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Introduction

Texas Energy Poverty Research Institute seeks to investigate how developments in the Texas energy landscape affect the energy cost burden for low and moderate income (LMI) households across the state. Winter Storm Uri and its lingering effects add to existing concerns about the affordability of household energy use in the state. In the months following the storm, journalists, academics, and policymakers sifted through the storm's wake to ascertain what exactly went wrong and explored how such a catastrophe could be avoided in the future. While many of us have been able to fully recover from the aftermath of the extreme winter weather, countless families across the state continue to struggle with the storm's consequences.

There continues to be a salient need to investigate how the storm affected communities in Texas where the cost of energy remains a burden on an everyday basis —not just during extreme weather events. TEPRI's goal as an organization is to better understand energy insecurity in the Texas context by capturing lived experiences. We focus on the disproportionate energy cost burdens, the trade-offs faced when paying utility bills, the discomfort and stress related to energy access and affordability, and the impacts on health for LMI households across the state.

Although the storm has passed, its lingering effects further complicate efforts for relieving energy poverty. Tens of billions of dollars of debt accrued during the peak of the winter weather that is starting to come due for ratepayers and retail electric providers alike.¹ While the Texas state legislature has attempted to soften the blow, nearly all Texans will still see their electricity bills go up in the near future to help pay down those debts.² Those payments are likely to last for years in order to avoid some of the potential sticker shock faced by some residents across the state. With some power generators now being required to weatherize against similar winter weather events, there are fears that bills could go up even further without additional relief at the state level.

Even after the extraordinary level of scrutiny that the Electricity Reliability Council of Texas (ERCOT) faced, the grid operator was forced to issue a request for electricity conservation on Monday, June 14, following higher than average temperatures for the month of June.³ The notice was in place until Friday, June 16, leading to concern among Texans who felt that measures should have been adopted to avoid such a scenario.⁴ Again, an unexpectedly high amount of power generation was forced offline during a period of peak demand, putting excess strain on the grid. Texans were urged to minimize electricity use by setting temperatures above 78 degrees Fahrenheit, to avoid using major appliances (such as dishwashers), and to unplug unused electronic devices.

¹ Robert Bryce, "Texas Ratepayers Are Being Saddled With Nearly \$38 Billion In Excess Energy Costs From Winter Storm Uri," *Forbes*, June 11, 2021, sec. Energy, <https://www.forbes.com/sites/robertbryce/2021/06/11/texas-ratepayers-are-being-saddled-with-nearly-38-billion-in-excess-energy-costs-from-winter-storm-uri/>.

² Loren Steffy, "Despite Losing Power for Days, Texans Will Pay Higher Power Bills—Perhaps for Decades to Come," *Texas Monthly*, March 4, 2021, <https://www.texasmonthly.com/news-politics/blackout-crisis-texans-electric-bills/>.

³ Mitchell Ferman, "Some Texas Power Plants Unexpectedly Went Offline Last Week. The Grid Operator Says It Still Doesn't Know Why," *The Texas Tribune*, June 24, 2021, <https://www.texastribune.org/2021/06/24/texas-ercot-power-plants-offline/>.

⁴ Tim McLaughlin, "Texas Power Grid Faces Summer Having Changed Little from February Freeze," *Reuters*, June 24, 2021, sec. Energy, <https://www.reuters.com/business/energy/texas-power-grid-faces-summer-having-changed-little-february-freeze-2021-06-24/>.

It is important to note, however, that ERCOT serves to monitor the grid operation but does not actually serve as the operator of the individual power generation facilities that make up the grid. As such, there is a network of independent operators that make up what is considered the ERCOT grid. Independent operators are not required to quickly disclose what causes generation capacity to go offline.⁵ At the time of writing, the causes of these outages were unclear.

Many low-income households across the state will again be forced to grapple with how to manage rising energy bills as the economy is still recovering from the pandemic-related economic downturn.

With recent events, the reliability of the ERCOT grid continues to be on the minds of families across Texas. While 2021 may not be Texas's hottest or driest year on record, the state is poised to experience temperatures that are hotter than average for the duration of the summer.⁶ Many low-income households across the state will again be forced to grapple with how to manage rising energy bills as the economy is still recovering from the pandemic-related economic downturn. Even then, the economic recovery is not happening at the same pace for all Texans. Despite lowering unemployment figures across the state, communities of color continue to have disproportionately higher levels of unemployment compared to their white counterparts.⁷

In response to Winter Storm Uri, TEPRI released the [Lived Experiences of Winter Storm Uri](#) in March 2021 - a blog post which presented high-level insights from a survey of 953 respondents from across Texas. The survey aimed to gauge how households across Texas and across the income spectrum were impacted by the storm and better understand the storm's lingering effects. This report seeks to dig deeper into the data presented in *Lived Experiences of Winter Storm Uri* and provide a more in-depth analysis of the storm's immediate and lasting impacts on low-income households in Texas. We begin by providing a brief overview of the sequence of events during Winter Storm Uri to demonstrate the conditions that led to the experiences highlighted in the report. This work also investigates the legislative and regulatory actions that followed in the storm's aftermath, with a particular focus on the financial impacts to individual ratepayers. We then discuss the methodology used in collecting data on lived experiences. Finally, we explore specific storm impacts on lower income respondents, focusing on their pre-storm concerns, threats to health and safety, property damage, and the storm's lasting effects.

