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# Texas' Grid Resiliency in a Changing Climate

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## Introduction

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In February 2021, Texas experienced a wave of power outages in the wake of a severe winter storm, leaving over 4 million Texans with no heat and no electricity, and causing hundreds of fatalities across the state. The outages caused by Winter Storm Uri brought energy resilience to the forefront of Americans' minds as we witnessed firsthand the consequences of poor infrastructure in the midst of unmitigated climate change. As extreme weather events like Uri increase in frequency, we can expect this will continue to be a hot-button issue in the lead up to the 2022 midterm elections. Democrats are leveraging the situation as a means for highlighting the failures of the Republican Party and are pushing forward an agenda laden with infrastructure investments and climate regulations. Republicans, on the other hand, are on the defensive, repeatedly assuring that the electrical grid is now secure and resilient to winter weather, ignoring the attacks leveraged against them and instead focusing on the legislation they've passed to winterize the grid.

Regardless of politics, one thing is certain: When the power went out during some of the lowest temperatures ever recorded in Texas, people suffered. Statewide food and water shortages ensued, pipes burst, and those desperately seeking warmth instead found themselves facing house fires or suffering from carbon monoxide poisoning or hypothermia. Across the state of Texas, over \$80 billion in damages and more than 200 deaths (according to the official death count, although this number may be closer to 700) have been attributed to the storm in an across-the-board collapse of food, water, and energy infrastructure. It's challenging to know the toll that this storm took on vulnerable populations — including the elderly, under-resourced and homeless communities, as well as those who are chronically ill — who typically bear the brunt of natural disasters. Even those who were fortunate enough to not lose power during the storms found themselves being charged exorbitant rates for their electricity bills.

The Texas power outages are a result of governance failures, corporate greed, and an unwillingness to recognize the ever-pressing need to climatize — not weatherize — our energy infrastructure. Our global climate systems are constantly changing, and in response, we must build and prepare for the climate of the future, not the weather of the present. Before exploring the need to tackle these issues head on, it's important to understand the circumstances leading to this devastating infrastructural collapse in Texas.

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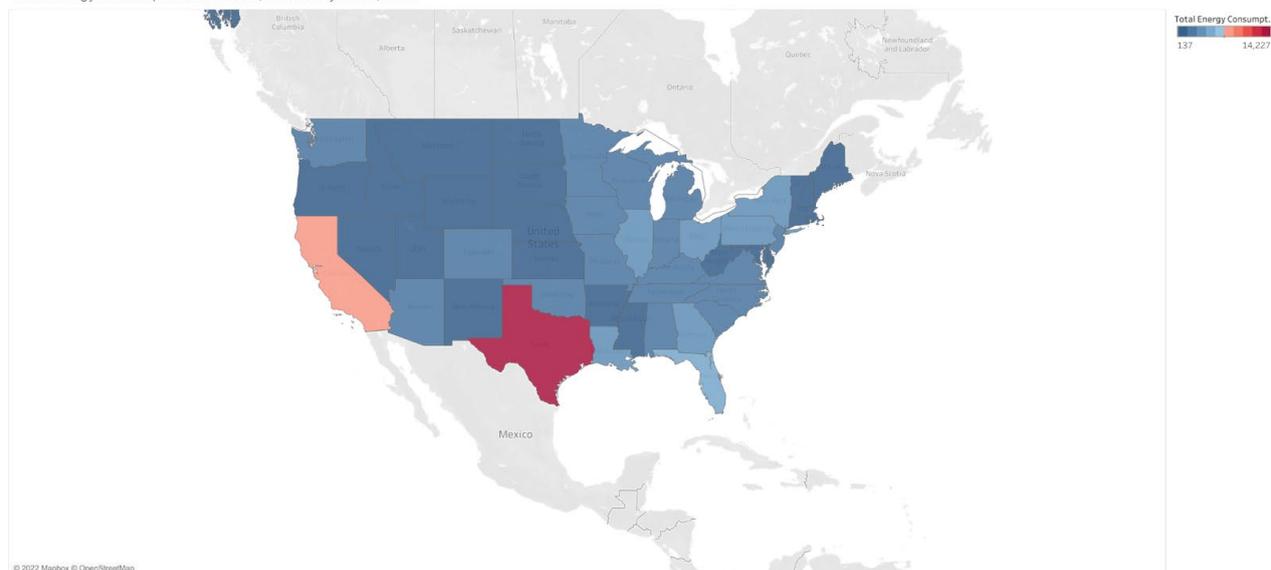
**“We must build and prepare for the climate of the future, not the weather of the present.”**

