

Rethinking Grid Governance for Texas in the Climate Change Era

Ningxin Li
University of Pennsylvania

Citation: Li N. (2022) Rethinking Grid Governance for Texas in the Climate Change Era, *International Journal of Weather, Climate Change and Conservation Research*, Vol. 8 No. 2, pp. 10-24

ABSTRACT: *Climate change has been plaguing the United States, most recently with increasingly extreme weather (Chediak & Malik, 2021). The February 2021 blackouts in Texas impacted over 4 million individuals for several days (Reuters Staff, 2021). The Texas blackouts disproportionately affected many low-income and marginalized communities (Srikanth, n.d.). In this paper, the author will analyze whether there is a lack of regulation in the energy sector. The current statutory framework provides power-sharing between federal and state governments with respect to energy regulation (Srikanth, n.d.). Energy deregulation in Texas has both advantages and disadvantages. This research will evaluate the impact of deregulation in the energy sector. In addition, the author will explain how public needs should affect the constitutional allocation of power between federal and state governments. The goal of this research is to provide historical context with which to evaluate some difficult challenges facing Texas today due to the February 2021 blackouts. Furthermore, this research will provide recommendations on how to prevent future blackout problems. This research encourages regulation reform for the transmission grid and the regional power market. Ensuring resiliency in grids is important in preventing severe natural disasters (Waseem & Manshadi, 2020). The author will argue that the federal government, Congress, Electric Reliability Council of Texas, the Public Utility Commission of Texas, and the Federal Energy Regulatory Commission should cooperate more in implementing grid regulations.*

KEYWORDS: Grid governance, climate change, technological innovation and microgrids, electric reliability

INTRODUCTION

Climate Change and the Texas Blackouts

Climate change has been plaguing Texas with increasingly extreme weather; it has caused problems for power grids (Yacobucci, 2016). The February 2021 blackouts in Texas impacted over 4 million people for several days (Reuters Staff, 2021). Experts found that people of color and those in low-income communities were especially affected by the blackouts (Bragg & Jervis, 2021). According to data from the US Census Bureau, in Texas, Hispanic and Black families are more than twice as likely as the White families who live under the poverty line (Srikanth, 2021). In rural Texas counties, Black and Brown people are the predominant population (Bragg & Jervis, 2021). The blackouts and ongoing coronavirus pandemic have disproportionately hurt the populations (Srikanth, 2021). Without electricity, Texas residents had to stay in dark and cold homes, hospitals

in Houston had nearly two dozen deaths reported after Texas lost power (Nakamura & Brooks, 2021). Many buildings did not have sufficient insulation to protect residents from the cold, especially those who were living in shelters (Nakamura & Brooks, 2021). Utility companies prioritized keeping the power on in downtown areas, but low-income families typically live farther from these areas (Bragg & Jervis, 2021).

For example, during the blackout, Maria Benitez stayed in her apartment with her husband and four teenage children (Bragg & Jervis, 2021). They ate tuna from a can and drank powdered milk. Members of the family pulled on several pairs of pants and sweaters to keep them warm (Bragg & Jervis, 2021). Because of the immediate impact on Texas families, it is important to reconstruct the facilities and infrastructure damages caused by the blackouts.

When the temperature dropped to -11°F, oil and gas pipelines were frozen, leading to power outages (Guest Contributor, 2021). Traditional grids can have problems in line losses between users and generating stations; Longer distances between end users and power plants could have led to large line losses (Mehta, 2021). Transmission disconnections and emergency load shedding are issues in Texas (Carvallo et al., 2021). Although federal emergency officials sent generators to support water treatment plants, hospitals, and nursing homes in Texas, advocates said that federal aid was often not distributed equitably to different communities (Bragg & Jervis, 2021).

Challenges of Texas Power Grids

Power grids have been facing multiple challenges in Texas (Mehta, 2021). The Electric Reliability Council of Texas (ERCOT) said that coal, gas, and nuclear energy lost nearly twice as much power because of cold weather compared to using renewable energies; renewable energy contributed to just 13% of the power outages (Reuters Staff, 2021). The cold weather during the outage made many generators malfunction (Douglas, 2021). Frozen natural gas wells and wind turbines caused people in Texas to face difficulties because they were relying on them for heat generation and power (Douglas, 2021). When the grids failed, the consequences did not affect every individual equally (Reta & Gout, 2021). Lower-income neighborhoods had to endure blackouts for several days because of systemic disinvestment of power facilities in these areas (Reta & Gout, 2021).

Energy Deregulation

Texas grids have been separated from the rest of the country; this originated during the evolution of electric utilities in the early last century (Galbraith & Tribune, 2021). The interconnected system has been operating in northern and southern Texas (Galbraith & Tribune, 2021), it had the purpose of keeping limited control from federal regulators (Galbraith & Tribune, 2021). Since the 1930s, the United States has deregulated electricity (Direct Energy, n.d.). Deregulation in Texas reduced the level of interference by the federal government in the Texas local energy market (San Francisco Business Times, 2006). In 1935, President Franklin D. Roosevelt signed the Federal Power Act to allow the Federal Power Commission to oversee interstate electricity sales (Galbraith & Tribune, 2021). In 1978, President Jimmy Carter made energy policy a top priority; Carter created a national energy policy which included conservation and new technology (Maas, 2021). He established the

Public Utilities Regulatory Policies Act of 1978, which aimed to boost more efficient energy production and the development of alternative and renewable energy (Maas, 2021). This act deregulated the nation's electricity market and allowed private investments in power (Direct Energy, n.d.). Congress also passed the Natural Gas Policy Act in 1978, which created a single natural gas market that allowed the market to establish its own prices (Direct Energy, n.d.). Until the 1990s, the Federal Energy Regulatory Commission (FERC) issued Orders 888, 889, and 2000 to integrate power plants that were either sold to a third party or transferred to an unregulated affiliate to ensure all power producers could receive fair access to the power grid with reliable power transmission (TransMissives, n.d.).

