The Relationship Between the Reliability and Resilience of the Texas Rural Electric Grid and Texas Rural Economic Development

Thomas Watson

Sam Houston State University | Institute for Homeland Security

Abstract

The Texas electric grid can drive economic development in rural counties by providing existing Texas companies across the state stable and affordable electric power. Stable and affordable Texas electric power is also crucial for attracting new industries and meeting the increasing demands of the rural population. In addition, a reliable and resilient electric grid:

1. Can attract financial investment, foster industrial growth among existing Texas businesses and support a wide range of diverse industries throughout the state. Recommendations for enhancing the Texas electric grid reliability and resilience impacts economic development to include attracting new businesses and investment, supporting industrial growth, addressing population growth, developing economic industrial diversity, innovation, investment and community resilience.
2. Is key for companies considering relocating to Texas, especially in energy-intensive industries like data centers, chip manufacturing and technology. Existing Texas companies in rural counties that access large amounts of stable electricity can also increase their industrial development, particularly in energy-intensive industries such as petrochemicals, data storage and manufacturing.
3. Is essential for a rapidly growing Texas population, supporting residential and commercial development, and Texas quality of life.
4. Can, in rural counties, broaden the state's economic base beyond traditional industries and urban counties, providing stability during economic cycles.
5. Can encourage further investment in new technologies and energy-efficient practices, fostering further innovation in rural counties.
6. is crucial during natural disasters and extreme weather, ensuring essential services continue to operate and minimizing economic disruption across the state.

However, the challenges to rural economic development dependents on a reliable and resilient Texas electric grid during extreme weather events. Texas has experienced major power outages during extreme weather like winter storms. These have significantly disrupted businesses and residents, particularly in rural counties. The reliability and resilience of the Texas electric grid also:

1. Requires managing a large and complex electric power grid and integrating a wide array of electric power generation sources, each with their own challenges.
2. Requires maintaining and updating the electric power grid through large scale capital investments and the use of innovation to meet the growing energy demands of both rural, suburban and urban counties across the State of Texas.
3. Requires policy decisions regarding electricity market design and regulation of new electric power generation capacity for rural Texas.

Overall, Texas has generally enjoyed a relatively reliable electric grid, but it is critical that the state ensures it continues to maintain electric grid reliability across the state while modernizing and expanding the system through proactive measures to sustain economic grow and attract new businesses. By improving the reliability and resilience of the electric grid for the rural counties of Texas, the Texas power grid will play a vital role in driving economic development, attracting new businesses and supporting industrial growth of existing companies in urban, suburban and rural counties.

Key Words: Reliability, Resilience, Rural Counties, Texas Electric Grid, Texas Rural Economic Development

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Introduction

This research paper examines the relationships between the reliability and resilience of the rural Texas electric grid and rural Texas economic development. In 2021, Winter Storm Uri caused widespread power outages in Texas during an extreme cold weather event. Uri resulted in 246 recorded deaths and left more than 4 million customers without power for almost a week (Abdelmalak et al., 2023). Winter Storm Uri also caused Texas economic losses of approximately $130 billion (Busby et al., 2021). The February 2021 Texas electric grid crisis also exposed significant social vulnerabilities and electric grid weaknesses. These disproportionately affected marginalized communities across demographic, economic and geographic lines. Urban centers and wealthier areas across Texas experienced faster power restoration, while rural counties faced prolonged outages due to weaker infrastructure and a lack of backup power (Flores, 2023). Economically, low-income households in Texas were hit hardest by the soaring energy bills, worsened by a deregulated market and price surges (Sahay et al., 2025). Policy failures such as insufficient risk communication and inadequate weatherization mandates left vulnerable populations across the state unprotected (Busby et al. 2021). The effects of Winter Storm Uri emphasized the need for better legislation, strategic planning, equitable policies for all Texans and stronger regulatory oversight to prevent disproportionate impacts across Texas counties in future crises (Sahay et al., 2025).

Even before Winter Storm Uri there were warnings of problems with the Texas electric grid (Sambasivam et al., 2022). For example, in 2017, during Hurricane Harvey, hundreds of thousands of customers in Texas lost electricity. ERCOT took almost two weeks to fully restore power and the storm resulted in approximately $3.3 billion in lost GDP (Sambasivam et al., 2022). Situations prior to Winter Storm Uri such as Hurricane Harvey had increased focus on the Texas electric grid reliability, but obviously not enough had been done by the time Winter Storm Uri hit (Sambasivam et al., 2022).

