If you've ever waited to run your dishwasher because water, gas, or electricity costs less at night, you've participated in a type of demand response. During heat waves or extreme cold, utilities and public officials may ask people to voluntarily use less energy — usually by turning down the heat or air conditioning — to help reduce the strain on the energy grid. Many Texans experienced this in mid-2021, when the Electric Reliability Council of Texas asked people to turn off their air conditioners and reduce electricity use during a heat wave.[89]

Over the past decade or so, new "smart," Internet-enabled appliances and thermostats have enabled automatic demand response. For example, a smart charging station for electric vehicles could charge more slowly during the day or other high-usage times, reducing electricity consumption, while charging more quickly at night or when the utility has signaled that there is lower demand for electricity.[90] Similarly, a smart thermostat might know to automatically turn off the air conditioning if no one is home, or to reduce energy usage when a utility signals there's a need for people to use less power. Following Winter Storm Uri, both smart charging stations for EVs and smart thermostats for homes and businesses were included in recommendations from the American Council for an Energy-Efficient Economy.[91]

Automatic demand response programs must be implemented carefully, however, or these programs can lead to unexpected changes and unhappy people. For example, during the Texas heat wave of June, 2021, some people found their thermostat was being remotely adjusted by their provider without notice.

> One Houston family told a local news affiliate that their smart thermostat was turned up to 78 degrees with seemingly no notice other than a text sent after the fact. When they enrolled in a program called "Smart Savers Texas" — entering them in a sweepstakes to win up to $5,000 off their energy bills for the next year — these users didn't realize that this also gave the power company permission to adjust their thermostat during high demand periods, like heat waves.
>
> — *How your power company can remotely control your smart thermostat,* Vox, June 21, 2021

Smart thermostats and appliances are powerful tools to improve people's lives and can offer significant reliability benefits to the grid by reducing demand at the exact moment the grid needs the help. Residential demand response programs should be expanded, but utilities need to offer those tools in a mutually beneficial, transparent, and understandable way. Ensuring clear communication about what to expect will enable these important programs to grow — saving people money on their utility bills and providing an additional layer of reliability for the entire grid.

3.3 Protect and Improve the Grid

While Winter Storm Uri caused outages for all types of power plants, coal and gas plants fared particularly poorly.[92] Texas's reliance on burning gas to generate power was a particular issue: The same gas used by power plants is also used in many places for heating and cooking, meaning cold weather drives up demand (and prices) for both electricity and warmth. That demand, coupled with freezing equipment at gas power plants and pipelines across Texas, meant there was a much higher demand than there was available supply.[93]

The general energy efficiency and demand response programs outlined elsewhere in this report would help reduce energy consumption across the board. That helps use less electricity in general, thus reducing the likelihood of power outages, regardless of whether the electricity was generated from renewable energy or by burning fossil fuels.

> It's worth noting that much of the cost of winterization would remain in the Texas economy. One of the world's leading manufacturers of heat-tracing equipment, Thermon Group Holdings, is based in Austin and operates a major factory in San Marcos. A few years ago, it winterized an oil complex on Russia's Sakhalin Island — where the average low temperature in January is 3 degrees Fahrenheit — for $12 million. "All of this technology exists," said Thermon CEO Bruce Thames. "We just haven't invested in it in the state of Texas."
>
> — *The Texas Electric Grid Failure Was a Warm-Up,* Texas Monthly, February 2022

Improving the grid should also focus on moving power from where it's generated to where it's needed. In Texas, this means ensuring that power generated by renewable resources like wind and solar in west and south Texas can reach the high-demand regions around Dallas, Houston, and the San Antonio-Austin corridor.

COMMUNITY VOICES

JOE THE BARBER
TEXAS

Abbot wants to invite Tesla and other businesses to use our energy grid, and it's already not in good shape. I pay attention and I hate it. The 2009 freeze happened and no recommendations were adopted. Same thing happened in 2021 and it's a big "f you" to Texans.***

A modern electric grid is more than simply wires that run from Point A to Point B, it must intelligently direct power where it's needed most. A modern grid may also include tools like onsite solar, energy storage, energy management systems, and potentially even the use of batteries from electric vehicles to provide power. In an emergency, communities could even create "Virtual Power Plants" (VPPs) by combining these resources, but electric grid operators, utilities, and regulators must first allow these technologies to be implemented.

In many cases, improving the existing grid will also mean winterizing existing fossil fuel infrastructure like gas wells, compressors, gas processing plants, gas pipelines and gas power plants. While we transition to a clean energy future, we must make sure customers aren't left out in the cold by existing equipment that isn't prepared for cold weather. Winterizing also makes economic sense: A 2011 estimate found that winterizing Texas's existing gas infrastructure would cost less than $200 million a year.[94] For comparison, damage from Winter Storm Uri cost almost $200 billion.

3.4 Increase Access to Clean Energy

In the long run, replacing fossil fuel with clean energy, including energy storage, is the only way to build a modern, resilient grid. In fact, wind power actually exceeded expectations during the Uri.[95] One utility regulator from Minnesota — a state known for its particularly cold winters — highlighted the ability of renewables to operate through cold weather, saying, "Renewables have nothing to do with [power outages in Texas]. Coal plants have frozen up. Nuclear facilities are not operating in Texas. Natural gas plants are not operating."[96]

Around the United States and around the world, renewable energy coupled with energy storage is often less expensive than continuing to build and operate fossil fuel plants, and are more than capable of operating in sub-zero temperatures.[97],[98] Texas is already a leader in wind and solar energy, with potential to power not just Texas but also other parts of the United States with renewable energy.[99]

Renewable energy also allows communities to generate their own electricity, whether through nearby solar and wind farms or by placing solar panels directly on area homes and businesses. In a modernized electric grid, these "micro-grids" can communicate with each other to determine who needs electricity, where there is extra capacity, and tell people of potential problems before they become disasters. This can be particularly important to people and organizations with heightened electricity needs, like people who rely on home medical devices like dialysis machines, as well as community centers and medical facilities.

COMMUNITY VOICES

ELIAN SWEETEN-LOPEZ
AUSTIN, TEXAS

I'm disabled and have issues with mobility; I'm an ambulatory wheelchair user. During the winter storm — with no power and no water, quickly running out of food that could be prepared in these conditions, and unable to drive on iced-over roads — I had no option but to travel on foot for miles to the nearest grocery store. I cannot tell you how long it took, how many times I slipped on ice. How long it took me. We must fix the grid, and we must try to prepare as best as we can, because of the dire, dire consequences that we are going to face if we don't.