Electric deregulation continued under Presidents Ronald Reagan, George H.W. Bush, and Bill Clinton (Maas, 2021). In 1992, Bush signed the Energy Policy Act into law, and economic deregulation was well-established across the United States (Benke, 2021). The provisions in the Act directed the Federal Energy Regulatory Commission (FERC) to give "open access" to power transmission lines (Benke, 2021). In January 1999, state senator David Sibley laid out a plan to deregulate the Texas energy market (10 Years of Senate Bill 7, n.d.). Additionally, the Texas legislature planned to reduce the federal government's control over electricity rates in the state (10 Years of Senate Bill 7, n.d.). Texas passed a deregulation law. After that, retail electricity providers could compete against each other for market share (Acacia, n.d.). In 2002, the deregulated retail market was opened under the rules of Senate Bill 7 (Acacia, n.d.). This bill was issued to guide legislation, which fundamentally changed how electricity was managed in Texas. It included establishing new energy efficiency guidelines for cutting the overall nitrogen oxide emissions of plants by 50% and sulfur dioxide emissions by 25% (Robinhood Learn, 2020). By adopting the deregulation law, Texas avoided federal jurisdiction (10 Years of Senate Bill 7, n.d.). When Bush signed Senate Bill 7 into law, he was clear about his intentions to encourage competition in the electric industry (10 Years of Senate Bill 7, n.d.). This bill was designed to encourage a fully competitive market and provide customer service with lowered prices (Quick Electricity, 2022). Senate Bill 7 aimed to foster new renewable generation of energy and enable electric retailers to earn renewable energy credits (Quick Electricity, 2022).

In 2013, President Barack Obama issued a Climate Action Plan to direct the United States Environmental Protection Agency (EPA) to propose standards for carbon dioxide emissions (EESI, 2015). The EPA proposed the Clean Power Plan in 2015. This plan sets individual state targets for average emissions from existing power plants (Yacobucci, 2016). It guides agencies to take action to address the impact of climate change as well as to ensure the health and wellbeing of individuals; It also directs Texas to make national adaptation plans to reduce greenhouse gases (Yacobucci, 2016). The United States is a federation of states (LaCroix, 2011). Different states have separate legislatures and executives, federalism allows for more than one central entity to have power (LaCroix, 2011). The federal government is above all others, and state governments can control regional issues (Robertson, 2017). Texas' electricity market has been deregulated (10 Years of Senate Bill 7, n.d.). Texas has the most active competitive energy retail market in the US (Calilung, 2015). Utility companies have formed the Texas Interconnected System to power military

manufacturing centers in the Gulf Coast (Quick Electricity, 2022). Until 2002, over 400 cities in Texas chose their retail electricity providers (Quick Electricity, 2022). Some economists believed deregulation increased economic growth (Robinhood Learn, 2020). In the late 1990s, the country's economy grew at more than twice the rate of other countries that did not deregulate to the same degree (Robinhood Learn, 2020). The local Texas governments formed energy regulatory commissions to ensure that they could maintain product prices that complied with Texas laws; Unlike people living in a regulated market, Texas customers can freely choose their retail energy suppliers (Quick Electricity, 2022).

Deregulated retail electric providers usually purchase wholesale power from power-generating companies and sell power to customers (10 Years of Senate Bill 7, n.d.). Retail providers are responsible for interaction with customers, including billing customers for transmission and distribution services (10 Years of Senate Bill 7, n.d.). The power plants, transmission lines, and distribution networks do not belong to a single company; instead, different companies have been generating and transmitting power (Douglas, 2021). Deregulation has advantages, including reducing costs for consumers, increasing market competition, and promoting profits for companies (Robinhood Learn, 2020). In Texas, consumers can compare rates and pick the services they want (Direct Energy, n.d.).

Texas has the largest deregulated electric sector in the US (Quick Electricity, 2022). Although some economists believed deregulation could increase incentives, stimulate economic growth, and reduce barriers to enter the market with lower cost (Boyce, 2021), the grid failed in a spectacular fashion and showed how deregulation can sometimes backfire (Mehta, 2021). Deregulation might have laid the foundation for Texas' blackouts in February, 2021 (Maas, 2021). Texas left the choice to utility companies to prepare for harsh weather (Douglas et al., 2021). Texas' deregulated energy market has been largely isolated from the rest of the US power grids (Douglas et al., 2021). In other words, Texas had to deal with the crisis by itself (Douglas et al., 2021). Some customers have saved money under deregulation, but many have not (Griffin, 2021). Some Texans have paid higher average prices than those in regulated states (Griffin, 2021). Some findings have indicated that the number of providers has increased, but the prices for customers has become higher since the market was deregulated (Quick Electricity, 2022). Prices have climbed above the national average (Quick Electricity, 2022). The federal data has shown that the prices for electricity for Texas residents have increased by more than 60% since 1999 (Quick Electricity, 2022).