Lessons Learned Post-Winter Storm Uri

In the months following Winter Storm Uri, Texas officials worked on preventing another major disaster, as ERCOT learned to better manage a largely deregulated grid that is isolated from the rest of the country (Cohn, 2022). In 2026, during Winter Storm Fern, ERCOT was able to ensure Texas had sufficient electric power generation capacity to meet the electricity demands caused by the storm, though Fern was shorter and less severe than Uri (Jenkins, 2026). In 2021, the cooperative's software for the electric grid could not handle ERCOT's instructions to institute rolling blackouts, so personnel were forced to do it manually (Jenkins, 2026). In the years since, the software was updated and systems stress-tested so ERCOT was able to handle Winter Storm Fern more effectively (Jenkins, 2026).

In the energy deregulation law passed by the Texas legislature in 1999, the state separates power generation, transmission, and retail sales in order to lower prices (Jenkins, 2026). While deregulation has enabled Texas to lead the nation in building renewable power and having faster interconnection processes than most states, this system can complicate reliability and resilience efforts (Jenkins, 2026). There were early efforts to develop a system for balancing cost and pricing, but they left ERCOT with a large capitalization gap to harden power generation, transmission and distribution systems for extreme weather events (Giacobone, 2025).

Most of Texas also does not have vertically integrated, regulated utility operations, like Entergy has in eastern Texas (Jenkins, 2026). Entergy's structure allowed it to communicate more effectively with customers during Winter Storm Uri and maintain better supply chain control, but it also has more regulatory oversight than ERCOT (Jenkins, 2026). How does ERCOT accomplish better communications under deregulation environment with extreme weather events becoming more frequent and destructive? That remains to be seen.

Characteristics of Reliable Electric Grids

At its core, the reliability of electric grids is the consistent ability to provide uninterrupted power to consumers and industries (FERC, n.d.). Reliability is measured and evaluated separately from the transmission/generation network and the distribution network. The components of bulk power system reliability include resource adequacy, operational reliability and resilience (NREL, 2024). Reliability metrics for the bulk power system focus on near-term operations and longer-term planning as defined by the North American Electric Reliability Corporation (NERC) (Carvallo et al., 2024).

Operating reliability is the ability of the bulk power systems to withstand normal disturbances, such as electric short-circuits or the unanticipated loss of system elements, while avoiding uncontrolled cascading blackouts or damage to equipment (NERC, 2025).

Adequacy is the ability of the electric system to supply sufficient electric power to meet demand at all times, taking into account scheduled and reasonably expected unscheduled outages of system components (NERC, 2025).

Reliability metrics for electric distribution systems tracks the interruption of the delivery of electricity in sufficient quantities and quality to meet customer needs (NERC, 2025). The emphasis is on delivery within distribution systems because that is where 90 percent of interruptions occur (NERC, 2025). Power losses of five minutes or less are referred to as momentary interruptions, while power losses lasting more than 5 minutes are called sustained interruption (NERC, 2025).

Characteristics of Resilient Electric Grids

Resilience is not the same thing as reliability (Carvallo et al., 2024). This paper follows the National Academy of Science guidelines that recommends minimizing the likelihood of large-area, long-duration outages (reliability). However, a resilient system acknowledges that such outages do occur, prepares for them, minimizes their impact when they occur and restores service as quickly as possible (Carvallo et al., 2024).

Unlike reliability, resilience is event-specific and is evaluated against a specific disruptive High Impact Low Frequency event (Kasina et al., 2024). For example, the electric grid resilience characteristics needed for a winter storm are different than those required to deal with a hurricane (Kasina et al., 2024).

Correlation of Reliable and Resilient of Electric Grids to Economic Development

Jakovac's (2017) the literature review clearly explains the undisputed practical importance of reliable electricity to economic development. A large body of literature has also documented a positive correlation between electricity consumption and economic development, as measured by Gross Domestic Product (GDP) per capita (Lee et al., 2017). Moss and Kincer (2023) observed that this positive relationship between electricity and economic development is highly correlated around the world and for every time period where data is available. Simply put, wealthy countries consume large amounts of electricity per capita and less developed countries consume small electricity per capita. The strong relationship between the consumption of electricity and economic growth is, in part, because production in modern 21st century economies relies on technological equipment, itself totally dependent on electric power. This includes computers, cloud storage, Bitcoin mining and artificial intelligence (Rahman et al., 2022). However, while over 20 years of numerous empirical research papers have shown a strong correlation between electric power consumption and economic growth, no studies have been able to definitively establish a universal causality between the two variables of electricity and economic development (Jakovac, 2017).

Texas Electric Grid Investment

Investment and Economic Considerations

One of the primary challenges in infrastructure development is addressing gaps and inequalities (Challoumis, 2024). Disparities in infrastructure quality and access can significantly affect economic growth and social equity (Challoumis, 2024). Rural areas and underdeveloped regions often suffer from inadequate infrastructure, limiting their economic potential and access to essential services. Bridging these gaps requires targeted investments and policies that prioritize these underserved communities (Challoumis, 2024).

