Energy Abundance in Texas

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Contents

Executive Summary

Texas is entering an unprecedented period of electricity demand growth and energy infrastructure expansion. Driven by rapid population increase, surging industrial activity, oil & gas sector electrification, data centers, electric vehicle adoption, and emerging industries like hydrogen production and cryptocurrency mining, the state's power needs could soar dramatically over the next decade. Analysis indicates that summer peak electrical demand in ERCOT (Texas's main grid) could rise by roughly 80% by 2035, and total energy consumption could increase by about 160%. Achieving "energy abundance" – a reliable surplus of affordable energy – will require an aggressive, multi-pronged strategy that leverages energy efficiency and a diverse mix of energy options. This report examines that strategy through load growth projections, an optimal generation fuel mix, infrastructure build-out, policy and market dynamics, and economic implications, to inform Texas policymakers' decisions.

Texas's energy leadership is already unparalleled: the state produces 42% of U.S. crude oil and 27% of its natural gas, leads in utility-scale solar and wind-powered electricity (about 26% of U.S. wind generation), and generates more total electricity than any other state.[1] Texas also consumes more energy than any other state[2], so ensuring energy abundance is critical for its economic growth. The analysis herein relies on data from ERCOT, the U.S. Energy Information Administration (EIA), industry forecasts, and scenario modeling of high-demand growth. It finds that meeting the surging load will require a balanced expansion of generation capacity – roughly doubling natural gas capacity, quadrupling wind, and tripling solar by 2035 – alongside potential development of new natural gas with carbon capture, nuclear and geothermal resources for clean, firm power. Major investments in transmission lines (on the order of ~61 GW-miles of new transfer capacity) and natural gas pipelines will be needed to deliver energy from resource-rich regions (West Texas wind, Permian gas fields, and so forth) to growing urban and industrial centers.

Policy and market frameworks will heavily influence Texas's success in this endeavor. At the federal level, a supportive environment could accelerate investment in renewables, advanced nuclear, hydrogen, and carbon capture projects in Texas. A return to previous Trump-era policies centered on "energy dominance" and deregulation presents opportunities (streamlined permitting for infrastructure, fast-tracking LNG export facilities) and challenges (trade restrictions raising equipment costs, federal prohibitions for renewable energy development, labor constraints because of throttled immigration, and general policy volatility). At the state level, recent legislative actions – including the creation of a Texas Energy Fund to incentivize new dispatchable capacity – underscore policymakers' recognition of these challenges though some legislation under consideration seeks to make it harder to build new power capacity. Maintaining a stable, market-friendly policy climate is essential to encourage the massive capital investments (potentially hundreds of billions of dollars) required for new generation capacity, grid build-out, and pipeline network expansion. However, policy uncertainty or restrictive measures on some energy sources could dampen investor

1 https://comptroller.texas.gov/economy/economic-data/energy/2023/texas.php

2 https://comptroller.texas.gov/economy/economic-data/energy/2023/texas.php

confidence, whereas an "all-of-the-above" pro-growth approach would leverage Texas's diversified energy economy.

Economically, pursuing energy abundance stands to bolster Texas's status as an "energy state" and an engine of job creation. The energy sector already employs nearly 1 million Texans[3], and this workforce could expand with new power plants, pipelines, export terminals, and technology deployments. Abundant and reliable energy will also attract energy-intensive industries (such as manufacturing, refining, chemicals, and high-tech data centers), further fueling job growth and investment. However, careful planning is required to avoid pitfalls – such as overreliance on any single technology, insufficient reliability, contrived policy barriers to energy development, or infrastructure bottlenecks that could lead to price spikes and grid crises. This report provides a detailed examination of these factors and offers strategic recommendations. In summary, Texas can secure its energy future through proactive investment in infrastructure, a balanced generation portfolio, and policies that embrace growth while managing risks. By doing so, Texas will not only meet the needs of its booming population and economy but also solidify its position as a global leader in energy innovation and supply.

3 https://comptroller.texas.gov/economy/economic-data/energy/2023/texas.php

Introduction

Texas stands at the forefront of a rapidly evolving energy landscape. Already the nation's leader in energy production, consumption and global trade,[4] Texas faces a confluence of challenges and opportunities that will define its energy future. On one hand, the state's robust economic and population growth are driving electricity demand to new heights. Texas is home to about 30 million people today, and projections suggest the population could approach 35 million by the mid-2030s, adding millions of new residents and energy consumers.[5] The economy is diversifying and expanding, with new high-tech industries and large-scale manufacturing projects choosing Texas for its pro-business climate and availability of affordable energy. This growth is evident in the electric sector: ERCOT (Electric Reliability Council of Texas) reported record-breaking peak demand of 85,508 MW in August 2023[6], and anticipates steep increases each year going forward.[7] In fact, ERCOT officials describe an "insatiable" appetite for power, noting that new load is being added to the system "faster and in greater amounts than ever before".[8,9]

At the same time, Texas's energy system is grappling with the imperatives of reliability, affordability, and expansion. Winter Storm Uri of February 2021 and subsequent winter storms and heat domes in 2022 and 2023 underscored the importance of a resilient grid and gas infrastructure. The concept of "energy abundance" has gained traction as an organizing principle – shifting the mindset from managing scarcity to proactively building for a surplus. This mindset means ensuring ample generation and infrastructure such that power is not a limiting factor for Texas' growth. It also aligns with Texas' historic ethos of energy leadership, often now framed as "energy dominance" or independence. However, achieving true abundance must be balanced with prudent diversification of energy sources to limit vulnerability to common-mode failure risks and exposure to price spikes. Policymakers must navigate how to add capacity in all forms – natural gas (ultimately with carbon capture), renewables, nuclear, storage, etc. – without compromising reliability or causing too much price volatility.

The introduction of new industries is both a boon and a design challenge for the grid. West Texas oil producers, for example, are increasingly electrifying their operations (drilling rigs, pipeline compressors, gas processing equipment, etc.) to improve efficiency, enhance wellsite safety, and reduce emissions.[10] This new load creates significant new demand in remote areas. Likewise, a wave of liquefied natural gas (LNG) export terminals under construction or planning along the Gulf Coast will require significant magnitudes of energy for liquefaction processes; many of these terminals (such as those in Corpus Christi, Brownsville, and Port Arthur) have chosen electric drive systems and are located

4 https://comptroller.texas.gov/economy/economic-data/energy/2023/texas.php

5 https://texas2036.org/populationgrowth/

6 Peak demand in 2024 was slightly lower than 2023, but is nonetheless expected to grow.

7 https://www.ercot.com/files/docs/2024/09/17/ERCOT-Monthly-Operational-Overview-August-2024.pdf

8 https://www.ercot.com/news/release/2024-04-23-ercot-enters-new

9 https://www.utilitydive.com/news/ercot-transmission-planning-2030-load-growth-projections/714104/

10 https://www.ercot.com/files/docs/2023/03/17/Presentation%20to%20ERCOT%20planning.pdf

in Texas.[11] The digital economy is also expanding in Texas – from hyperscale data centers to Bitcoin mining farms and semiconductor fabrication facilities – attracted by the state's relatively low electricity costs, thriving tech sector, and business-friendly policies. Each of these developments promises economic benefits (jobs, investment, global market share for Texas) but also adds strain to the power system if not matched with new supply and grid upgrades.

In this context, Texas policymakers are asking: What would it take to ensure energy abundance for Texas over the next decade and beyond? This report addresses that question, providing a data-driven analysis of projected demand growth, the generation mix needed to meet it, infrastructure requirements, policy variables, and economic ramifications. We focus on the electric power sector as the backbone for broader energy abundance—a view published by the *Wall Street Journal* in their recent article "Economic Growth Now Depends on Electricity, Not Oil"[12]— while recognizing interactions with oil, gas, and export markets. The target audience for this report is Texas state policymakers, with the intent of supporting strategic decision-making with objective evidence. Throughout, we incorporate comparisons to national and international trends where relevant – for instance, highlighting how Texas's growth outpaces national averages and how other regions are handling similar issues. The overarching goal is to inform a proactive strategy that keeps Texas's lights on and its economy thriving under even the most robust growth scenarios. In the sections that follow, we detail our methods, present the key findings, and discuss their implications, culminating in recommendations for a path forward toward Texas energy abundance.

11 https://www.energy.gov/sites/default/files/2022-03/FERC%2C%20N.%20American%20LNG%20export%20terminals_0.pdf

12 https://www.wsj.com/business/energy-oil/economic-growth-now-depends-on-electricity-not-oil-40250941

Methods and Approach

To evaluate Texas's pursuit of energy abundance, this study combines scenario modeling with a review of current data and literature. The analysis is grounded in several reputable sources: historical and forecast data from ERCOT, state and federal datasets (including the U.S. EIA and Texas Demographic Center), public reports from industry (utility investor presentations, LNG project documents), and relevant academic and think-tank studies. Our approach was to establish a high-growth scenario for Texas's electricity demand through 2035, then assess the infrastructure and policy measures required to fulfill that scenario. Key steps in our methodology include:

Demand Scenario Development

We built a bottom-up projection of Texas's electricity load growth (peak demand and energy use) from 2025 to 2035. This approach involved identifying major demand drivers and estimating their contribution. The drivers considered include:

- **Population Growth:** Using Texas demographic projections, we assumed the continued addition of ~300–400k people per year. Population growth increases residential and commercial power usage in line with housing and economic activity. (Baseline per-capita consumption was taken from EIA state data and scaled with population.)
- **Electrification of End-Uses:** We incorporated adoption curves for electric vehicles (EVs) and electrified heating. For EVs, we referenced ERCOT's EV adoption study, which projects over 1 million electric light-duty vehicles on Texas roads by 2029 (roughly 4% of the vehicle fleet).[13] We extended this outlook to 2035 by assuming accelerating adoption (supported by falling EV costs and potential federal standards), reaching on the order of 4–5 million EVs by 2035. Each EV was estimated to add ~2–3 kW to peak (during charging) and ~3,000 kWh/year of energy demand, adjusted for charging behaviors. Similarly, we estimated increased winter peak load from electric heating (heat pump installations in new homes, etc.), though this has a smaller impact on summer peak.
- **Industrial and Commercial Large Loads:** We gathered data on specific large-scale developments:
  - **Oil & Gas Electrification:** We used industry reports and ERCOT planning studies for the Permian Basin. One study (S&P Global/ERCOT) indicates that serving emissions-reduction goals in the Permian could raise on-grid demand there from about 9.3 GW in 2029 to roughly 12.7 GW by 2035.[14]
  - **LNG Export Facilities:** Based on publicly announced projects, we added anticipated demand for all of the major LNG terminals in Texas expected online by 2030. Each facility can require hundreds of MW of steady load. We assumed ~2.2 GW of new LNG-related load by 2030 and beyond.