Natural Monopoly

Historically, energy and utility companies exist as natural monopolies; because of this, the utility industry should be regulated to protect consumers (Robinhood Learn, 2020). For decades, energy companies in Texas have been holding monopolies and controlling almost all areas of supply chains, such as generation, transmission, distribution, and billing (Acacia, n.d.). In Texas, the price of energy is based on supply and demand, that means energy usually becomes more expensive when there is less energy available (Buchele, 2021). A natural utility monopoly occurs when involving high fixed costs or declined long-term average costs (Knight & Brownell, 2010). Energy

economist, Ed Hirs, at the University of Houston, said that “Higher prices mean energy sellers can make more money by selling less energy” (Buchele, 2021). Texas natural-gas prices increased from week-before prices of \$2 per million Btu to around \$200 per million Btu (John, 2021). Also, Texas retail energy providers have been facing financial imbalances between the prices they offered to their customers and the cost of power in the markets (John, 2021).

Prevent Market Manipulation

The entity created under the monopoly market might have adversely affected the price of electric power and quality service (Wiseman, 2015). Preventing market manipulation is essential: “It shall be unlawful for any person engaged in commerce, in the course of such commerce, either directly or indirectly, to discriminate in price between different purchasers of commodities of like grade and quality, where either or any of the purchases involved in such discrimination are in commerce, where such commodities are sold for use, consumption, or resale within the United States” (The Sherman Antitrust Act, 1890). Federal agencies should launch an investigation on energy market manipulation toward the February blackouts. Also, Texas agencies should cooperate with FERC to investigate any allegations of manipulating energy markets and other possible violations (Macedonia, 2013).

Rate Adjustment

Currently, there is jurisdictional uncertainty over regulatory power over retail transmission in Texas (Robertson, 2001). The power industry requires proper regulation, the Federal Power Act requires that utility rates be just and reasonable; Texas could determine a proper rate and substitute it for the existing one (Springstein, n.d.). Some economists have said that regulators could use scarcity pricing to ensure reliability, but it might cause prices to increase due to electric shortages (Stephanie et al., 2021).

The Texas government is responsible for regulating their utility service and rates. They need to make plans to prepare for emergent circumstances (Electric Choice, 2021). Governments should reform the laws that dictate energy retail prices. Agencies should improve risk management associated with fluctuating energy prices. The government should limit the monopoly control of some energy providers and control unfair price increases under the deregulation law (Springstein, n.d.). Not only should the wholesale markets be overseen at the federal level, but the retail market should also be regularly evaluated at both federal and state levels.

Responsibilities of the Electric Reliability Council of Texas

Texas keeps its energy system independent and isolated from other states (Stephanie et al., n.d.). The grid system in Texas has been largely dependent on its own resources and operated by ERCOT, which is not subject to federal oversight (Federal Energy Regulatory Commission, n.d.). ERCOT’s major responsibilities include ensuring open access to transmission lines, maintaining power reliability, and promoting competitive electricity markets (Reuters Staff, 2021). ERCOT connects more than 46,500 miles of transmission lines and 650 power generation facilities (Minton, 2020). It provides electricity to more than 26 million customers (Minton, 2020). ERCOT indicated that

the cold weather had forced about 34,000 megawatts of generation offline during the rolling blackouts (Stephanie et al., 2020). In fact, ERCOT officials received a report warning that their system had problems and their employees needed better management (Quick Electricity, 2022). Critics said that ERCOT did not respond effectively to federal warnings to ensure the safety of energy infrastructure and transmission (Nakamura & Brooks, 2021). ERCOT should maintain sufficient generating capacity to meet people's needs during the wintertime (Minton, 2020). They should protect the grid's reliability and prevent further uncontrolled outages (Minton, 2020).

In order to avoid further problems, ERCOT should assess the reliability of the power system, ineffective power market operation might have been an issue during the blackouts (PUC of Texas Commissioners, 2020). ERCOT should advocate for energy markets to operate efficiently to meet the power demands. Cooperation between ERCOT, fuel suppliers, power plants, and regulators is important (PUC of Texas Commissioners, 2020). ERCOT should manage electric regional transmission supplies properly.

Evidence showed that many power plants were unexpectedly offline at the same time when people in Texas were using a large amount of electricity; It triggered tight grid conditions for the electricity supply (Bryce, 2021). ERCOT should promote power conservation. Power grids must be preserved properly to keep supply and demand in balance. During the blackout, ERCOT kept the emergency prices in place for hours; However, ERCOT's Independent Market Monitor later found that it was an inappropriate pricing intervention, which led to \$16 billion in excess costs (Steffy, 2021).

Regulations should be improved to maximize social welfare (Bozeman, 2007). Increased energy efficiency for low-income families in Texas is important. Low-income homes are usually less energy efficient, and they have been paying a much higher proportion of their incomes on energy compared to other residents (PUC of Texas Commissioners, 2021). It is important to make it more efficient for these families to improve their health and comfort. The legislature should modify low-income programs to weatherize building facilities and replace inefficient heating and cooling systems (PUC of Texas Commissioners, 2021).

Additionally, ERCOT should coordinate with wholesale and retail electric providers. ERCOT and the Public Utility Commission of Texas (PUCT) should actively review reliability requirements. When a winter storm hits Texas, it could cause days-long blackouts (McInerny, 2021). It is important for Texas to consider connecting its backup power grids with those of other states so that the power can be distributed into Texas under emergency circumstances (McInerny, 2021). In addition, ERCOT can accelerate the development of transmission projects that will increase connectivity between existing and new generation plants to ensure the reliability and stability of the electric grid system (Staff, 2021).

