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A Decade of Deliberate Inaction: Root Causes and Fallout from the Deadly Texas Power Failure of 2021

By Ed Hirs

Millions of Texans lost power in February 2021. Hundreds died as a result. Tens of billions of dollars in damages were lost. Billions were just transferred from consumers by government action, and now consumers are paying billions to bailout corporations. What went wrong?

Generators failed during the winter storm in February 2021 with many of “the freeze-related outages occurring at temperatures above the unit’s stated ambient design temperature.”¹ Stripping away everything else, the system operated by the Electric Reliability Council of Texas, ERCOT, failed because generator companies did not invest in weatherization practices after a similar failure in 2011. For eight of the 10 years prior to 2021, the average wholesale price of electricity in ERCOT was too low for generator companies to earn returns on capital.² Consequently, they had every incentive not to invest in weatherization. The ERCOT market rewarded volatility at the expense of reliability, despite a decade of warning.

Executive Summary

The primary Texas electricity market is the largest in the nation, as much as twice the size of California’s. It is operated by ERCOT under the direction of the Public Utility Commission of Texas, PUCT. The ERCOT market serves about 85% of the state’s population, totaling approximately 26 million people. In the late 1990s, Texas followed California’s example to loosen government regulations of the electricity market. Under the laws passed at the time, ERCOT was empowered not only to manage the flow of electricity across the grid but to buy electricity from generators in an ERCOT-managed wholesale market and to sell that electricity to middlemen, who in turn sell the electricity to consumers.

¹ FERC - NERC - Regional Entity Staff Report: The February 2021 Cold Weather Outages in Texas and the South Central United States, November 16, 2021, page 17. Available at <https://www.ferc.gov/media/february-2021-cold-weather-outages-texas-and-south-central-united-states-ferc-nerc-and>

² Hirs, Ed, “[ERCOT—GENERATORS’ REVENUES LESS THAN COSTS FOR 8 OUT OF 10 YEARS Excerpts from ERCOT’s State of the Market Reports 2011—2020](#)” June 4, 2021, Available at edhirs.com

Consumers within ERCOT select retail energy providers and plans based on their geographic locations.³ Proponents hailed this as "deregulating" the Texas electricity market just as the California market had been "deregulated," but it put the ERCOT marketplace on the road to February's system collapse. Hundreds died. More than \$100 billion in property damages were incurred. More than half the nation's refinery and petrochemical complex was knocked out of commission, with supply chains not expected to be fully restored until January 2022.⁴ What happened in 2021 was preventable and had been predicted a decade earlier in 2011, when a similar winter storm caused blackouts across Texas. That storm was itself previewed by an earlier winter storm, which hit Texas between February 24-26, 2003.⁵

The February 2021 Cold Weather Outages in Texas and the South Central United States report was issued November 16, 2021, ("FERC 2021 Report") by the Federal Energy Regulatory Commission, FERC, and the North American Electric Reliability Corporation, NERC, and Regional Entities.⁶ The report analyzes the timeline of the system's physical failure and speaks to a frustration with the lack of preparations for cold weather. The report did not address "potential market manipulation or market design issues."⁷

This white paper addresses the ERCOT market design in the context of the 2011 and 2021 failures. We examine reports and data and, to the extent possible currently, summarize the human costs, impact on consumers, and the financial costs.

- ERCOT's energy-only market means some generators are idle many months of the year, guaranteeing they won't earn enough to reinvest in the Texas market.
- The ERCOT market design is vulnerable to price manipulation.
- Some much-touted potential solutions, including connecting the ERCOT grid with those in neighboring states, would not have helped in February 2021, largely because neighboring states' federally regulated grids were facing their own severe weather and could have only provided 7 gigawatts of power when 40 gigawatts were necessary.
- Recommendations by both ERCOT and the FERC following the 2011 winter storm and blackout went unheeded, by the Legislature, then-Gov. Rick Perry, PUCT, ERCOT, and by the generating companies themselves.
- Legislators and Gov. Greg Abbott did act after the 2021 storm, but the changes stopped short of what is needed.
- Despite claims that the market design results in lower retail electric prices, consumers pay more under ERCOT than in regulated markets.

³ Sixel, L.M., "Analysis: The murky and confusing Texas electricity market". Houston Chronicle. Nov. 1, 2019. Available at: <https://www.houstonchronicle.com/business/energy/article/Analysis-The-murky-and-confusing-Texas-14707148.php>

⁴ Thompson, Jesse *Texas Winter Deep Freeze Broke Refining, Petrochemical Supply Chains . Southwest Economy: Second Quarter 2021*. Available at: <https://www.dallasfed.org/research/swe/2021/swe2102/swe2102c.aspx>

⁵ https://www.puc.texas.gov/industry/electric/reports/ERCOT_annual_reports/special/weather_event.pdf

⁶ *The February 2021 Cold Weather Outages in Texas and the South Central United States*. FERC. Nov. 16th, 2021. Available at <https://www.ferc.gov/media/february-2021-cold-weather-outages-texas-and-south-central-united-states-ferc-nerc-and>

⁷ Ibid, page 21

- ERCOT consumers paid the price for the failures in terms of premature deaths, higher bills, lost revenues, lost wages, damaged businesses, and damaged homes.

The ERCOT market failed. The actions taken to date by the Texas Legislature, PUCT, and ERCOT do not assure that reliability will improve. Early evidence from a brief freeze in early January 2022 suggests significant problems remain, but eight months is too little time to repair a decade of neglect. Texas consumers are guaranteed to pay higher rates. The failure of electricity providers to weatherize infrastructure was encouraged by the flawed ERCOT market design. Texans are now also saddled with state government mandated bailouts equivalent to multiple Enrons.

The ERCOT Model Set Up Texas for Failure

In 2013, former member of the Council of Economic Advisors and late Yale professor Paul W. MacAvoy and I identified the structural deficiencies in the ERCOT market.⁸ The market design that was supposed to foster competition ironically replicated an old-style Soviet purchasing bureau, one in which a government-authorized buyer was the only purchaser of electricity in the market. It is the definition of a monopsony market, with only one buyer. (The flip side is a monopoly market, in which there is only one seller.)