An assessment of electricity outages found the greatest risks are concentrated in rural counties (Sovacool et al., 2024). Research of electric power outages from 2018 to 2020 across 2447 US counties (73.7 4 % of the US population) and 520 million customer-hours without power annually found that rural counties experienced outages lasting more than 8 hours. They also suffered the highest incidence of social vulnerability and prevalence of electricity-dependent durable medical equipment use (Sovacool et al., 2024). Rural areas also took longer to recover from blackouts with slower and more uneven restoration times compared to urban areas (Sovacool et al., 2024).

To stimulate electric grid investment at the local level, Texas Tax Code Chapters 312 and Chapter 313 reduced local taxes for investors, including renewable energy developers (Lyu et al., 2024). Chapter 312 empowers municipalities and county commissioners across the state to designate reinvestment zones within which project investment, including renewables, could receive tax abatement (Lyu et al., 2024). Chapter 313 offered school districts the option of ten-year tax abatement before developed property became fully taxable. Even with the ten-year initial tax abatement, over the lifetime of renewable energy projects rural counties received significant tax revenue windfalls (Lyu et al., 2024).

However, Texas started to move away from supporting renewable energy in 2023, with Senate Bill 624/House Bill 3707 introduced into the State Legislature to add regulations to renewable generation siting (Lyu et al., 2024). Had they passed, Senate Bill

624/House Bill 3707 would have changed siting processes for wind and solar facilities, requiring new and expanding facilities to apply for permits from the Public Utility Commission of Texas (PUCT). They would also have added requirements for public notice, environmental assessment and public meetings (Lyu et al., 2024). PUCT and local officials would have had the authority to deny the construction of new facilities, adding a new layer of approval for renewable energy projects (Lyu et al., 2024). While developers were concerned about stricter requirements, hard core critics claimed it would increase energy prices and slow economy development. However, rural county residents, whose concerns were not being heard about the local environmental impacts of renewable generation facilities, would have had the opportunity to voice their opinions (Lyu et al., 2024). The legislation did not pass but is expected to come up during the next session.

Reliable Electric Power in Rural Texas

Reliability

The main challenges facing electric grid reliability in rural Texas are:

1. Insufficient electric power generation capacity
2. Limited and aging transmission and distribution infrastructure, and
3. High energy costs compared to urban areas with alternatives sources of electric power generation and transmission (Krishnamoorti & Datta, 2025).

Power Generation

Renewables are a significant source of revenue for local jurisdictions and landowners across Texas. Any policy changes will may these benefits to many rural counties (Rhodes, 2025). The Texas Trends 2025 survey of rural residents and community leaders with renewable energy projects generally see them as a positive and appreciate the consistent long-term revenue streams (Buttorff et al., 2025). Landowners with renewables and energy storage systems are satisfied with the income streams they generate and how renewable energy projects integrate into the local economy. Even landowners without direct benefits from wind turbines, solar panels, batteries or supporting infrastructure such as transmission substations have expressed appreciation for the additional local tax revenues (Rhodes, 2025). For rural counties and school districts with small tax bases, renewable and energy storage projects are a major source of revenue.

Texas has experienced a rapid increase in solar power because of its long periods of sunshine, large tracks of available land and growing demand for renewable energy (Su, 2024). The number of solar panels in the Texas rose 30 percent between 2017 and 2022, more than any other renewable power-producing system (Su, 2024). In the third quarter of 2024, Texas led the US in sustainable power installations, adding 2,596 MW of new utility-scale solar, wind and battery storage capacity (Su, 2024). Texas is planning to reach an estimated total of 100 GW of new solar capacity over the next decade (Su, 2024). To achieve 100 GW, would require 500,000 to 700,000 acres, with more than enough land in the rural counties of West Texas and the Panhandle available to meet that goal (Su, 2024).

Transmission

For some rural counties in Texas, uneven siting of transmission infrastructure results in those counties not having affordable access to electricity, even though they house the transmission infrastructure (Sovacool et al., 2024). Because of these conditions, rural county residents often oppose the construction of extension of transmission lines in their counties (Komendantova et al., 2015), but transmission infrastructure is forced on them by state and local governments imposing eminent domain or declared rights of way (Sovacool et al., 2024). This inequity in the electric grid concentrates greater blackout risks on rural counties where electric outages are increasing rapidly (Sovacool et al., 2024).

Transmission lines are the critical link for the flow of energy across long distances, to meet the demand across both urban and rural counties (Moudgalya et al., n.d.). With the increasing use of renewable electric power and the need for a more reliable electric grid, the Texas transmission infrastructure must be able to handle both the current and future demands created by a rapidly changing Texas energy landscape (Moudgalya et al., n.d.).