## Texas Energy at a Glance

At present, there are three main energy grids in the United States: the Eastern Interconnection, the Western Interconnection, and the Texas Interconnection. The Eastern grid is the largest of the three, and the Texas Interconnection is the only decentralized state grid in the continental U.S. — a result of the passage of a state law to deregulate the grid in 1999 in a bid for Texas to gain more energy independence and market competitiveness in the energy sector. What’s more, having an intrastate gas and power market allows the state to avoid Federal Energy Regulatory Commission (FERC) oversight of the state’s electricity production. Texas’ grid, which covers about 90 percent of the state’s electrical load, is managed by the Electric Reliability Council of Texas (ERCOT). ERCOT’s main responsibilities include: maintaining system reliability, facilitating a competitive wholesale market, facilitating a competitive retail market, and ensuring open access to transmission.

Texas has the highest rate of energy consumption in the country (14,227 trillion Btu in 2019) — roughly 14 percent of the U.S.’s total energy consumption and almost double that of California.

Total Energy Consumption Estimates, Ranked By State, 2019



While Texas is the largest energy-consuming state, it also produces more energy than any other state in the U.S. In 2020, Texas accounted for 43 percent of the country’s crude oil production and 26 percent of its natural gas production, largely due to its proximity to the shale-rich Permian Basin from which it extracts vast amounts of oil and gas. Texas’s energy generation is 51.0 percent natural gas, 24.8 percent wind, 13.4 percent coal, 4.9 percent nuclear, 3.8 percent solar, 1.9 percent other (i.e., hydropower and biomass power), and 0.2 percent energy storage. This low level of stored energy is a result of the structure of Texas’ energy market. In addition to having an independent energy grid, Texas does not have a “capacity market, a policy used in other states which pays utilities to have additional power reserved. Rather, it operates an “energy-only market” (also referred to as an “electricity-only market”), where utilities are only paid for the kilowatt hours they produce. The downside to this structure is that a decentralized energy grid essentially means that Texas is virtually on its own in the event of an

energy crisis, and an “energy-only market” ensures that there is a lack of power reserves and essentially no backup energy stored in case of emergencies.

By decentralizing its energy grid and establishing an “energy-only market,” Texas gained what the state had long sought: the opportunity to capitalize on its energy production power and become a big player in the U.S. energy market. The sheer volume of energy that the state produces and consumes, however, means that there is much at stake in terms of the energy, economic, and physical security of the state.

## A History of Grid Failure

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Prior to the 2021 disaster, Texas faced similar threats to its energy infrastructure. In February 2011, the Groundhog Day blizzard caused blackouts in upwards of 75 percent of the state. This all-out grid failure led to investigations on behalf of FERC and North American Electric Reliability Corporation (NERC), which both recommended that the state take action to winterize its electricity infrastructure. The NERC’s 2019 Summer Reliability Assessment reported that ERCOT’s grid had one of the U.S.’ lowest reserve margins of any operator in the state, alarming when considering the sheer volume of energy that Texas consumes. FERC and NERC made it clear to the Texas legislature that this posed a clear threat to Texas’ grid resiliency. The Texas legislature chose to ignore these warnings despite their urgency, and Texans faced the consequences a decade later.

Ten years after the Groundhog Day blizzard, Winter Storm Uri brought temperatures lower than those in Alaska to parts of the Lone Star State, devastating Texas’ energy infrastructure. Despite being forewarned about grid reliability issues following the failures of the Groundhog Day storm, the state again found itself experiencing severe blackouts and massive infrastructural damage. The main catalysts for Texas’ 2021 power outages were: mass freezing/damage to electrical equipment, natural gas fuel supply issues (which are interrelated), and load shedding. Load shedding is the process of shutting off certain parts of the electrical grid to prevent a full collapse of the system in times of systemwide stress, as was the case in Texas in 2021 during the winter storm as more electricity was being used to heat and power homes, and thus ERCOT ordered certain utilities to shut down to avoid overloading the grid. An increased demand for electricity and reduced energy supply led to a number of energy producers to profit immensely from this dire situation.