While gas is a global commodity prone to unexpected price spikes during times of high demand, wind and solar have zero fuel costs, forever. The cost of gas also increases significantly once weatherization and reliability costs are taken into account.[100] Building our electricity system around clean energy — and then using that clean electricity to power homes — provides predictable prices for consumers, instead of the volatility of fossil fuels.[101]

When paired with energy efficiency improvements and energy storage, renewable energy has the capacity to provide clean, reliable energy that stays on during both the hottest and coldest months of the year, all while allowing people to pay less than they would from burning fossil fuels. But first, these tools must have access to the market and be able to compete fairly with fossil fuels, a difficult thing to achieve when fossil fuel subsidies are often difficult to see and even harder to remove.[102]

3.5 Foster More Public Input

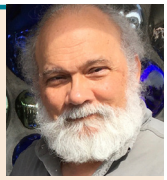
The majority of people living in the United States agree that climate change is happening, that it is caused by human activity, and that public officials at all levels — local, state, and federal — should do more to address climate change.[103]

ADVOCATES CALLING ON TEXAS OFFICIALS TO PRIORITIZE A CLEAN AND RELIABLE ELECTRIC GRID

Yet, in many states, it's complicated and difficult for residents to give input on energy and utility issues, if opportunities for public comment are available at all. For example, a recent hearing held by the PUCT did technically allow for public comment, but only in-person comments were accepted. For someone living in the Rio Grande Valley in far south Texas, appearing in person at the PUCT's hearing in Austin would have required almost 15 hours of driving simply to provide input on how Texas can create a safer and more reliable energy system. To address these shortcomings, groups like AARP Texas have proposed regional public hearings, better cost-benefit analysis, and more transparency.[104]

COMMUNITY VOICES

DR. CRAIG MORRIS NAZOR
AUSTIN, TEXAS



I went to a Texas PUC hearing and the stories from people who testified were tragic to hear. There were folks in food deserts who rely on local convenient stores like 7-11 that were closed, so folks were going hungry. One person testified about going out in search of food, getting in a car accident, and had to go to the hospital. In the gallery, you could tell the fossil fuel lobbyists because they were wearing suits or dresses with heels and they were just staring at people who were testifying. The biggest thing that got me is that a state representative stood up and claimed that Texas had the best grid and that cheap wind and solar ruined the Texas grid.

Even with the existing obstacles to public engagement, almost 4,000 people submitted written comments calling on the PUCT to focus more on renewable energy and energy efficiency solutions, and less on propping up the fossil fuel industry. It still remains to be seen whether or not the commissioners will actually listen.

> "I cannot begin to express in words the terror that we experienced because of the lack of power," Laura Taylor told the commission.
>
> Taylor said her daughter Julie is "not ambulatory" and requires machines to help her breathe. She said when their power went out in Katy they needed to use their cars to charge her breathing apparatus.
>
> "During the 72 hours, we were frantically trying to keep really warm and perform her breathing treatment," she said.
>
> — *Medically vulnerable Texans tell the state to keep their power on in the next emergency,* KUT 90.5, January 13, 2022

Texas, however, isn't the only state that makes it unnecessarily difficult for the public to provide input or engage with regulators and policymakers. And while one analysis found that "regulators, utilities, and related stakeholders are increasingly employing broader, more participatory processes to address this increasingly complex nature of electricity reforms," what this looks like varies wildly from state to state.[105] Clearly, there is still much work to be done.

3.6 Learn from Past Mistakes

El Paso proves that it is possible to prepare an electric grid for cold weather, even in Texas: The city "invested in preparing infrastructure" after the 2011 winter storm, and came through Winter Storm Uri relatively unscathed.[106]

WORKERS CLEAR SNOW OUTSIDE THE PERIMETER OF COWBOYS STADIUM AFTER A SNOWSTORM HIT THE AREA FEBRUARY 4, 2011 IN DALLAS, TEXAS

But for much of the region, one of the most frustrating realities of Winter Storm Uri is that the possible changes outlined in this report are not new — they were identified following previous winter storms, only to be ignored by policymakers and public officials. A FERC report on the power outages that occurred in February 2011 found that "more than two dozen of the generators that failed in [the 1989 winter storm] failed again in 2011."[107] Similarly, dozens of the power plants that failed in 2011 failed again during Winter Storm Uri.[108]

> [Following power outages in February, 2011, an] answer came in the form of a bill introduced by Senator Glenn Hegar, a Republican from Katy. It required the Public Utility Commission, which oversees ERCOT and the state's electricity utilities, to review power plants' weatherization plans. If any plan was deemed insufficient, the PUC could request more detail, but it had no enforcement authority. (The bill didn't mention the need to winterize natural gas pipelines, an omission that rendered the measure effectively meaningless, since those power plants, even if fully operational, can't produce electricity without a steady supply of gas.) Craig Estes, a Republican senator from Wichita Falls, tried to put some teeth on the bill with a substitute that required power plants to comply with the state's findings. But a few days later, Hegar's original bill was back, with Estes's changes stripped out. Hegar, who later left the Senate and was elected state comptroller in 2014, ensured the PUC was little more than a glorified paper collector.
>
> — *The Texas Electric Grid Failure Was a Warm-Up,* Texas Monthly, February 2022

Extreme weather doesn't impact every community in the same way. Communities of color and low-income communities suffer most when climate disasters hit. The concept of "environmental justice" expands on this insight, acknowledging not only that pollution and the climate crisis disproportionately impact communities of color and poor

communities, but also that addressing these challenges requires combating racism, classism, and other forms of systemic oppression.

A NOTE ON LANGUAGE

WHAT IS ENVIRONMENTAL JUSTICE?

Environmental justice is the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation and enforcement of environmental laws, regulations and policies.

Fair treatment means no group of people should bear a disproportionate share of the negative environmental consequences resulting from industrial, governmental and commercial operations or policies.

Meaningful involvement means:

- People have an opportunity to participate in decisions about activities that may affect their environment and/or health;
- The public's contribution can influence the regulatory agency's decision;
- Community concerns will be considered in the decision making process; and
- Decision makers will seek out and facilitate the involvement of those potentially affected.