As a result of these limitations between power generation, transmission and distribution, Texas has more extreme outage events than any other state in the United State. It is also the number one state in the US for extreme weather events exceeding one billion dollars in economic losses (Abdelmalak et al., 2023). In addition, Texas is one of the top states exposed to outages with impacts exceeding 24 hours before starting to restore the energy loads (Abdelmalak et al., 2023).

Characteristics of Rural Texas

Texas is one of the fastest growing states in the US, but this growth is unevenly distributed across the state's 254 counties (Asch, 2023). Texas has gained residents in 158 of its counties. However, 95 rural counties have lost residents, mostly in West and South Texas in the most recent census, with San Saba County remaining unchanged (Asch, 2023).

Texas is following the national trend of urbanization with the majority of Texans who move from rural counties going to urban and suburban counties in Texas looking for better economic opportunities (Lyu et al., 2024). Currently, 211 Texas counties consist of farms, ranches, fossil fuel extraction and forests (Lyu et al., 2024). At the same time, six of the top 10 US urban counties for population growth are Harris, Collin, Denton, Fort Bend, Bexar and Montgomery in the core of the metropolitan areas. Five Texas counties are on the list of the 10 fastest-growing US suburban counties, including Kaufman, Rockwell, Parker, Comal and Chambers (Asch, 2023). Over 95 percent of the state's population growth is concentrated in the 26 Metropolitan Statistical Areas (MSAs) (Potter, 2023). This trend should continue since most of the Texas economic growth drivers are located in or around the new industrial activities in the Texas Triangle of urban megaregions consisting of the Houston, Dallas-Fort Worth, Austin, and San Antonio metropolitan areas (Hartley et al., 2024).