⁵ Ferman, "Some Texas Power Plants Unexpectedly Went Offline Last Week. The Grid Operator Says It Still Doesn't Know Why."

⁶ Chris Coleman, "Seasonal Updates," *Seasonal Updates* (blog), May 7, 2021, <http://www.ercot.com/about/weather/updates>.

⁷ Julia Wolfe, "How Fast Is The Economy Recovering?," *FiveThirtyEight*, July 2, 2021, <https://projects.fivethirtyeight.com/us-economy-coronavirus/>.



Image source: [bk1bennett \(link\)](#)

Winter Storm Uri: Background

Severe winter weather blanketed much of Texas beginning on February 10, 2021, with lower-than-average temperatures lasting through February 20. Temperatures across much of the state dropped to extreme lows in the evening of Sunday, February 14th and the early morning of Monday, February 15th, resulting in single-digit temperatures in communities like Dallas-Fort Worth, Austin, and San Antonio. That night, nearly 10,000 megawatts (MW) of gas and wind power generation capacity shut down due to fuel shortages or frozen equipment. ERCOT ordered load shed on February 15th to avoid a total grid collapse.⁸ By the morning of the 15th, more than 30 gigawatts (GW) of generation capacity was offline - well beyond the maximum of 14 GW that the state had expected could go offline in its extreme winter planning scenario.⁹ The unprecedented strain on the electricity supply, coupled with skyrocketing demand for home heat, caused ERCOT to be unable to conduct rolling blackouts as planned. Instead, much of the state was plunged into darkness for the duration of the cold weather event.

In the aftermath of the storm, researchers, policymakers, and journalists examined some of the most widespread impacts on populations across Texas. More than 4.5 million households, or roughly one in three Texans, lost electricity during the storm at some point - some for as long as five days.¹⁰ The Perryman Group, a Texas-based economic research firm, estimates that Texas sustained between \$85.8 and \$128.7 billion in economic losses,

⁸ "ERCOT Calls for Rotating Outages as Extreme Winter Weather Forces Generating Units Offline," accessed July 2, 2021, <http://www.ercot.com/news/releases/show/225210>.

⁹ Brian Bartholomew, "ERCOT Expected 14GW of Power Plant Outages in Its 'extreme' Winter Planning Scenario. By Late Monday Morning, More than 30GW Were Offline. <https://t.co/6HvkEaT1en>," Tweet, @BPBartholomew (blog), February 24, 2021, <https://twitter.com/BPBartholomew/status/1364446059028750337>.

¹⁰ Cassandra Pollock, "Gov. Greg Abbott Says Power Is Almost Fully Restored Statewide and Grocery Stores Will Soon Be Restocked," *The Texas Tribune*, February 21, 2021, <https://www.texastribune.org/2021/02/21/texas-power-outage-grocery-stores-greg-abbott/>.

outpacing the economic impacts of both Hurricanes Harvey and Ike.¹¹ Karen Clark & Company, a Boston-based catastrophe risk modeling firm, estimates that there are over \$18 billion in insurance claims for property damage in Texas and neighboring states that were affected by the storm.¹² That figure does not include the damage sustained by homeowners and renters who lack adequate insurance coverage on their residences. From our own data, we noted that only 31% of all the respondents from our survey felt sure that they would be able to file an insurance claim or receive FEMA funds to help with the cost of repairs.

The negative human health effects of the storm were exacerbated by the worsening conditions in many people's homes due to lack of electricity, gas, and potable water. Property damage, including burst water pipes and collapsed ceilings, and unbearable living conditions led to many homes becoming inhospitable. These conditions forced individuals to brave dangerous road conditions to seek alternative accommodations - all with the omnipresent threats from the COVID-19 pandemic. Official figures from the Texas Department of State Health Services (DSHS) estimate that 151 people died as a direct result of the storm.¹³ Independent analysis, which aimed to identify excess deaths using CDC mortality data, places the death toll north of 700.¹⁴ The lived experiences of Texans, particularly those with preexisting health conditions or vulnerabilities, demonstrates that there is still much that is left to uncover about the long-term side effects of Winter Storm Uri.

A report authored by six former members of the Public Utility Commission of Texas (PUCT), including TEPRI's founder and board member Becky Klein, identified several key contributing factors that led to the crisis witnessed during Winter Storm Uri.¹⁵ Of the key factors and recommendations supported by the authors, one set of recommendations focused on a lack of information for the "contributing causes of the blackout and the sequence of events and actions by ERCOT, power plants, fuel suppliers, regulators, and customers before and during the storm." While many of the impacts of the storm have been well documented, there are still ongoing investigations by ERCOT, PUCT, the Texas Attorney General, and the Federal Energy Regulatory Commission (FERC) that will provide further insight into the problems and missteps that occurred during the weather event.

¹¹ "Preliminary Estimates of Economic Costs of the February 2021 Texas Winter Storm" (The Perryman Group, February 2021), <https://www.perrymangroup.com/media/uploads/brief/perryman-preliminary-estimates-of-economic-costs-of-the-february-2021-texas-winter-storm-02-25-21.pdf>.

¹² "Preliminary Estimates of Economic Costs of the February 2021 Texas Winter Storm."

¹³ "Winter Storm-Related Deaths - April 28, 2021," *Texas Department of State Health Services* (blog), April 28, 2021, <https://www.dshs.state.tx.us/news/updates.shtm>.