13 https://www.ercot.com/files/docs/2023/08/28/ERCOT-EV-Adoption-Final-Report.pdf

14 https://www.ercot.com/files/docs/2023/03/17/Presentation%20to%20ERCOT%20planning.pdf

- **Data Centers and Crypto Mining:** We tracked news of data center builds (such as large campuses by cloud service providers) and the growth of cryptocurrency miners who often interconnect in West Texas. ERCOT's recent board presentation highlighted that crypto mining and data centers are significant contributors to load growth.[15] We added ~40 GW of new demand by 2035 allocated to these uses.
- **Hydrogen Production:** Texas is poised to be a hydrogen hub, using electrolysis powered by renewable energy. We included about 15.6 GW from hydrogen facilities by 2035, knowing that international demand for hydrogen or its carriers in Southeast Asia and Europe combined with federal incentives (via the 2022 Infrastructure Law and IRA) could spur large electricity-dependent hydrogen projects along the Gulf Coast.
- **Manufacturing Reshoring:** Texas has attracted new manufacturing, from semiconductor fabs near Austin to EV and battery factories (Tesla's facility near Austin, for instance). These tend to be large continuous power users. We added load growth reflecting Texas's share of the recent U.S. manufacturing investment boom (which nationally is over $480 billion since 2021 in new factories).[16] Our scenario adds almost 5 GW by 2035 for new manufacturing facilities (metals, electronics, chemicals, etc.).

Fuel Mix and Capacity Modeling

Given the demand scenario, we determined an optimal generation capacity expansion plan to meet the 2035 needs while aligning with a pro-growth, balanced strategy. We used the GenX[17] capacity expansion model which considers resource costs, capacity factors, and policy constraints. Clean, firm power (weather-independent clean resources that can be turned on and off at will) are included as part of the suite of options. Key assumptions included:

- Natural gas remains the primary firming and dispatchable resource. We started with the existing fleet and allowed the model to build new combined-cycle and combustion turbines as needed for reliability. However, we note from industry guidance that supply chain constraints exist. NRG Energy has indicated no new large gas plants are likely to come online in ERCOT before 2030 unless already in development, partly due to a 3+ year order backlog for turbine equipment.[18]
- No coal expansion (and likely continued retirements of older coal units). Given market trends and environmental pressure, we assumed coal's role will diminish. Any shortfall in dispatchable capacity is more likely to be filled by natural gas or emergent technologies than new coal.
- **Emerging New Firm Generation Options:** We included the possibility of new nuclear or geothermal, though conservatively. Small Modular Reactors (SMRs) or advanced nuclear in Texas are not expected until the 2030s at earliest – even NRG's projections do not foresee SMRs before ~2035.[19]

15 https://www.ercot.com/files/docs/2024/04/22/5%20CEO%20Update.pdf
16 https://www.dallasfed.org/-/media/documents/research/events/2024/24energy/24energy-gramlich.pdf
17 https://genxproject.github.io/GenX.jl/stable/
18 https://investors.nrg.com/static-files/ab972752-25ad-4cca-afbe-0027e2754723
19 https://investors.nrg.com/static-files/ab972752-25ad-4cca-afbe-0027e2754723

Geothermal, for which Texas has non-trivial potential (particularly with oil/gas drilling expertise), was noted qualitatively but shown to have a large numeric contribution by 2035 due to its early development stage. Notably, the Texas Railroad Commission recently approved its first geothermal well.

- **Continued cost declines for renewables:** Wind and solar remain the cheapest bulk energy sources in Texas. We assumed their build-out would be limited not by policy but only by integration challenges and transmission. The current ERCOT interconnection queue has about 155 GW of solar and 40 GW of wind awaiting connection.[20]
- Utility-scale battery storage was included to support renewables and help meet peak demand, but its contribution to *firm* capacity is limited by duration. We did model significant battery deployment (tens of GW) for energy shifting and ancillary services, given the 169 GW of battery projects in ERCOT's queue.[21] However, for multi-day reliability, we still count on thermal generation.
- Demand-side measures (demand response and energy efficiency) were considered tools for meeting the reserve margin. While these are outside "supply", we assumed that Texas will implement more demand response programs (as ERCOT is studying[22]), which can reduce peak load by a few thousand MW. Doing so slightly reduces the amount of new generation needed to ensure reliability.

Infrastructure Assessment

We also evaluated the transmission expansion needed to support the generation and load growth. Using ERCOT's planning criteria, we mapped where new generation (particularly wind/solar in West Texas) would connect and what new transmission lines or upgrades would be required to carry power to load centers (Dallas/Fort Worth, Houston, San Antonio, Austin corridors). We took cues from ERCOT's own studies and stakeholder reports. For example, the ERCOT "Permian Basin Reliability" plan and other regional transmission plans identify specific corridors needing reinforcement. The model built new transmission capacity as needed to keep the grid stable and affordable. Additionally, we assessed natural gas infrastructure (pipelines, storage) based on the increased gas volumes for power generation and LNG exports.

Policy Analysis

We conducted a qualitative analysis of policy scenarios – chiefly comparing a status quo / pro-energy policy environment to a world of higher energy expansion barriers. This assessment involved reviewing policy documents, campaign statements, and analyses of regulatory changes. We specifically looked at potential impacts on Texas, such as: changes to federal permitting (NEPA reform or lack thereof), support or opposition to renewable energy incentives, trade tariffs

20 See February 2025 ERCOT Generator Interconnection Queue: https://www.ercot.com/mp/data-products/data-product-details?id=PG7-200-ER

21 See February 2025 ERCOT Generator Interconnection Queue: https://www.ercot.com/mp/data-products/data-product-details?id=PG7-200-ER

22 https://www.utilitydive.com/news/ercot-transmission-planning-2030-load-growth-projections/714104/

on materials, and any federal reliability standards or interventions. We also reviewed recent Texas legislation from the 2023 session affecting the power market (like Senate Bill 2627 creating the Texas Energy Fund, and other bills related to renewable permitting) to incorporate state policy direction.

Economic Impact Evaluation

To understand the economic implications, we gathered data on current energy sector employment and investment in Texas (from sources like the 2023 U.S. Energy and Employment Report and Texas Comptroller's office).[23] We then reasoned how the "energy abundance" build-out might affect jobs, GDP, and tax revenues. We also considered risks such as stranded investments (if policy or technology changes) and the impact of energy prices on industry competitiveness. Wherever possible, we cite quantitative estimates (e.g., dollars of investment, number of jobs) from studies or analogous historical build-outs.

This mixed-method approach – quantitative modeling for demand/supply and qualitative policy/economic analysis – provides a fuller picture of the Texas energy landscape. It should be noted that our high-growth scenario is not a precise forecast but rather a plausible upper-range scenario based on current trends. By examining this scenario, we can stress-test Texas's preparedness and identify what bottlenecks or policy adjustments would need attention. The findings and discussion section will walk through these results in detail, and the conclusions will offer recommendations informed by this analysis.

23 https://comptroller.texas.gov/economy/economic-data/energy/2023/texas.php

Findings and Discussion

Load Growth and Fuel Mix Analysis

Texas is on the cusp of an unprecedented surge in electricity demand. The compiled data and scenario analysis indicate that, under robust economic growth assumptions, peak electricity load and total energy consumption could far exceed historical growth rates by 2035. ERCOT has already recognized this trend, noting a 40 GW upward revision in its 2030 load forecast in just the past year due to new large customers and economic expansion.[24] Our scenario aligns with these signals, projecting summer peak demand rising from roughly 85 GW in 2023 to around 175 GW or more by 2035, an increase on the order of 100%. Figure 1 below illustrates this trajectory and the contributing sectors driving peak demand growth.

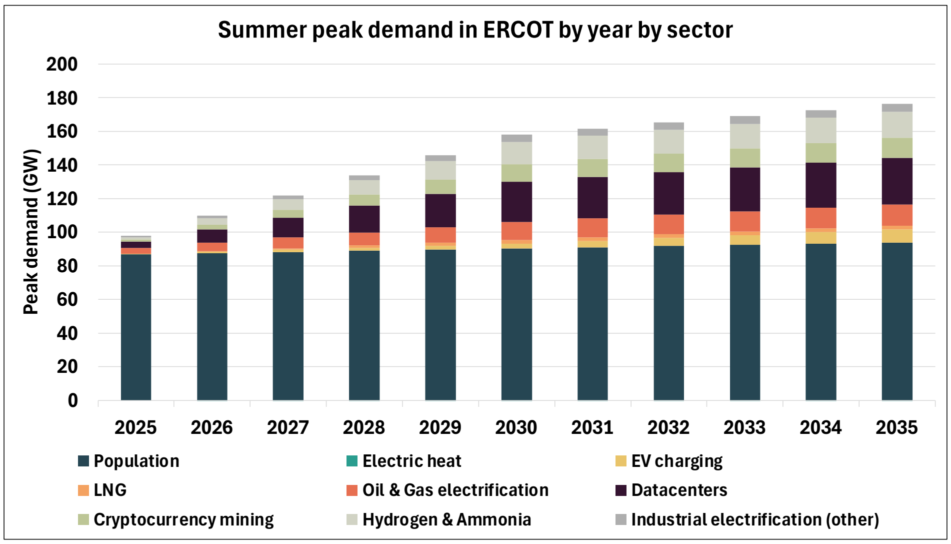

Figure 1: Projected ERCOT summer peak demand by year (2025–2035) and contributing demand drivers (stacked). In this high-growth scenario, peak demand roughly doubles from ~100 GW in 2025 to ~175 GW in 2035, about an 75% increase.