The problems with monopsony markets are well documented. Producers bid to sell their products to the market rather than consumers bidding to buy. If there is more available supply than consumers require or demand at the time, producers tend to bid down to their marginal costs to earn enough to cover labor, operating costs, and fuel costs. They do not earn enough to cover the costs of capital and earn a profit for shareholders. Consequently, some producers will exit the market, as has been the history in ERCOT, or, at the very least, they will not re-invest in capital equipment. Why invest more just to lose more? To the contrary, producers know that building new capacity for the ERCOT market guarantees that prices will never go up enough to make a profit on their investment. Similarly, there is no incentive to spend money to weatherize.⁹

ERCOT is primarily an “electricity only market,” meaning generators only receive revenues when supplying electricity to the grid. For example, if the Houston Astros were paid on an “electricity only” basis, only those players taking the field would receive a paycheck for the game. Those who remained on the bench would not be paid. In the ERCOT market, some generators can be idle more than 10 months out of the year and not earn sufficient revenues to cover costs of employees, maintenance, and depreciation. The results are predictable, and we predicted this outcome in 2013.

⁸Hirs, Edward A III and MacAvoy, Paul, *Texas suffers from Soviet-style electricity system*. February 22, 2013, *The Houston Chronicle*. Available at: <https://www.chron.com/opinion/outlook/article/Texas-suffers-from-Soviet-style-electricity-4301693.php>

⁹ Hirs, Ed, “[‘ERCOT—GENERATORS’ REVENUES LESS THAN COSTS FOR 8 OUT OF 10 YEARS Excerpts from ERCOT’s State of the Market Reports 2011—2020](#)” June 4, 2021, Available at edhirs.com

We identified is that the ERCOT market rewards gaming to drive up prices in times of tight supply—driven by the weather or contrivance. Electricity consumers in the ERCOT service area purchase from the various middlemen/retail companies that buy solely from the ERCOT monopoly in the wholesale market. Recall the 2001 movie *A Beautiful Mind* about Nobel Prize-winning game theorist John Nash.¹⁰ Nash showed that sellers will explicitly or tacitly collude to drive up prices if given the opportunity—as the OPEC cartel demonstrates. The ERCOT market has been subject to complaints about market manipulation since 2003.¹¹ For example, suppose the ABCD Generation Company operates 10 large plants in the ERCOT service region. For much of the year, it operates seven plants, keeping three idle. Let’s have bad weather hit anytime. Ask yourself what the payoff is to start the three idle plants if there is chance that adding the power generated by those three plants would keep the average wholesale market price at 3 cents per kWh when not starting those plants virtually guarantees that the wholesale price jumps higher—perhaps to the price cap of \$9 per kWh under the ERCOT market rules in effect in 2021? Is there a question about what the generators will do?¹²

The Lack of Alternatives

Some analysts have cited the lack of interconnects between ERCOT and grids in neighboring states as a contributing factor to the February debacle, but there was not enough excess supply in other states to make up for the shortfall in Texas.¹³ Given that the February supply shortfall in ERCOT was almost equivalent to the entire market served by CAISO, the California Independent Service Operator, it is specious to suggest that interconnects could have saved ERCOT. At most, the Western Interconnect had 7 GW of available capacity, while ERCOT was short 40 GW. Other states were also experiencing high demand and could not have diverted enough electricity to Texas to prevent the system failure.

As CAISO has demonstrated, the systemic risk of needing electricity during extreme weather also extends to the neighboring states, upon which CAISO depends for as much as 35% of daily electricity supplies.

¹⁰ “John F. Nash Jr., Math Genius Defined by a ‘Beautiful Mind,’ Dies at 86” *The New York Times*, May 25, 2015 <https://www.nytimes.com/2015/05/25/science/john-nash-a-beautiful-mind-subject-and-nobel-winner-dies-at-86.html>

¹¹ Hurlbut, David, et al. “Staff Inquiry into Allegations Made by Texas Commercial Energy regarding ERCOT Market Manipulation” Project No. 25937, PUC Investigation into Possible Manipulation of the ERCOT Market, Jan. 28, 2004. Available at: https://www.puc.texas.gov/industry/electric/reports/ERCOT_annual_reports/special/TCE_allegations.pdf

¹² Other schemes such as withholding electricity in the daily physical market to drive up prices for other generators or the value of financial derivatives purchased on the commodities exchanges, are described in Chapter 5 of the *2020 FERC Energy Primer: A Handbook for Energy Market Basics* by the staff of the Federal Energy Regulatory Commission, Updated June 3, 2020. <https://www.ferc.gov/media/energy-primer-updated-6320>

¹³ *February 2021 Cold Weather Grid Operations: Preliminary Findings and Recommendations*, FERC, NERC and Regional Entity Joint Staff Inquiry, September 23, 2021 Available at: <https://www.ferc.gov/february-2021-cold-weather-grid-operations-preliminary-findings-and-recommendations>

Analysts have also suggested that the lack of a capacity market contributed to the February collapse. But capacity markets, wherein generators are paid to keep equipment available to respond to spikes in demand, have not proven to be effective in California or the region served by PJM Interconnection. The ERCOT market has trusted participants to make infrastructure investments, conduct maintenance and needed upgrades, and to maintain reserves at the generator rather than system level.¹⁴ Without having incentives or mandates to maintain electric reserves in case of a surge in demand, the Texas marketplace has been caught off guard when demand outpaces the supply of energy.¹⁵

The ERCOT market in Texas exchanged reliability in favor of volatility and increased uncertainty for consumers and generators alike.