The winter storm also caused trees, wind, rain, and ice to damage electrical equipment, including power lines and generators, which natural gas facilities used for power generation. Initially, Texas Governor Greg Abbott incorrectly blamed renewable energy (solar and wind) for the power outages, and then later admitted that the issue was an across-the-board grid failure. In the wake of Winter Storm Uri, the U.S. experienced its largest monthly decline of natural gas production on record. Texas lost 50 percent of its gas production statewide. For one of the largest gas producers to lose half of its production in the wake of severe weather is no small issue, and this reaped an enormous economic impact on Texas, which the state is still working to fully quantify.

In spring 2021, Texas proposed dozens of bills in response to Winter Storm Uri. These bills, and their status (whether they failed or were signed into law), include:

- ▶ **HOUSE BILL 11** — defines extreme weather conditions to improve emergency preparedness protocols for electrical facilities; FAILED
- ▶ **HOUSE BILL 14** — creates the Texas Supply Chain Security and Mapping Committee to map the state’s electrical infrastructure and make recommendations for making electric and gas facilities more resilient to extreme weather events; FAILED
- ▶ **HOUSE BILL 17** — prevents cities and municipalities from limiting natural gas usage; SIGNED INTO LAW
- ▶ **HOUSE BILL 4492** — securitizes costs associated with electric markets to protect consumers from electrical price surges associated with natural disasters and other “catastrophic events” and implements a loan plan for power companies to offset these costs; SIGNED INTO LAW
- ▶ **SENATE BILL 2** — amends the governance structure of ERCOT, reducing the number of board members from 16 to 11 and requiring board members to live in Texas; SIGNED INTO LAW
- ▶ **SENATE BILL 3** — requires power companies to weatherize and better prepare for power outages; SIGNED INTO LAW and
- ▶ **SENATE BILL 13** — requires that entities receiving state funding cut ties with companies that divested from fossil fuels; SIGNED INTO LAW.

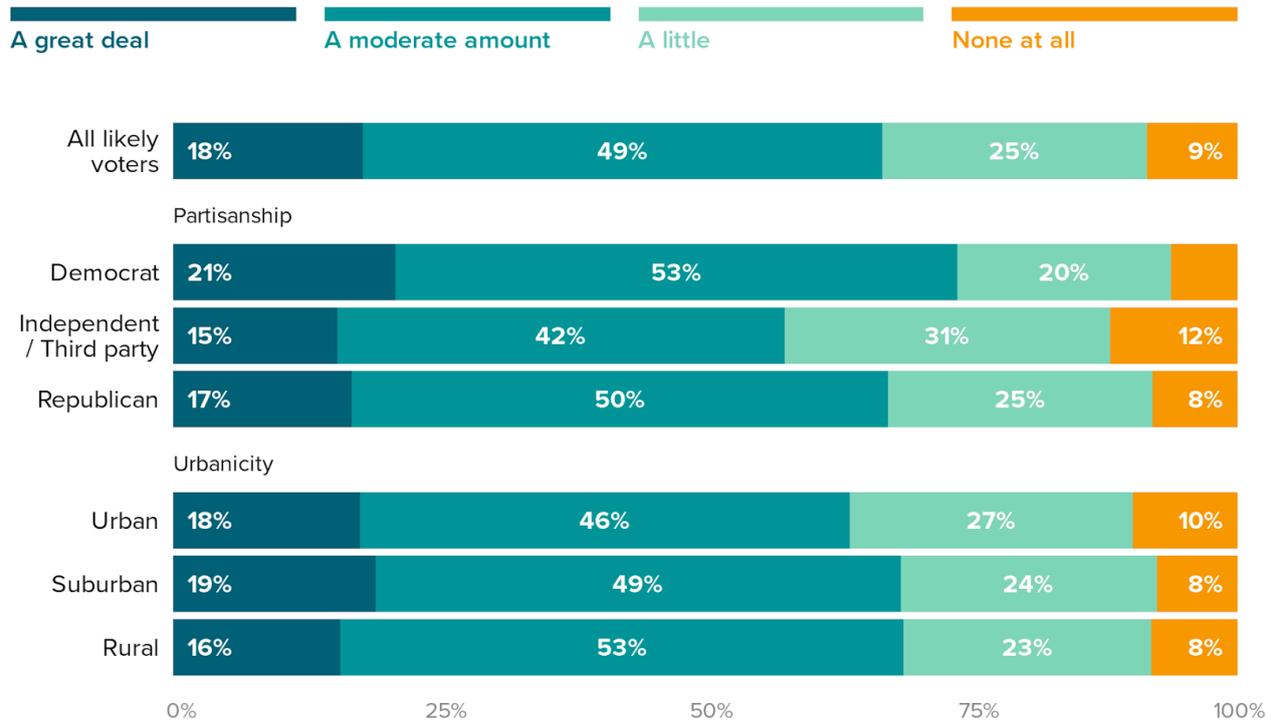
Among these bills, SB 13 has received notable praise on behalf of industry and Texas reps, who tout oil and gas as the “lifeblood” of Texas’ economy. The bill is a step backward for Texas, which should be prioritizing clean energy technologies rather than trying to resuscitate the dying fossil fuel industry.