Several factors underpin this dramatic rise. Population growth is the foundation: Texas continues to add the equivalent of a mid-sized city every year. The state's population grew ~16% in the past decade and is expected to exceed 33–35 million by 2035.[25] All else equal, more people mean higher residential and commercial electricity usage for homes, schools, stores, and services. But population alone is not the whole story – in fact, per-capita electricity use had been relatively flat or declining in many areas due to efficiency gains. What makes the next decade different is the layering of new types of loads on top of population growth:

- **Industrial and Oilfield Electrification:** One cause of rapid growth in demand is the oil & gas sector's power usage. Traditionally, remote oilfields used gas-fired generators or operated pumps with gas/diesel engines, but there's

24 https://www.utilitydive.com/news/ercot-transmission-planning-2030-load-growth-projections/714104/

25 https://texas2036.org/populationgrowth/

a shift toward tapping the grid for reliability and to lower emissions. In the Permian Basin in West Texas, plans are underway to string high-voltage lines out to the oilfields. The Permian Basin Reliability Plan foresees total load in that region potentially reaching 23–26 GW by 2030s (from under 5 GW in 2022)[26] – a staggering increase that reflects new electric drives for drilling rigs, compressors, injection pumps, and associated industrial development. Our scenario just included the Texas (ERCOT) portion of this: by 2030, we added roughly 10.9 GW of new peak load in Far West Texas (Permian) for oil and gas operations, increasing to 12.7 by 2035. One data point: *in August 2023, the Far West Texas load hit 7.94 GW, up 20% from the previous year*[27], demonstrating how quickly demand is rising there. This trend is likely to continue as producers electrify to lower costs, improve productivity, enhance safety, reduce flaring and meet environmental goals. Each unit of oil produced using grid power shifts energy demand from the oil and gas itself (which might have been burned on-site) to the electric sector – effectively transferring some energy consumption from on-site hydrocarbons to electricity, freeing up those hydrocarbons for sale or export. For Texas, which has abundant gas and renewables to generate that electricity, this presents an opportunity to support oil production while selling more electricity.

- **LNG Export Facilities:** Texas is a hub for LNG exports, which have grown markedly in the last few years. Liquefying natural gas is energy intensive. Multiple large export terminals are already operating in Texas, and more trains or terminals are under construction (e.g., Golden Pass LNG, Port Arthur LNG, Corpus Christi Stage III).[28] Modern LNG plants often choose electric motors to drive compressors (as opposed to gas turbines) to improve efficiency and lower onsite emissions. This design means they draw power from the grid. We anticipate several GW of new continuous load from LNG facilities by 2030. For example, Port Arthur LNG's Phase 1 expects to use around 200–250 MW. Cumulatively, if all planned Texas LNG projects come online, they could require on the order of 1–3 GW of steady demand (which contributes to base load and, to a lesser extent, peak since they run year-round). In our scenario, we assumed that by 2035, Texas will be serving multiple LNG facilities, adding roughly 4 GW to peak (since some have backup generation for emergencies) and on the order of 20 TWh annually in energy consumption.

- **Data Centers and Digital Economy:** Texas has rapidly become a favored location for large-scale data centers, including both traditional corporate data centers (for cloud computing, media streaming, etc.) and cryptocurrency mining operations. Data centers are typically high load factor consumers – they draw near-constant power, 24/7, and can be hundreds of MW each for the biggest facilities. Northern Virginia historically was the epicenter of data centers, but Texas (especially the Dallas/Fort Worth and Austin areas, as well as some West Texas crypto clusters) is catching up due to available land and relatively cheap power. Recent reports indicate data centers and similar

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26 https://www.spglobal.com/commodity-insights/en/news-research/latest-news/electric-power/061124-texas-grid-stakeholders-mull-plans-for-massive-power-demand-in-permian-basin

27 https://www.hartenergy.com/exclusives/electrification-permian-faces-problem-not-enough-shock-system-211160

28 https://comptroller.texas.gov/economy/fiscal-notes/industry/2024/lng-info/

new large loads have pushed ERCOT's five-year load growth forecast to 8.1% (from 2.8% previously) at the national level,[29] and ERCOT specifically cites data centers as a key growth area.[30] Our scenario added 27.5 GW of continuous data center load by 2035, including the announced large campuses. Crypto mining, which flocked to Texas for its deregulated market and demand response opportunities, contributed roughly 12 GW of peak load in our modeling by 2035. The ERCOT CEO Pablo Vegas noted that much of the recent forecast increase is "in the form of crypto mining and data centers".[31] These new loads underscore that Texas's electricity growth is not just from more homes using air conditioning – it is from fundamentally new classes of industrial customers whose demand will have a different load shape.

- **Emerging Industries – Hydrogen, Batteries, Manufacturing:** Texas is positioning itself for growth in clean energy industries that themselves consume power. For example, if electro-pyrolysis (using electricity to separate hydrogen from natural gas) or "green hydrogen" (using electrolysis to separate hydrogen from water) takes off for chemical feedstock or fuel production, Texas' abundant renewables could be used to run pyrolysis facilities or electrolyzers. A single large hydrogen plant (producing say 100,000 tons of H_2 per year) might require ~250 MW of steady power. The Regional Clean Hydrogen Hubs awarded funds to a Gulf Coast Hydrogen hub that includes Texas, so by late 2020s some demonstration projects might start.[32] In fact, one demonstration plant outside of San Antonio that makes hydrogen from pyrolysis started operations in March 2025.[33] We included about 15.5 GW hydrogen-related load by 2035. Similarly, new battery manufacturing or other high-tech manufacturing (like semiconductor fabs such as the Samsung plant in Taylor, TX) can draw substantial power – the Samsung fab under construction near Austin reportedly could use around 250 MW by itself when fully ramped. We estimate that these new factories will contribute about 5 GW to our industrial load category by 2035, reflecting Texas capturing a share of the national manufacturing renaissance (the U.S. has over 200 new manufacturing facilities announced since 2021, many in the South).[34] Because natural gas is abundant and cheap in Texas, and because the fate of 45V hydrogen tax credits seem less assured than 45Q carbon capture credits, it is possible that hydrogen from methane (with carbon capture) will out-compete electrolysis in Texas.

- **Transportation Electrification (EVs):** Texas has over 26 million registered vehicles[35], and while EVs currently represent only a few hundred thousand of those, the number is poised to grow substantially. By 2035, EVs could constitute 20–30% of new vehicle sales, leading to millions of EVs on Texas roads. Each EV added to the grid is roughly akin to the load of an additional house (depending on charging patterns). Our scenario estimates over 100 terawatt-hours of annual demand from EV charging by 2035. While EV charging

29 https://www.dallasfed.org/-/media/documents/research/events/2024/24energy/24energy-gramlich.pdf

30 https://gridbeyond.com/ercot-unveils-new-era-of-planning-to-accommodate-power-demand-growth/

31 https://gridbeyond.com/ercot-unveils-new-era-of-planning-to-accommodate-power-demand-growth/

32 https://www.energy.gov/oced/regional-clean-hydrogen-hubs-0

33 https://cen.acs.org/energy/hydrogen-power/Graphitic-Energy-starts-turquoise-hydrogen-pilot/103/web/2025/03

34 https://www.dallasfed.org/-/media/documents/research/events/2024/24energy/24energy-gramlich.pdf

35 https://www.txdmv.gov/about-us

is somewhat flexible (many vehicles charge overnight or can delay charging), the sheer volume of energy needed will raise the overall load shape. Smart charging programs and time-of-use rates can help flatten the impact, but peak summer afternoons will still see some EV-related load (e.g., drivers charging after work in the early evening).

Combining all these drivers, the total annual energy consumption in Texas could increase by roughly 2.6 times (160% increase) from 2025 to 2035, according to our high-growth scenario. Figure 2 shows the energy (TWh) outlook by sector, illustrating that energy demand grows even faster than peak demand. This rate is a notable change as historically, energy growth was slow, and peak growth often outpaced it due to air-conditioning (high peak, moderate total energy). Now, with sectors like data centers and industrial loads that run 24/7, the overall energy usage rises steeply. As one analysis put it, "*the era of flat power demand is over*"[36], particularly due to new large loads with high load factors.

