Texas Public Policy Foundation

FOOL ME TWICE: WHY THE TEXAS GRID IS STILL VULNERABLE TO WINTER STORMS

Part 1: The Evolution of the Texas Grid Since Winter Storm Uri in 2021

WRITTEN BY **Brent Bennett, Ph.D.**

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INTRODUCTION

With the five-year anniversary of the Winter Storm Uri disaster approaching, now is an appropriate time to take stock of how much the ERCOT grid has improved since February 2021 and whether Texas is prepared for the next big storm. This analysis—the first of a three-part series—will examine how the ERCOT grid has evolved since Uri and the impact of the policy changes since 2021. The second part will forecast how the grid will change between now and 2030, and the final part will analyze what can be done to solve the winter reliability problem in ERCOT.

The fact that Texas has experienced no widespread outages since 2021 has fueled the public narrative that the grid is more resilient than ever. However, this narrative is driven by perception and not the actual data. News articles[1] cite the lowered risk of outages in ERCOT's resource adequacy models compared to last year, but they fail to note that the difference is due to ERCOT dramatically lowering the demand profiles[2] it uses in its simulations. A closer look at the data shows that while ERCOT's *modeled* outage risk decreased, the actual risk of winter outages is rising.

OUTLOOK FOR THE 2025-2026 WINTER SEASON

Comparing page 4 in ERCOT's Monthly Outlook for Resource Adequacy (MORA) for January 2026[3] to page 5 in the MORA for January 2025,[4] one can see that the amount of resources available for the peak hour (i.e., the hour ending at 8 a.m.) is basically the

1 Jankowski, P. (2025, June 24). *Texas risk of power blackouts reduced as 100-degree days near, officials say*. The Dallas Morning News. https://www.dallasnews.com/business/energy/2025/06/24/texas-risk-of-power-blackouts-reduced-as-100-degree-days-near-officials-say/

2 Electric Reliability Council of Texas (ERCOT). (2025, May 16). *Report on the capacity, demand and reserves (CDR) in the ERCOT Region, 2026-2030*. pp. 4-5. https://www.ercot.com/files/docs/2025/05/16/CapacityDemandandReservesReport_May2025_Revised.pdf

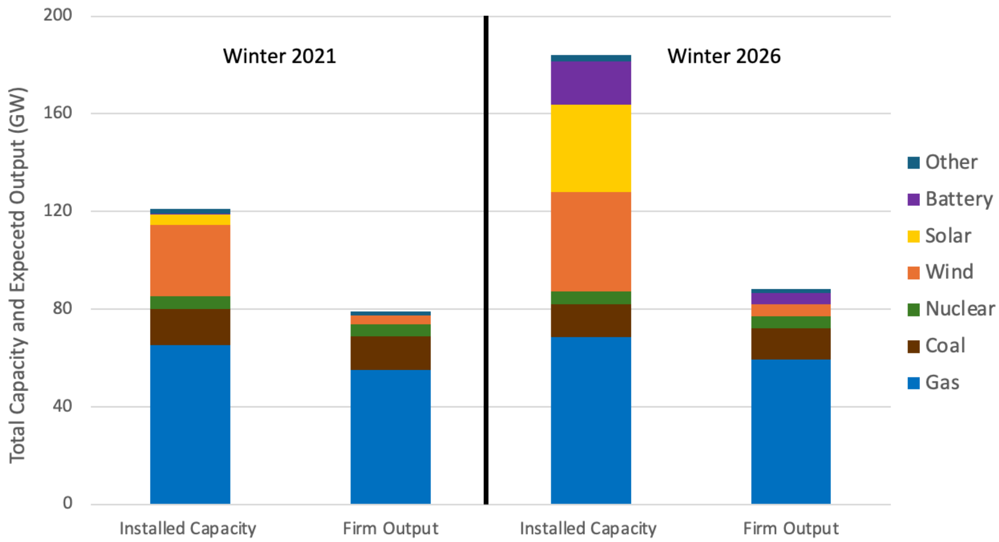
3 Electric Reliability Council of Texas (ERCOT). (2025, November 7). *Monthly Outlook for Resource Adequacy (MORA), January 2026*. p. 4. https://www.ercot.com/files/docs/2025/11/07/MORA_January2026.pdf

4 Electric Reliability Council of Texas (ERCOT). (2024, November 1). *Monthly Outlook for Resource Adequacy (MORA), January 2025*. p. 5. https://www.ercot.com/files/docs/2024/11/01/MORA_January2025.pdf

continued

Figure 1

Comparison of 2021 and 2026 Winter Installed Capacity and Expected Firm Output by Fuel Source