— *Learn About Environmental Justice,*
The Environmental Protection Agency,
Accessed February 4, 2022

In Texas, Black and Hispanic families are twice as likely to live under the poverty line as white families and, during Winter Storm Uri, power outages were more likely to occur in low-income areas.[109] That meant Black and Hispanic Texans were more likely to experience blackouts during Winter Storm Uri than their white neighbors.[110] To be clear, many white Texans also experienced power outages, but embracing the principles of environmental justice is necessary to build an electric system that truly works for everyone.

MULTIPLE PEOPLE OUTSIDE OF HEB GROCERY STORE DURING WINTER STORM URI

For example, utilities must better isolate so-called "critical load circuits" to allow for scheduled rolling blackouts, and ensure no one community bears the brunt of an extreme weather event. Businesses could also power down empty office buildings or other sites. During Winter Storm Uri, the city of Dallas received criticism for its bright Valentine's Day light display as many Texas were without power, and people across Texas took to social media to express their anger at brightly-lit, completely empty office buildings, sports stadiums, and construction sites.[111]

Living near a hospital or in a wealthier downtown area means the area's lights are less likely to be turned off, [says Cyrus Reed, the conservation director at the Sierra Club's Lonestar Chapter], because those areas are prioritized during rolling blackouts. "So if you're in one of those fancy-schmancy, really expensive million dollar apartments, you were fine," he says. "If you were just across the highway ... in low-income subsidized high rises ... your lights were cut off. You had no idea what was going on and looked across the highway at all the lights downtown."

— *Texas's grid may still be unprepared for the next big winter storm,*
Popular Science, January 18, 2022

Winter Storm Uri was not simply a one-time emergency, but part of a global trend of increasingly extreme weather caused by climate change. Unless we learn from the storm — and the mistakes that led to millions of people losing power and hundreds of people freezing to death — it's only a matter of time before the next extreme weather event forces history to repeat itself.

4.0 WHAT'S HAPPENING RIGHT NOW?

Creating a clean and reliable electric grid, one that provides safe and affordable power across the United States, requires advocacy and smart policy decisions at all levels of government.

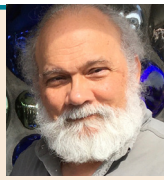
But improving our electric system is complicated by the fact that people in the United States receive electricity from one of three different types of utilities:

- Investor-owned utilities are private companies that attempt to make a profit for their investors.
- Electric cooperatives, or coops, are utilities that are democratically operated by their customers, who are also called member-owners.
- Municipal utilities are public companies that are operated by a federal, state, or municipal government.

There are almost 3,000 electric utilities in the United States.[112] That fact — coupled with the various levels of government and differing approval processes, regulatory requirements, and oversight bodies that manage those utilities — means that modernizing our electric system can be a slow, complicated process. Still, we are gradually making progress towards a more modern and more equitable electric system.

COMMUNITY VOICES

DR. CRAIG MORRIS NAZOR
AUSTIN, TEXAS



The thing we have to do here is address the responsibility of business and fold that into free enterprise. If our grid doesn't have to be reliable, then energy companies will not spend money making it reliable. Otherwise they will walk away and just say that the grid doesn't need to work when it gets cold.

4.1 What's Happening at the Federal Level?

On the federal level, FERC's report on Winter Storm Uri, which was released in November, 2021, included more than two dozen recommendations to increase the safety and reliability of the electric grid, including many of the possible changes identified elsewhere in this document. FERC is also beginning to identify the reforms needed to improve electric grid transmission and interconnections, with an eye towards "[the nation's transition] to a cleaner energy future."[113] FERC will likely publish its draft plan sometime in 2022.

FERC chairman Richard Glick also indicated he supports mandatory reliability standards for energy pipelines to protect against extreme weather, such as Winter Storm Uri, and cyberattacks, such as the Colonial Pipeline ransomware attack of May 2021.[114]

Also in November, President Biden signed the Infrastructure Investment and Jobs Act (IIJA) into law.[115] The legislation provides historic investments of nearly $28 billion to make our nation's electricity grid more reliable, resilient, and better able to integrate renewable energy sources. The IIJA includes $5 billion to establish a new Department of Energy grant program for innovative projects that reduce extreme weather's impacts on the grid, as well as $3 billion to restart a Smart Grid Investment Grant Program that will boost private sector investment in a range of technologies needed to keep the power on when climate disasters hit.

Finally, there are more than 20 shovel-ready transmission projects across the country.[116] Some would extend or upgrade existing transmission lines; others would build transmission lines for new clean energy resources or better connect the various electrical grids.

While these are all steps in the right direction, they do not confront the energy system's contributions to the climate crisis — nor the amount of damage it's expected to face from increasingly frequent climate disasters — at the scale necessary for real and lasting change. We need to fully modernize the power grid, with a strong emphasis on providing access to pollution-free energy, especially for underserved communities.

4.2 What's Happening In Texas?

In Texas, both the PUCT and ERCOT have been implementing the legislative directives outlined on page 14 of this report, as well as opening up dockets on proposed changes to reliability requirements and the design of Texas electricity and gas markets. Some of their efforts have resulted in positive changes. Now, all power plants are required to be winterized and inspected. Utilities are better able to quickly mobilize emergency demand response resources, and avoid blackouts and brownouts, while ERCOT has contracted more reliability services, and the PUCT has adopted a market redesign blueprint to increase the reliability of the grid.[117,118]

Unfortunately, the exact cost and market impacts of these proposals is unknown, and because there was little transparency and few opportunities for public comment, everyday Texans were largely shut out of the decision-making process".[119] Some of the longer-term solutions could be very expensive to consumers, and many favor fossil fuels over storage and renewable technologies.

Many of the possible changes identified in this report — including energy efficiency and demand response programs, improving transmission infrastructure, and better incorporating distributed technologies into the energy market — have yet to be adequately addressed, although the PUCT has at least acknowledged the need to do so. [120] Additionally, the Texas legislature is requiring the PUCT to examine how Texas's grid might be better integrated with other states'.[121] It's unclear, however, if the actions the PUCT and ERCOT have taken since Winter Storm Uri would prevent a repeat of 2021's widespread outages.