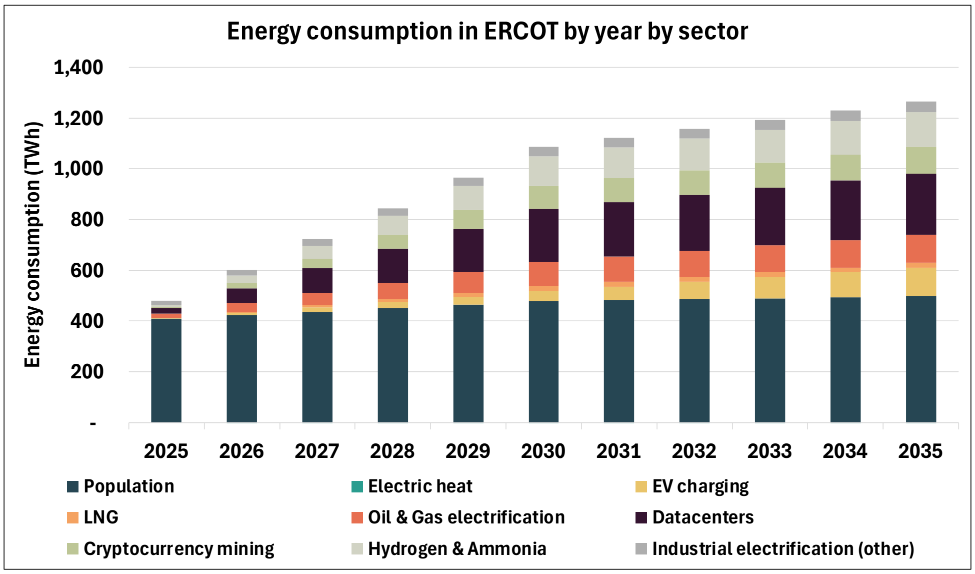

Figure 2: Projected annual energy consumption in ERCOT by sector (2025–2035). Total electricity usage grows from roughly 480 TWh in 2025 to almost 1,300 TWh in 2035 in this scenario (approximately +160%). The stacking shows contributions for each sector. The rapid growth in energy use (much higher than historical ~1-2%/yr) is a new phenomenon for ERCOT.

The implication of this demand growth is clear: Texas must dramatically expand its power generation capabilities to maintain reliability and achieve energy abundance. In practical terms, meeting a ~175 GW peak in 2035 with adequate reserve margin means having perhaps 300-400 GW of available generation capacity (accounting for maintenance and intermittency). Today, ERCOT has about 172 GW of installed capacity.[37] Thus, on the order of 125–225 GW of additional capacity may be needed within a dozen years.

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36 https://www.dallasfed.org/-/media/documents/research/events/2024/24energy/24energy-gramlich.pdf

37 https://www.ercot.com/files/docs/2025/03/07/MORA_May2025.pdf

Fuel Mix Projections and "All of the Above" Strategy

Texas has an advantage in that it has a highly diversified set of energy resources available. The state has world-class natural gas reserves and infrastructure, one of the strongest wind resources in the country, significant solar insolation, and a history of nuclear power operation and potential geothermal resources. An energy-abundance strategy leverages all of these. Our analysis sought an optimal, but balanced fuel mix to meet the growth – meaning no single resource meets all the demand.

In our quantitative optimization, we found that the least-cost way to supply the huge increase in energy was to build renewables at an unprecedented scale (taking advantage of their low operating cost), complemented by natural gas capacity for firming and peak coverage. By 2035, wind power in particular becomes the workhorse of the ERCOT grid from a capacity and energy standpoint. Figure 3 depicts the projected capacity and Figure 4 shows energy generation by fuel type through 2035 under our scenario.

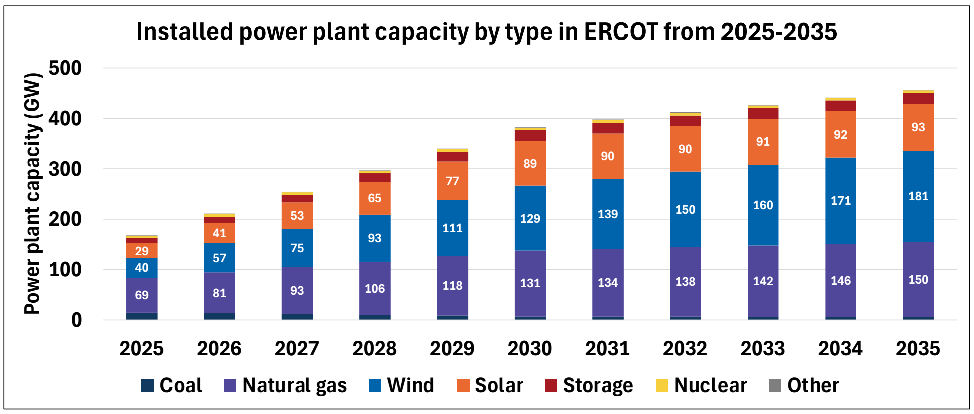

Figure 3: Modeled ERCOT electricity generation capacity by fuel type (GW by year, 2025–2035) in an energy-abundance high-load scenario. With the addition of large new loads that often run around the clock, wind energy (blue) becomes extremely valuable, comprising almost 40% of total capacity by 2035. Natural gas (purple) continues to play a critical role for reliability (~32% of capacity by 2035) but grows slower after 2030 because the assets are long-lived. Solar PV (orange) grows to about 20% of capacity. Coal capacity, mostly built in the 1970s and 1980s, retires through the 10-year projection.

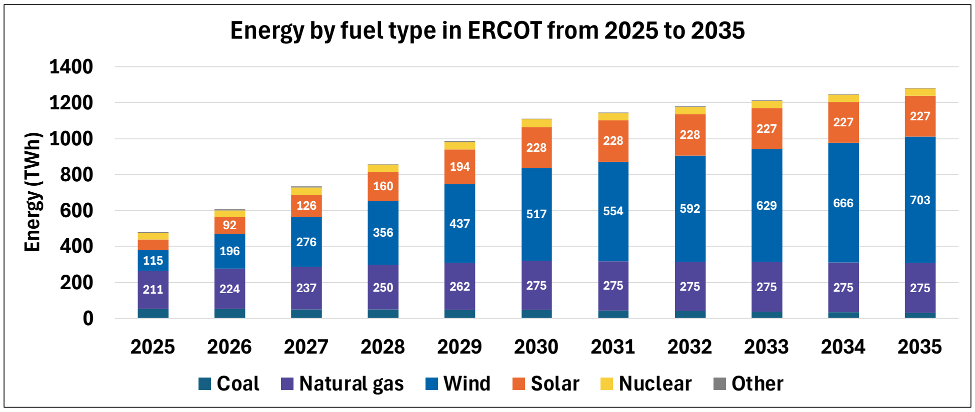

Figure 4: Modeled ERCOT electricity generation by fuel type (TWh per year, 2025–2035) in an energy-abundance high-load scenario. Wind energy (blue) supplies roughly 55% of total annual generation by 2035. Natural gas (purple) continues to play a major role (~22% of energy by 2035) but plateaus in output as its capacity is used for peak periods and reliability. Solar PV (orange) grows to about 18% of energy.

Several insights emerge from the fuel mix results:

- **Natural Gas: Doubling Capacity:** Natural gas remains critical for ensuring reliability in our scenario, but its role evolves. We project roughly a 2× increase in gas-fired generation capacity by 2035, with new gas plants built mostly in the early 2030s). This deployment means adding perhaps 80+ GW net of new gas generators, many of which would be highly efficient systems to replace older, less efficient gas boilers. By volume, gas consumption for power generation in ERCOT rises roughly from 2.0 Tcf/year in 2025 to 2.5 Tcf/year in 2035 (a 22% rise).[38] This increase in gas usage will require robust gas infrastructure (discussed later). These new plants are needed to meet peak demand and provide backup during times of low wind/solar output or extreme weather. However, similar to the natural gas plants that were built in the 2000s to serve peak loads, those built in the 2030s are not expected to run at full output most of the year. Rather they would operate less often but at more valuable times. Our model shows gas generation (in TWh) growing about 30% from 2025 to 2035 – significantly less than the percentage growth in load. Gas plants in 2035 have a lower capacity factor on average because during many hours renewables can meet the load. Essentially, gas would serve as the swing produce to fill in gaps and maintain stability. We assume these plants use Texas's abundant natural gas supply, with improved firm fuel arrangements to avoid fuel shortages (an issue in the 2021 winter storm and subsequent freezes in 2022 and 2023). Gas with carbon capture could potentially satisfy customer requirements for clean, firm power. Though gas capacity doubles, its share of generation falls to ~22% because total generation needs are so large and wind/solar take the majority share throughout the year. This dynamic underscores how Texas can leverage cheap renewables for energy while still valuing gas for capacity and reliability.
- **Wind and Solar Expansion:** Texas is already a leader in wind (with over 39.5 GW installed) and solar (~30 GW). Because of their low cost to build and operate, cost optimization calls for roughly 4.5× increase in wind capacity and

38 Future gas plants are assumed to be more efficient thus requiring less gas burn for more energy.

3× increase in solar capacity by 2035, compared to today's levels.[39] In absolute terms, wind capacity might grow from ~39.5 GW to 180 GW or more, and solar from ~30 GW to ~90 GW or more by 2035. This growth is aggressive but not inconceivable – the ERCOT interconnection queue has the ability to handle enough projects to meet these numbers, and developers are motivated by low cost. Federal incentives (Investment Tax Credits, Production Tax Credits) also encourage this build-out. With so much new load, Texas can absorb a lot of renewable energy without curtailment, especially if transmission keeps up. By 2035, in our scenario wind farms (especially in West Texas and the Panhandle) are generating over 600–700 TWh/year, which is more than half of all expected energy on the grid. Wind provides about 55% of ERCOT's electricity by 2035 in this outlook, up from roughly 25% today.[40] This high penetration is aided by the fact that many new industrial loads (like water treatment plants, arc furnace steel mills or crypto miners) can run flexibly and align with renewable output to some degree. This analysis effectively treats wind as a primary energy source for powering new industries. Solar also grows and contributes strongly to summer peak shaving and midday energy; by 2035 solar supplies roughly 18% of annual energy. One interesting effect in the scenario is that wind, with its nighttime output, becomes more valuable with the proliferation of these new large loads. Traditionally ERCOT had excess generation at night and tightness late afternoon; but as we electrify processes like oilfield operations that run 24/7, nighttime demand increases, making good use of Texas's vast nighttime wind generation. This change has the potential to improve the overall utilization of the generation fleet, which would lower costs for everyone.