Responsibilities of the Federal Energy Regulatory Commission

FERC has limited jurisdiction over ERCOT's electricity management under section 215 of the Federal Power Act (White & Case LLP, 2021). However, FERC has jurisdiction over the

transportation and storage of resources (Morehouse, 2021). FERC and the North American Electric Reliability Corp (NERC) can require power utilities to protect people from cold weather, build new units, and fix outdated grids (Federal Energy Regulatory Commission, 2021). FERC can have flexibility over approving retail rates as well as prevent fluctuations in wholesale markets (United States of America Federal Energy Regulatory Commission, 2020).

Under Section 215 of the FPA, FERC has authority over ERCOT regarding electric reliability (Berman and Todderud LLP, n.d.). FERC should investigate if ERCOT has violated NERC and FERC reliability standards (Berman and Todderud LLP, n.d.). Also, FERC has authority to investigate and prevent electric market manipulation. If ERCOT would allow one or more electric interconnections, FERC would have full authority over ERCOT (Berman and Todderud LLP, n.d.). In 2021, FERC and NERC announced a joint inquiry into the factors of the Texas blackouts (Congressional Research Service, 2019). FERC can pursue rulemaking to improve grid resilience and ratify mandatory reliability measures. The Public Utility Commission of Texas, ERCOT, and FERC should implement statutes to ensure infrastructure reliability. The federal and Texas governments could investigate the problems and provide accurate information for policymakers. Agencies should understand why the power plants failed. The federal and Texas governments need to focus on grid improvements for depleted and aging infrastructures. Also, FERC could improve coordination between state agencies and utilities.

Responsibilities of Congress

Reliable electricity has become critical as Texas' electricity supply has increased each year (Federal Energy Regulatory Commission, 2021). Texas has been increasingly relying on renewable resources, it is important to maintain the reliability of electricity grids during periods of high demand, Congress could consider providing continuing support to the state's utilities (Minton, 2020). Also, Congress and federal regulators could look for ways to incentivize generators to have enough fuel storage at power plants (Congressional Research Service, 2019).

Regulators and utility companies can work together to determine the opportunities to build a network of reliable, efficient, and sustainable grid systems. One way to improve reliability and resilience is to increase Texas' maximum reliable capacity between jurisdictions (Bryce, 2021). Over the past century, Congress has slowly examined significant topics of energy policy for federal control, such as fuel economy standards and interstate transmission (Mehta, 2021). Texas could determine electric transmission lines, retail electricity, regulate natural gas sales, and grant approval of electric power generation facilities (Klass, 2018). Since Texas has a unique energy system (Klass, 2018), Congress should give deference to Texas regulators to improve ERCOT's rules. Also, Congress might consider expanding federal jurisdiction to set stronger energy efficiency standards to ensure electric reliability. Congress could require FERC to coordinate a record for judicial review of pipeline proceedings in Texas under federal law, including environmental permits, energy policy, and other laws that could significantly impact the state's regulatory authority and policy.

Responsibilities of Texas Lawmakers

The energy market could be fragile and inefficient without proper regulations (McInerny, 2021). Over the past years, the fragility of grids has led to damages in extreme weather in Texas (Bryce, 2021). Texas lawmakers should make changes to regulations. They should address problems that threaten energy reliability and create safeguards against future power outages. Texas lawmakers could pass bills to weatherize power plants and require utilities and power plants to upgrade their facilities to adapt to extreme weather (Bryce, 2021). In addition, analysts could be invited to identify the factors for the power outages.

Federal-State Cooperation

Federal-state cooperation is essential when state law interferes or unreasonably delays the construction of a project for power recovery (Rossi, 2016). Improving federal-state coordination in energy regulation might prevent further blackouts and unfair market manipulation (Rossi, 2016). The federal government should be prepared to cope with any emergency through regulations (Antonio, 2021). Texas could not feasibly and reasonably sustain itself alone without receiving assistance from other states and the federal government. Texas might consider joining the national grid or other states' grids. This cooperation might help ensure that people will not again suffer from power outages but will live comfortably.

Funding Incentives

Texas should increase funding to hire more experts to evaluate and improve the grid system. The federal government can provide grants to influence the state government (Broadway & Shah, 2009). Money and resources provided by the federal government to the state can be used for specific projects to improve the grid system (Broadway & Shah, 2009). The federal and state governments should share funding and administrative responsibilities (Broadway & Shah, 2009). The federal government could use this strategy to enforce national rules and standards to protect public interests. The goal is not just to ensure the efficient allocation of resources, but also to protect liberty and restrain the power of the state government when state agencies refuse to follow certain regulations or public policies or when they fix the problems in inefficient ways (Broadway & Shah, 2009). Additionally, this strategy might help share legislative and fiscal competencies, as well as foster market participation (Johnson et al., 2021). For example, the federal government could offer the state incentives to undertake additional spending to meet their needs (Johnson et al., 2021). The federal government can provide a block grant for the state to use in any specific programs or offer some fixed amount with a mandate that the funding must be spent for the purposes of improving the infrastructure and the alarm system in low-income communities and adding more grids to avoid another blackout (Gruber, 2012).