Low Prices? Not According to the Data

The common argument for the design of the ERCOT market is that it keeps electricity prices low, a key issue for energy-intensive manufacturing plants along the Gulf Coast. Proponents continue to argue that electricity rates in Texas are lower than in states with regulated utilities.¹⁶ The data do not support that claim. Individual customers in the ERCOT territory paid on average \$5,500 more on their electric bills over a 14-year period.¹⁷ Prices for consumers within the ERCOT marketplace in Texas are consistently higher than for the roughly 15% of Texas customers within the regulated marketplaces outside the ERCOT service area. Equally significant, in 2019, ERCOT consumers paid more than consumers in Oklahoma, Arkansas, and Louisiana.¹⁸ According to the Energy Information Administration (EIA), the average retail price for electricity is 7.86 cents/kWh in Oklahoma, 8.22 cents/kWh in Arkansas and 7.71 cents/kWh in Louisiana. It is 8.60 cents/kWh on average in Texas.¹⁹ The federally regulated service areas in these states faced the same severe February 2021 weather but were not as adversely affected as Texas.²⁰

Estimates by *The Wall Street Journal* show that ERCOT's consumers paid almost \$28 billion more between 2004 and 2019 than they would have in an old-fashioned regulated

¹⁴Report on Outages and Curtailments During the Southwest Cold Weather Event of February 1-5, 2011, Causes and Recommendations. Federal Energy Regulatory Commission and North American Electric Reliability Corporation. August 2011. <https://www.ferc.gov/sites/default/files/2020-04/08-16-11-report.pdf>

¹⁵ Hirs, Ed. *Why the Texas Power Market Failed*. Yale Insights. March 23rd, 2021. Available at: <https://insights.som.yale.edu/insights/why-the-texas-power-market-failed>

¹⁶ *State Electricity Profiles* US Energy Information Administration. Available at: <https://www.eia.gov/electricity/state/>

¹⁷ Sixel, L.M. *Deregulated electricity markets paying more*. San Antonio Express-News. May 22nd, 2018. Available at: <https://www.expressnews.com/business/eagle-ford-energy/article/Deregulated-electricity-markets-paying-more-12935019.php>

¹⁸ US Energy Information Administration.

¹⁹ US Energy Information Administration.

²⁰ Englund, Will. *The Texas grid got crushed because its operators didn't see the need to prepare for cold weather*. Feb. 16th, 2021. Available at: <https://www.washingtonpost.com/business/2021/02/16/ercot-texas-electric-grid-failure/>

market.²¹ Consumers in the regulated system averaged prices that were 8% lower than the nationwide average, while consumers in ERCOT averaged prices that were approximately 13% higher.

A report from the Texas Coalition for Affordable Power estimated that between 2002 and 2014, consumers in the ERCOT market could have saved upwards of \$24 billion in electricity costs were their rates the same as consumers in the traditionally regulated utilities that serve the approximately 3 million Texans who live outside the ERCOT service area.²² The same report found that prior to partial deregulation in 2002, Texans paid rates 6.4% below the national average, while in the following 10 years, they paid rates 8.5% above the national average. Moreover, charges stemming from partial deregulation known as “stranded costs” added nearly \$7 billion to consumer bills.

This is reflected in data acquired from the Energy Information Administration, which shows that nationwide on average, families utilize 877 kWh per month, which is rounded to an industry-standard comparison of prices for a typical customer using 1000 kWh per month.²³ Examining residential rates through this lens provides context to the uncertainty and varied rates in the ERCOT marketplace.

According to average annual rates provided by the PUCT in March 2021, Texas families that used 1000 kWh monthly in the competitive electricity marketplace could expect to spend at least 8.93 cents/kWh monthly and at most 12.77 cents/kWh monthly, a variation of more than one-third.²⁴ For residential consumers who only used 500 kWh monthly, the costs were at least 9.32 cents/kWh and at most 14.11 cents/kWh, a variation of nearly 50%. Only one residential rate is lower or equal to the EIA statewide average – the fixed rate price for average monthly usage of 2000 kWh (more than twice the national average) provided by First Choice Power, priced at 8.51 cents/kWh. However, it is worth noting that First Choice Power residential rates are above the EIA state average for both 500 kWh monthly and 1000 kWh monthly at 9.77 cents/kWh and 8.93 cents/kWh respectively.²⁵

²¹ According to an Analysis of EIA data from the Wall Street Journal. McGinty, Tom. *Texas Electric Bills Were \$28 Billion Higher Under Deregulation*. Available at: <https://www.wsj.com/articles/texas-electric-bills-were-28-billion-higher-under-deregulation-11614162780>

²² *Deregulated Electricity in Texas*. 2018 annual edition. Texas Coalition for Affordable Power. Available at: <https://tcaptx.com/wp-content/uploads/2018/03/TCAP-HistoryofDeregulation-2018.pdf>

²³ *How much electricity does an American home use?* U.S. Energy Information Administration. <https://www.eia.gov/tools/faqs/faq.php?id=97&t=3>

²⁴ *Public Utility Commission of Texas Competitive Markets Division Retail Electric Service Rate Comparison: March 2021 Bill Comparison*. Texas Public Utility Commission. Available at: <https://www.puc.texas.gov/industry/electric/rates/RESrate/rate21/Mar21Rates.pdf>

²⁵ Ibid.

ERCOT Consumers Face Confusing Retail Marketplace

Bills for consumers also vary greatly dependent on which of the PUCT-regulated middleman providers they utilize. Some offer variable price plans tied to time-of-day or time-of-week usage. Most middlemen offer fixed-rate plans for various contract periods. But substantial fee increases surprised many on fixed-rate plans following the storm, with fees going up in some cases by 100% compared to prior months.²⁶ These fees or ancillary costs, which are set by ERCOT, are heavily affected by extreme weather conditions and risk exposing consumers to highly inflated rates, irrespective of the type of plan they are on.

Purchasing electricity has been tremendously complicated for Texas consumers (not to mention, rife with hidden costs, including extra charges for speaking to a human customer service agent and even “under-using” electricity).²⁷ Perhaps nothing illustrates this more aptly than former PUCT Chair, DeAnn Walker, noting the confusing if not outright deceptive nature of the PUCT’s regulated Power to Choose website: “I know we have a competitive market, and people can come up with their products... but it does concern me that we have things on the Power to Choose [website] that, while maybe not deceptive, are at least misleading...”²⁸ While consumers may have choices, they lack the clarity to make informed decisions on their electricity usage. The problem was so widespread that the only retail electric provider company that advertised truthfully, the now infamous Griddy, parodied the Power to Choose site with their own site, aptly titled “Power to Confuse.”²⁹

The 2011 Storm

The failures of 2021 should not have surprised anyone. A decade earlier, in February 2011, abnormally cold weather hit Texas. With the cold came increased electricity usage across the state, and the grid quickly became overloaded. Numerous plants across the state went offline because critical equipment froze. These failures, coupled with a lack of available natural gas, led ERCOT to implement rolling blackouts to prevent a complete system failure.³⁰

²⁶ Samsel, Haley. *Even Texans with fixed electricity plans may face high energy costs due to this fee*. Fort Worth Star-Telegram. Available at: <https://www.star-telegram.com/news/business/article249728743.html>

²⁷ Lieber, Dave. *The Public Utility Commission has a secret: Regulator quietly dissolves its enforcement division*. Dallas Morning News. Jul 31st, 2020. Available at: <https://www.dallasnews.com/news/watchdog/2020/07/31/the-public-utility-commission-has-a-secret-regulator-quietly-dissolves-its-enforcement-division/>

²⁸ Mosier, Jeff. *Texas to scrutinize 'misleading' electricity plans on Power to Choose website*. Dallas Morning News. Jun 29th, 2018. Available at: <https://www.dallasnews.com/business/energy/2018/06/29/texas-to-scrutinize-misleading-electricity-plans-on-power-to-choose-website/>

²⁹ Ibid.