Despite the constant reassurance on behalf of Texas officials that the energy grid is resistant to extreme weather, Texans are experiencing deja vu this year. In the wake of Winter Storm Landon, Governor Abbott walked back his certainty around the electrical grid’s resilience to winter weather, saying that “no one can guarantee” that there wouldn’t be outages, and in fact, there were over 16,000 reported outages in Texas in early February 2022 as a result of this storm.

Additionally, voters across the country remain skeptical that their electricity providers would maintain service in the case of a natural disaster or weather emergency like a blizzard, hurricane, or tornado. Only 18 percent of likely voters have “a great deal” of confidence in their electricity provider to provide service during extreme weather events. Energy experts have expressed similar concerns about Texas’ energy system being able to withstand a storm as powerful as Winter Storm Uri.

# Voters Express Skepticism About Grid Reliability During Extreme Weather Events

How much confidence do you have in your electricity provider to maintain service in the case of a natural disaster or weather emergency? (e.g., a blizzard, hurricane, or tornado)



February 11–14, 2022 survey of 1,226 likely voters

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What’s more, this year’s winter storm happened in spite of the fact that December 2021 was the hottest December on record — a nod to the fact that extreme weather is becoming more and more unpredictable in a changing climate. This means that while Winter Storm Landon did not cause unmitigated damage to the state’s energy system, Texas must not get overly confident in its grid’s ability to withstand natural disasters. The stakes were lower in this context, and state officials have expressed that this storm failed to truly test the resiliency of the supposedly upgraded power grid, as it was mild in comparison to Winter Storm Uri, and winter is not over yet.

Politicians, celebrities, and community members alike came together to support the state of Texas during Winter Storm Uri. Actor Matthew McConaughey raised over \$7.7 million through a benefit concert to support Texas communities impacted by the storm. Former U.S. Representative and current gubernatorial candidate Beto O’Rourke ran a phone bank to connect over 784,000 seniors across the state with resources like food, water, and shelter. Rep. Alexandria Ocasio-Cortez raised \$4.7 million for Texas. All of these efforts have one thing in common: They served to supplement the insufficient efforts of Texas’ governing bodies to protect their citizens before natural disasters strike. Responding our way out of crises is the common protocol in the U.S.; however, what we need is common-sense, data-driven hazard mitigation protocols in place to prevent the devastation Texans have experienced from happening again. In 2022, we simply do not have time to waste to protect people from the effects of

climate change and the unpredictability of extreme weather events. The 2021 power outages in Texas were preventable, and the state must rise above partisan political games and protect its constituents. Data for Progress has compiled a series of policy recommendations for upgrading Texas' grid resiliency by: investing in clean energy, improving energy infrastructure, ensuring consumer protections, and disincentivizing corporate greed.