- **Coal Retirements and Nuclear Status:** Under market forces alone (without policy intervention), it is likely that most of Texas's aging coal plants will retire by the early 2030s. They struggle to compete on cost and face maintenance and environmental upgrade needs. In our scenario, nearly all existing coal generation (which was ~13% of ERCOT's energy in 2022) is phased out by 2035, replaced by the combination of gas and renewables. These retirements improve overall emissions profiles and aligns with many plant owners' announced plans. Nuclear power (the South Texas Project and Comanche Peak plants) continues to operate at its current capacity (~5 GW total) through 2035. We assumed these units get life extensions as needed. They provide a steady ~40 TWh/year in our model. The model did not build new nuclear, but if small modular reactors become economically viable in the 2030s, Texas could see them come online beyond 2035. For now, nuclear's share drops simply because total generation grows and nuclear output is flat (meaning by 2035 nuclear might be ~5-6% of the mix, down from ~10% today).

- **Emerging Clean Firm Resources (Geothermal, Hydrogen as Storage):** While not explicitly shown in Figure 3 (lumped in "Other"), we note that achieving balance might involve new resources. Geothermal energy, for instance, could provide always-on power if deep drilling technology advances. Texas's geothermal potential is currently under study but could be significant. Also, hydrogen production and use in turbines (power-to-gas-to-power)

39 https://www.ercot.com/files/docs/2025/03/07/MORA_May2025.pdf

40 https://comptroller.texas.gov/economy/economic-data/energy/2023/texas.php

could act as long-duration storage by 2035, storing excess wind and solar as hydrogen and then burning it in turbines during low renewable periods. Our scenario did not heavily rely on these as the technologies are nascent and expensive, but qualitatively, they could improve the feasibility of such high renewable penetration by providing additional reliability.

In summary, the load growth can be met if Texas embraces an energy abundance mindset that allows for an aggressive build-out of generation resources, especially wind, solar, and natural gas plants. This is the essence of an "energy abundance" approach: allow the market to build enough capacity of all kinds so that supply comfortably exceeds the highest demands. The scenario we've outlined is ambitious – on the order of 400 GW of capacity by 2035 – but Texas has a track record of adding infrastructure when needed (e.g., the Competitive Renewable Energy Zone (CREZ) transmission lines that enabled a wind boom in the 2010s and the recent quadrupling and quintupling of oil and gas production in Texas). The challenge is coordinating this expansion with the necessary infrastructure (transmission lines, gas pipelines) and doing so in a way that maintains reliability during the transition.

One should note that our scenario assumes favorable conditions for renewable expansion (continuation of federal tax credits through the late 2020s, reasonable permitting environment, etc.). If policies shift to be less favorable for renewables, Texas might need to lean even more on pricier options or possibly on imported power (if connections to other grids were expanded, though currently ERCOT is largely isolated). We will examine policy scenarios in a later section. But from a purely technical and economic perspective, Texas's abundant wind, solar, and gas make for a complementary mix to satisfy the projected demand and a cost-optimal approach does not require nor prohibit any of those three options. During most times, cheap renewable energy can power the new loads (some of which might be flexible enough to use power when it's plentiful), and during critical peak or low-renewable times, natural gas and other dispatchable sources ensure the lights stay on.

To ensure adequacy under extreme conditions (e.g., an extended wind lull or a severe winter storm), Texas would also need more reserve margin and storage in this future. Our scenario implicitly saw battery storage scaling up to ~21+ GW by 2035 to handle daily variability. For multi-day events, retaining some excess gas capacity and possibly using demand response are key strategies. The Methods section mentioned demand response: by 2035 it is possible for Texas to get 10+ GW of peak shaving from large flexible loads (like crypto miners shutting down, pausing the charging of EVs, or emergency conservation appeals). This demand response capability can act as a "resource" during tight grid conditions, further enhancing the abundance cushion. However, the state will need to implement programs to support such efforts.

In conclusion, the load growth and fuel mix analysis indicates that Texas can accommodate massive new demand if it adopts an "energy abundance" mindset that allows for a diversified portfolio of generation assets to meet new demands. An energy abundance mindset in this context means using gas for what it's best at (flexible, on-demand power and high availability) and use renewables for what they excel at (low-cost bulk energy production). Texas has the natural resources to achieve this mix at scale, making energy abundance an achievable goal. The next sections will discuss the practical aspects of building the required infrastructure and the policy environment that could accelerate or hinder this vision.

Infrastructure Development for Energy Abundance

Achieving the kind of generation expansion outlined above will hinge on building out electric transmission and natural gas infrastructure at an extraordinary scale and pace. Without adequate transmission lines, even if Texas installs the needed 400+ GW of generators, the power won't get to where it's needed, and without sufficient gas pipeline capacity, new gas plants (and LNG terminals) won't have a reliable gas supply. Thus, an energy abundance strategy must be as much about wires and pipelines as about power plants and export facilities. Our analysis identified key infrastructure needs:

Transmission Expansion: "Steel in the Ground" for the Grid

By 2035, Texas will need a significantly enhanced electric grid to move power from generation-rich regions (often remote) to load centers (cities and industrial hubs). In our high-growth scenario, we estimated that approximately 61,300 MW-miles of new transmission transfer capacity would be required across various parts of ERCOT. This figure can be understood as the sum of the capacity of major new transmission corridors needed. To put it in perspective, ERCOT today has about 54,000 miles[41] of transmission lines[42]; by 2035, many more miles (likely in the tens of thousands) of high-voltage lines will need to be added or upgraded via reconductoring.

The distribution of needed transmission projects is not uniform. Most new generation is expected in West Texas (wind/solar) and South Texas (solar and possibly new gas or nuclear), whereas most new load growth is in Central/East Texas (the major cities) and also in far West Texas (Permian oil region). This mismatch in location creates a pattern where power will flow over longer distances and in different directions than it has historically. Figure 5 highlights the major transmission corridors we identified for expansion. Notably, it shows a strong west-to-east emphasis: moving gigawatts of wind from the Panhandle and plains (Zones 12 Amarillo, 13 Lubbock, 14 Midland in the figure) to the I-35 corridor (Dallas, Austin, San Antonio – Zones 1, 2, etc.).

41 Of mixed kVA (or MW) capacities.

42 https://www.ercot.com/news/release/2024-04-23-ercot-enters-new

Zone	Area
1	Dallas
2	San Antonio
3	Houston
4	Corpus Christi
5	McAllen
6	Laredo
7	Del Rio
8	San Angelo
9	San Saba
10	Abilene
11	Wichita Falls
12	Amarillo
13	Lubbock
14	Midland
15	Fort Stockton
16	Pecos

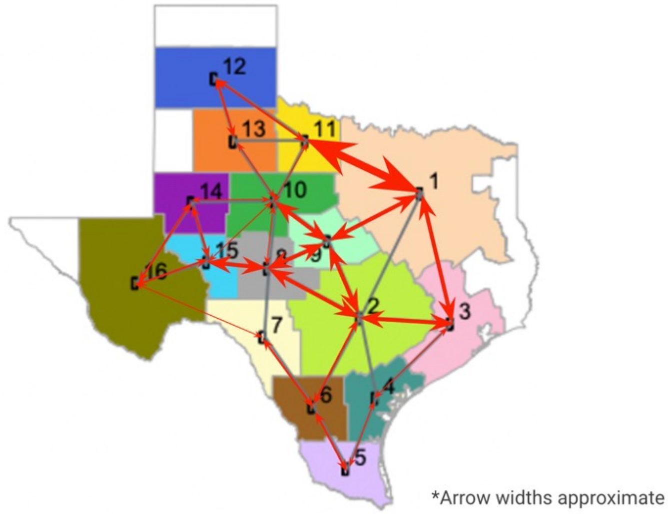

Figure 5: Indicative major transmission upgrades needed in Texas by 2035 (red arrows) to support the energy abundance scenario. The map shows ERCOT zones (numbered regions) and new high-capacity lines (arrows) linking them. An estimated 61,300 MW-miles of new transmission capacity (sum of arrow label values) is required. Key expansions include very large corridors from West Texas (Zones 15,16 in Permian; 12 Panhandle; 13 South Plains) to Central and East Texas (Zones 1 Dallas, 3 Houston); reinforcements from South Texas (Zone 4 Corpus area) northwards; and strengthening ties into growing West Texas load pockets (e.g. Midland/Odessa Zone 14 to Pecos Zone 16). Arrow widths are illustrative of relative capacity (not geographic route).

In practical terms, the grid expansions would involve constructing new high-voltage lines (345-kVA, and perhaps for the first time in Texas, 765-kVA+ ultra-high-voltage lines). The Texas legislature and PUCT have already begun considering these higher capacity lines in the state. In 2023, a Permian Basin transmission “unlock” plan was approved, which contemplates new lines to serve oil producing regions and possibly using a 765-kV line standard (which can carry more power per corridor). Building at 765 kV could allow Texas to carry huge blocks of power (on the order of 3–6 GW per line) from remote areas. Our recommendation, based on the identified needs, is to use the highest practicable voltage for major trunk lines – for example, run double-circuit 525-kV or 765-kV lines from the wind-rich Panhandle down towards Dallas and across toward Houston. Doing so would minimize the number of separate corridors needed, which is important for minimizing land use and speeding deployment.

The specific projects likely needed include:

- **Panhandle & Western Expansion:** The Panhandle (Zone 12 Amarillo) still has excellent wind potential that’s underdeveloped due to limited transmission beyond what CREZ built a decade ago. New lines heading east/southeast from there (toward Dallas/Fort Worth) are needed. Also, connecting more strongly from the Permian (Zone 16 Pecos/Fort Stockton area) to central Texas.
- **North-to-South Reinforcement:** As loads grow in North Texas and generation grows in South Texas (potentially new solar or nuclear near the coast), strengthening the north-south “backbone” is vital. The existing 345-kV lines along I-35 could be potentially upgraded or paralleled.