³⁰ Galbraith, Kate. *The Rolling Chain of Events Behind Texas Blackout*. Texas Tribune. Feb 2, 2011. <https://www.texastribune.org/2011/02/03/the-rolling-chain-of-events-behind-texas-blackouts/>

The 2011 ERCOT blackouts came at a high price. Blackouts shutdown medical facilities and directly impacted 3.2 million people. At least one person died.³¹ Due to the lack of available power, ERCOT raised the price to its then market cap of \$3,000 per megawatt hour (or \$3 per kWh—more than 50 times the average price for generation).

Following the 2011 blackouts, several reports—state and federal—were released recommending changes be made to prevent another overloading of the grid. As was widely reported in 2021, these warnings went unheeded.³²

FERC’s 2011 analysis determined that ERCOT’s scarcity pricing model used in times of high demand and low supply led to the highly inflated prices during the 2011 storm while providing less service. FERC found that ERCOT lacked sufficient reserves for the extreme weather conditions during the storm and determined that additional reserves may have mitigated the effects.³³

Following the 2011 storm, ERCOT released a report which determined that the plant failures were directly the result of the lack of proper weatherization to sustain production in extreme weather events.³⁴ ERCOT made recommendations for companies to improve their infrastructure, but these recommendations did not provide a way for generators to recover the additional costs of weatherization. The Texas Legislature did not require action, and the recommendations went ignored by industry.³⁵

The 2011 FERC report concluded that the costs to winterize were low.³⁶ The punchline from the 2011 FERC report:

“While the probability of a winter event in the predominantly summer peaking Southwest appears to be low, shedding load in the winter places lives and property at risk. The task force recommends that all entities responsible for the reliability of the bulk power system

³¹ Helman, Christopher. *Rolling Blackouts Force Texas To Import Power From Mexico*. Forbes. Feb 3, 2011. Available at: <https://www.forbes.com/sites/christopherhelman/2011/02/03/rolling-blackouts-force-texas-to-import-power-from-mexico/?sh=5f54c6d71101>

³² Price, Asher. *Winter storm blackouts plagued Texas in 2011, too. Recommendations made afterward went unenforced*. USA Today. Feb 19, 2021. Available at: <https://www.usatoday.com/story/news/nation/2021/02/18/state-energy-winter-protections-lacking-reports-have-suggested/4490501001/>

³³ *Report on Outages and Curtailments During the Southwest Cold Weather Event of February 1-5, 2011, Causes and Recommendations*. Federal Energy Regulatory Commission and North American Electric Reliability Corporation. August 2011. <https://www.ferc.gov/sites/default/files/2020-04/08-16-11-report.pdf>

³⁴ *Obtained from Buzzfeed article by Zahra Hirji*. Slides from ERCOT Generation Weatherization Workshop. June 8, 2011. Available at: https://www.documentcloud.org/documents/20488320-ercot_generation_weatherization_workshop_06_08_11_final obtained via <https://www.buzzfeednews.com/article/zahrahirji/texas-power-outage-causes-2011>.

³⁵ Ibid.

³⁶ *Report on Outages and Curtailments During the Southwest Cold Weather Event of February 1-5, 2011, Causes and Recommendations*. Federal Energy Regulatory Commission and North American Electric Reliability Corporation. August 2011. <https://www.ferc.gov/sites/default/files/2020-04/08-16-11-report.pdf>

in the Southwest prepare for the winter season with the same sense of urgency and priority as they prepare for the summer peak season.”³⁷

The 2021 Winter Storm

Almost exactly 10 years later, temperatures began dropping across Texas. In the days that followed, almost 70% of Texans in the ERCOT region lost power. Blackouts continued for most of the week of February 14, and scattered service outages continued for several weeks.

By the end of February 2021, at least 246 Texans were dead, according to state agencies, with some estimates placing the number of dead closer to 702.³⁸ Families across the state had struggled to stay warm. Hospitals that were already overextended by the COVID-19 pandemic reported numerous injuries and fatalities from carbon monoxide poisoning and exposure. In Houston, a tragic house fire killed three children and their grandmother who were struggling to stay warm by using a fireplace.³⁹

People resorted to extreme measures. Approximately one-fifth of Texans affected by the blackouts braved icy road conditions to find shelter away from home, and 9% of them stayed in their cars, including, famously, Elon Musk, who tweeted that ERCOT was not “earning that R.”⁴⁰ Those who stayed home preserved heat however possible. Consumers risked carbon monoxide poisoning by staying in running vehicles to access heat and keep cellphones operational. One in four attempted to use gas-powered ovens, cooktops or even grills to warm their homes.⁴¹ Consumers struggled with poor access to food and clean water. Information was hard to come by because with the power out, cellphone service was out; Internet service was out; some television and radio stations were down while those without portable radios could not hear reports; and newspapers were not distributed.