Both the PUCT and ERCOT have taken at least a few steps in the right direction, even if more work remains to be done. The Railroad Commission (RRC) of Texas, however — which regulates the oil and gas industries in Texas — has failed to implement any supply or weatherization requirements on the gas industry, other than requiring gas facilities to report if they should be classified as "critical infrastructure."[122] But if gas companies choose not to classify their facilities as critical, they may be off the hook for weatherizing their equipment.[123]

Part of the RRC's lack of action is due to the weak legislation from the Texas legislature and signed by Governor Abbott: Most weatherization requirements don't go into effect until 2023, and may not cover all of the gas infrastructure that failed during Winter Storm Uri.[124, 125]

Energy analyst Doug Lewin, described the problem at an ERCOT hearing in January 2022: "So much of the focus of the activity in the 11 months since the outages has been on power plants, and so little on gas supply, it is entirely possible that all of the work done on the power plant side really is worth very little, because gas supply is not weatherized, and you can't get gas to the plant."[126]

As recently as January 19, 2022, the Railroad Commission requested — but did not require — that Texas oil and gas companies to "please consider calling or email [sic] us if you detect significant losses due to extreme cold weather," indicating that such reporting was not mandatory.[127]

It remains to be seen whether or not Texas has effectively protected its existing grid from extreme weather. An ERCOT analysis of five extreme weather scenarios found that four of the five scenarios would leave Texas short on electricity, resulting in power outages.[128] But even if Texas improves its fossil fuel infrastructure, the state certainly has far to go to achieve a truly clean and reliable electric grid that provides safe, affordable power to its residents and businesses. For now, Texans are forced to wait, worry, and hope that the next extreme weather event doesn't leave them in the dark.

> Low-carbon grids are the future, and Texas has a multiyear head start. But before this opportunity can be grasped, the state needs political leaders and regulators who are focused on the jobs and well-being of average Texans rather than on the narrower incumbent interests of owners and executives of fossil fuel companies.
>
> — *The Texas Electric Grid Failure Was a Warm-up,* Texas Monthly, February 2022

4.3 What's Happening In SPP and MISO South?

Both SPP and MISO released reports on Winter Storm Uri that include lessons learned and recommendations for increasing grid reliability.[129,130] State regulatory agencies have also opened dockets to investigate what can be learned from the storm, including in Arkansas, Kansas, and Missouri. While federal agencies like FERC, regional grid operators like SPP and MISO, and state regulatory agencies are reviewing what happened and assessing next steps, there's not as much momentum as in Texas to address the problems, possibly because the impacts were not as severe.

As mentioned previously, municipal utilities, electric cooperatives, and investor-owned utilities are significantly increasing utility rates to pay the debt of high gas costs during the freeze. Environmental and consumer advocates have called on utilities to institute a disconnection moratorium because fuel costs from the storm are being passed along at a time when many utilities, like Ameren Missouri, are imposing general rate increases, while inflation and the transmission of COVID-19 are also on the rise.[131]

COMMUNITY VOICES

MICHAEL REBNE
ROELAND PARK, KANSAS

As teachers, [my spouse and I] are on an income that is nearly fixed. The increase in utility bills means less to be able to save for kids' college, spend on food, or purchase clothing for our growing children.

The gas industry was already pursuing well-funded public relations and political engagement efforts before the Winter Storm Uri, and it doubled down afterward. Alabama Power, for example, argued in March 2020, that it needs additional gas-fired power plants to avoid winter blackouts.[132] Less than a year later, Winter Storm Uri showed that — far from preventing winter blackouts — vulnerable gas infrastructure buckles under cold weather.

Another concerning trend is that many of the states within SPP and MISO are establishing gas preemption laws.[133] These laws prevent local governments from creating building codes that ban gas hookups in new or rehabbed buildings. States like Iowa, Kansas, and Missouri passed their preemption laws *after* the gas failures that lead to widespread power outages and massive financial consequences that came with the deep freeze.

Meanwhile, the electric utilities that watched gas operations fail and prices skyrocket during the winter freeze have plans to build new gas plants:[134]

- **Indiana:** Duke Energy Indiana is proposing 1,221 megawatts of new gas plants[135] and CenterPoint Energy 450 megawatts of new gas plants and associated pipelines.[136]
- **Louisiana:** Magnolia Power is proposing a 730 megawatt gas plant.[137]
- **Nebraska:** Omaha Public Power District (OPPD) is planning to build three new gas plants that will generate a total of 800 megawatts.
- **North Dakota:** Great River Energy is proposing a 100 megawatt gas plant and Montana-Dakota Utilities Co is proposing a 90 megawatt gas plant
- **Oklahoma:** The Public Service Company of Oklahoma (PSO) is proposing a 50 megawatt plant

The good news is that some utilities, like Entergy Arkansas, are now pivoting away from plans to build new gas power plants. Entergy Arkansas provided the following statement after submitting its final Integrated Resource Plan with the state's PSC:

> *The analysis we conducted in our 2021 Integrated Resource Plan showed that renewable resources represent the best combination of cost, reliability and environmental sustainability for meeting the load and energy requirements of our customers. Removing the natural gas-powered CCGT (combined cycle gas turbines) from Entergy Arkansas' prior resource plan and replacing it with emission-free renewable resources provided better economics and increased environmental benefits for our customers.*[138]

5.0 TAKING ACTION

Public officials, policymakers, and regulators need to hear from you about the lessons we must learn from Winter Storm Uri. No matter where you live — and whether or not you were directly impacted by the storm itself — you can help build an electricity grid that is safe, reliable, and affordable.

ADVOCATES CALLING ON TEXAS OFFICIALS TO PRIORITIZE A CLEAN AND RELIABLE ELECTRIC GRID

COMMUNITY VOICES

DANIELA SILVA
AUSTIN, TEXAS

About a week in, when we finally had the bandwidth to do wellness calls, we reached out to some homes of elderly people to realize they had perished. These deaths were completely preventable if the recommendations to weatherize the grid had been taken into account, and also if we had more of a focus on making more energy-efficient homes and buildings. The most vulnerable will continue to be hit the hardest with more climate-related disasters that will happen more and more in the future. In the next storm, the wealthy will be ready with generators while the rest of us will literally be left out in the cold.

5.1 Things To Think About

You can share your voice in lots of ways: By writing an op-ed or a letter to the editor, calling or writing to a public official, speaking at a public hearing, posting on social media, and so much more. No matter where and how you share your story, it's important to speak in your own words, and about your own experiences. We've included some ideas to get you started, but you should rewrite and modify these to make them your own.

THE "DEEP FREEZE" DIDN'T NEED TO HAPPEN

- Texas and other states in the region have been repeatedly warned about the risk of power outages from winter storms. Most utilities and public officials refused to take those recommendations seriously
- The fact that El Paso's made it through the storm without major power outages proves that it *is* possible to prepare for extreme cold weather.
- But as of early February, 2022, the gas producers and pipeline operators that contributed to Texas's blackouts are not under any requirements to prepare for cold weather.
- Had the Texas grid been less isolated from the rest of the country, Texas could have brought in extra electricity from other states.