¹⁴ Peter Aldhous, Stephanie Lee, and Zahra Hirji, "The Texas Winter Storm And Power Outages Killed Hundreds More People Than The State Says," *BuzzFeed News*, May 26, 2021, <https://www.buzzfeednews.com/article/peteraldhous/texas-winter-storm-power-outage-death-toll>.

¹⁵ Pat Wood et al., "REPORT | Never Again: How to Prevent Another Major Texas Electricity Failure," June 3, 2021, https://cgmf.org/blog-entry/435/REPORT-%7C-Never-Again-How-to-prevent-another-major-Texas-electricity-failure.html#_ftn2.



Image source: Wikimedia Commons ([link](#))

Legislative and Regulatory Updates

The storm brought unprecedented national attention to ERCOT, the PUCT, and the Texas electrical grid. For many, it was not easily understood why power generation failed and why grid operators could not readily source power from outside of the state in the case of such an emergency. As such, the spotlight was placed on legislators and regulators to determine what exactly went wrong, who was at fault, and how such a problem could be avoided in the future. Winter Storm Uri also happened to occur during the 87th Texas Legislative Session, casting a spotlight on the legislative body to promptly develop solutions.

In response, Texas lawmakers passed several key bills to address some of the root causes of the electric grid failures. Senate Bill 3, which was signed into law, aims to address concerns over the weatherization requirements for power generators and transmission line operators by requiring certain facilities to weatherize.¹⁶ The bill requires the PUCT to establish weather emergency reliability standards for municipally owned utilities, power generators, electric cooperatives, or exempt wholesale generators that sell electricity on the wholesale market, including weatherization standards. As for natural gas facilities, only facilities that are considered critical are required to undergo weatherization.

Members of the Texas House of Representatives passed House Bill (HB) 2000, which would have created a \$2 billion program from the state's rainy-day fund to help subsidize the costs of power plant weatherization.¹⁷ The program, to be known as the State Utilities Reliability Fund (SURF), would have provided grants and low-cost loans to help support those efforts. SURF was modeled off the existing State Water Implementation Fund for Texas (SWIFT) and

¹⁶ Schwertner et al., "Senate Bill 3," accessed July 2, 2021, <https://capitol.texas.gov/BillLookup/History.aspx?LegSess=87R&Bill=SB3>.

¹⁷ Erin Douglas, "Texas House Advances Plan to Subsidize Power Plant Weatherization," *The Texas Tribune*, May 3, 2021, <https://www.texastribune.org/2021/05/03/texas-house-power-weatherization-fund/>.

would have required voter approval given its proposed modifications to the state constitution. HB 2000 was also amended to include a provision that would have allowed for funds to be used for projects that reduce electricity demand. Despite strong support in the House, the bill failed to get a committee hearing in the Senate before Sine Die, the legislature's conclusion. Without state funds clearly earmarked, it remains unclear how weatherization efforts will be paid for and whether those costs will be passed on to ratepayers, further increasing energy costs.¹⁸

Electricity market conditions during the storm also garnered the attention of lawmakers during the legislative session. Electricity scarcity during the storm led electric regulators to set market prices at the maximum rate of \$9,000 per megawatt-hour (MWh) to attract power generators to bring additional capacity online. Under normal grid conditions, prices typically average around \$30/MWh. These prices lasted from Monday, February 15, to the morning of Friday, February 19th, despite ERCOT ending the load shed order at 11:55pm on Wednesday, February 17.¹⁹ It is estimated that roughly \$47 billion in electricity charges were billed during the winter storm alone.²⁰ Potomac Economics, the PUCT's independent market monitor, issued a letter stating that the market price of \$9,000/MWh was in place for nearly 32 hours longer than it should have been based on ERCOT's load shed order, resulting in an estimated \$16 billion in excessive charges.²¹

With these exorbitant economic impacts, the legislature faced the challenge of helping to stymie the financial blow incurred by electricity retailers across the state. HB 4492, which was approved by the legislature during the final day of session and signed into law, provides billions of dollars in state funds and bonds for electric and gas companies to seek relief for the extreme debt incurred during the storm. These funds aim to spread the cost of debt repayment over a longer period. Regardless, most Texans will begin to see higher electric bills for years to come to help pay off this debt, raising concerns about additional energy cost burdens for low-income households. Although bills are likely to only go up by a few dollars a month, any increase in electricity bills is likely to have a disproportionately higher impact on lower-income communities.²² As of Sine Die, there was no legislation to provide financial relief to electricity customers across the state. The Senate version of HB 4492 would have included one-time funds to help reduce the financial burden for residential ratepayers.²³ That provision, however, was removed from the bill in the House of Representatives with only five minutes left in the legislative session. Lieutenant Governor Dan Patrick called on the legislature to address potential direct credits to ratepayers during the special legislative

¹⁸ Erin Douglas and Mitchell Ferman, "Texas Legislature Approves Bills to Require Power Plants to 'Weatherize,' among Other Measures to Overhaul Electric Grid," *The Texas Tribune*, May 26, 2021, <https://www.texastribune.org/2021/05/26/texas-power-grid-reform-legislature/>.

¹⁹ Joshua W. Busby et al., "Cascading Risks: Understanding the 2021 Winter Blackout in Texas," *Energy Research & Social Science* 77 (July 1, 2021): 102106, <https://doi.org/10.1016/j.erss.2021.102106>.

²⁰ Busby et al.