	Winter 2021		Winter 2026
Installed Capacity	121,061	Installed Capacity	184,087
Firm Output	78,959	Firm Output	88,209
Peak Demand	67,208	Peak Demand	80,150
Reserve Margin	17.5%	Reserve Margin	10.1%

same as last year. Nine GW of solar was added over the past year, but winter peak demand hours usually occur just before sunrise and after sunset. Installed gas and coal capacity is down by 700 MW, and the additional "firm" capacity comes entirely from batteries and from the inclusion of some mobile diesel units that ERCOT purchased to handle grid congestion in South Texas.

In fact, as shown in **Figure 1**, the combined amount of gas, coal, and nuclear capacity in the ERCOT region is roughly the same today as it was before Winter Storm Uri five years ago. The 11% uptick in "firm" capacity available to the system (shown in the right-hand columns) is due almost entirely to the addition of more than 11 GW of wind (we consider 1.4 GW or 12% of that total to be "firm") and 15 GW of energy storage (of which we count 4 GW as "firm"). The 31 GW of solar added over the past five years does not contribute to meeting peak winter demand and so is not counted in the firm output column.

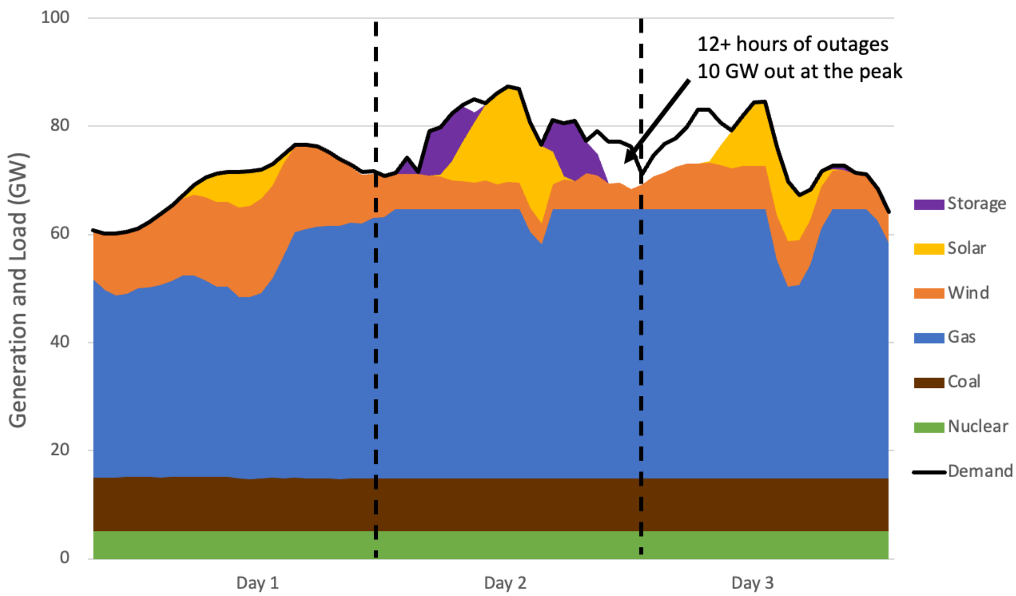
That increase in capacity may seem strong, but it has been far outweighed by a 20% increase in expected peak demand since 2021. As a result, the winter planning reserve margin has dropped by nearly half, from 17.5% to 10%. Most utilities across the country strive to achieve a 15% reserve margin[5] in order to account for power plant failures and other outages that occur during extreme weather events. Such outages took down over 30% of the ERCOT grid during Winter Storm Uri,[6] but even under normal cir-

5 North American Electric Reliability Corporation. (2025, November). *2025-2026 winter reliability assessment*. p. 41. https://www.nerc.com/globalassets/our-work/assessments/nerc_wra_2025.pdf

6 Electric Reliability Council of Texas (ERCOT). (2021, April 27). *Update to April 6, 2021 preliminary report on causes of generator outages and derates during the February 2021 extreme cold weather event*. p. 12. https://www.ercot.com/files/docs/2021/04/28/ERCOT_Winter_Storm_Generator_Outages_By_Cause_Updated_Report_4.27.21.pdf

Figure 2

Forecast Generation and Demand During a Long-Duration Winter Storm in 2025



cumstances, outages can easily be up to 10% of the system. Hence, the desire for a 15% margin.