- **Coastal Corridor:** With LNG and industry along the Gulf Coast drawing more power and also new wind (possibly offshore wind in future) injecting power, an improved coastal transmission route from the Rio Grande Valley/Corpus (Zones 5,4) up to Houston (Zone 3) might be required. Subsea cables along the intracoastal waterway might also be considered as a way to accelerate deployment by avoiding landowner opposition.
- **Interconnections and Imports:** While ERCOT is mostly isolated, energy abundance might also consider selective new ties to outside regions (SPP to the north or Mexico to the south) for mutual support. For instance, a high-voltage direct current (HVDC) link to the Eastern Interconnection or the WECC[43] could provide import/export capability of a few GW for reliability. This was not explicitly in our 61 GW requirement, but we mention it as a resiliency measure. (It might need federal coordination or waivers given ERCOT's unique status.)

Importantly, transmission projects have long lead times (often 5-10 years), so planning would need to start immediately. The analysis implies Texas would be well served to start approving and routing multiple large projects now to be ready by the late 2020s and early 2030s. The legislature's push for "transmission for the Permian" is a step in this direction. Additionally, Texas might explore policy changes to streamline transmission construction. For example, current cost allocation rules spread costs to ratepayers broadly, which has worked well to get lines built (as in CREZ). There is discussion about refining the process to ensure truly needed infrastructure get built while speculative ones do not. One idea raised is to reform how projects are selected and paid for, to "weed out chaff" and provide clarity to the market. This process could involve requiring generation or new large load developers to shoulder some transmission upgrade costs (to signal serious projects) and then reimburse them over time (10-15 years) so that their upgrade costs are not unfairly borne by other ratepayers and to avoid fly-by-night loads from saddling ratepayers with unnecessary burdens. This method also has to potential to bring more capital to deploy quicker, something that the companies behind the new large loads appear to have at the ready.

Natural Gas Infrastructure: Fueling Power Plants and Exports

Natural gas is the lifeblood of Texas's electric grid (fueling ~50% of generation today) and will remain so in 2035 in our scenario (though it might provide smaller relative share, the absolute volume of gas use for power generation rises significantly). Expanding carbon capture with gas combustion will be a nearer-term part of the all-of-the-above technology for meeting low-carbon energy requirements in the market than nuclear or geothermal. Ensuring energy abundance means ensuring that gas can flow freely to where it's needed. Two main considerations are pipeline capacity and gas storage.

Our findings show that ERCOT's total gas burn for power generation would increase ~22% from 2025 to 2035. However, this volume does not include the extra gas needed for LNG exports. This increase in gas need means the gas pipeline network must deliver much more fuel on peak days. Currently, Texas's

43 https://www.sciencedirect.com/science/article/pii/S0306261924021159

gas grid is extensive, but there are regional limitations. For instance, the Permian Basin (Waha hub) has historically faced export constraints; new pipelines like Whistler and Permian Highway have helped, but by the late 2020s, if LNG exports and domestic power demand are drawing heavily, congestion will likely return. We also identified that certain regions of ERCOT that historically burned little gas (like the Valley or Far West) will burn a lot more in the future, implying new lateral pipelines or compression upgrades would be beneficial.

Figure 6 illustrates the increase in gas usage by region. Notably, Houston, Dallas, and San Antonio regions see big jumps in gas burn (in MMBtu) by 2035, and even regions like Corpus Christi and Midland show mostly steady growth.

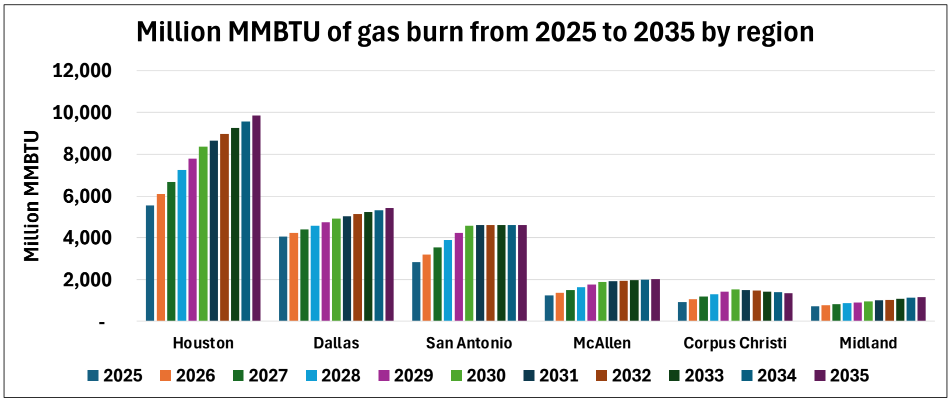

Figure 6: Increase in natural gas consumption (for power generation only) by ERCOT region, 2025 vs 2035 (in million MMBtu). Major load zones like Houston, Dallas, and South-Central (San Antonio) each see gas use climb into the 8,000–12,000 million MMBtu range by 2035 (roughly 8–12 trillion BTU each annually), reflecting more gas plants running to support new loads. Smaller regions (McAllen, Corpus Christi, Midland etc.) also grow from near-zero to meaningful levels. This excludes industrial non-power gas use.

What this means operationally is that gas delivery capacity must expand. Many new gas plants will likely be built near existing hubs (e.g., along the coast where LNG and petrochemical demand is also present, or near the Dallas load center). These plants will need firm pipeline contracts. In some cases, new pipeline laterals might be required – for example, if a cluster of new gas peakers is built in West Texas near load (to support the oilfield), connecting them to major gas supply trunklines will be necessary.

In addition to power plants, LNG export terminals will become huge gas sinks. By 2035, Texas could be sending an additional 12+ Bcf/day of gas to LNG facilities on top of current volumes. This demand will strain certain routes, especially moving gas from West Texas (Permian) and South Texas (Eagle Ford) to the Gulf Coast. Currently, multiple pipelines (like Gulf Coast Express, NET Mexico, etc.) handle Texas gas flows. Additional expansions or new pipelines might be needed by late 2020s. The Texas Comptroller reports that four LNG terminals under construction represent at least $49 billion investment[44], and exports already account for over 25% of U.S. LNG exports by value[45] – these numbers are likely to grow. Thus, we will need to ensure the "pipe highway" from Permian to Gulf Coast can handle simultaneously high domestic power demand, full LNG exports, and possibly exports to Mexico.

44 https://comptroller.texas.gov/economy/fiscal-notes/industry/2024/lng-info/

45 https://comptroller.texas.gov/economy/fiscal-notes/industry/2024/lng-info/

To visualize pipeline needs, Figure 7 shows a simplified Texas gas pipeline map (with interstate lines in blue, intrastate in red) and highlights (green arrows) key flow increases we anticipate. Essentially, more gas needs to move eastward from the Waha area (Permian) toward East Texas and the coast, as well as southward from North/East Texas towards the Gulf Coast Industrial Corridor. Currently, Texas produces more gas than it consumes (hence exports out of state via interstate pipelines), but in an energy abundance scenario the in-state consumption (power + LNG) rises so much that Texas may consume a larger share of its production internally.

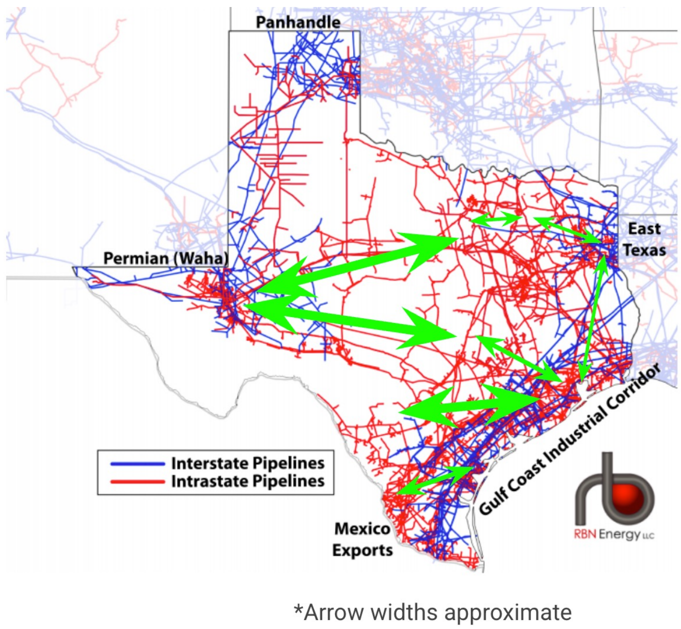

Figure 7: Texas natural gas pipeline network (schematic) and anticipated increased flow directions (green arrows) by 2035. Red lines = intrastate pipelines, Blue = interstate pipelines (exports). The Permian (Waha hub in West Texas) will need to send significantly more gas eastward to fuel central/east power plants and LNG on the coast. South Texas and East Texas production will feed the Gulf Coast Industrial Corridor (Houston/Galveston to Beaumont/Port Arthur) where LNG and industrial gas use grows. Gas exports to Mexico (via pipelines to border) will remain significant. The arrows indicate where pipeline capacity expansions or new pipelines may be required (arrow thickness ~ relative volume). Data source: RBN Energy (background).