²¹ "Texas Watchdog Says Grid Operator Made \$16 Billion Error," *Bloomberg.Com*, March 4, 2021, <https://www.bloomberg.com/news/articles/2021-03-04/texas-watchdog-says-power-grid-operator-made-16-billion-error>.

²² "Lawmakers Try New Solution to Minimize Winter Storm Debt," *Dallas News*, May 7, 2021, sec. News, <https://www.dallasnews.com/news/2021/05/07/lawmakers-try-new-solution-to-minimize-winter-storm-debt/>.

²³ Madlin Mekelburg, "Sweeping Bill to Address Texas Power Grid Failures Heads to Gov. Abbott's Desk," *Austin American-Statesman*, May 30, 2021, <https://www.statesman.com/story/news/politics/state/2021/05/30/texas-power-grid-failure-legislation-reform-abbott-governor/5273492001/>.

session beginning July 8.²⁴ ²⁵ Governor Greg Abbott, however, did not include grid infrastructure or electricity issues on the 11-item agenda for the special session.²⁶ As such, lawmakers are unable to pass laws on those topics during the special legislative session.²⁷

While the legislature was tasked with appropriating state funds for winter storm relief, the PUCT took several impactful regulatory actions. In response to the financial uncertainty caused by the winter storm, the PUCT issued a moratorium in February aimed at preventing utility companies from shutting off service to customers for late or unpaid bills incurred during the storm.²⁸ On June 13, the PUCT chose to lift the moratorium beginning on June 18, with shutoffs authorized in the final week of June.²⁹ In a memorandum to PUCT Commissioner Will McAdams, PUCT Chairman Peter Lake stated that “while there are many who are still affected by the events in February, I believe that the urgency of the situation has passed, and that a continuance of a Uri-based moratorium could lead to an unsustainable impact on a significant number of financially at-risk Texas consumers.”³⁰ With the warm summer months approaching, Chairman Lake noted that existing safeguards prevent retail electric providers and other entities from disconnecting service during periods when the National Weather Service issues heat advisories.³¹

Despite those provisions, the end of the moratorium coincided with near-record demand for electricity as Texas experienced higher than normal temperatures in June.³² While demand grew, ERCOT urged electricity conservation statewide due to 12,000 MW of power generation capacity unexpectedly being offline for maintenance. For nearly all Texans, home cooling accounts for the majority of electricity bills in summer months. Unexpectedly high June temperatures, coupled with new fees for the repayment of Winter Storm Uri debt on utility bills and the lifting of the PUCT moratorium, could potentially put extra strain on low-income populations during the summer. As noted in previous TEPRI publications, low-income households often must make difficult trade-offs to afford electricity bills.³³ Most commonly, low-income individuals choose to forgo spending on clothing, food, transportation, and technology to afford the cost of electricity. With growing concerns about electricity

²⁴ Douglas and Ferman, “Texas Legislature Approves Bills to Require Power Plants to ‘Weatherize,’ among Other Measures to Overhaul Electric Grid.”

²⁵ Cassandra Pollock, “Texas Gov. Greg Abbott Sets July 8 Date for Special Legislative Session on Voting Bill, Other Issues,” *The Texas Tribune*, June 22, 2021, <https://www.texastribune.org/2021/06/22/texas-greg-abbott-special-session/>.

²⁶ Greg Abbott, “Proclamation by the Governor of the State of Texas,” July 7, 2021, https://gov.texas.gov/uploads/files/press/PROC_first_called_session_87th_legislature_IMAGE_07-07-21.pdf.

²⁷ Mitchell Ferman, “Officials in Charge of Texas’ Power Grid Try to Reassure Lawmakers and the Public That They’re Fixing Lingering Problems,” *The Texas Tribune*, July 13, 2021, <https://www.texastribune.org/2021/07/13/texas-power-grid-ercot-puc-hearing/>.

²⁸ Andrew Barlow, “PUC Emergency Actions to Protect Texas Electricity Customers,” February 21, 2021, <https://www.puc.texas.gov/agency/resources/pubs/news/2021/PUCTX-REL-COLD21-022121-EOM.pdf>.

²⁹ Dominic Anthony Walsh, “Electricity Disconnections To Resume In Texas As Summer Heat Arrives,” *Houston Public Media*, June 11, 2021, sec. Energy & Environment, <https://www.houstonpublicmedia.org/articles/news/energy-environment/2021/06/11/400446/electricity-disconnections-to-resume-in-texas-as-summer-heat-arrives/>.

³⁰ “‘The Emergency Has Passed’: PUC Ends Moratorium on Shutting Off Utilities for Nonpayment,” *NBC 5 Dallas-Fort Worth*, June 11, 2021, <https://www.nbcdfw.com/news/local/texas-news/the-emergency-has-passed-puc-ends-moratorium-on-shutting-off-utilities-for-nonpayment/2655018/>.

³¹ “Subchapter A. General Provisions,” Title 2. Subtitle B. Chapter 39. Utilities Code §, accessed July 2, 2021, <https://statutes.capitol.texas.gov/Docs/UT/htm/UT.39.htm>.

³² Erin Douglas, “Texas Grid Operator Urges Electricity Conservation as Many Power Generators Are Unexpectedly Offline and Temperatures Rise,” *The Texas Tribune*, June 14, 2021, <https://www.texastribune.org/2021/06/14/texas-power-grid-conserve-ercot/>.