Unfortunately, the picture darkens a little more when we consider how reliable batteries are in the winter. Batteries are heavily duration-limited because they can only "fuel up" by charging from the grid, instead of receiving a constant supply of fuel as gas and coal units do. If there is no extra energy on the grid, batteries deplete very quickly when discharged at their peak rate, which is usually within a couple of hours. In fact, the amount of energy stored in all the batteries in ERCOT, which cost as much to build[7] as 7 or 8 GW of gas power plants, is only equal to running a 1 GW gas plant for about a day and a half.

While batteries are useful for managing daily grid volatility, during a long-duration winter storm, they are only worth a fraction of the dispatchable gas and coal power plants they are attempting to replace. The increasing reliance of the ERCOT grid on batteries for reserve capacity means that not only is the winter reserve margin falling, but more and more of it is available for only a few hours a day.

Figure 2 shows an example of a 1-in-10-year winter storm lasting for approximately 48 hours—a far cry from the 1-in-100-year storm that was Winter Storm Uri, but rare enough that Texas has not experienced one like it since 2021. Notice how the batteries are sufficient to cover a few hours of high demand before sunrise, but they quickly deplete as high demand persists overnight. The amount of storage capacity in ERCOT would need to be triple today's levels for the system to cover a storm like this without outages.

An important assumption in this model is that the amount of power plant outages is less than 10 GW, instead of the 30 GW experienced during Uri. This is consistent with ERCOT's projections[8] following the implementation of the new weather resiliency standards. Even with this improved performance, the grid is still very vulnerable. Unless the wind happens to blow at the right time (as happened during Winter Storm Elliott in 2022), a half day or more of outages is likely.

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7 Lazard. (2025). *Levelized cost of energy+*. pp. 37, 43. https://www.lazard.com/media/eijnqja3/lazards-lcoeplus-june-2025.pdf

8 Electric Reliability Council of Texas (ERCOT). (2025). *2024 grid reliability and resiliency assessment final update*. p. 16. https://www.ercot.com/files/docs/2025/01/28/2024_Grid_Reliability_and_Resiliency_Assessment_Results_January_2025_RPG.pdf

Instead of making the necessary upgrades and adding reliable capacity to protect against the next storm, the ERCOT market drove tens of billions of dollars into new wind generation. When the next major winter storm came in 2021, the wind didn't show up, and even more power plants failed.

WHY THE ERCOT MARKET IS STILL FAILING TO PREPARE FOR THE NEXT BIG STORM

The immediate legislative response to Uri, SB 3 in 2021,[9] dealt with many of the *operational* problems exposed by Uri, including a lack of winter resiliency standards for power plants and pipelines, and a lack of emergency coordination measures. However, those operational issues were largely a result of market design failures that drove nearly $100 billion into new wind and solar generation[10] instead of improving the existing gas and coal fleet and building new reliable capacity. The regulatory changes simply mandated what the market should already be providing.

To be sure, there have been some overtures to market reform since 2021. HB 1500 in 2023[11] required new wind and solar generators to provide more reliable power, but the resulting actions amount to a pilot program that will not have a material impact on the market. The Public Utility Commission of Texas has led multiple market reform discussions, but none have resulted in any significant changes being undertaken. If policymakers want Texas to be prepared for the next major winter storm, they must require all wind and solar generators to meet a reliability standard and to better value reliable generation.

Because of this inaction on market reform, the state is continuing the pattern of investment that existed before 2021, with nearly $50 billion in new solar and energy storage[12] that will do little to protect the state when the next big winter storm hits. As winter demand grows steadily, the reliable capacity needed to meet it is not keeping up.

Another way to think about the folly of the current investment pattern in Texas is to consider a scenario in which there is enough natural gas, coal, and nuclear generation to meet summer peak demand with a 15% reserve margin, instead of relying on wind, solar, and energy storage to meet growing demand. In that case, the ERCOT region would now have about 103 GW of dispatchable generation to meet the expected summer peak of 90 GW, instead of the 74 GW it currently has. Even if 10% of this capacity was offline—exceeding the amount that has been offline during the past few winters—the ERCOT region would still have about 93 GW of capacity to cover this kind of winter storm. Instead of a 10 GW deficit like in Figure 2, there would be almost a 10 GW surplus.