³⁷ Ibid. page 197

³⁸ Svitek, Patrick. *Texas puts final estimate of winter storm death toll at 246*. Texas Tribune. January 2, 2022. Available at <https://www.texastribune.org/2022/01/02/texas-winter-storm-final-death-toll-246/>
Martínez-Cabrera, Alejandro. *Texas Winter Storm Death Toll Could Be Much Higher Than The State’s Count, BuzzFeed Data Review Found*. Houston Public Media. May 27, 2021. Available at: <https://www.houstonpublicmedia.org/articles/news/energy-environment/2021/05/27/399291/texas-winter-storm-death-toll-could-be-much-higher-than-the-states-count-buzzfeed-data-review-found/> and <https://www.nbcnews.com/news/us-news/death-toll-rises-210-february-cold-wave-texas-n1273911>

³⁹Marfin, Catherine et al. *Texas power grid was ‘seconds or minutes’ from a total blackout that could have lasted months, ERCOT says*. The Dallas Morning News. Feb 18 2021. Available at: <https://www.dallasnews.com/news/weather/2021/02/18/oncor-ends-controlled-outages-thousands-of-north-texans-still-without-power-due-to-equipment-damage/>

⁴⁰Musk, Elon. Twitter. Feb 17th, 2021 <https://twitter.com/elonmusk/status/1361962505573031938>

⁴¹ *Winter Storm 2021 and the Lifting of COVID-19 Restrictions in Texas*. Hobby School of Public Affairs. Winter 2021. Available at: <https://uh.edu/hobby/winter2021/>

Response to the 2021 Storm is Ongoing but Insufficient

Unlike following the 2011 storm, the Texas Legislature did enact measures aimed at correcting some of the issues that contributed to the 2021 blackouts. Specifically, Senate Bill 2 changed the mechanisms for selecting PUCT commissioners and ERCOT board members, tightening requirements for appointments, changing the size of the ERCOT board and giving the power to appoint the selection committee to the governor, lieutenant governor and speaker of the Texas House, thereby placing the management of ERCOT completely in the hands of political appointees.⁴² SB 2 requires that ERCOT board members not have any outside interests in the electricity market within the ERCOT region and that board members not register as a lobbyist for two years after their time on the ERCOT board.⁴³ SB 2 requires that the ERCOT board provide a market impact statement to the PUCT prior to enacting any new rules or protocols.⁴⁴

The law also requires that PUCT commissioners and ERCOT board members be Texas residents. Prior to the 2021 storm, five members had been from outside of Texas with one residing in Canada.⁴⁵ However, residency is not a guarantee of competency and electricity expertise.

Senate Bill 3 requires updating the electricity infrastructure and mandates weatherization for generators and other critical components of the energy delivery system. The bill requires that a power outage alert system be implemented to warn consumers when outages may occur due to inadequate supply of power.⁴⁶ However, SB 3 gives wide discretion to the PUCT to implement the law. Experts criticized the bills for not doing enough to prevent another crisis, especially given that the population of Texas is expected to continue to grow.⁴⁷

The natural gas system in Texas also had significant failures that contributed to the failure of generators in ERCOT in both 2011 and 2021. As noted in the FERC 2021 Report, some natural gas supplies failed to be delivered to natural gas fired generators contributing to the prolonged outages after the initial collapse. Commissioners on the Railroad Commission of Texas, the regulatory body for oil and gas in Texas, complained that ERCOT imposed blackouts of natural gas facilities were responsible for the gas supply failures. Investigations are underway to determine if any of the shortfalls in natural gas deliveries were contrived, but to address freezing equipment in the natural gas system, SB 3 imposes requirements for weatherizing

⁴²S.B. 2. 87(R). 2021. Full text available at:

<https://capitol.texas.gov/tlodocs/87R/billtext/pdf/SB00002F.pdf#navpanes=0>

⁴³Title 3. Legislative Branch. Subtitle A. Legislature. Chapter 305. Registration Of Lobbyists. Subchapter A. General Provisions; Registration. Text available at:

<https://statutes.capitol.texas.gov/Docs/GV/htm/GV.305.htm#305>

⁴⁴ S.B. 3 87(R). (2021). Text Available at:

<https://capitol.texas.gov/tlodocs/87R/billtext/pdf/SB00002F.pdf#navpanes=0>

⁴⁵Barr, Jody. KXAN News. *5 ERCOT board members don't live in Texas, one from Canada*. Feb 18th, 2021.

Available at: <https://www.kxan.com/investigations/5-ercot-board-members-dont-live-in-texas-one-from-canada/>

⁴⁶ S.B. 3. 87(R). 2021. Full text available at:

<https://capitol.texas.gov/tlodocs/87R/billtext/pdf/SB00003F.pdf#navpanes=0>

⁴⁷ Weber, Paul. *Texas missing chance to avert deadly blackouts, experts say*. AP News. May 26, 2021. Available at:

<https://apnews.com/article/texas-science-government-and-politics-business-04066e53148a52ec2cdc6e7370f406b3>

natural gas facilities, although fines for noncompliance are minimal. The Railroad Commission of Texas was slow to act and does not require weatherization preparations before 2023. During the February 2021 winter storm, natural gas prices in Texas soared to hundreds of times the price in the weeks before and after the storm, costing consumers billions of dollars in gas charges and additional billions in electricity charges, not only in Texas but across the nation. The appropriate weatherization of these natural gas facilities, as was recommended in 2011, could have reduced the scope and duration of the 2021 blackouts.⁴⁸ In ERCOT, natural gas fueled generators typically provide more than 40% of total electricity generation capacity.⁴⁹

Who Profited?

Litigation is just beginning. There are more than 170 actions pending, ranging from wrongful death to price gouging.⁵⁰ Many of the litigants find themselves at once adversaries and allies with other parties. The victors arising from the death and devastation of the ERCOT failure will not be settled for several years, but there are clues.

First, ERCOT and PUCT paid generators who were producing electricity a massive \$16 billion more than the generators asked during the February freeze.⁵¹

Second, officials with ICE Futures US, the commodities exchange on which financial futures and options for ERCOT electricity are traded, testified at the Texas Legislature during the first week of hearings.⁵² Why are the commodities exchanges important? When a consumer commits to a fixed rate electricity contract with a retail electricity provider, the retail electricity provider will, ordinarily, buy a futures contract or call option contract to offset their commitment to the consumer to provide a fixed price. Generation companies also enter futures and options contracts to protect against price volatility in ERCOT's wholesale market, and they enter similar contracts to lock in deliveries and prices for fuel supplies—especially for the natural gas fired generators. There is a leakage of the consumers' dollars to these commodities markets, and this

⁴⁸ Dongqi Wu, Xiangtian Zheng, et al. *An Open-source Model for Simulation and Corrective Measure Assessment of the 2021 Texas Power Outage*. Published 2021. Available at: <https://arxiv.org/pdf/2104.04146.pdf>