³³ “Energy Insecurity: Why It Matters” (Texas Energy Poverty Research Institute, April 22, 2020), https://txenergypoverty.org/wp-content/uploads/2020/04/TEPRI_CV19_EconInsecurity_April2020.pdf.

affordability and reliability, there continues to be a need to investigate how the impacts of Winter Storm Uri were felt among lower-income Texans.

Methodology

As discussed in *Lived Experiences of Winter Storm Uri*, TEPRI launched a survey to 953 participants that aimed to gauge how households across Texas and across the income spectrum were impacted by the storm and to understand its lingering effects. The results were collected from March 8-10, 2021, using Pollfish, a survey platform optimized for mobile users.

For the purposes of this report, we aim to further analyze the data from our Winter Storm Uri survey to identify particular impacts on low-income respondents. We therefore split the respondent data into two distinct categories - lower income (LI) and higher income (HI) - based on responses to the following question:

Which of the following categories best describes your household's financial circumstances?

- A. Very low income/experiencing poverty
- B. Low income/struggling to get by
- C. Moderate income/getting by
- D. High income/comfortable
- E. Very high income/wealthy

Respondents who self-identified as “very low income/experiencing poverty” and “low income/struggling to get by” were included in the LI category, whereas all other respondents were included in the HI category. Of the 953 total respondents, 360 (38%) self-identified as low income or very low income. TEPRI's [Low-Income Community Profile](#) series, published in 2019, found a similar percentage of households in Texas (41%) to be at or below 80% of Area Median Income (AMI) - a commonly-used benchmark in assessing household income.

Our team also collected data on other indicators of income and wealth. As part of our survey, we asked respondents to indicate whether they were renters or homeowners and whether they participated in an income-based public benefits program (such as SNAP, WIC, or free and reduced school lunch programs). Additionally, Pollfish collects demographic data on all survey participants, including self-reported income, which went into the survey's analysis. Nevertheless, self-reported income level from the survey remained the most valuable indicator to measure the respondent's experience during the winter weather events. Other proximate variables (such as homeownership or receipt of public benefit benefits) were not found to be better indicators of income or lived experiences.

Throughout the remainder of this report, we measure the differences in how the storm impacted Texans of various income brackets by examining specific pre-storm conditions, impacts to safety and health, property damage, and long-term impacts to well-being.



Image Source: Jonathan Cutrer ([link](#))

Specific Impacts on LI Communities

Pre-storm conditions

A portion of TEPRI's Winter Storm Uri survey sought to better understand respondents' energy use and to gauge any potential concerns prior to the storm. Roughly 77% of LI respondents answered that they were either "very concerned" or "somewhat concerned" about their ability to afford their electricity bills before the storm compared to only 40% of HI respondents. This discrepancy alone highlights the importance of understanding energy cost burdens for Texans of different income groups. High energy cost relative to income, especially for those struggling during the COVID-19 pandemic, puts individuals at risk of accruing utility bill debt. Roughly one in three (34%) LI respondents said that they had some amount of outstanding electricity bill debt before Winter Storm Uri. In contrast, only 13% of HI respondents said that they had similar outstanding debt.

In addition to pre-pandemic economic concerns, the COVID-19 pandemic caused many survey respondents to struggle to afford their electricity bills. Of the LI respondents surveyed, one in four (25%) responded that they had either applied for electricity bill assistance or had enrolled in a deferred electricity bill payment plan as a result of the pandemic. In addition, nearly one in three (31%) LI respondents reported that their electricity had been disconnected for nonpayment since the pandemic started.

It is also important to highlight how electricity bills were already affecting people's way of life before the storm. For many, electricity bills are a regular cost burden that influences household decision making. Of the respondents surveyed, roughly 60% of LI respondents agreed with the statement that electricity bills are "causing money-related stress and anxiety." That figure was nearly half (31%) for HI respondents. Over one-third (35%) of LI respondents stated that they keep their homes at uncomfortable temperatures in order to save money. As noted later in the report, this practice puts additional strain on people's health and well-being.

Pre-storm Perceptions - Electricity affordability (by income group)

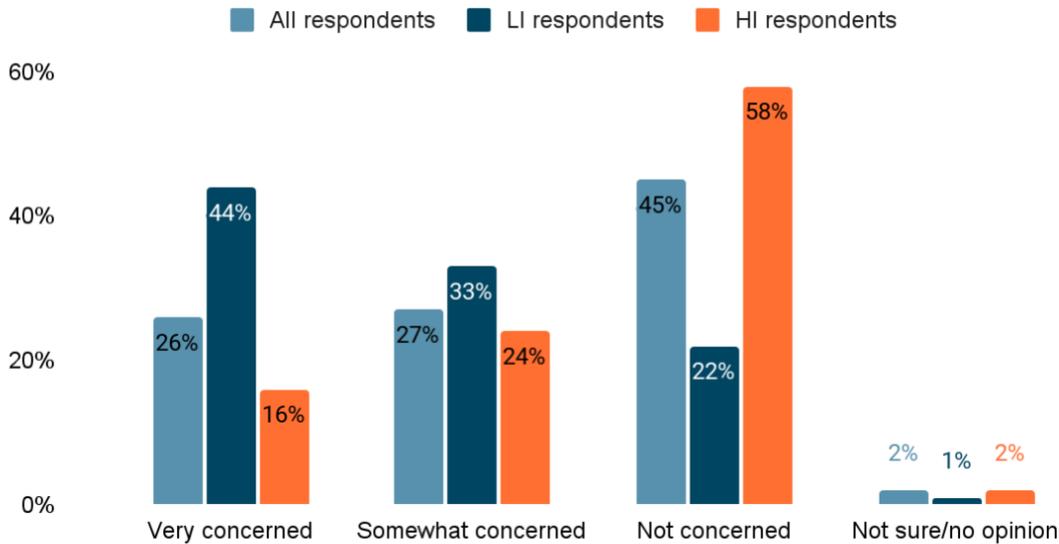


Figure 1: Responses to the question “Before the winter storm, how concerned were you about being able to afford your electricity bill?”