FOSSIL FUEL COMPANIES PROFITED WHILE PEOPLE FROZE

- Many publicly owned utilities are drowning in debt from the storm, including San Antonio's CPS Energy, the country's largest public electric utility. .
- Fossil fuel companies made billions of dollars off the storm, including Energy Transfer of Dallas, Kinder Morgan of Houston, and BP.
- The attorneys general of Kansas, Oklahoma, Arkansas, Texas all vowed to investigate whether gas providers manipulated market prices by withholding the supply of gas during Winter Storm Uri, but none have brought charges in the year since the event.

WE CAN PREVENT ANOTHER DEEP FREEZE FROM HAPPENING AGAIN

- Commonsense solutions like energy efficiency and demand response would help reduce electricity demand and the strain on the grid.
- Reducing fossil fuel use by transitioning to renewable energy (like wind and solar) and adding battery storage can make our grid more reliable and more affordable.
- The general public must have more opportunities to shape our energy system, and regulators must do a better job listening to the most marginalized communities and individuals.

5.2 Debunking Myths and Falsehoods

There are lots of myths and falsehoods about Winter Storm Uri, why so many people lost power, and how we can change Texas's energy system for the better. Here are some notes on debunking some of the most common misconceptions:

MYTH	FACT
There was no way to prepare for Winter Storm Uri	Most of the possible changes identified in this report are not new–one of the most frustrating realities of Winter Storm Uri is that regulators and policymakers knew exactly how to prepare for extreme cold, they just didn't do it. A FERC report on 2011's power outages found that "more than two dozen of the generators that failed in [the 1989 winter storm] failed again in 2011."[139] Similarly, dozens of the power plants that failed in 2011 failed again during Winter Storm Uri.
Renewables failed during Winter Storm Uri	Some public officials were quick to blame renewable energy for the blackouts, even though there were fewer wind and solar outages than fossil fuel and nuclear outages.[140] There's even evidence that Texas Governor Gregg Abbott's office knew there would likely be gas shortages as early as February 10, 2021, more than three days before the storm hit Texas, and about four days before Texas' first widespread blackouts. Governor Abbott blamed renewables anyway.[141]
Renewables can't handle the freezing cold	A safe and reliable clean energy grid is built on multiple interconnected technologies: Energy efficiency, demand response, energy storage, preparation for extreme weather, intelligent interconnections with other grids, and more. That means that, if one section of the grid does go down, other sections of the grid can step in and share the load. That said, wind and solar can both be prepared for extreme cold and extreme heat, with wind turbines able to operate at temperatures down to minus 22ºF (minus 30ºC), and solar panels able to operate at temperatures over 150ºF (65ºC). [142,143] These technologies are improving all the time, meaning tomorrow's solar panels and wind turbines will be even more weather-resistant than they are today.
The free market can solve this problem	Texas has a competitive, deregulated electricity market, but that has not translated to affordable or reliable power. Without requirements for robust weatherization, generators failed to invest in their power plants, leaving Texans in the dark. Without mandated goals, energy companies are unlikely to invest in energy efficiency and demand response programs. And without price regulations, gas suppliers in Texas are allowed to sell and charge whatever they like, leading to huge spikes in energy costs, including allegedly withholding supplies.
Gas is the most reliable energy source	The evidence says gas is not reliable: No fuel source had more problems than gas during winter storm Uri, and even more recent events — such as supply issues in January 2022, show the vulnerability of gas to weather extremes.[144, 145] The storm also illustrated how gas is prone to sudden price spikes that are almost always passed directly to consumers.
This was a once-in-a-lifetime storm and won't happen again	There is ample evidence that extreme weather events have become more common over the past 50 years,[146] and scientists overwhelmingly agree that climate change is responsible. Many use the analogy of "loading the dice" — as the world warms, the occurrence (frequency), intensity, and/or geographic extent of many types of extreme events is increasing."[147,148]

5.3 Social Media Content

Sharing information on social media is a great way to raise awareness and get more people involved in the fight for reliable and affordable electricity generated by clean energy. Feel free to use any of these sample social media posts, or edit them to make them your own.

For any of these posts, be sure to link back to this report at sc.org/uri. You can also search Twitter or Facebook for your specific public officials and utility companies — tag them in your posts so they're sure to see that you care about this issue!

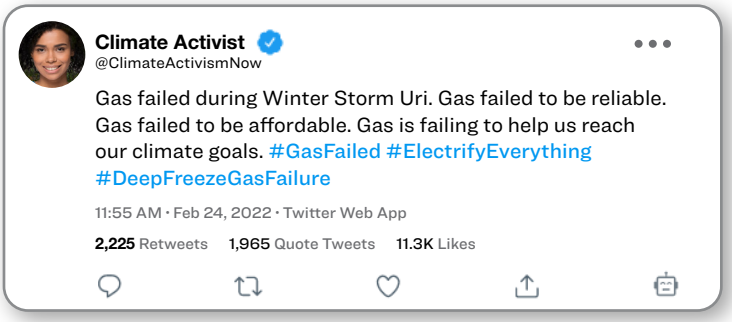
SAMPLE TWITTER POSTS

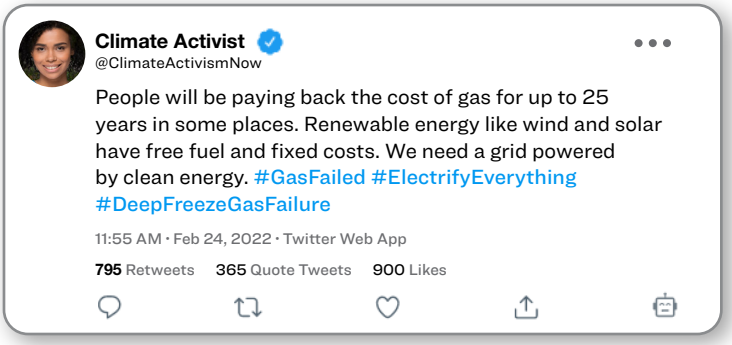
Hashtag ideas:

#GasFailed

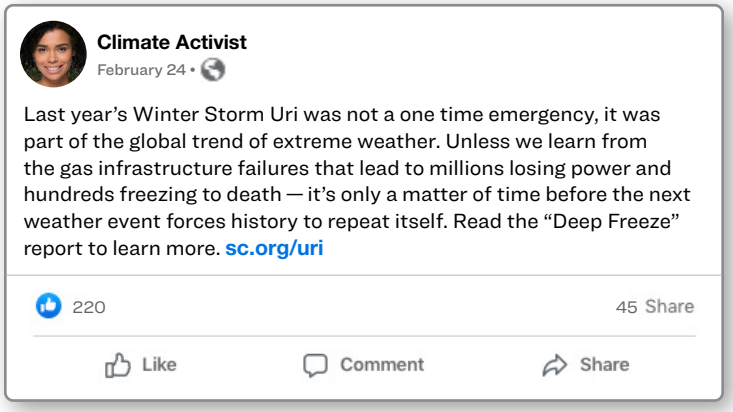
#ElectrifyEverything

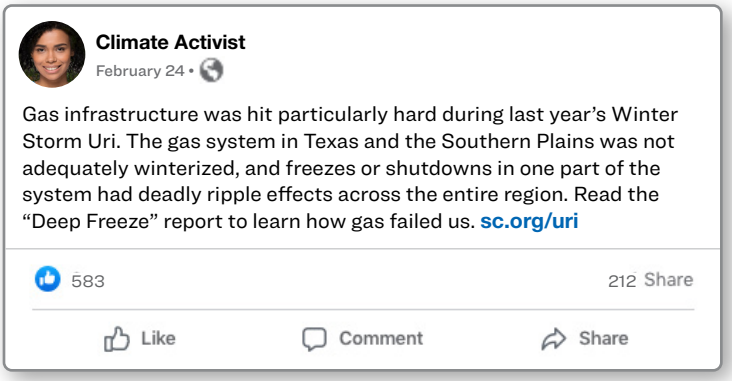
#DeepFreezeGasFailure

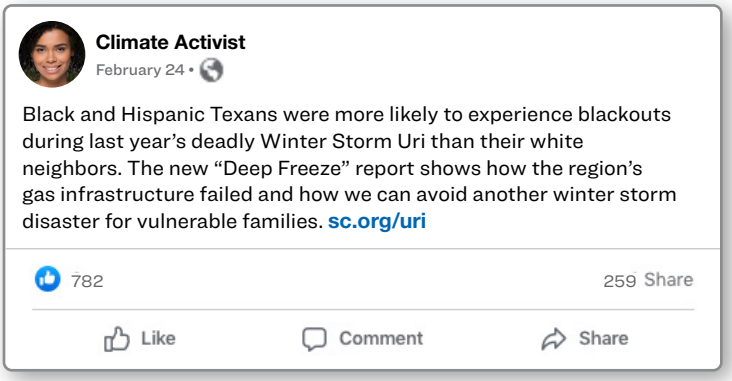


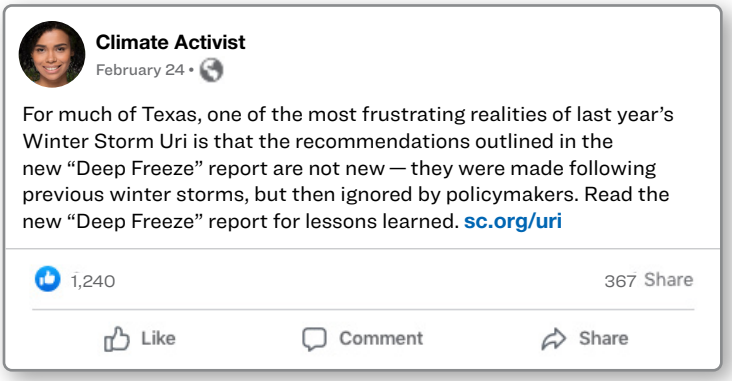


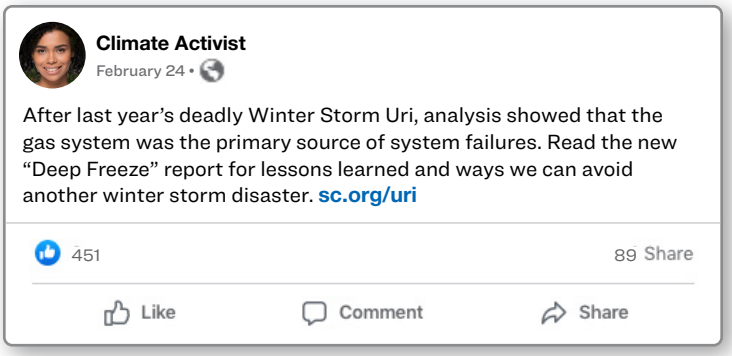
SAMPLE FACEBOOK POSTS

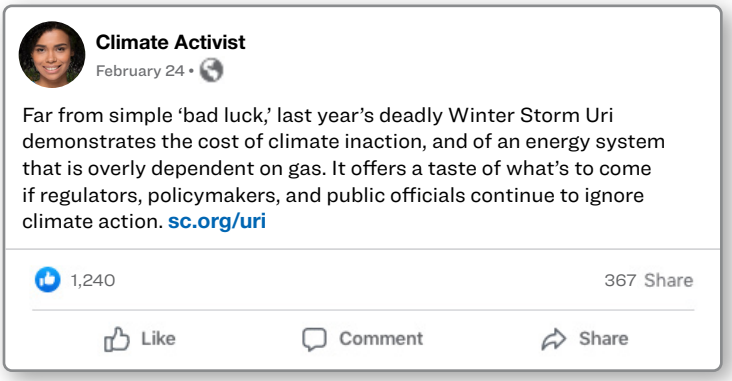


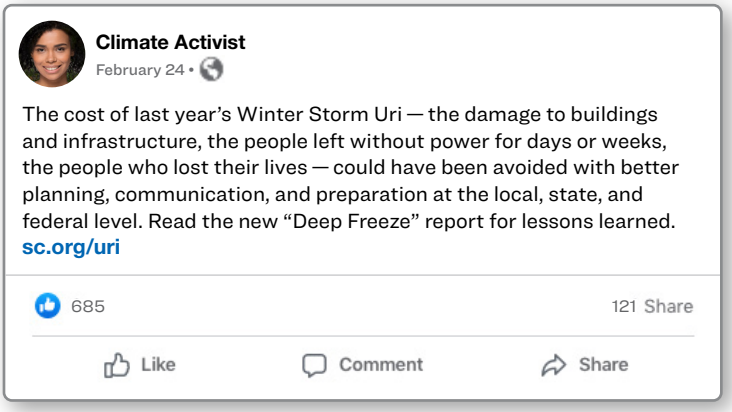












5.4 How You Can Help

WRITE A LETTER TO THE EDITOR

Letters to the editor, found in the Opinion section in most newspapers, are a wonderful way to share your voice and speak out in favor of an energy system that works for everyone. Visit sc.org/LTE to learn how to write your own letter to the editor, perhaps using the information found in this report.