## Policy Recommendations

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### POLICY RECOMMENDATION 1 — INVEST IN CLEAN ENERGY

Fossil fuels are a dated and limited resource for producing energy. Not only are they land- and resource-intensive, but they also are responsible for destroying wildlife habitat, polluting our air and water systems, and emitting vast amounts of greenhouse gasses that are driving global climatic changes. There is an abundance of alternative and renewable sources that could better serve the state of Texas by producing cleaner and more reliable energy. During the 2021 power outages, greenhouse gas emissions (particularly SO<sub>2</sub> and CO<sub>2</sub>) skyrocketed, and the Wildcat and Sand Hills natural gas plants released four times the emissions of the nation's largest oil refinery. Although legislation was put in place to winterize the electricity sector, the greenhouse gas emissions that oil and gas companies emit during energy production have in large part been overlooked.

When energy producers are allowed to take advantage of emergency situations to scale up their profits, consumers suffer. Data for Progress polling shows time and time again that the majority of Americans are concerned about their energy prices. Scaling up the production of solar, wind, and other clean energy technologies via clean energy tax credits is one of the most cost-effective ways to ensure safe, reliable energy in Texas. Decarbonizing the electricity sector is also a critical component of achieving a clean energy economy as intended by the Biden Administration.

Texas can revolutionize its energy production by:

- ▶ **ADVOCATING FOR THE BUILD BACK BETTER ACT (BBBA)**, which includes \$550 billion in investments in climate change, with over half (\$292 billion) allocated to clean energy tax incentives to supercharge the installation of renewable energy, increase accessibility for low- and middle-income households, and lower the average family's energy bill by \$500 per year. These clean energy tax credits could also eliminate upwards of 8.1 billion metric tons of CO<sub>2</sub> by 2050, saving the U.S. as much as \$1.8 trillion.
- ▶ **DEMOCRATIZING THE ERCOT BOARD** to ensure that rural, marginalized, and fossil fuel communities, as well as climate experts, are prioritized and represented in the transition to a clean energy economy. A lot of focus in Texas grid resiliency was placed on large cities like Houston and Austin during Winter Storm Uri, even though rural and disadvantaged communities were severely impacted, too. The council must be composed of representatives from all corners of the state to address the varying needs and economic makeup of the state;

- ▶ **DIVERSIFYING STATE ENERGY PRODUCTION.** When one line of energy production fails, there should be others that can readily backstop to meet the state’s energy needs. Texas must diversify its fuel sources — moving away from gas and building on the state’s past successes adopting renewable energy sources like hydropower, solar, and nuclear. Hydropower is able to stabilize an energy grid during natural disasters, as it is highly resilient to extreme weather, including extreme cold. Texas doubled its hydropower output last year but it did not make a significant difference since there is still so little hydropower in operation (~0.2 percent as opposed to ~4 percent for the Eastern Interconnection and over 20 percent for the Western Interconnection). Texas can scale up its hydropower capacity by optimizing existing dams (increasing megawatt generation) and converting non-powered dams to electricity-generating dams)<sup>1</sup>