TEPRI also gathered information about respondents’ housing stock type and method of home heating. Housing stock differed significantly between income groups, with low-income respondents being disproportionately more likely to live in manufactured homes and HI respondents being much more likely to live in single-family houses. From a health and safety perspective, manufactured homes tend to have less insulation and weatherization infrastructure, making them especially vulnerable to extreme weather conditions. With respect to home heating type, LI respondents tended to rely much more heavily on space heaters for home heating (21% of respondents selecting space heaters as their primary source of heat) compared to their HI counterparts (7%). The data also showed that only 14% of LI households have gas-powered furnaces. The discrepancies in home heating type thus demonstrate the limited heating capacity for many LI households, even if electricity service had been reliable during the storm. These pre-storm conditions demonstrate that lower-income households were already struggling with energy affordability before the unexpected events of Winter Storm Uri.

Health and Safety Impacts

The loss of power and extreme winter weather conditions threatened the health and well-being of people of all backgrounds across the state. From our preliminary investigation in March, we found that roughly 75% of all respondents experienced a loss of electricity at some point during the storm. Despite showing discrepancies in other categories, our data shows that income did not appear to be a primary correlative indicator of the length of electricity outage experienced during the storm. In general, however, higher-income respondents were found to be more likely to have never lost their electricity at all. This finding would imply that HI households are more likely to be near “critical facilities” or be on

grid sections that are classified as ‘priorities’ by electric utilities. Findings from a group of researchers at the University of Massachusetts, Lawrence Berkeley National Laboratory, and the Colorado School of Mines, however, indicate that the “presence hospitals or police and fire stations – critical facilities – in a [census block group] reduces the chances of blackouts by around 0-6%, a small difference that does not otherwise explain the disparity among communities.”³⁴ Instead, their research points to racial background being a stronger indicator of the probability of lost electricity during the storm. While further research is needed to explore these findings, they posit that neighborhoods with higher minority populations were more than four times as likely to suffer blackouts than predominantly white areas.

Length of electricity outages during storm (by income group)

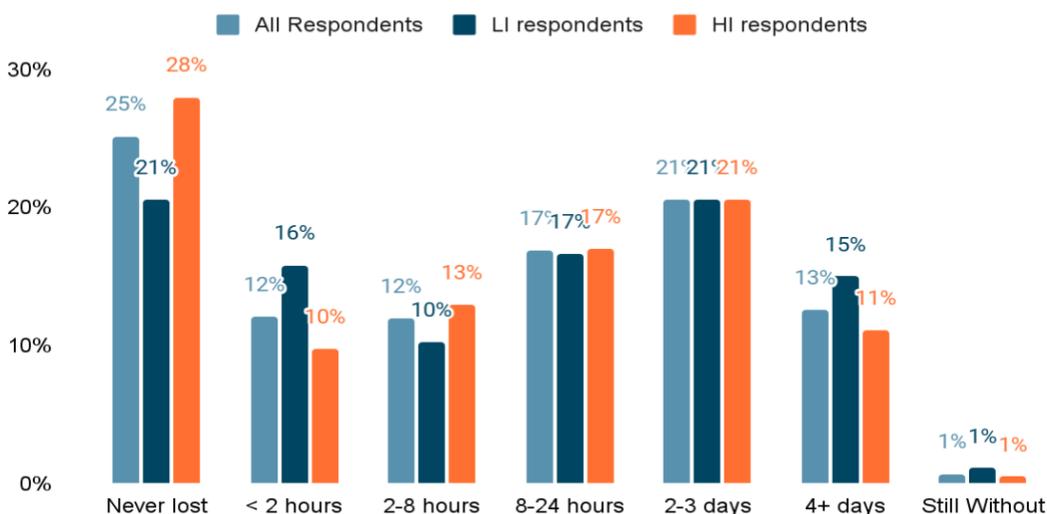


Figure 2: Responses to the question “How long did you go without electricity during Winter Storm Uri, which hit Texas starting on February 13, 2021?”

With respect to natural gas, the vast majority of respondents noted that they never lost natural gas delivery during the storm. For those who did lose gas, there was a slightly higher probability of the respondent being from a low-income household. Similarities in gas outages among income groups can likely be traced to a 1973 Texas Railroad Commission (RRC) order, which requires residential customers and essential services, such as hospitals, to be prioritized for natural gas delivery. This RRC order operates in contrast to the practice of electric utilities, which are instructed to prioritize electricity delivery only to specific areas with critical infrastructure. Regardless, over 10% of respondents stated that they had lost access to natural gas for at least two days, which for many may have been their only source of fuel for heat and cooking.