Several specific recommendations for gas infrastructure emerge:

- **Expand West-to-East Pipeline Capacity:** Encourage or fast-track expansions on routes from the Permian basin to East Texas. This could mean looping existing pipelines or building new ones paralleling them. For example, a Permian to Katy (Houston area) new pipeline could ensure adequate supply to Houston-area power plants and industries. The reliability of power plants during winter events also depends on robust gas supply; adding redundant pipeline routes reduces the chance of fuel cutoffs.
- **Integrate Gas Storage with Power Needs:** Texas has many underground gas storage fields (salt domes, depleted reservoirs). Traditionally, these serve seasonal demand (for winter heating) or pipeline balancing. In a future with extreme peaks, ensuring power generators have access to storage gas is crucial (to avoid pressure drops or supply shortfalls). Policymakers might incentivize gas storage expansion or improved deliverability, specifically to serve electric

generation. A concept being implemented is requiring gas suppliers to secure firm supply for "critical" power plants (firm fuel contracts, on-site backup). Implementation of the new Firm Fuel Supply Service (FFSS) product by ERCOT will help gas generators ensure fuel availability in emergencies.[46]

- **Coordinate LNG and Power Gas Planning:** LNG terminals, because they draw gas at a consistent rate, can actually help smooth out utilization of pipelines (they use gas even in off-peak electric periods). Improved coordination and information-sharing between LNG operators and ERCOT gas-burning generators could enhance reliability. During times of grid stress, potentially LNG could reduce draw (if they have storage) to free up gas for electricity – this kind of arrangement might be explored for mutual emergency support.

- **Address "Last-Mile" Gas for New Plants:** For any new gas power plant, pipeline interconnection is required. The state could streamline the siting of these laterals.

It is worth noting that pipeline permitting is generally easier at the state level in Texas than electric transmission, but federal environmental permits can still cause delays for interstate lines or LNG feed lines. This is where federal policy, like streamlined NEPA rules, could help (discussed in Policy section).

A final piece of the infrastructure puzzle is supply chain and other supporting infrastructure: this set includes assets like ports and railways for equipment delivery (big transformers, turbine components), manufacturing capacity for grid components, etc. One key supply chain risk if that much of the nation's electric grid equipment (transformers, large power poles) are imported or produced out-of-state. For instance, power poles almost come exclusively from Canada and transformers almost exclusively from Mexico. Trade disputes with Canada and Mexico could constrain these flows of needed infrastructure or drive up prices dramatically. Texas might consider working with suppliers to ensure it has priority access or even fostering domestic manufacturing of critical grid components, given the scale of build-out planned. The creation of new jobs in manufacturing those components in Texas would be an economic bonus and reduce reliance on potentially unstable trade flows (discussed under Policy and Economic sections).

In summary, the infrastructure required for Texas energy abundance is large but achievable with focused effort. The electric grid needs expansion akin to building a new backbone alongside the existing one, and the gas network needs enhancements to handle new patterns of usage. Policymakers will need to enable this expansion through supportive regulation (e.g., permitting reform, cost-sharing mechanisms) and perhaps new funding tools. The Texas Energy Fund is currently aimed at generation, but perhaps a similar concept could enable transmission. Or, new cost allocation mechanisms, such as having new large loads pay for upgrades and then paying the large loads back over time could allow for more projects to move forward more quickly.

The result for this infrastructure investment could be a more robust and flexible energy system that can deliver power where it's needed even under extreme conditions, which in our view is the essence of energy abundance. Without these upgrades, Texas could face congestion and constraints, leading to higher prices and reliability risks, which is the opposite of the abundance goal. Thus, infrastructure must be front and center in the strategy.

46 https://www.ercot.com/news/release/2024-04-23-ercot-enters-new

Policy and Market Considerations

Energy abundance in Texas will not occur in a policy vacuum. Government actions – at both the federal and state levels – and the design of electricity markets will significantly influence the path forward. In this section, we analyze how various policy scenarios and market mechanisms could affect Texas's energy abundance strategy. We pay special attention to the potential impacts of a change in federal leadership (specifically a return of Donald Trump to the presidency), as well as ongoing state policy initiatives.

Federal Policy Environment: Biden-era Incentives vs. Trump-era "Energy Dominance"

Under the previous federal administration (Biden), policy largely aimed to accelerate a transition to cleaner energy, through carrots like the Inflation Reduction Act (IRA) incentives and sticks like tighter environmental regulations (such as fees on methane emissions). For Texas, the IRA of 2022 has been a boon in spurring private investment in renewables, batteries, hydrogen, and carbon capture. Many projects in Texas are moving forward to take advantage of generous tax credits for wind, solar (30% ITC), standalone storage, hydrogen production ($3/kg subsidy for green hydrogen), and EV manufacturing. These policies effectively lower the cost of the generation build-out required for our scenario, making it easier to achieve energy abundance with a cleaner mix. For example, solar and wind developers in Texas have reported that IRA credits improve project economics so much that they can more than offset rising interest rates. Similarly, federal funds for grid resilience and transmission facilitation could support some Texas projects, though ERCOT's independence means it doesn't directly partake in interstate grid programs.

In contrast, the new Trump administration has signaled a very different energy approach. Trump's energy platform in 2016–2020 was centered on maximizing fossil fuel production, reducing regulations, and withdrawing support for climate initiatives. Trump's second term appears ready to double down on these themes – often branded as achieving American "energy dominance" or "energy independence" via expanded oil, gas, and coal use. Let's break down specific aspects and how they align or conflict with Texas:

- **"Energy Expansion" vs "Transition":** The Trump perspective prefers terms like "energy expansion" or "addition" – meaning adding energy sources – rather than "energy transition" which implies moving away from fossil fuels. In principle, this all-of-the-above expansion rhetoric resonates with an abundance mindset. Texas too wants to expand energy production. Indeed, Trump's "*unleash American energy*" rallying cry could support the idea of building more gas plants, drilling more wells, and constructing infrastructure – all of which Texas could benefit from economically. Texas's own Governor and Legislature are largely in favor of expanding energy of all forms. So, in spirit, there is alignment: a Trump administration would likely remove perceived roadblocks to domestic energy projects. For instance, Trump has declared a national energy emergency to fast-track energy infrastructure, potentially allowing him to override certain regulatory hurdles.[47] For Texas,

47 https://www.whitehouse.gov/presidential-actions/2025/01/declaring-a-national-energy-emergency/

that could mean easier approval of pipelines, refineries, export terminals, and even power plants on federal lands (though most of ERCOT is on private/state land).

- **Permitting Reforms:** One of the few areas of bipartisan agreement is the need to streamline permitting of infrastructure. The Trump administration might pursue sweeping changes to environmental review processes (NEPA) to shorten timelines and reduce the scope of reviews. This could benefit Texas's infrastructure build-out: for example, if federal permits for cross-border lines (transmission to Mexico or pipelines) become easier, or if Army Corps of Engineers permits for pipelines and LNG ports are expedited. Texas has many projects that could take advantage of faster federal permitting – from new LNG terminals to possibly offshore oil/gas exploration expansions. However, Texas's renewable energy developers might also need federal permits (e.g., connecting offshore wind in the Gulf would need BOEM permits; transmission lines crossing federal lands etc.). A pro-infrastructure stance from DC would help across the board. The cautionary note is that Trump's past approach sometimes streamlined fossil projects but was less friendly to renewables (i.e. attempting to impose tariffs on solar panels, or revising wildlife rules that could hamper wind). We might see selective reform that favors pipelines over transmission. Still, overall, a loosening of bureaucratic red tape is likely *good for energy abundance*, as it makes it quicker and cheaper to build the needed assets.

- **Support for Fossil Fuel Production**: Trump's energy policy emphasizes increasing oil, gas, and even coal production – e.g., opening federal lands for drilling, approving pipelines like Keystone XL (which he did last time, though it ultimately failed), and rolling back methane regulations to lower costs for drillers. Texas, being the nation's leading oil and gas producer, stands to gain from any pro-drilling stance. If environmental restrictions are eased, Texas producers could pump more, potentially lowering fuel costs for power generation and providing feedstock to new gas power plants cheaply. But there's a double-edged sword: an oversupply of natural gas due to maximal drilling could lead to very low gas prices (great for consumers, but bad for the profitability of Texas upstream companies). Texas's economy historically does better when oil & gas prices are high (boosting revenue and jobs) while electricity prices are low. An "energy dominance" scenario might flood the market and keep gas cheap – that's good for power generation cost and thus for attracting industrial load, aligning with abundance goals. Yet it could hurt some Texas producers' bottom line and might make it harder for gas-fired power plants to recoup their costs. In essence, cheap fuel is a boon for energy abundance (because running gas plants and filling storage is easier), but Texas policymakers might need to cushion any economic impacts on the drilling sector. Still, given efficiency gains, many Permian producers can remain profitable at moderate prices. Lower gas prices would likely encourage even more gas power build-out long-term. Support for tax credits such as 45Q in support of carbon capture can also help facilitate clean-firm power from natural gas.[48]

- **Attitude Toward Renewables**: This is a critical area of concern. President Trump has been openly skeptical or hostile toward wind and solar energy, often citing incorrect claims (famously, "windmills cause cancer" rhetoric) and criticizing their reliability. A policy framework that disfavors renewables could manifest in several ways: removal of federal tax credits (or not renewing them when they expire), attempts to impose tariffs or trade barriers on imported solar modules or wind turbine parts, reducing R&D support for clean energy, inhibiting development through delays in FAA allowances for wind or outright bans on solar, and generally using the bully pulpit to encourage states to slow renewable expansion. If such policies took effect, it could slow the growth of wind/solar in Texas, making it harder to achieve the scenario we laid out (which relies heavily on renewables). For example, if the solar ITC is repealed in 2025, many planned solar projects in Texas might stall or become more expensive, making harder to ensure resource adequacy for the grid. Texas policymakers would have to decide whether to continue encouraging renewables regardless of federal stance, given how integral they are to meeting demand quickly. It's noteworthy that even with some federal pushback, Texas's renewable momentum might continue due to cost-competitiveness; wind and solar are now the cheapest option for a vast preponderance of locations. But hostile federal policies could introduce uncertainties (as seen in 2018 when tariffs on solar panels slowed some projects).