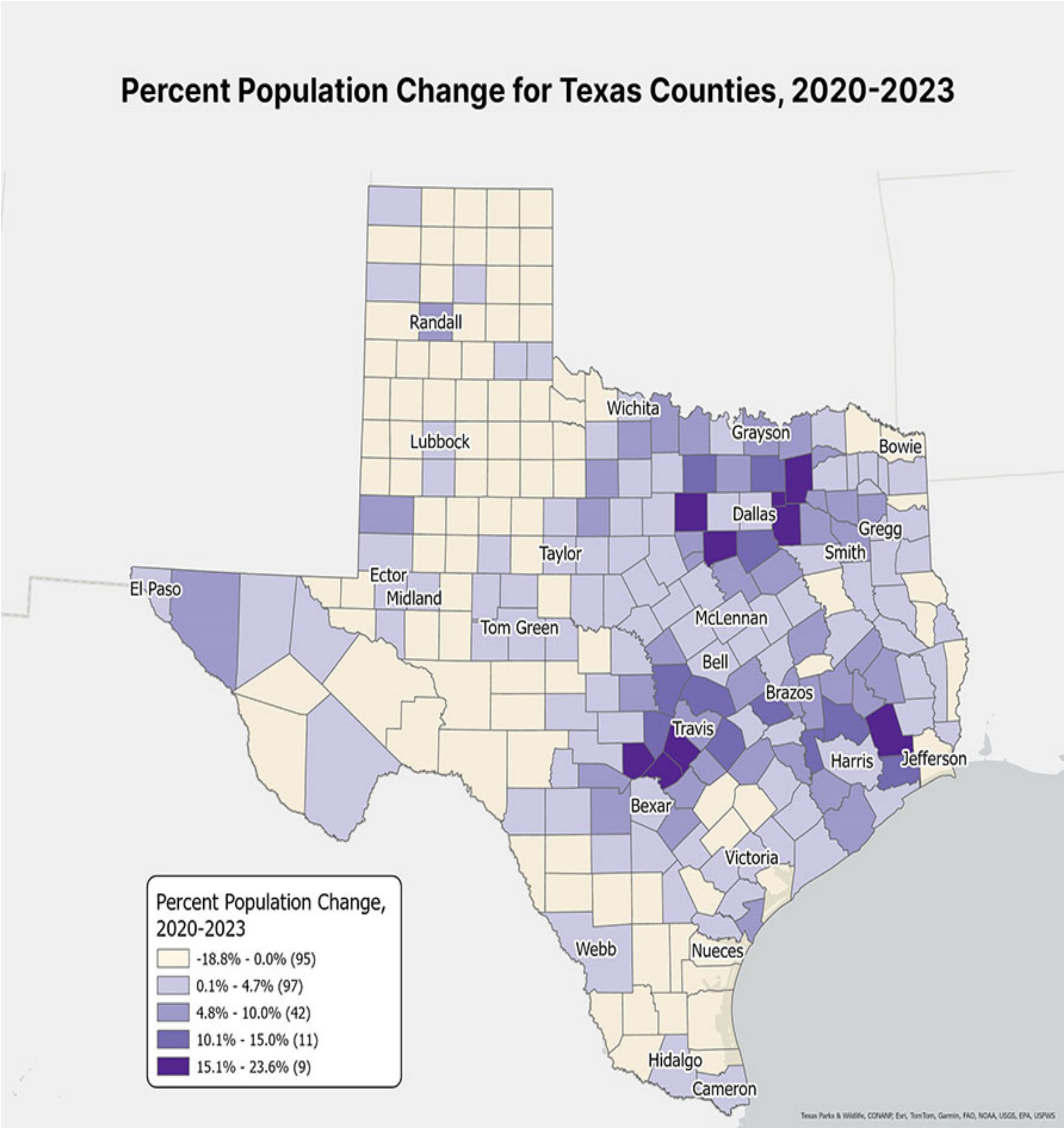

Figure 1. Source: Texas Demographic Center. Vintage 2023 Population Estimates.

The primary economy of most rural Texas counties is agriculture and ranching, with fewer people and less industry per area than the urban and suburban counties in the state (Lyu et al., 2024). For historical, cultural and quality-of-life reasons, many Texans living in rural counties find this desirable, but the lack of industries results in fewer jobs and large amounts of land with agricultural tax-exemptions providing smaller tax bases for many rural counties (Rhodes, 2025). These problems are compounded by the fact that many rural counties cover large land areas with many miles of roads to maintain, as well as providing other essential services such as law enforcement, emergency services and education to small populations spread over large areas (Rhodes, 2025). In spite of these factors, some rural counties in Texas are growing economically because of renewable energy, energy storage, cryptocurrency mining and data storage given their existing resources and available land (Rhodes, 2025).

In Texas, the consumption of electricity is also strongly correlated with population and/or economic activity as measured by per capita GDP (Krishnamoorti & Datta, 2025). The rise of data centers in Texas, rapid growth of electric vehicles and added electrification of industrial processes will drive a major increase in electricity demand over the next decade (Krishnamoorti & Datta, 2025). Rural locations in West, Far West and Northwest Texas, along with the Dallas and Houston metro areas will be home to most of the data center expansion (Garcia & Shaw, 2026). West, Far West and Northwest Texas have significant wind, solar and natural gas resources, however, they also often lack sufficient electricity transmission and natural gas pipelines to support their economic development (Krishnamoorti & Datta, 2025).

Most major data centers are planned for West, Far West, and North rural counties of Texas, along with half of the growth in Texas large load interconnections (Krishnamoorti & Datta, 2025). However, the regions are also underserviced by natural gas pipeline capacity and electricity transmission lines when compared to the load centers in the more populous East, North Central, and Coast counties of Texas creating energy bottlenecks for new data center projects (Krishnamoorti & Datta, 2025). In addition to transmission constraints, the regulatory wait times for projects approval and coming online are now resulting in some data centers co-locating electricity generation facilities on their sites (Krishnamoorti & Datta, 2025).

Economic Investment in Rural Texas

Data Centers

In 2026 the largest proposed data center in the US was approved in Pecos County (Garcia & Shaw, 2026). Earlier in 2025 construction started on a $500 billion data center outside of Abilene city limits and a planned 5,800-acre project in the Texas Panhandle (Garcia & Shaw, 2026). Together with smaller projects near Waco and Harlingen, Texas is now challenging Virginia for dominance in US data centers. However, in many of these rural counties , locals are demanding their elected officials stop further building of data centers (Garcia & Shaw, 2026).

Data centers projects come with the promise of jobs and a massive increases to local property taxes (Garcia & Shaw, 2026). For example, the $10 billion data center proposal near Waco would be the largest economic development project in McLennan County history, generating $50 million a year in tax revenue for Lacy Lakeview and its 7,000 residents (Garcia & Shaw, 2026). The increase in local property taxes was also central to negotiations with the CyrusOne project northwest of Waco in Bosque County, population 19,000 (Garcia & Shaw, 2026). The Bosque County data center is projected to increase tax revenue for the county by 120% or $70 million over the next three decades when it is completed (Garcia & Shaw, 2026). Many Texas towns in rural counties face tight or deficit budgets, but are constrained by state law in raising additional revenues (Garcia & Shaw, 2026). This helps explain why many small and rural municipalities are boosters of data center development in Texas (Garcia & Shaw, 2026). And many of these rural towns with revenue shortfalls also struggle to create jobs, which data centers have promised to provide, as well (Garcia & Shaw, 2026).

Across Texas the data center industry has produced 61,060 direct jobs and contributed $3.5 billion in Texas state and local tax revenues in 2023 (Garcia & Shaw, 2026). However, many of these jobs are short-term construction jobs with the number of permanent long-term jobs being much lower after construction is completed (Garcia & Shaw, 2026). To qualify for the current Texas state sales tax exemptions, a data center of 100,000 square feet or more is only required to create a minimum of 20 jobs (Garcia & Shaw, 2026).