⁴⁹ Minton, Lisa. *Texas' Electricity Resources: Where Power Comes From And How It Gets To You*. Texas Comptroller of Public Accounts. August 2020. Available at: <https://comptroller.texas.gov/economy/fiscal-notes/2020/august/ercot.php>

⁵⁰ Mindock, Clark. *ERCOT Granted MDL For Texas Winter Storm Suits*. Law 360. Available at: <https://www.law360.com/articles/1393287/ercot-granted-mdl-for-texas-winter-storm-suits> and “More than 400 Texans have sued ERCOT, energy providers over deadly February blackouts” by Zach Despart, *The Houston Chronicle*, January 1, 2022, at <https://www.houstonchronicle.com/news/houston-texas/houston/article/More-than-400-Texans-have-sued-ERCOT-energy-16741904.php>

⁵¹ Report compiled by Potomac Economics, Ltd. *PUCT Project No. 51812, Issues Related to the State of Disaster for the February 2021 Winter Weather Event*. Available at: https://interchange.puc.texas.gov/Documents/51812_61_1114183.PDF

⁵² *Written Testimony Of Ice Futures Us Before The Senate Committee On Business And Commerce Texas Senate March 3, 2021*, March 3rd, 2021 Available at https://legacy-assets.eenews.net/open_files/assets/2021/03/09/document_ew_01.pdf

helps to explain why consumers in ERCOT can have higher prices while generators have not earned a return on capital.

A third clue is the recorded phone call during which then PUCT Chair Arthur D'Andrea promised Bank of America investors that he would not abide by the Independent Market Monitor's call to return that \$16 billion to the consumer side of the market and correct pricing for the week of February 14.⁵³ What do Bank of America commodities speculators have to do with generating electricity for Texans?

Finally, during the news conference announcing the signing of SB 2 and 3, State Senator Kelly Hancock stated that there were conflicts of interest.⁵⁴ Criminal investigations are underway by the Texas Attorney General. As happened in California when Pacific Gas & Electric Company was charged with involuntary manslaughter following deaths in a 2020 wildfire, manslaughter charges relating to the deaths caused by the ERCOT failure may be forthcoming.

What has been done?

In August 2021, the PUCT adopted some of the 2011 FERC report's recommendations for weatherization in ERCOT, as well as recommendations made by a consulting group in 2012.⁵⁵ These new regulations require generator and transmission entities to prepare their equipment for cold weather but do not provide a mechanism for the entities to recover the costs associated with the capital upgrades.

In its Dec. 16, 2021, meeting the PUCT adopted several tweaks to the current market design that purport to provide incentives to increase reliable dispatch of electricity by generators and to compensate customers who curtail electricity usage during periods of high demand.⁵⁶ The irony of these actions is not lost.

The Operating Reserve Demand Curve, (ORDC) add-ons to the market costs are an excise tax on top of the market clearing prices for each day, with no express *quid pro quo* for ERCOT consumers.

⁵³ Steffy, Loren. "Some on Wall Street Profited off Texas Blackouts. In a Private Call, a Top Regulator Pledged He Would Try to Protect Their Windfall" *Texas Monthly*, March 16, 2021

<https://www.texasmonthly.com/news-politics/wall-street-profited-off-texas-blackouts/>

⁵⁴ "There began to be some conflicts of interest, and so we blew it up, said state Sen. Kelly Hancock (R-North Richland Hills) during a news conference at the State Capitol in Austin moments after the signing. "It is a completely independent board now." Bennett, Adam. *Gov. Abbott signs ERCOT reform, weatherization bills into law*. KHOU. June 8th, 2021. Available at: <https://www.khou.com/article/news/local/abbott-ercot-reform-weatherization-bills/285-979fccc-1df5-4d2d-abf4-061ebf7c896c>

⁵⁵ *Texas - Public Utility Commission of Texas - Work Session: Work Session on August 26th at 9:30am*, Admin Monitor, Aug. 26th, 2021. Available at: http://www.adminmonitor.com/tx/puct/work_session/20210826/1/, and http://www.adminmonitor.com/tx/puct/work_session/20210826/2/.

⁵⁶ Haguwood, Ben. *PUCT Memorandum from Ben Haguwood Re: Project No. 52313, Review of Wholesale Electric Market Design*. Available at: http://interchange.puc.texas.gov/Documents/52373_268_1172004.PDF

The PUCT adopted a recommendation to develop further a more robust demand response program. In plain English, this means that ERCOT will pay certain consumers market prices—or more—to turn off their own electricity usage during periods of peak demand. Certainly, some consumers will opt into such a program, but this will pit one class of consumer against another—with the customer who can least afford to go without electricity having to pay an exorbitant price to the consumer who has alternative means of satisfying its electricity demand in the deep of a winter storm or sweltering heat of an August day.

The PUCT also adopted a recommendation to develop further “ancillary services,” a catch-all category that realized prices of \$25,000 per mWh during the February 2021 winter storm. Each of these regulatory mandates will serve to increase prices and price volatility for ERCOT consumers with no guarantee of improved reliability. One PUCT commissioner asked if consumers would be forced into signing new retail contracts every two months because of increased price volatility brought on by the proposed market changes.⁵⁷ These post-mortem tweaks will not eliminate the “crisis” market model in ERCOT as described by PUCT Chair Peter Lake on numerous occasions.⁵⁸

Consumers Suffered the Most, During and After the Storm

Unsurprisingly, approval ratings for ERCOT were abysmal following the storm and subsequent outages. The University of Houston surveyed 213 counties served by ERCOT and found that Texans overwhelmingly disapproved of ERCOT’s performance during the storm. A whopping 74% disapproved of the way in which ERCOT managed the storm’s impact, and 81% believed they would have benefitted from more reliable information from ERCOT regarding the storm.⁵⁹ These approval ratings are important because ERCOT is, first and foremost, a political creation.

One economics consulting firm estimated that the total storm cost was somewhere between \$86 billion and \$126 billion,⁶⁰ with the damages equal to or higher than those incurred during the devastation of Hurricane Harvey.