CONTACT LOCAL AND STATE OFFICIALS

Your local and state officials need to hear from their constituents. Try searching online for city or state officials's contact information. You can call, write, or request a meeting with them to express how strongly you feel about creating an energy system that is clean, reliable, and affordable for all. You can also visit your local Sierra Club chapter website to get emails that will let you know when and how you can take action.

CONTACT FEDERAL OFFICIALS

Federal officials need to hear from their constituents, too. You can search online to learn how to contact the officials who represent you, or visit your state's Sierra Club chapter to subscribe to emails that will let you know when and how you can take action.

LET YOUR VOICE ADD UP

Visit https://addup.sierraclub.org/, the Sierra Club's online hub for taking action. There you can find campaigns happening in your city or state, as well as national Sierra Club campaigns to transform our country for the better.

GET INVOLVED WITH YOUR LOCAL CHAPTER

Your local Sierra Club chapter is a gateway to joining an amazing community working to change our society for the better.

The Lone Star Chapter (Texas) website is at https://www.sierraclub.org/texas. Volunteers and staff in Texas are working hard to demand more accountability and transparency in the energy system, and the implementation of clean energy solutions that work for Texas. You can email lonestar.chapter@sierraclub.org with questions or for more information.

For other Sierra Club chapters, visit https://www.sierraclub.org/chapters or search online to find the chapters nearest to you.

6.0 GLOSSARY

Dockets are used by regulatory agencies to organize documents, testimony, and information during proceedings.

Electric Reliability Council of Texas (ERCOT) operates the electric grid and manages the deregulated energy market that serves 75 percent of Texans.

Energy Burden is the percentage of household income that goes toward energy costs, like gas and electric bills.

Environmental Racism refers to the disproportionate impact of environmental hazards on communities of color, whether it stems from policy or practice.

Federal Energy Regulatory Commission (FERC) is an independent agency that regulates the interstate transmission of natural gas, oil, and electricity.

Integrated Resource Plan (IRP) is a long-range energy plan that investor-owned utilities submit to regulators every three years. In an IRP, utilities evaluate the different methods of meeting their customers' energy needs.

Investor-owned utilities (IOUs) are designated monopolies that are guaranteed a certain rate of return on approved projects, like building power plants and transmission lines, in exchange for being regulated by state agencies like a Public Service Commission, Public Utility Commission, or state Corporation Commission.

Midcontinent Independent System Operator (MISO) is the regional transmission operator, or grid operator, for some or all of the 15 states between Louisiana and the Canadian province of Manitoba.

Megawatt hour (MWh) equals 1,000 kilowatts of electricity generated per hour and is used to measure electric output. It is equivalent to the amount of electricity used by about 330 homes in one hour.

North American Electric Reliability Corporation (NERC) is a not-for-profit regulatory authority whose scope extends over Canada, Mexico, and the continental United States. NERC develops and enforces reliability standards; conducts long-term assessments on grid reliability; monitors the bulk power system, and educates, trains, and certifies industry personnel.

Public Service Commission (PSC), Public Utility Commission (PUC), or Corporation Commissions are state agencies that regulate investor-owned utilities, a.k.a monopoly utilities. These commissions are responsible for reviewing whether the cost of utility investments should be passed along to customers, or whether they were imprudent, and should be borne by the utility. They also establish consumer rates and ensure the reliability of electricity delivered to consumers, among other responsibilities. State regulatory agencies vary in size and structure. Some have three members; others have five. Some commissions are appointed; others are elected.

Railroad Commission of Texas (RRC) is the Texas state agency that regulates the oil and natural gas industries. As of 2005, the RRC no longer has jurisdiction over railroads, but kept its name.

Southwest Power Pool (SPP) is the regional transmission operator, or grid operator, for some or all of 17 states between Louisiana and Texas and Montana.

7.0 ADDITIONAL RESOURCES

You may find these resources helpful as you advocate for clean, renewable energy and an energy system that works for us all. Note that not all of these resources are specifically about Winter Storm Uri or about the states discussed in this report.

Reports

Kansas Pays the Price (2019) & Kansas Pays the Price Volume 2 (2021)

The Sierra Club

These reports compare the cost of coal plants and renewable energy for electric consumers of Evergy, Kansas City Power and Light, and Westar, and find that, in almost all cases,renewable energy would be safer, more reliable, and more affordable than coal.

Louisiana Coal to Clean Energy

The Sierra Club

This 2020 report examines Louisiana's few remaining coal plants, and makes the case that they could be safely and affordably replaced with clean energy.

Rhetoric vs. Reality: The Myth of "Renewable Natural Gas" for Building Decarbonization

Earthjustice and The Sierra Club

This 2020 report highlights the gas industry's deceptive efforts to keep gas appliances in homes and buildings.

Natural Gas: A Bridge to Climate Breakdown

As You Sow and Energy Innovation

This 2020 report "serves to inform investors about the evolving risks associated with the use of natural gas within the power sector."

Interactive Maps

Map of Cancer-Causing Industrial Air Pollution in the US

ProPublica

This interactive map uses five years of EPA data to identify "more than 1,000 toxic hot spots across the country."

Toll from Coal

Clean Air Task Force

This interactive map shows the locations of coal-fired power plants in the United States, as well as the pollutants they emit into our air. It also explains how those pollutants harm our health.

Yale Climate Opinion Maps

Yale Program on Climate Change Communication

This interactive map shows "how Americans' climate change beliefs, risk perceptions, and policy support vary at the state, congressional district, metro area, and county levels."

Power Plants and Neighboring Communities

Environmental Protection Agency

This EPA website has links and resources about environmental justice, as well as an interactive map that "identifies the locations of [fossil fuel] power plants and highlights the key demographics of people living within three miles of those plants."

ADDITIONAL RESOURCES

The Dirty Truth About Utility Climate Pledges

The Sierra Club

This interactive tool will help you figure out if your utility's pledge to become "carbon-neutral" is truly being implemented.