Transmission

Texas has some of the strongest pro-transmission policies in the US because its elected officials understood that a strong transmission network is essential to the Texas free market for electricity (AWEA, 2019). The ERCOT policy is to strengthen transmission for a better free market, allowing a larger set of power generators from across Texas to compete in the marketplace (AWEA, 2019). The ERCOT and PUCT position on electric grid reliability is to ensure continuous operations following an unexpected outage of one or more generators or transmission elements, based on having a strong transmission network (AWEA, 2019).

Given that transmission infrastructure typically remains in service for 40 years or more, new transmission capabilities will provide benefits that are unanticipated when it is initially built (AWEA, 2019). Even though they were planned only 10 years ago, ERCOT has documented how the Competitive Renewable Energy Zone (CREZ) transmission upgrades are addressing reliability concerns caused by the retirement of older fossil fuel generators (AWEA, 2019). Additionally, electric grid upgrades are addressing unanticipated reliability concerns from the surge in electricity demands from oil and gas production in West Texas (AWEA, 2019). ERCOT has evaluated the future transmission expansion needs under a range of future scenarios and found that more transmission lines were needed (AWEA, 2019).

In addition, NREL analysis of the Texas electric energy market found that small additions of energy storage could significantly reduce curtailment when five percent of energy was provided by renewables, but the value of additional storage diminishes rapidly (AWEA, 2019). This happens because many periods of excess renewable output exceed the MWh storage and duration capability of batteries (AWEA, 2019).

Current Concerns

Texans have expressed widespread concern about rising electricity costs and unequal energy burdens. According to Buttorff et al. (2025), 33 percent of Texans are spending seven percent or more of their household income on summer electricity–above the high-burden threshold. The cost of the Texas electric grid expansion is due to the rapid growth of energy-intensive data centers across Texas will further increase the costs for residential and existing commercial ERCOT consumers (Buttorff et al., 2025). Southern and western counties near El Paso, Laredo, San Antonio, and parts of the Gulf Coast could observe households spending 7–10 percent of their income on energy (Buttorff et al., 2025). By comparison, counties with large urban centers should show moderate burdens of 3–6 percent spending cost to their customers (Buttorff et al., 2025). The lower average burden in urban and suburban counties is reflective of higher incomes and more efficient housing compared with rural counties (Buttorff et al., 2025). Texas households continue to navigate an evolving energy landscape shaped by extreme weather, rapid population growth and infrastructure constraints. Gulf Coast communities face disproportionately low investment relative to the high concentrations of energy-burdened households (Buttorff et al., 2025).

As Texas continues to expand its energy-intensive industries, including data centers and manufacturing, balancing reliability and affordability will be critical to the Texas economic and social well-being of its residences (Buttorff et al., 2025). The Texas Trends 2025 survey findings suggest that policy efforts should prioritize reducing household energy burdens through efficient housing programs, equitable investment in clean energy, and transparent regulation of utility rate adjustments (Buttorff et al., 2025).

Agricultural Concerns

Texas has been experiencing a decline in farms and ranches for decades. Texas lost nearly 18,000 farms and ranches and over 1.5 million acres of agricultural land between 2017 and 2022 (Su, 2024). An aging population of farmers and ranchers is resulting in a combination of consolidation by large agricultural conglomerates or subdivision of agriculture lands into less efficient track for family members, forcing many Texans to move away from farming and ranching as a business. Some of these farms and ranches are also moving into long-term contracts to produce solar or wind electric power generation. Rising agricultural production costs, market changes and volatility of commodity prices are also all contributing to the reduction in Texas farms and ranches (Su, 2024). Some legislators have concerns about the long-term implications of removing prime land into solar or wind electric power generation from production, especially when energy project contracts can lock up land for decades (Su, 2024).

However, renewable energy has become a good alternative business model for rural landowners, enabling them to continue keeping their land holdings intact and in the family (Su, 2024). The presence of solar and wind farms has actually driven up land values in many rural counties in West Texas and the Panhandle with substantial economic gains for landowners(Su, 2024). Land values in areas with solar and wind development appreciated due to the stable and predictable leasing income provided from solar and wind projects (Su, 2024).

Land-Use Conflicts and Other Concerns

From Amarillo to Waco and College Station to Harlingen, Texans are also raising concerns over the proliferation of data centers in rural counties due to their use of large amounts energy, water, and overcrowding of existing roads (Garcia & Shaw, 2026). Despite local rural resident concerns, Texas leaders still envision the state as the US leader in datacenter development, based on the state's reputation for abundant gas supply and business-friendly environment to attract billions in investment (Garcia & Shaw, 2026). To this end, Republican state leadership has taken steps to limit local governments from enacting rules in the interest of their residents (Garcia & Shaw, 2026). However, as the public outcry has grown, Texas has taken belated steps to account for the rapid spread of data centers and other large, energy-intensive facilities (Garcia & Shaw, 2026). In 2025, the Texas Legislature passed Senate Bill 6 establishing requirements for companies that consume large amounts of electricity to operate, such as industrial and petrochemical facilities and data centers (Garcia & Shaw, 2026).