Residential power rates went up an average of 7% for February 2021 compared to February 2020, and industrial and commercial rates more than doubled what they were in

⁵⁷Texas - Public Utility Commission of Texas - Work Session: Work Session on December 16th^h at 9:30am. Admin Monitor. Available at: http://www.adminmonitor.com/tx/puct/open_meeting/20211216/1/, and the second half of the meeting at http://www.adminmonitor.com/tx/puct/open_meeting/20211216/2/

⁵⁸Texas - Public Utility Commission of Texas - Work Session: Work Session on August 26th at 9:30am, Admin Monitor, Aug. 26th, 2021. Available at: http://www.adminmonitor.com/tx/puct/work_session/20210826/1/, and http://www.adminmonitor.com/tx/puct/work_session/20210826/2/.

⁵⁹ Winter Storm 2021 and the Lifting of COVID-19 Restrictions in Texas. Hobby School of Public Affairs. Winter 2021. Available at: <https://uh.edu/hobby/winter2021/>

⁶⁰ The Perryman Group. Preliminary Estimates of Economic Costs of the February 2021 Texas Winter Storm. Feb 2021. Available at: <https://www.perrymangroup.com/media/uploads/brief/perryman-preliminary-estimates-of-economic-costs-of-the-february-2021-texas-winter-storm-02-25-21.pdf>

February 2020 (from 5.40 cents/kWh in 2020 to 12.15 cents/kWh in 2021 and from 7.89 cents/kWh to 16.29 cents/kWh, respectively) with increased volatility. The PUCT, following ERCOT's request, on Feb. 16 ordered wholesale prices for electricity be set at \$9,000 per megawatt hour (approximately 300 times normal prices and three times higher than in the 2011 emergency), in an effort to ensure greater production during the storm.⁶¹ The PUCT stated that this measure was taken "because energy prices should reflect scarcity of the supply, the market price for the energy needed to serve load being shed in the face of scarcity should also be at its highest...". However, the Independent Market Monitor for ERCOT stated that these rates were inflated for longer than they should have been, at the expense of Texans.⁶² Brad Johnson, interim CEO of ERCOT, testified that ERCOT had violated its own rules during the 2021 storm and that the decision to set rates at the maximum amount permitted for an extreme length of time "overrode the ERCOT protocols" (in reference to the decision by ERCOT to set pricing at the maximum allowed rate for 32 hours more than needed during the storm).⁶³

One of the primary fallacies behind the ERCOT market design was illustrated during the freeze—that high prices would draw more electricity supply to the market. The PUCT and ERCOT knew in 2011 and in 2021 that the lack of electricity was because generators had failed and could not jump back online to take advantage of the higher prices. It was never a question of providing a "market incentive" to build new generation capacity with a long lead time. Therefore, raising the wholesale price more than 300 times base price served only to enrich those generators who were already operating, at the expense of consumers—a massive transfer of wealth.

One of the most harrowing experiences for many Texans was the lack of access to the most basic of needs: clean water. Power failures meant that water systems failed. In the aftermath of the storm, more than 14 million people⁶⁴ in 141 counties faced water disruptions and a lack of safe drinking water.⁶⁵ Many without electricity remained unable to boil water, and residents resorted to walking miles through the snow or braving unsafe road conditions to drive to homes of friends or family who had access to water. Dan Benjamin, an Austin resident, told the Wall Street Journal that "I'm like, great, you're telling us to boil water, but nobody's talking about the fact that I know one person who has water, and I'm driving to that person's house right

⁶¹ *News Release: PUC Issues Emergency Order On Electricity Pricing*. Public Utility Commission of Texas. Feb 15th, 2021. Available at: <https://www.puc.texas.gov/agency/resources/pubs/news/2021/PUCTX-REL-COLD21-021521-EMERGorder-FIN.pdf>

⁶² Report compiled by Potomac Economics, Ltd. *PUC Project No. 51812, Issues Related to the State of Disaster for the February 2021 Winter Weather Event*. Available at: https://interchange.puc.texas.gov/Documents/51812_61_1114183.PDF

⁶³ Mendoza-Moyers, Diego. San Antonio Express-News. 'A deviation from ERCOT rules': Interim CEO's comments raise questions about power pricing during storm May 14th, 2021. Available at: <https://www.expressnews.com/business/article/ERCOT-CEO-winter-storm-pricing-16178206.php?converted=1>

⁶⁴ Findell, Elizabeth and Thomas, Ken. *Texas Cities Under Boil-Water Orders*. Wall Street Journal. Feb 19th, 2021. available at: <https://www.wsj.com/articles/texas-cities-under-boil-water-orders-11613671450>

⁶⁵ Samuels, Alex. *Nearly 12 million Texans now face water disruptions. The state needs residents to stop dripping taps*. Texas Tribune. Feb 17, 2021. Available at: <https://www.texastribune.org/2021/02/17/texas-water-boil-notice/>

now to get some....”⁶⁶ No drinking water. No water to flush toilets. When the water service was restored, some residents still had to boil water for weeks.

Following the storm, many customers were left to “providers of last resort” when their retail electricity providers failed in the aftermath. This is a regulated outcome. The provider of last resort is the fallback middleman for consumers to avoid losing electricity service when their retail provider leaves the marketplace. Providers of last resort can charge the “highest simple average hourly real-time settlement point price for the customer's load zone for the 12 months ending the previous Sept. 1, plus 25%” pursuant to PUCT Substantive Rule 25.43.⁶⁷ Consumers who had contracted with PUCT-licensed and regulated providers were stuck with higher rates and no recourse following the switch, and very little (if any) notice.⁶⁸ This has been a problem for Texas consumers from the beginning. It has devolved to the point that the largest electricity generators scoop up more customers as a provider of last resort.⁶⁹ These acquisitions are contrary to the Texas laws that broke up the vertically integrated electric utilities in the first place.