Implement Environmental Regulations on the Texas Energy Sector

More importantly, PUCT and ERCOT should estimate the challenges of air pollution and global climate change. Over the last century, the United States has been using fossil fuels for generating power, which has disproportionately caused people to face dangerous health risks due to harmful emissions (Reta & out, 2021). From extraction to burning, fossil fuel has been emitting greenhouse

gases and pollutants (Reta & out, 2021). Studies have shown that people's sustained exposure to the pollution has caused them to suffer higher rates of asthma, cancer, and other serious health issues (Reta & out, 2021). Texas should ensure that the power companies' actions would comply with state and federal environmental regulations, including the Federal Clean Air Act and the Clean Water Act. Also, the U.S. Environmental Protection Agency should promulgate agencies' responsibilities for implementing federal environmental regulations on the energy sector (EPA, n.d.).

Renewable Energy Advocacy

Climate change policymakers and activists have been advocating for increasing the use of renewable energy, such as wind and solar energy (Bryce, 2021). The Resolving Environmental and Grid Reliability Conflicts Act of 2013 was aimed to protect electric reliability and the environment (Macedonia, 2013). This bill amended the Federal Power Act to protect a regulated generator from violating the environmental law (Macedonia, 2013). Local, state, and national actors should monitor energy reliability regularly while ensuring that the energy policies will comply with environmental laws (Macedonia, 2013).

The use of renewable energies has been growing in the power supply of Texas (Koenig, 2021). The blackout may have been a warning for promoting renewable generations and grids (Reuters Staff, 2021). State agencies should act to secure low-carbon and resilient power supplies. The governments can issue regulations to limit greenhouse gas and encourage renewable energies. Additionally, regulators can establish winterization rules for facilities (Kelly et al., 2021). Moreover, policymakers must pay careful attention when managing the transition to green energy under different kinds of catastrophic risks (Reuters Staff, 2021).

Technological Innovation and Microgrids

Technological innovations have been penetrating the energy industry in recent years (Knight & Brownell, 2010). A comprehensive microgrid strategy is key to improve grid resiliency (Guest Contributor, 2021). A microgrid is a decentralized group of electricity sources with controlled capability; It can be disconnected from traditional grids and operated autonomously (Roosa, 2020). The microgrid allows a place to keep power on, it can help prevent power outages (Ognenova, 2021). The federal and state governments can provide financial incentives to invest in microgrid technologies (Dirkman, n.d.). According to the Department of Energy, power outages in the United States have steadily increased in the last decade (Mehta, 2021). Microgrids might increase the efficiency of delivery companies and energy suppliers to reduce losses from power outages (Knight & Brownell, 2010).

Technological Influence on the Texas Utility Market

Microgrids can be useful as backup power during extreme weather crises (Wood, 2021). Microgrids have been affecting the natural monopoly of the energy supply; The relationship between supply and demand is an important factor in the Texas utility market (Knight & Brownell, 2010). Microgrids initiatives could seek to use technology to influence this relationship; using

microgrids might help maintain a sustainable downward pressure on future price increases for customers, microgrids can empower customers to make more informed buying decisions (Knight & Brownell, 2010). Also, the microgrid is a cost-effective solution in responding to power crises for low-income areas, it might improve market transparency and monitoring (Knight & Brownell, 2010).

Maintain Non-renewable and Renewable Generators

ERCOT can establish a maintenance schedule for both non-renewable and renewable generators to ensure that they will be integrated adequately to supply power grids. Texas plays an important role in developing renewable power (Galbraith, 2021). Microgrids with renewable energy might have less environmental impact (Microgrid Knowledge, n.d.). Microgrids can function with non-renewable and renewable power, such as wind power, solar power, wave energy, and hydroelectric power (Ognenova, 2021). Agencies could prioritize the replacement of heavily polluting fossil fuel-fired resources with clean energy alternatives (Cleetus, 2021). An advantage of using microgrids includes providing power at a lower generator fossil fuel burn rate, which can reduce the amount of carbon dioxide (Dirkman, n.d.).

Improve Energy Storage

Microgrids can store energy and create more reliable energy supplies for generations, advanced controller, infrastructure, and energy management systems are needed for microgrids to store power properly (Dirkman, n.d.). Microgrids can sense a pending outage before the outage impacts the community, which might reduce or eliminate the problem, a microgrid can be used for a home, military base, university, and municipality (Dirkman, n.d.). For example, when a power outage occurs in a hospital, the microgrid system can provide medical equipment with electricity from the vending machines and it can control the power input for the rooms that need more electricity than others (Dirkman, n.d.).

Ensure Fair Energy Transmission

Technology innovations would stimulate more reliable energy to urban, suburban, and rural areas (Dirkman, n.d.). Texas should remedy discrimination in transmission services in different regions. Energy agencies should work to minimize damages and ensure power plants function in various areas, including low-income communities (Guest Contributor, 2021). Facilitating the integration of renewable energy generations and modern grid modernization would provide benefits for people who are living in such communities (Reta & out, 2021). When powered by microgrids, facilities can take demand off the main grids to reduce the stress on the energy system in emergency circumstances (Guest Contributor, 2021). Additionally, distributing energy systems with microgrids can be more reliable than large, centralized power plants, they allow people to take control of their energy generations and provide higher certainty during unpredictable weather (Roosa, 2020). For example, distributed systems' owners could check insulation regularly to prevent damages from unpredictable weather (Roosa, 2020).