Senate Bill 6 enables ERCOT to oversee energy transactions between power generators and large consumers such as data centers that did not ordinarily involve the Texas electric grid (Garcia & Shaw, 2026). ERCOT also has the authority to cut their power and redistribute it during an emergency (Garcia & Shaw, 2026). In parts of Texas where electricity comes from a single source, such as a municipal utility or an electric cooperative, companies interested in that power are expected to pay for the cost of that connection (Garcia & Shaw, 2026).

As Texas voters increasingly demand action on data centers heading into the March 2026 primary elections, the political momentum about regulating the data center industry has been changing (Garcia & Shaw, 2026). In February, 2026, the State Republican Executive Committee passed a resolution calling for rigorous independent assessments of proposed data center projects and their impact on grid reliability and water shortages before final approval (Garcia & Shaw, 2026). The resolution additionally called for a pause on open loop data centers, which is the most efficient water cooling method for computer chips, but uses the most water, as well as other oversight and local control measures (Garcia & Shaw, 2026).

The Texas Agriculture Commissioner also wants to ensure farmland is not lost to data center sites by creating designated Agriculture Freedom Zones that would use tax incentives for data center developers to build elsewhere (Garcia & Shaw, 2026). The unchecked spread of data centers onto prime farm and ranch land is a growing threat to the Texas agricultural industry (Garcia & Shaw, 2026). Texas will need to balance the relationship of agricultural production and technology innovation to continue to be the world leader in both (Garcia & Shaw, 2026).

Policy

Since 2021, policymakers and regulators have enacted legislation and regulatory changes to reform and strengthen the Texas electric grid. These efforts include improving reliability and reliability standards and performance, expanding backup baseload power services, and improving transmission planning (Buttorff et al., 2025). However, continuing population growth in urban and suburban areas, rising peak demand and increasing energy needs from data centers and cryptocurrency operations continue to strain the Texas electricity grid (Buttorff et al., 2025).

Data centers enjoy discounted energy tariffs and tax incentives, as Texas state governments and local governments compete to attract business (Mural et al., 2026). Although early incentives have driven substantial data center investments, emerging regulatory debates are impacting market development across Texas. The passage of Texas Senate Bill 6 signals policies shifting toward future regulator interventions to address local concerns over reliability and affordability. (Mural et al., 2026).

Renewable energy and energy storage development have also made a significant and positive economic impact across Texas, providing income to landowners and tax revenue to rural counties. The current and planned renewable power and energy storage projects are expected to pay almost $50 billion in lifetime landowner payments and local taxes (Rhodes, 2025).

By mid-2024, Texas state lawmakers were growing concerned by emerging electric energy risks with regards to fairness in cost recovery from existing customers because data center requests could shift upgrade costs onto residential and smaller commercial customers; behind-the-meter (BTM) co-location of existing electric grid-facing generation behind a private fence, reducing ERCOT’s ability to access additional electric power generation under tight conditions; and managing resource adequacy and emergency operations during an emergency (Mural et al., 2026).With the passage of Senate Bill 6 (SB6) in June 2025, the Texas State Legislature enacted a number of planning, interconnection, cost-sharing, transparency and emergency operations reforms aimed at strengthening and protecting the Texas electric grid (Mural et al., 2026). The law formalizes ERCOT's Large Load Interconnection Study (LLIS) process; directs PUCT to determine a reasonable share of upgrade costs for new customers with large loads; and requires improved disclosure to reduce speculative filings (Mural et al., 2026). Overall, SB6 expands regulation across Texas regional markets in order to increased energy affordability and address cost-sharing concerns (Mural et al., 2026).

SB6 sets demand-response mandates, clearer rate structures and load management requirements for large electric power customers such as data centers (Egan, 2025). While these provisions are an improvement for Texas electric grid reliability, more policy actions are needed to secure the electric grid, address the demands of rural counties and electric energy supply mismatches across the state and maintain Texas position as a global leadership in energy (Egan, 2025).

Recommendations

Rural County Consumers

1. Address the needs of low-income households in rural counties hardest hit by soaring energy bills, deregulated market and price surges.
   a. Consider grants, loans and rebate programs for retrofitting poorly insulated homes and businesses.
   b. Increase emergency shelters in rural counties during power outages.
   c. Address concerns about data centers use of limited resources such as water, energy and roads in rural counties.