The pattern that Texas is following now—i.e., investing to meet summer demand while ignoring winter needs—is eerily similar to the one it followed before Winter Storm Uri. In February 2011, the ERCOT grid was hit with a multi-day winter storm and suffered rolling outages because of an unprecedented number of power plant failures. Instead of making the necessary upgrades and adding reliable capacity to protect against the next storm, the ERCOT market drove tens of billions of dollars into new wind gen-

9 S.B. 3. (2021). 87th Legislative Session. Regular. https://capitol.texas.gov/tlodocs/87R/billtext/pdf/SB00003F.pdf

10 American Clean Power Association (ACPA). (2025). *Texas clean energy factsheet*. https://cleanpower.org/wp-content/uploads/2025/09/Texas_clean_energy_factsheet.pdf. Note: The number is taken from a version of this factsheet that was posted in 2021 but is no longer available online. The factsheet refers to the total amount of investment prior to 2021 and includes some projects in Texas outside of the ERCOT region.

11 H.B. 1500. (2023). 88th Legislative Session. Regular. https://capitol.texas.gov/tlodocs/88R/billtext/pdf/HB01500F.pdf

12 ACPA. (2025). Note: this number is calculated by the author by subtracting the amount of investment cited in the 2021 factsheet from the amount in the current version of the factsheet.

eration. When the next major winter storm came in 2021, the wind didn't show up, and even more power plants failed.

Now, the investment problem is manifesting in the form of a growing shortage of reliable capacity. Between 2021 and 2025, ERCOT added over 25 GW of solar and 16 GW of battery storage but only 2.3 GW of natural gas capacity.[13] Whereas the amount of gas, coal, and nuclear resources available in the winter was 6 GW more than winter peak demand in 2021, it is now 3 GW less than peak demand. There are some large gas power plants in development, but solar and batteries[14] still comprise more than 80% of capacity in the late stages of development.

The response of Texas policymakers to this pattern is reminiscent of the old saying, "Fool me once, shame on you. Fool me twice, shame on me." Texas was fooled twice by mass failures of power plants in 2011 and 2021, so legislators finally decided to mandate winter resiliency standards for power plants and other critical equipment. But they missed the root cause of the problem, which is the failure of the market to invest in reliable generation. Winter Storm Uri should have been the wakeup call that policymakers needed on market reform, but the lack of action is setting them up to be fooled twice again.

If policymakers want Texas to be prepared for the next major winter storm, they must require all wind and solar generators to meet a reliability standard and to better value reliable generation.

Don't believe the headlines that the ERCOT grid is more resilient than it ever has been. The fact remains that the capacity gap in the winter is considerably larger than it was five years ago during Winter Storm Uri and will grow even more unless the pattern of investment changes. Stay tuned for the next installment in this series, which will attempt to shed light on the effect of the data center explosion and what lies ahead between now and 2030. ■

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13 Electric Reliability Council of Texas (ERCOT). (2025, November 6). *Capacity changes by fuel type charts October 2025*. https://www.ercot.com/gridinfo/resource

14 Electric Reliability Council of Texas (ERCOT). (2025, November 3). *GIS_Report_October2025*. https://www.ercot.com/mp/data-products/data-product-details?id=pg7-200-er. Note: The link refers to the webpage where the file is housed. The file is an Excel spreadsheet downloaded from that webpage. The statistic refers to the power plants that have an interconnection agreement in place.

ABOUT THE AUTHOR

Brent Bennett, Ph.D., is the policy director for Life:Powered, an initiative of the Texas Public Policy Foundation to raise America's energy IQ and promote human flourishing through energy freedom. Dr. Bennett is responsible for Life:Powered's research and policy development, which has helped secure policy victories such as rolling back subsidies for unreliable energy, ending electric vehicle subsidies and mandates, stopping discrimination against responsible energy producers, and promoting policies to improve grid reliability.

Dr. Bennett has an M.S.E. and Ph.D. in materials science and engineering from the University of Texas at Austin and a B.S. in physics from the University of Tulsa. His graduate research focused on advanced chemistries for utility-scale energy storage systems. Prior to joining the Foundation, Dr. Bennett worked for a startup company selling carbon nanotubes to battery manufacturers, and he continues to provide technology consulting to energy storage companies.

Dr. Bennett spent his early years in Midland, Texas surrounded by amazing energy entrepreneurs, and he has been a passionate student of energy his entire life. He now lives in Austin with his wife, Erin, and his two children, Jack and Madeleine.

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901 Congress Avenue | Austin, Texas 78701 | (512) 472-2700 | www.TexasPolicy.com