CONCLUSION

This research explained that many people were impacted by the blackouts in Texas in February 2021. This research suggested the regulatory framework should be reevaluated to keep a balance between energy efficiency and deregulation policy. Additionally, this research compared the advantages and disadvantages of deregulation and its impact on Texas' decisions in the energy sector. The author evaluated the process of deregulation policies and identified ways to improve the energy sector's policies.

Energy is critical to people's safety and well-being. It might require certain power transformation and policy modification. Texas should have certain reserved powers, but at the same time, federal agencies should oversee any activities that might violate federal and energy law. It is important to balance the federal and state interests in important energy issues (Bozeman, 2007). This research aims to provide ideas for improving energy policy at both federal and state levels. It emphasizes that both federal and state governments should act to repair the harm and injustices of any energy policies and infrastructure damages. This research also encourages energy regulatory agencies to evaluate current barriers to build a more comprehensive infrastructure plan to advance people's health, safety, and welfare. Moreover, it calls for the government to have policy reform to improve energy policies to ensure that all areas in Texas will receive energy fairly, especially under emergency circumstances. Additionally, power grids must be equipped to reliably manage the electricity demand; This research also emphasizes that providing reasonable energy bills is important. Agencies could encourage investing in more efficient and reliable power grids to assist low-income families in decreasing the burden of energy costs (Reta & Gout, 2021).

The author believes federal and state governments and legislative agencies should consider the climate change factor by creating more reliable energy and reducing pollution. Agencies must implement energy provisions in compliance with climate policies to reduce emissions. Furthermore, this research explained why building microgrids could help enhance energy reliability. The author argues that grid modernization would be beneficial for people to prepare for extreme weather in the climate change era.

References

- Anagha Srikanth, *Texas blackouts disproportionately affect low-income, nonwhite communities* (Feb. 17), <https://thehill.com/changing-america/resilience/natural-disasters/539273-texas-blackouts-disproportionately-impact-low>.
- Acacia, *Deregulation of Electricity in Texas* (n.d.), <https://www.acaciaenergy.com/deregulation-of-electricity-in-texas/>.
- Alison L. LaCroix, *The Ideological Origins of American Federalism* (Oct. 15, 2011).
- Alexandra B. Klass, *Federalism “Collisions” in Energy Policy* (Nov. 19, 2018), <https://www.theregreview.org/2018/11/19/klass-federalism-collisions-energy-policy/>.

- Brent D. Yacobucci, *Energy Policy: 114th Congress Issues* (Sept. 30, 2016), <https://sgp.fas.org/crs/misc/R42756.pdf>.
- Barry Bozeman, *Public Values and Public Interest: Counterbalancing Economic Individualism* (Oct. 27, 2007).
- Berman and Todderud LLP, *FERC Authority over ERCOT*, (n.d.), <https://www.lexology.com/library/detail.aspx?g=047b0d6f-3530-4ecf-b533-9463566d81a1>.
- Biljana Ognenova, *Could Microgrids Be a Safety Net for Future Power Outage Disasters?* (Apr. 23, 2021), <https://www.allaboutcircuits.com/news/could-microgrids-be-safety-net-future-power-outage-disasters/>.
- Cassandra Burke Robertson, *Bringing the Camel int Bringing the Camel into the To the Tent: State and F ent: State and Federal Power over Electricity Transmission*, 49, 1 (2001).
- Claire McInerny, *Why Is Texas On Its Own Electric Grid?* (July 22, 2021), <https://www.kut.org/energy-environment/2021-07-22/texas-electric-grid-february-blackouts-the-disconnect>.
- Catherine Morehouse, *FERC to examine potential market violations in wake of massive Texas power outages* (Feb 23, 2021), <https://www.utilitydive.com/news/ferc-electric-reliability-potential-market-violations-in-ercot-spp-miso/595502/>.
- Congressional Research Service, *Maintaining Electric Reliability with Wind and Solar Sources: Background and Issues for Congress* (June 10, 2019), <https://sgp.fas.org/crs/misc/R45764.pdf>.
- Craig L. Johnson, Martin J. Luby & Tima T. Moldogaziev, *State and Local Financial Instruments: Policy Changes and Management (Studies in Fiscal Federalism and State-local Finance series)* (Nov. 30, 2021).
- David Koenig, *Congress questions Texas officials about power grid failure* (Mar. 24, 2021), <https://abcnews.go.com/Politics/wireStory/congress-questions-texas-officials-power-grid-failure-76654309>.
- David Brian Robertson, *Federalism and the Making of America* (Sept. 22, 2017).
- Direct Energy, *Energy Deregulation in the United States and Canada* (n.d.), <https://business.directenergy.com/what-is-deregulation>.
- EESI, *Timeline of Progress Made in President Obama's Climate Action Plan* (Aug. 5, 2015), <https://www.eesi.org/papers/view/fact-sheet-timeline-progress-of-president-obama-climate-action-plan>.
- Erin Douglas, *Texas largely relies on natural gas for power. It wasn't ready for the extreme cold* (Feb. 16, 2021), <https://www.texastribune.org/2021/02/16/natural-gas-power-storm/>.
- Erin Douglas, Kate McGee & Jolie McCullough, *Texas leaders failed to heed warnings that left the state's power grid vulnerable to winter extremes, experts say* (Feb. 17, 2021), <https://www.texastribune.org/2021/02/17/texas-power-grid-failures/>.
- Electric Choice, *See electric rates available to your home/business* (Feb 24, 2021), <https://www.electricchoice.com/blog/guide-texas-electricity-deregulation/>.