The provider of last resort policy disproportionately impacts low-income consumers. Consumers with low credit scores are automatically placed on “provider of last resort” plans in the best of times. Analogous to paycheck loan operations, these providers of last resort charge consumers with poor credit scores inflated costs or buy electricity through a pre-paid plan. The inherent issues of equity are obvious. PUCT rules let providers refuse service for reasons including (1) failing to pay a deposit if a consumer has a poor credit rating and (2) failing to pay previous utility bills for the same type of service.⁷⁰ In 2004, TXU came under fire for scaling its rate increases to reflect consumer credit scores, with those with low credit scores getting higher rates.⁷¹

It Could Have Been Much Worse—National Security Was Threatened

The scariest thing is that the fallout could have very easily been much, much worse. ERCOT had not addressed its black start capabilities in many years—ignoring recommendations

⁶⁶ Findell, Elizabeth and Thomas, Ken. *Texas Cities Under Boil-Water Orders*. Wall Street Journal. Feb 19th, 2021. available at: <https://www.wsj.com/articles/texas-cities-under-boil-water-orders-11613671450>

⁶⁷ Watson, Mark. *Texas electricity retailer defaults, prompting switch of 9,800 customers*. S&P Global Market Intelligence. Jun 1, 2018. Available at: <https://www.spglobal.com/marketintelligence/en/news-insights/trending/srrlg-yt-hqeqn-tfavjzw2>

⁶⁸ Walsh, Dominic. *Public Utility Commission Decision May Enable Largest Electricity Providers In Texas To Become More Powerful*. Houston Public Media. Feb 21 2021. Available at: <https://www.houstonpublicmedia.org/articles/news/energy-environment/2021/02/21/391935/public-utility-commission-decision-may-enable-largest-electricity-providers-in-texas-to-become-more-powerful/>

⁶⁹ Watson, Mark. *Texas electricity retailer defaults, prompting switch of 9,800 customers*. S&P Global. Jun 1st, 2018. Available at: <https://www.spglobal.com/marketintelligence/en/news-insights/trending/srrlg-yt-hqeqn-tfavjzw2>

⁷⁰ *Know Your Rights*. Public Utility Commission of Texas. Available at: <https://www.puc.texas.gov/consumer/complaint/Rights.aspx>

⁷¹ Smith, Rebecca. *TXU Energy Uses Credit Information To Assess Its Rates*. *The Wall Street Journal* Sep 9th, 2004. Available at: <https://www.wsj.com/articles/SB109469015834513166>

made in 2011. A black start is a restart of a grid that has been completely de-energized. “Black start power plants” are generator plants that can be restarted from scratch, making them a critical component to restart a completely black grid.

During the 2021 storm, more than half of black start power plants experienced some level of failure (nine out of 13 facilities). ERCOT was likely *five minutes* from needing those black start plants, potentially leaving Texans in the dark for weeks.⁷² In testimony to the Texas Legislature, then-ERCOT CEO Bill Magness stated that the time for ERCOT to recover from a black start “could be weeks, and depending on the conditions you’re operating under when you go into a black start condition, it could take longer than that...”,⁷³ an ominous prediction. This timeline is especially concerning when taking into consideration that black starts in other states are accomplished within hours (if not within minutes).⁷⁴ The Northeast Blackout of 1965 included New York City and extended across eight states and Ontario began to recover from a black start in eight minutes.⁷⁵ Grids affected by other major blackouts—the great Northeast blackout in 1977 impacting 30 million people;⁷⁶ the massive 2003 blackout affecting 50 million people along the Atlantic seaboard after a tree hit a line in Ohio;⁷⁷ and the 2011 Arizona-Southern California failure, when an operator pushed the wrong button⁷⁸—recovered within days, if not hours. Imagine 26 million Texans without electricity for weeks. No electricity to run water plants; sewage plants; traffic lights; fuel pumps; hospitals; the nation’s largest refinery and petrochemical complex. Much of the nation’s fuel supply would have been disrupted. Even the Colonial Pipeline would have shutdown.

Summary

While the winners of the 2021 debacle are not wholly clear as of the date of writing, the losers are readily apparent. Texas consumers, who already paid the price in human suffering during the storm, will foot the bill. They already face higher bills for electricity contracts.⁷⁹ Later

⁷² De Chant, Tim. *WIDESPREAD FAILURES — Texas’ “failsafe” generators failed, risking weeks-long catastrophe*. Ars Technica. May 28th, 2021. Available at: <https://arstechnica.com/tech-policy/2021/05/texas-power-outage-almost-became-weeks-long-catastrophe/>

⁷³ Buchele, Mose and Largey, Matt. *If The Texas Power Grid Had Gone Down, It Would Need A 'Black Start.' How Long Would That Take?* KUT. Aug 5th, 2021. Available at: <https://www.kut.org/energy-environment/2021-08-05/if-the-texas-power-grid-had-gone-down-it-would-need-a-black-start-how-long-would-that-take>

⁷⁴ Ibid.

⁷⁵ Clarion Energy Content Directors, *Black Start: Preparedness for Any Situation*. Power Engineering. July 1st, 2011. Available at: <https://www.power-eng.com/coal/boilers/black-start-preparedness-for-any-situation/#gref>

⁷⁶ *This Day in History: The Great Northeast Blackout*. History. <https://www.history.com/this-day-in-history/the-great-northeast-blackout>

⁷⁷ *This Day in History: Blackout hits Northeast United States*. History. <https://www.history.com/this-day-in-history/blackout-hits-northeast-united-states>

⁷⁸ *September 2011 Southwest Blackout Event*. NERC. <https://www.nerc.com/pa/rm/ea/Pages/September-2011-Southwest-Blackout-Event.aspx>

⁷⁹ Lieber, Dave. *The Watchdog: Texas’ latest electricity prices will shock you*. *The Dallas Morning News*. Available at https://dentonrc.com/news/the_watchdog/the-watchdog-texas-latest-electricity-prices-will-shock-you/article_d2149159-c56c-5117-9d4f-9767dacf2ccf.html

in 2022, Texas consumers will also begin paying off the unnecessary billions ERCOT, the PUCT, and the Legislature obliged them to pay during the February 2021 winter storm. These costs will be felt the most by consumers who can afford them the least. Where is the benefit of the bargain for Texans who will pay for electricity that they did not receive?

The Texas calamity has shown that the false promises of the ERCOT market model have brought higher, more volatile prices, and less service. This is the same outcome that Nash predicted and that a monopoly market forces on consumers. The promotion of a so-called “deregulated” system is really a complexly regulated, confusing system that preys on consumers and requires almost 2,000 pages of rules to manage—a lucrative cottage industry for lobbyists, consultants, and lawyers by itself.⁸⁰ The ERCOT market is wholly reliant on the state to pass along the enormous costs of its failings to consumers while simultaneously failing to provide them with an acceptable standard of reliable service. Texas and the nation deserve better.

⁸⁰ *Protocol Library – Nodal*. ERCOT. Jan 15th, 2022. Available at: <https://www.ercot.com/mktrules/nprotocols/library>