TEPRI investigated whether respondents used unconventional sources of energy, heat, or water to ease the burden of the storm. Across the spectrum, respondents of all income levels reported turning to such measures as boiling snow to have water, burning wood and grill

³⁴ JP Carvallo et al., “Frozen Out in Texas: Blackouts and Inequity,” *The Rockefeller Foundation* (blog), April 14, 2021, <https://www.rockefellerfoundation.org/case-study/frozen-out-in-texas-blackouts-and-inequity/>.

charcoal to stay warm, and using the power and heat from their cars. For example, as many as 27% of all respondents used their ovens to stay warm, exposing themselves to the risk of dangerous carbon monoxide inhalation. Nevertheless, our data did not show any major differences in the reliance on unconventional sources of energy, heat, or water among income groups, geographic location, or housing stock. These findings instead indicate the desperation felt by countless individuals to find alternative sources of energy, sustenance, and warmth.

Accessibility to clean and reliable water was also a major concern for households across the state during the storm. Over 12 million Texans were under boil water notices after water systems raised concerns about potability.³⁵ Many systems faced contamination and water pressure concerns, threatening the safe delivery of water. Even a week after the storm, nearly 8.7 million people remained under one of the 1,259 boil water notices in place at the time. People lost access to water for many reasons, including burst and frozen pipes. From our survey data, we found that LI and HI households lost access to potable water at similar rates for similar periods of time. Even still, many households were left without viable sources of clean drinking water during the storm and were forced to resort to such measures as boiling snow.³⁶

Property Damage

While immediate lived experiences already threatened the well-being of many, households across the state experienced billions of dollars in property damage as a result of the storm. With extreme cold temperatures, widespread loss of electricity, and uncommonly high snowfall, housing stock and infrastructure was under particularly intense strain. For context, three out of five households in the state are reliant on electric-powered heating units - one of the highest rates in the country.³⁷ For houses with gas furnaces, many often still rely on an electric ignitor and air handler to work properly. As such, low temperatures in homes contributed to a large portion of the property damage experienced by households across the state.

In our survey, we asked respondents whether they had experienced burst water pipes, fallen trees, damaged appliances, or roof damage. Across all incident types, LI respondents were more likely to experience property damage than their HI counterparts. Over one third of all low income-respondents (38%) experienced burst water pipes, compared to only 25% of HI respondents. Similar trends were witnessed in other property damage categories, as seen in Figure 3 below.

³⁵ Bill Chappell, "8.7 Million People Under Boil Water Notices In Texas," *NPR.Org*, February 22, 2021, <https://www.npr.org/sections/live-updates-winter-storms-2021/2021/02/22/970241763/monday-update-8-7-million-people-under-boil-water-notices-in-texas>.

³⁶ Salvador Hernandez, "People In Texas Are Melting Snow And Icicles Because They've Lost Access To Water," *BuzzFeed News*, February 19, 2021, <https://www.buzzfeednews.com/article/salvadorhernandez/texans-melting-snow-no-water>.

³⁷ "Texas - State Energy Profile Analysis - U.S. Energy Information Administration (EIA)," April 15, 2021, <https://www.eia.gov/state/analysis.php?sid=TX#109>.

Property Damage Type	LI respondents impacted	HI respondents impacted
Burst pipes, flooding, or water damage	38%	25%
Fallen trees	16%	10%
Damaged appliance(s)	15%	8%
Roof or other structural damage to home	15%	8%
Minor cosmetic issues	18%	17%
Other	3%	2%
No damage	38%	54%

Figure 3: Survey respondents who responded ‘yes’ to having sustained property damage of varying types.

From the above data, it can be inferred that housing stock played a significant role in the lived experiences of respondents of different income brackets. TEPRI’s 2017 [Energy Poverty Landscape Analysis](#) provided much insight into the role that housing plays in energy use and affordability. It is well understood that because of financial constraints, lower income communities are more likely to live in older homes where preventative maintenance may not have been undertaken. Low-income housing often has substandard insulation, inefficient appliances, and older windows. Those who rent are also less likely to have energy-efficient upgrades made to their homes compared to those who live in owner-occupied housing.

As such, the higher instances of property damage can be attributed to the lack of available resources for maintenance, upgrades, and weatherization measures. Burst pipes and water damage can likely be linked to outdated plumbing systems and lack of weatherization or insulation in housing stock among lower-income households. Many homes were not able to retain significant heat during the storm, thus causing plumbing systems to freeze and burst, which in turn caused water damage. Higher instances of fallen trees among lower income

respondents may also be attributed to the lack of available funds for the inspection, upkeep, and removal of older trees on residential properties. However, these figures do not account for differences in landscape or geographical location. The disproportionate damage sustained to appliances and roofs among lower-income households can likely be explained by similar circumstances, such as the lack of available funds for the replacement of outdated appliances or roofs.

Aftermath

The findings above demonstrate how the unexpected consequences of Winter Storm Uri threatened the immediate health and well-being of many across the state. While the storm has come and gone, there are also longer-term effects that continue to negatively affect the lives of countless people. Figure 4 depicts responses to a prompt about the hardships faced during and after the storm.

Issue or hardship	LI respondents impacted	HI respondents impacted
Lost wages or reduced income	37%	24%
Food spoilage	44%	38%
Medical equipment malfunction	14%	5%
Stress, mental anguish	59%	52%
Health emergency	10%	5%
Unaffordable electricity bill	34%	13%
Unaffordable gas bill	13%	6%

Figure 4: Survey respondents who responded 'yes' to having sustained certain issues or hardships.