- EPA, *Federal Facilities and Other Environmental Laws and International Environmental Requirements*, <https://www.epa.gov/enforcement/federal-facilities-and-other-environmental-laws-and-international-environmental>.
- Elisa Wood, *The Texas Grid is the Latest Too-Big-to-Fail Story* (Feb/ 19, 2021), <https://microgridknowledge.com/texas-grid-microgrids/>.
- Federal Energy Regulatory Commission, *ERCOT*, <https://www.ferc.gov/industries-data/electric/electric-power-markets/ercot>.
- Federal Energy Regulatory Commission, *FERC, NERC Staff Review 2021 Winter Freeze, Recommend Standards Improvements* (Sept. 23, 2021), <https://www.ferc.gov/news-events/news/ferc-nerc-staff-review-2021-winter-freeze-recommend-standards-improvements>.
- Federal Energy Regulatory Commission, *FERC, NERC to Open Joint Inquiry into 2021 Cold Weather Grid Operations* (Feb. 16, 2021), <https://www.ferc.gov/news-events/news/ferc-nerc-open-joint-inquiry-2021-cold-weather-grid-operations>.
- Go Nakamura & Brad Brooks, *No electricity, no water, Texans struggle through historic cold with more dark days ahead* (Feb. 17, 2021), <https://www.reuters.com/article/us-usa-weather-texans-shiver-through-night-as-arctic-cold-keeps-energy-offline-idUSKBN2AH0S5>.
- Guest Contributor, *Could distributed energy systems have prevented the Texas blackouts?* (Mar. 22, 2021), <https://www.smart-energy.com/industry-sectors/distributed-generation/could-distributed-energy-systems-have-prevented-the-texas-blackouts/>.
- Gavin Benke, *Texas, Enron, and Energy Monopolies* (Apr. 8, 2021), <https://origins.osu.edu/connecting-history/texas-enron-and-energy-monopolies>.
- George Sawyer Springstein, *Government Regulation and Monopoly Power in the Electric Utility Industry*, Case Western Reserve Law Review, 33, 2.
- Hannah J. Wiseman, *Moving Past Dual Federalism to Advance Electric Grid Neutrality* (2015), <https://ilr.law.uiowa.edu/online/volume-100/moving-past-dual-federalism-to-advance-electric-grid-neutrality/>.
- JP Carvallo, Feng Chi Hsu, Zeal Shah, & Jay Taneja, *Frozen Out in Texas: Blackouts and Inequity* (Apr. 4, 2021), <https://www.rockefellerfoundation.org/case-study/frozen-out-in-texas-blackouts-and-inequity/>.
- Jimmy Maas, *How Deregulation Laid The Foundation For Texas' February Blackouts* (July 26, 2021), <https://www.kut.org/business/2021-07-26/how-deregulation-laid-the-foundation-for-texas-february-blackouts>.
- Jeff St. John, *Texas Crisis Drives First Nonprofit Utility Bankruptcy, With More Fallout Expected* (Mar. 1, 2021), <https://www.greentechmedia.com/articles/read/texas-crisis-drives-first-public-power-bankruptcy-with-more-fallout-expected>.
- John Dirkman, P.E., *Microgrids: Changing the Face of Energy Output and Consumption* (n.d.), <https://electricenergyonline.com/energy/magazine/884/article/Microgrids-Changing-the-Face-of->.
- Jennifer Macedonia, *First Steps: Bipartisan Cooperation to Ensure Electric Reliability* (June 3,

-
- 2013), <https://bipartisanpolicy.org/blog/first-steps-bipartisan-cooperation-ensure-electric-reliability/>.
- Jim Rossi, *The Brave New Path of Energy Federalism*, Texas Law Review, 95, 399 (2016).
- Jonathan Gruber, *Public Finance and Public Policy* (2012).
- Kate Galbraith & Texas Tribune, *Why Does Texas Have Its Own Power Grid?* (Feb. 15, 2021), <https://www.houstonpublicmedia.org/articles/news/energy-environment/2021/02/15/391519/why-does-texas-have-its-own-power-grid/>.
- Kate Galbraith, *Blackouts Revive Debate Over Electric Deregulation* (Feb 21, 2021), <https://www.texastribune.org/2011/02/21/texas-blackouts-revive-deregulation-debate/>.
- Lisa Minton, *Texas' Electricity Resources* (August 2020), <https://comptroller.texas.gov/economy/fiscal-notes/2020/august/ercot.php>.
- Loren Steffy, *Griddy Argues It Was, in Fact, a Champion of Consumers* (June 9, 2021), <https://www.texasmonthly.com/news-politics/griddy-argues-it-championed-consumers/>.
- Mark Chediak & Naureen S Malik, *Texas Isn't Ready for Another Deep Freeze* (Oct. 30, 2021), <https://www.bloomberg.com/news/articles/2021-10-30/texas-energy-grid-remains-vulnerable-to-winter-blackouts>.
- Mark Knight & Nora Brownell, *How Does Smart Grid Impact the Natural Monopoly Paradigm of Electricity Supply? Grid-Interop Forum* (2010).
- Muhammad Waseem & Saeed D. Manshadi, *Electricity grid resilience amid various natural disasters: Challenges and solutions*, The Electricity Journal, 33, 10 (2020).
- Michael D. Mehta, *Texas electricity grid failure shows how microgrids offer hope for a better future* (Feb. 23, 2021), <https://theconversation.com/texas-electricity-grid-failure-shows-how-microgrids-offer-hope-for-a-better-future-155708>.
- Mikyla Reta & Elise Gout, *Advancing Equity Through Grid Modernization* (Apr. 28, 2021), <https://www.americanprogress.org/article/advancing-equity-grid-modernization/>.
- Mose Buchele, *How Market Manipulation Might Have Worsened The Texas Blackout* (Sept. 22, 2021), <https://www.kut.org/energy-environment/2021-09-22/how-market-manipulation-might-have-worsened-the-texas-blackout>.
- Microgrid Knowledge, *The Affordable Microgrid: Securing Electric Reliability through Outsourcing* (n.d.), <https://enchantedrock.com/wp-content/uploads/MGK-Report-The-Affordable-Microgrid.pdf>.
- N'dea Yancey-Bragg & Rick Jervis, *Texas' winter storm could make life worse for Black and Latino families hit hard by power outages* (Feb. 20, 2021), <https://www.usatoday.com/story/news/nation/2021/02/20/texas-ice-storm-blackouts-minorities-hardest-hit-recovery/4507638001/>.
- Quick Electricity, *The History of Texas Electricity Deregulation* (Jan. 8, 2022), <https://quickelectricity.com/resources/energy-deregulation-texas/>.
- Paul Boyce, *Deregulation Definition* (Jan. 8, 2021), <https://boycewire.com/deregulation-definition-and-examples/>.
- Paul Griffin, *The real problem in Texas: Deregulation* (Feb. 24, 2021), <https://www.utilitydive.com/news/the-real-problem-in-texas-deregulation/595564/>.