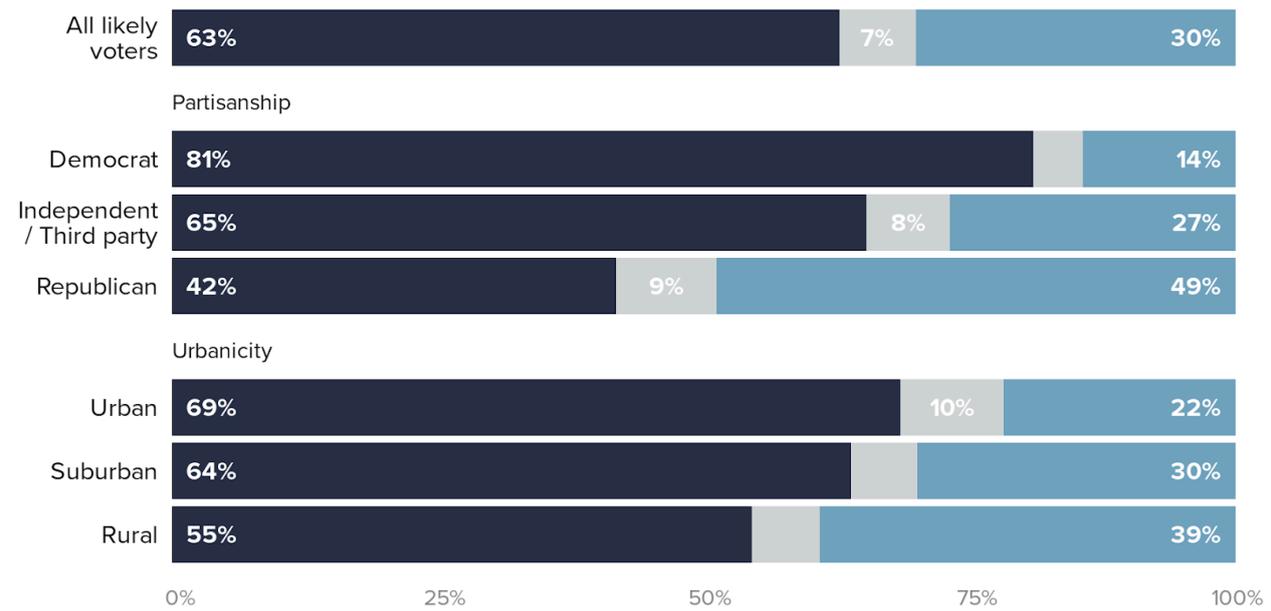
There is strong political will behind the idea of switching to clean electricity across the country. A majority of likely voters (63 percent) believe that utility companies should invest in renewable energy sources to ensure they can supply electricity even in the face of extreme weather, rather than relying on gas and coal to power our electricity systems. Nearly all Democrats (81 percent), a majority of Independents (65 percent), and 42 percent of Republicans agree with this sentiment. Moreover, there is a broad consensus among urban, suburban, and rural voters that investments in clean energy can improve grid reliability.

1 While approaching hydropower as a means for strengthening Texas’ energy grid, the prospective social and environmental ramifications, including, destruction of [wildlife habitat](#), flooding, and impacts on food security must be considered.

# Voters Agree Investments in Clean Energy Will Improve Grid Reliability

Which statement comes closer to your view, even if neither is exactly right?

<p><b>Utility companies should not rely on gas and coal to power our electricity systems. They should invest in renewable energy sources to ensure they can supply electricity even in the face of extreme weather.</b></p>	<p>Don't know</p>	<p><b>Utility companies should keep the status quo and continue using gas and coal to generate electricity. Investing in renewable energy sources could be costly to consumers and leave us without power when we need it the most.</b></p>
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## POLICY RECOMMENDATION 2 — IMPROVE TEXAS’ ENERGY INFRASTRUCTURE

While clean energy investments are crucial for fixing a number of Texas’ energy woes, they are futile if the state’s energy infrastructure is not up to par. While companies may believe that they would rather pay for infrastructural updates after a disaster, studies show that paying more for mitigation along the way is a wiser financial decision than waiting for disaster to strike. The 2019 National Institute of Building Sciences Mitigation Saves [report](#), a cost-saving analysis illustrating the benefits of hazard mitigation, shows that by being proactive and investing strategically, natural hazard mitigation saves \$6 on average for every \$1 spent on federal mitigation grants. There is an urgency for hazard mitigation in states like Texas, where there are countless lives and dollars to be saved.

The Infrastructure Investment and Jobs Act (IIJA) has a number of provisions centered around bolstering grid resiliency and energy efficiency, which Texas can capitalize on:

- ▶ **GRID RESILIENCE** — \$5 billion to reduce the probability and severity of impacts to the electric grid due to extreme weather, wildfire, and natural disasters;
- ▶ **RURAL TRANSMISSION** — \$1 billion in federal assistance to rural areas for transmission upgrades, greenhouse gas emission reductions, microgrid development, and increasing energy efficiency;
- ▶ **TRANSMISSION FACILITATION PROGRAM** — \$2.5 billion to facilitate the construction and upgrade of power transmission lines; and
- ▶ **ENERGY STORAGE** — \$355 million for energy storage.