It becomes immediately clear from the results of this portion of the survey that there is a wide discrepancy in concern over utility bill affordability between income groups in the

aftermath of the storm. Low-income respondents were over twice as likely to express concern about their ability to afford their electricity and gas bills. Part of this concern may be attributed to the widely circulated reports published immediately following the storm that documented how individual ratepayers in some markets were being charged thousands of dollars for using electricity during the widespread outages.³⁸ One report, in particular, chronicled how one individual received a bill of nearly \$17,000 for energy use - nearly 70 times their normal monthly utility allowance.³⁹ However, these exorbitant charges were isolated to ratepayers who purchase electricity at wholesale rates from companies on the competitive market, such as Griddy. Of the roughly 5.7 million customers in the ERCOT market who purchase electricity on the competitive market, only an estimated 30,000 customers purchase electricity at wholesale prices.⁴⁰ This level of concern was also measured in March, long before the long-term economic impacts of the storm were fully understood and before the Texas Legislature took actions to address economic uncertainty in electricity markets. Nevertheless, energy affordability remains a key concern for low-income households.

With rising electric bills during the summer months, coupled with the repayment of Winter Storm debt and stagnant economic recovery, many LI households are likely going to have to make difficult decisions on where to allocate their resources. Over a third of LI respondents (37%) also reported lost wages or reduced income during the storm. For households living paycheck to paycheck, it can be difficult to recover quickly when vital income is lost. Reports have shown that fewer than 40% of American households have the available funds to comfortably cover a \$1,000 emergency expense.⁴¹

³⁸ Rebecca Hersher, "After Days Of Mass Outages, Some Texas Residents Now Face Huge Electricity Bills," *NPR.Org*, February 21, 2021, <https://www.npr.org/sections/live-updates-winter-storms-2021/2021/02/21/969912613/after-days-of-mass-outages-some-texas-residents-now-face-huge-electric-bills>.

³⁹ Giulia McDonnell Nieto del Rio, Nicholas Bogel-Burroughs, and Ivan Penn, "His Lights Stayed on During Texas' Storm. Now He Owes \$16,752.," *The New York Times*, February 21, 2021, sec. U.S., <https://www.nytimes.com/2021/02/20/us/texas-storm-electric-bills.html>.

⁴⁰ Mitchell Ferman, "Texas Legislature Approves Bill to Ban Residential Wholesale Electricity Plans — the First Major Winter Storm Bill Sent to the Governor," *The Texas Tribune*, May 13, 2021, <https://www.texastribune.org/2021/05/13/texas-power-grid-failure-legislature/>.

⁴¹ Jeff Ostrowski, "Fewer Than 4 In 10 Americans Could Pay A Surprise \$1,000 Expense From Savings, Survey Finds" (Bankrate.com, January 11, 2021), <https://www.bankrate.com/banking/savings/financial-security-january-2021/>.

Moving Forward

Winter Storm Uri was an unprecedented shock to Texas infrastructure. Even months later, it remains clear that the storm's major impacts continue to affect the lives of many across Texas. Our data adds to the existing understanding of the importance of affordable, reliable energy to average electricity ratepayers, particularly to those in lower socioeconomic brackets. This report was authored at a time in which economic uncertainty still lingers and the threats of the coronavirus pandemic have yet to subside. Rising energy costs, warmer than average temperatures, and unaddressed storm-related impacts are just a few of the long-term challenges of Winter Storm Uri that Texans must cope with going into the summer months.

As of writing, ERCOT officials still have not explained what caused 12,000 MW of power generation capacity to unexpectedly go offline during the period of unexpectedly high temperatures seen during the week of June 14, 2021. It remains unclear how much thermal power generation capacity is still offline from Winter Storm Uri going into the warmest summer months with peak demand. Less than 500 of the 12,000 MW of the thermal generation capacity that was offline during the week of June 14 planned to be out for maintenance.⁴² As we head into the warmest summer months, especially as the Pacific Northwest experiences its hottest temperatures ever recorded, individual ratepayers have concerns about how tight grid conditions may affect their health and well-being.⁴³ With the lingering effects of Winter Storm Uri not far in the rear view mirror, Texans are wary of similar grid failures occurring during summer months.

The upcoming Texas Special Legislative Session may provide additional relief to individual ratepayers across the state who face paying higher bills for years to come. With the PUCT moratorium lifted, individuals who have not been able to recover from the coronavirus pandemic may face disconnection for nonpayment. Either way, households across the state are going to face tough tradeoffs when heightened electricity bills come due during costly summer months. With lost wages from both Winter Storm Uri and the longer-term trends of the pandemic, these tradeoffs may be even more cumbersome to daily life.

TEPRI intends to monitor the summer grid conditions closely, focusing particularly on impacts to LI communities. Our research team plans to conduct additional research on the lived experiences of Texans during the summer months, especially following recent ERCOT notices to conserve energy amid sweltering temperatures. Texans typically experience their most expensive electricity bills during the summer, and as such, people will likely be faced with difficult financial decisions to reduce energy cost burdens.

⁴² Ferman, "Some Texas Power Plants Unexpectedly Went Offline Last Week. The Grid Operator Says It Still Doesn't Know Why."

⁴³ "A Running List of All-Time Heat Records Broken in Pacific Northwest, Western Canada," The Weather Channel, accessed July 2, 2021, <https://weather.com/forecast/regional/news/2021-06-28-record-heat-wave-northwest-washington-oregon-canada>.