Utilities 101: Guide, Video, and Slide Deck

Initiative for Energy Justice

This online toolkit "was created to break down the basics of the electric utility industry with a focus on justice."

8.0 ENDNOTES

1 5 Million Americans Have Lost Power From Texas to North Dakota After Devastating Winter Storm, TIME, February 15, 2021

2 Global Catastrophe Recap, AON, September 2021

3 The Texas Winter Storm And Power Outages Killed Hundreds More People Than The State Says, BuzzFeed News, May 26, 2021

4 Texas winter storm report: 246 people died statewide; Travis County had second highest fatality total in state, KVUE, January 3, 2022

5 Climate Change Indicators: Weather and Climate, EPA

6 Natural gas explained, Energy Information Administration, accessed on January 19, 2022

7 Where our natural gas comes from, Energy Information Administration, accessed on January 19, 2022

8 Confusingly, in the United States, the gasoline that goes in cars and other vehicles is also often called gas. Unless otherwise noted, however, this report uses "gas" to refer to the gas used by power plants and gas appliances, not the kind that goes in your car.

9 Winter gas bill from hell: Oklahomans face paying $1.4bn over snowstorm, The Guardian, January 19, 2022

10 The Timeline and Events of the February 2021 Texas Electric Grid Blackouts, The University of Texas at Austin Energy Institute, July 2021

11 Winter Storm Uri — Natural Gas Analysis, ENVERUS, April 2021

12 Preliminary Report on Causes of Generator Outages and Derates For Operating Days February 14 — 19, 2021 Extreme Cold Weather Event, ERCOT, April 6, 2021

13 Oklahomans are stuck with a $4.5 billion bill after February's winter storm. Here's why, The Oklahoman, May 2, 2021

14 Getting The Gas You Need Was A Key Problem For Texas In Storm, Forbes, March 5, 2021

15 Why does Texas have its own power grid?, The Houston Chronicle, February 17, 2021

16 Energy deregulation worsened the Texas crisis — and Enron is partly to blame, The Washington Post, February 23, 2021

17 The Texas Freeze: Why the Power Grid Failed, The Wall Street Journal, February 19, 2021

18 Texas Energy Production Estimates, 2019, Energy Information Administration, Accessed January 27, 2022

19 Texas natural gas production dropped during recent cold front, reviving concerns about electric grid, The Houston Chronicle, January 5, 2022

20 Paperwork failures worsened Texas blackouts, sparking mid-storm scramble to restore critical fuel supply, The Texas Tribune, March 18, 2021

21 Approximately 50 percent of Texas electricity is generated by burning gas, making systemic gas failures across the industry during Winter Storm Uri particularly harmful to the electric grid. See the EIA's Texas State Profile and Energy Estimates for more information on how Texas generates electricity.

22 The Timeline and Events of the February 2021 Texas Electric Grid Blackouts, The University of Texas at Austin Energy Institute, July 2021

23 *Ibid*

24 New Report Details Impact of Winter Storm Uri on Texans, University of Houston, March 29, 2021

25 Polar Vortex Power Outages: 6 Things to Know about Supply, Demand, and our Electricity Future, Union of Concerned Scientists, February 16, 2021

26 Cascading risks: Understanding the 2021 winter blackout in Texas, Energy Research & Social Science, July, 2021

27 Winter Storm Uri: A Test of Texas' Water Infrastructure And Water Resource Resilience to Extreme Winter Weather Events, World Scientific, December 31, 2021

28 His Lights Stayed on During Texas' Storm. Now He Owes $16,752., The New York Times, February 20, 2021

29 Texas Legislature close to approving billions to pay for winter storm financial fallout, The Texas Tribune, May 25, 2021

30 Frozen Out in Texas: Blackouts and Inequity, The Rockefeller Foundation, April 14, 2021

31 Past Housing Discrimination Contributed To Wealth Gap Between Blacks And Whites In Kansas City, KCUR, August 10, 2018

32 Racial covenants, a relic of the past, are still on the books across the country, NPR, November 17, 2021

33 After extreme cold events in 1989 and 2011, Texas was warned to winterize power plants — but many still froze in the latest storms, Insider, February 19, 2021

34 Report on Outages and Curtailments During the Southwest Cold Weather Event of February 1-5, 2011, FERC and NERC, August 2011

35 Winter storm blackouts plagued Texas in 2011, too. Recommendations made afterward went unenforced. USA Today, February 18, 2021

36 The Timeline and Events of the February 2021 Texas Electric Grid Blackouts, The University of Texas at Austin Energy Institute, July 2021

37 Texas Winter Storm Death Toll Goes Up To 210, Including 43 Deaths In Harris County, Houston Public Media, July 14, 2021

38 Tomlinson: Natural gas companies failed again, showing Texas energy system still vulnerable, The Houston Chronicle, January 7, 2022

39 As Texas faces another winter storm, can it prevent a 'failure on all fronts'?, The Guardian, February 4, 2022

40 Natural gas providers notify ERCOT of supply reductions: What that means for the power grid, WFAA, February 2, 2022

41 Southwest Power Pool Addresses Problems From February Winter Storm, KGOU, July 29, 2021

42 Derating is when a power plant intentionally operates at less than its full "rated" capacity, in this case due to extreme weather.

43 The February 2021 Cold Weather Outages in Texas and the South Central United States, FERC, NERC and Regional Entity Staff, November 2021

44 Winter storm no-fault zone: SPP says gas, coal and wind plants all tripped offline during Uri, Powergrid International, March 25, 2021

45 SPP'S Response to the February 2021 Winter Weather Event, SPP, July 19, 2021

46 Winter storm no-fault zone: SPP says gas, coal and wind plants all tripped offline during Uri, POWER Engineering, March 24, 2021.

47 ERCOT Winter Storm Uri Blackout Analysis, Vibrant Clean Energy, February, 2021

48 A Comprehensive Review of the Southwest Power Pool's Response to the February 2021 Winter Storm, SPP, July 19, 2021

49 ISOs, regulators, utilities respond to extreme winter weather across U.S., TransmissionHub, February 15, 2021

50 The February Arctic Event: February 14-18, 2021, MISO, 2021

51 Gas Failure in February May Have Been Profit-Driven, Reform Austin, December 22, 2021

52 FERC Examining Possible Natural Gas, Power Market Manipulation Amid Texas Freeze, Natural Gas Intelligence, February 23, 2021

53 Brad Johnson tweet, December 17, 2021

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