Texas can become more resilient to natural hazards and improve its state energy infrastructure, by:

- ▶ **CLIMATIZING RATHER THAN WEATHERIZING STATE ENERGY SYSTEMS.** Texas should follow the lead of cold climate systems throughout the U.S. for winterizing its energy systems. Protocols for heat tracing, insulation, and other long-term safeguards to prevent system failures in the event of a weather event should be implemented;
- ▶ **IMPLEMENTING MORE RELIABILITY PERFORMANCE STANDARDS FOR GAS UTILITIES.** Following the passage of last year’s bills following Winter Storm Uri, many actions were taken to winterize the electricity sector, but not the gas sector. ERCOT must institute more oversight on gas utilities and implement the reliability standards proposed by FERC<sup>2</sup>;
- ▶ **AMENDING SB 3.** The final version of the bill requires only “critical” gas facilities (as designated by ERCOT) to be able to withstand a weather emergency, creating a loophole for those utilities that do not register themselves as essential, like gas companies;
- ▶ **INVESTING IN BATTERY STORAGE, BACKUP GENERATORS.** Hospitals were able to run during Winter Storm Uri due to their operation of their own generators — not relying on the state grid. In the midst of a pandemic, when healthcare is more essential than ever, having state-supported, resilient power supplies is critical. Texas must invest in improving its energy storage capacity and ensure that storage mechanisms are efficient and durable in the case of emergency events.

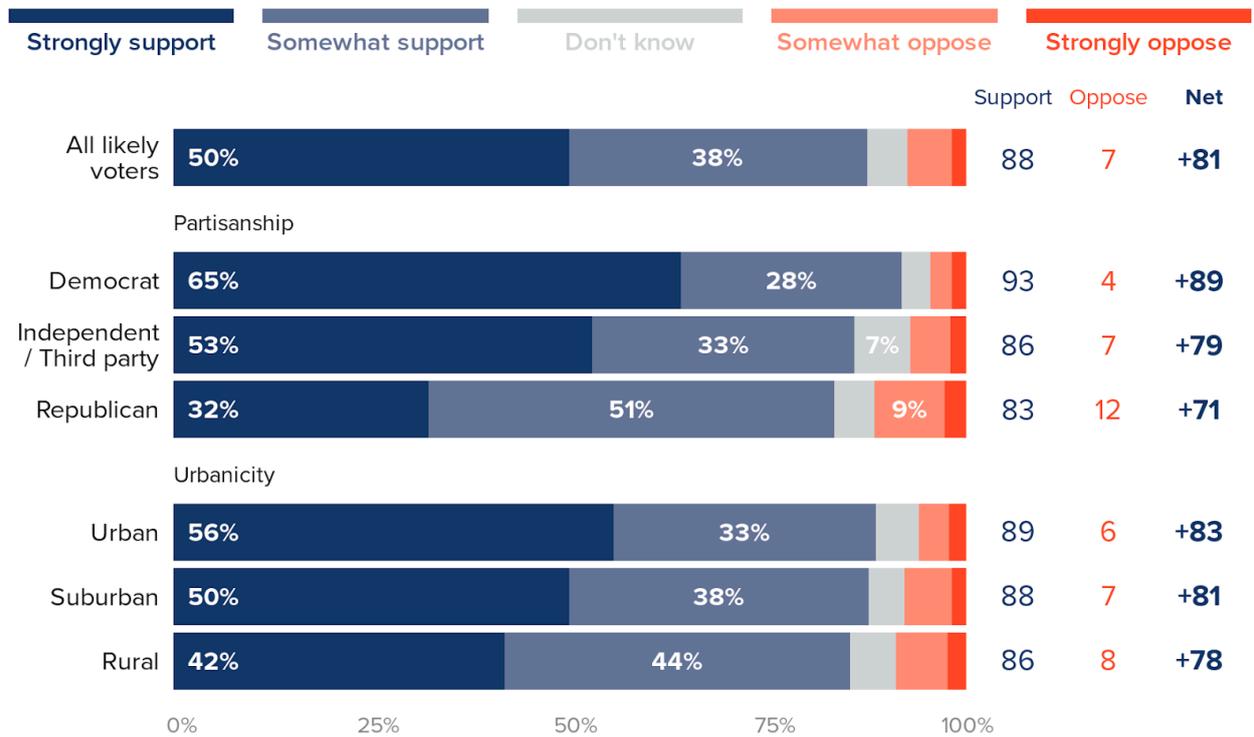
There is widespread bipartisan support for federal investments to make our nation’s power infrastructure more resistant to extreme weather and natural disasters. By a staggering +81-point margin, voters support investments in grid reliability. These investments enjoy the support of nearly all Democrats (93 percent), Independents (86 percent), and Republicans (83 percent). Moreover, urban, suburban, and rural voters express roughly equivalent levels of support.