Policy

1. Address insufficient vertical risk communication with retail providers, utilities, other load-serving companies and customers during severe weather. Consider a model such as Entergy has in the eastern part of Texas.
2. Consider incentives and/or mandates to address inadequate weatherization of gas lines and backup baseload generators.
3. Strategic planning should include community involvement, along with development funds for rural counties to address disparities.
4. Protect prime farmland from data center site conversion to balance out the needs for both agriculture and the data center industries.

Power Generation

1. Dispatchable battery capacity can transform how the Texas electric grid reacts to storms such as Uri and Fern by halting the frequency freefall, stabilizing the system and buying time for baseload power generation units to respond.
2. Address insufficient baseload power generation capacity in rural counties.

Infrastructure

1. Rural Texas counties suffer from inadequate infrastructure, limiting their economic potential and access to essential services. These gaps need to be bridged with targeted investments and policies that prioritize these underserved counties.
2. Allocate capital to address obsolete and poor electricity transmission and distribution infrastructure in rural counties.
3. Address uneven siting of transmission infrastructure in rural counties that do not have affordable access to electricity, even though they house the transmission infrastructure.
4. Allocate capital to address rural counties underserviced by natural gas pipeline capacity to resolve potential bottlenecks for new data center projects.

Conclusion

The Texas electric grid is vital to economic development across the rural counties of the state by ensuring power stability and affordability. It supports existing businesses, attracts new industries, meets rising energy needs, and encourages financial investment, positioning the state for sustained economic growth. Reliability and resilience are crucial for the Texas electric grid to ensure the state's rural counties continued economic development in the 21st century. The Texas electric grid is going through tremendous changes such as grid modernization and distributed energy sources which will enable greater reliability and resilience within the system. Enhanced reliability and resilience of the Texas electric grid has the potential to attract new businesses and financial investment to Texas, support new industrial growth within the state, support residential and commercial development for a growing population and the Texas quality of life, broaden the state's economy beyond traditional industries for stability during economic cycles, investment in new and emerging technologies and energy-efficient practices to foster innovation within the state and ensuring essential services are available to Texas rural communities during disasters to enable them to continue to operate and minimizing economic disruption. The Texas electric grid is central to economic prosperity of its rural counties, yet it faces structural challenges in reliability and resilience. The current market design prioritizes cost efficiency at the expense of long-term stability and preparedness. Infrastructure investment, operational reform and legislative oversight are essential to strengthen the grid against future disruptions, but there are gaps. Balancing the power generation mix, transmission modernization and distribution reliability will determine whether the rural counties across Texas have the ability to achieve sustained economic growth while maintaining energy security. Texas's electricity framework emphasizes affordability through the use of a free market place, but this comes with trade-offs in the electric grid reliability and resilience. The combination of a decentralized market, low-cost priorities and natural threats creates tension between achieving a sustainable and reliable electric power supply. Texas's electricity grid faces significant challenges related to reliability and resilience due to underinvestment, complex infrastructure demands and the need to balance supply and demand. Events like Winter Storm Uri exposed vulnerabilities that could lead to prolonged blackouts, particularly in the rural counties of Texas. Effective resilience requires strengthening backup systems, improving investment strategies and adopting comprehensive infrastructure recommendations. Texas is at a critical juncture in balancing economic growth, innovation and energy reliability for the whole state, not just urban and suburban counties. While new technologies promise greater grid efficiency, increasing renewable dependence and limited investment in dispatchable electric power pose real reliability risks. The future reliability and economic health of Texas depend on strategic policymaking—particularly regarding balanced electric power generation sources, battery storage, transmission and distribution modernization. Achieving lasting reliability will require independent regulation, innovative solutions and acceptance of necessary costs for stronger electric energy resilience. The importance of strategically balancing short-term operational improvements with long-term infrastructure investments to improve utility resilience is critical for rural counties in Texas. While major electric grid upgrades are vital, financially constrained utilities can also make meaningful progress by focusing on training, communication and cultural adaptation. Developing these internal capacities helps utilities prepare for disasters, support rural counties and lay the groundwork for future large-scale modernization. Texas' rural economic success depends on a reliable electricity grid but current observations reveal that market design, cost-focus and policy gaps have weakened the electric grid reliability. This qualitative examination of the actions that are the more effective, efficient and reliable for Texas rural electric grid will provide viable options for decision makers to grow the economy of Texas rural counties.

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Biographical Note:

Dr. Thomas F. Watson (DSc in Civil Security Leadership, Management and Policy, from New Jersey City University), works in the field of cyber insurance and its impact on operational cyber risk management in banking. He has worked for over 20 years in various senior positions related to critical infrastructure issues for the Center for Climate and Security (CCS), the Department of Homeland Security (DHS) and on the faculty of the Industrial College of the Armed Forces (now the Eisenhower School for National Security and Resource Strategy) at the National Defense University. Currently he is working as an independent senior researcher.

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