PUC of Texas Commissioners, *Never Again, How to Prevent Another Major Texas Electricity Failure* (June 3, 2021), <https://cgmf.org/blog-entry/435/REPORT-%7C-Never-Again-How-to-prevent-another-major-Texas-electricity-failure.html>.

Reuters Staff, *Fact check: The causes for Texas' blackout go well beyond wind turbines* (Feb. 19, 2021), <https://www.reuters.com/article/uk-factcheck-texas-wind-turbines-explain/fact-check-the-causes-for-texas-blackout-go-well-beyond-wind-turbines-idUSKBN2AJ2EI>.

Robinhood Learn, *What is Deregulation?* (Oct. 6, 2020), <https://learn.robinhood.com/articles/3xnlnbuG9QuGJtYeKlOlvf5/what-is-deregulation/>.

Robert Bryce, *Blackouts Plague Our Power Grid - Why Congress Must Act To Ensure Electric Reliability* (Oct. 31, 2021), <https://www.forbes.com/sites/robertbryce/2021/10/31/blackouts-are-plaguing-our-electric-grid-congress-must-act-to-assure-the-grids-resilience-and-reliability/?sh=2b92e8f69676>.

Robin Boadway & Anwar Shah, *Fiscal Federalism: Principles and Practice of Multiorder Governance* (May 11, 2009).

Rachel Cleetus, *We're in a Climate Crisis. Congress Must Go Big on Climate Action Now* (July 8, 2021), <https://blog.ucsusa.org/rachel-cleetus/priorities-for-congress-climate-change/.Reta & Elise Gout, Advancing Equity Through Grid Modernization> (Apr. 28, 2021), <https://www.americanprogress.org/article/advancing-equity-grid-modernization/>.

San Francisco Business Times, *Texas overtakes California as top U.S. producer of wind energy* (July 25, 2006).

Stephanie Kelly, Tim McLaughlin, & Swati Verma, *Explainer: Texas's one-of-a-kind power system raises questions during price spike* (Fr. 16, 2021), <https://www.reuters.com/article/us-usa-weather-power-prices-explainer/explainer-texas-one-of-a-kind-power-system-raises-questions-during-price-spike-idUSKBN2AG2KD>.

San Antonio, *Castro Leads Texas Delegation Demanding Answer on Power Outages from ERCOT and Public Utility Commission* (Feb. 16, 2021), <https://castro.house.gov/media-center/press-releases/castro-leads-texas-delegation-demanding-answers-on-power-outages-from-ercot-and-public-utility-commission>.

Stephen A. Roosa, *Fundamentals of Microgrids* (Sept. 4, 2020).

TransMissives, *Restructuring: The Effects of FERC Orders 888, 889, and 2000*, <https://transmissives.com/the-story-of-the-grid/restructuring-the-effects-of-ferc-orders-888-889-and-2000/.TinaCalilung>, <https://digitalcommons.wcl.american.edu/cgi/viewcontent.cgi?article=1068&context=aublr>, American University Business Law Review, 4, 2 (2015).

The Sherman Antitrust Act (1890).10 Years of Senate Bill 7, *The History of Electric Deregulation in Texas* (n.d.), <http://tcaptx.com/downloads/HISTORY-OF-DEREGULATION.pdf>.United States of America Federal Energy Regulatory Commission, *Qualifying Facility Rates and Requirements Implementation Issues Under the Public Utility Regulatory Policies Act of 1978* (July 16, 2020), <https://www.ferc.gov/sites/default/files/2020-07/07-2020-E-1.pdf>.

White & Case LLP, *The Texas Blackout: A Regulatory Retrospective and Future Outlook* (Mar. 18, 2021), <https://www.jdsupra.com/legalnews/the-texas-blackout-a-regulatory-7249695/>.