2      Revise the Reliability Standards to require:

- Generator Owners (GOs) to identify and protect cold-weather-critical components
- GOs to build new generating units, and retrofit existing units, to operate to specific ambient temperatures and weather based on extreme temperature and weather data, and account for effects of precipitation and cooling effect of wind
- Annual training on winterization plans
- GOs that experience freeze-related outages to develop Corrective Action Plans

# Voters Overwhelmingly Support Investments to Improve Grid Reliability

Do you support or oppose federal investments to make our nation's power infrastructure better able to withstand extreme weather and natural disasters?



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There is unlimited value to making investments in the physical energy infrastructure in Texas, but this must be accompanied by protections for consumers against utilities seeking to capitalize on their monopoly on Texas energy markets.

## POLICY RECOMMENDATION 3 — ENSURE CONSUMER PROTECTIONS AND DISINCENTIVIZE CORPORATE GREED

Corporate greed is a pervasive issue in all sectors of the economy, including the electricity sector. Texas can combat this greed and protect its energy consumers by:

- ▶ **ENDING FOSSIL FUEL SUBSIDIES:** Bailing out fossil fuel companies not only prolongs the life of a dying and polluting industry, it also diverts funding away from areas where funds could be better used;
- ▶ **REMOVING “SOVEREIGN IMMUNITY” PROTECTIONS FOR ENERGY COMPANIES:** Energy companies in Texas are currently protected from lawsuits due to sovereign immunity — meaning that they are an entity that cannot be sued if this will be disruptive to “key government services.” This reduces their accountability and disincentivizes reform efforts;

- ▶ **REFORMING THE “ENERGY-ONLY MARKET” TO A “CAPACITY MARKET”:** Having energy reserves drives up energy costs, which affects electric companies’ bottom lines. Maintaining energy reserves, however, is critical in mitigating the effects of unpredictable extreme weather events like Winter Storm Uri.
- ▶ **INSTITUTING A CAP ON ENERGY PRICES AND TRANSPARENT PRICING FOR GAS PRODUCERS:** A number of utility companies made a lot of money during the 2021 power outages, largely due to price gouging and market manipulation. Energy prices spiked from an average of \$22 per megawatt hour (MWh) in 2020, to \$9,000/MWh in February 2021, with consumers bearing the brunt of these spikes. Texas must implement price caps and transparent pricing for gas producers to prevent companies from taking advantage of vulnerable consumers in the face of disaster.
- ▶ **SUPPORTING THE HEATING AND COOLING RELIEF ACT.** This bill, introduced by Rep. Jamaal Bowman and Sen. Ed Markey, invests in and expands the Low Income Home Energy Assistance Program (LIHEAP) to provide funding to families that need assistance with their energy bills. These investments are critical for improving energy access for low-income and marginalized communities in Texas and beyond.

## Conclusion

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As we approach the anniversary of Winter Storm Uri, Texas officials owe it to their constituents to safeguard them in the event of another devastating extreme weather event. As an energy-producing powerhouse, Texas has the capacity to be a thought leader in the clean energy industry. Rather than competing with itself and bandaging the issue, Texas needs to think strategically to employ long-term policy interventions that address the state’s unique energy issues at the source.

By investing in clean energy, improving its energy infrastructure, and ensuring consumer protections and disincentivizing corporate greed, Texas can be innovative in building a cleaner, more efficient, and more resilient energy system that serves as a model for other states.

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