- **Trade Policy Impacts:** Trump's first term was marked by trade conflicts (tariffs on steel, aluminum, Chinese goods, etc.). For energy infrastructure, trade policy can significantly affect costs. As mentioned earlier, many grid components are imported. A return to aggressive tariffs could make building transmission lines more costly (e.g., if Canadian wood poles or Mexican transformers face tariffs). Additionally, Mexico and Canada are huge importers of Texas energy (Mexico buys Texas natural gas and gasoline; Canada buys and sells gas and electricity, petrochemicals, etc.). If a trade war escalates, those countries could retaliate by reducing energy imports from Texas or imposing their own tariffs. For instance, Mexico's energy sector is intertwined with Texas – any friction could disrupt the ~5 Bcf/d of gas Texas sends to Mexico.[49] That could lead to oversupply in Texas if Mexico cut back, potentially forcing gas prices even lower or causing shut-ins. While consumers might enjoy low prices, it could deter further gas production or pipeline builds if export economics sour. A cooperative North America, on the other hand, helps all three countries: Canada provides some supplies (like uranium for nuclear plants or transmission components) and buys refined products; Mexico buys gas and possibly excess power (Texas has discussed more grid connections to Mexico). Therefore, a confrontational trade policy could indirectly harm Texas's energy growth plans by unsettling these relationships.

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48 CCS applied to natural gas power generation ("NG + CCS") stands out among low- or zero-carbon electricity source options. BloombergNEF and the Business Council for Sustainable Energy estimate that NG + CCS provides among the lowest levelized cost of electricity (LCOE) for dispatchable, or firm, power generation – lower than coal with CCS, hydrogen gas turbines, or nuclear. (BloombergNEF and BCSE, 2025)" (Global CCS Institute, April, 2025)

49 https://dailyenergyinsider.com/news/36358-daily-west-texas-natural-gas-exports-to-mexico-reached-1-6-billion-cubic-feet-even-as-national-figures-decreased/

- **Federal Regulatory Oversight vs ERCOT Independence:** Under Trump previously, FERC (Federal Energy Regulatory Commission) was generally hands-off on ERCOT, since ERCOT isn't under FERC's interstate market jurisdiction. That likely continues – ERCOT's status as an "energy island" without federal oversight was even touted by ERCOT's CEO as an advantage.[50] A Trump DOE might revive ideas like subsidizing coal/nuclear for "grid resilience" (as attempted in 2017), but Texas's market would not necessarily be directly affected due to independence. However, if the administration tried to mandate coal use, ERCOT might see pressure to keep coal plants running (perhaps via some state-led mechanism or PUCT actions influenced by federal narrative). It's uncertain, but Texas's own leadership has shown some interest in ensuring reliability by retaining dispatchable plants (which includes coal) – e.g., recent legislation about evaluating a "backup" ancillary service for older plants. A federal push for coal might embolden those efforts. Yet market economics in Texas strongly disfavor coal now; it's unlikely to see a renaissance barring extraordinary subsidies or aggressive market interventions.

- **Environmental and Climate Regulations:** The Trump Administration might halt or reverse many climate-focused regulations – for example, rescinding power plant CO_2 emission limits (the proposed EPA rules that would force carbon capture on gas plants), loosening methane rules for oil/gas, and easing Endangered Species Act enforcement that sometimes complicates transmission or wind projects. This deregulation could lower costs for Texas energy operations (there would be no need to invest in carbon capture for new gas plants, for instance, saving billions, but allowing for greater emissions). It could also remove legal barriers to things like new offshore drilling in the Gulf or new coal mining. The downside is that such moves might extend the life of high-emission assets which could conflict with long-term sustainability or investor preferences (many utilities and investors are committed to environmental goals regardless of federal mandates). And international customers in Southeast Asia and Europe have requirements for cleaner fuels, so the loosening of these rules might make it harder for Texas to reap economic value from its export potential. For Texas policymakers, the immediate effect would be more freedom to permit new gas plants without carbon controls – potentially making it simpler to build the ~80 GW of gas capacity we envision by 2035 if no federal carbon rule stands in the way. However, one should consider that policy whiplash (strict then loose then strict again regulations across administrations) creates uncertainty that can chill investment. Investors in a 30-year power plant worry that even if 2025–2028 is lax, by 2030 regulations might tighten again. To mitigate this, Texas might try to create its own stable regulatory environment (for example, state-level permitting that gives long-term certainty to projects, irrespective of federal swings).

- **Federal Layoffs, Immigration Barriers and Deportations:** The Trump Administration has also pledged strict immigration barriers and deportations, which can affect the ability to build-out the energy sector. As it stands, there is already a surge in demand for electricians and the US is likely to soon be

50 https://www.utilitydive.com/news/ercot-transmission-planning-2030-load-growth-projections/714104/

short over half a million pipefitters and plumbers.[51,52] However, these types of jobs don't seem to be attractive to the current generation that is entering the workforce.[53] Policies that deport millions of people or make it harder to recruit laborers can inhibit the growth of the sector. Furthermore, mass layoffs in government risks undermining the permitting reform initiatives as there will be fewer people available to review and approve permit applications.

In summary, the Trump Administration offers a mixed bag for Texas energy abundance:

- **Positives:** Faster permitting, support for oil & gas (hence ample fuel supply), potentially lower compliance costs, a narrative of "drill and build" that aligns with expanding capacity. Federal actions might expedite LNG terminals (Trump is likely to encourage LNG exports, viewing them as geopolitical tools) and pipelines. Texas could see a friend in Washington when it comes to things like approving export licenses or cross-border infrastructure.
- **Negatives:** Possible undermining of renewables growth if barriers or bans are implemented for renewables, incentives are removed, trade conflicts are initiated that raise cost of materials, and general policy instability runs rampant which makes long-term planning harder. There's also the possibility that federal hostility to renewable energy could slow innovation – e.g., DOE under Trump might not prioritize grid modernization or storage R&D, which indirectly affects future tech deployment in Texas. Mass layoffs, deportations and immigration barriers could also slow permitting and construction of projects.

Thus, Texas's unique position – as a state with a huge oil/gas sector, the nation's largest wind/solar fleet, and extensive international trade in fuels and energy technologies – means it is "uniquely exposed to Trump's energy policies". Any policy that hits one part of the energy spectrum will have an impact in Texas because Texas has it all. Policymakers in Texas should thus prepare to adapt state policies to either complement or counterbalance federal moves depending on state interests. For instance, if federal support for renewables wanes, Texas might consider whether to create its own incentives or simply rely on market economics to continue their deployment. Texas has historically not subsidized renewables at the state level (beyond property tax abatements, which ended in 2023), but it has benefited immensely from federal ones; losing them could slow progress toward meeting demand growth (because gas plants alone may not be able to be built fast enough or run cheaply enough to supply all the new load).

Texas State Policies and Market Design

At the state level, policy in recent years has been grappling with ensuring reliability after the 2021 blackouts, while also accommodating the rapid changes in the generation mix. The Legislature and Public Utility Commission of Texas (PUCT) have been active:

51 https://www.bls.gov/ooh/construction-and-extraction/electricians.htm#tab-6

52 https://www.bloomberg.com/news/newsletters/2024-03-14/plumbing-jobs-available-as-retirements-outnumber-apprentices

53 https://www.npr.org/2023/01/05/1142817339/america-needs-carpenters-and-plumbers-try-telling-that-to-gen-z

- In 2023, lawmakers passed SB 2627 establishing the Texas Energy Fund, a $10+ billion fund aimed at incentivizing new dispatchable generation (preferably natural gas-fired) by offering low-interest loans or grants. This explicitly is intended to correct what some see as a market imbalance where too much investment was going to renewables and not enough to dispatchable capacity. If implemented effectively, this could finance a significant portion of the ~20 GW of gas plants targeted for the late 2020s to early 2030s in our scenario. It aligns with the energy abundance goal by ensuring reliability resources keep up with demand. However, there's an execution risk: it must attract private developers and not crowd them out. Multiple entities selected for the Texas Energy Fund have since withdrawn indicated that this approach is not effective so far.

- On the renewable side, Texas lawmakers have considered (though not passed, so far) measures that could impede renewables – such as stricter permitting, giving local governments veto power over wind/solar projects, imposing onerous setback distances, or requiring renewable owners to pay for ancillary services. Some minor changes passed (requiring weatherization of wind turbines and some costs for new transmission to connect renewables), but by and large Texas hasn't erected major barriers yet. However, the rhetoric around "renewable reliability" issues remains. An abundance strategy should caution against overly restricting renewables because, as our analysis shows, they are needed to carry a lot of the load growth. This suggests that policymakers should avoid empowering local vetoes that could halt wind/solar farms (like some other states have done) since that would slow capacity additions. Instead, a balanced approach would streamline renewable siting while also pushing for more gas and possibly nuclear – truly an "all of the above" expansion.

- The current 2025 Texas legislative session also includes bills that would require 50% of new capacity to be natural gas. However, with the supply-chain constraints in new gas plants out until 2030, such a restriction could mean that Texas falls short of the needed capacity ~200+ GW to meet the new loads.

- Texas also must coordinate energy policy with environmental and economic goals. For example, legislation to designate hydrogen hubs, or incentives for energy storage manufacturing, etc., are ways the state can leverage the new industries. There's also discussion of transmission cost allocation reforms at the PUCT, as mentioned, to ensure needed lines get built (like maybe socializing the big "highways" but making generators and loads pay for their connection, but then be refunded over time – this hybrid approach can expedite core projects while discouraging speculative ones).

Market-wise, ERCOT's status as an energy-only market means prices will get very high in scarcity, which theoretically should draw investment. The recent forward-looking statements (like "all tools are on the table" after 2021) indicate some supplemental constructs are likely (like the PCM or a strategic reserve of generators). For energy abundance, a stable market design is crucial – investors need to know how they will recoup multi-billion-dollar investments. Texas policymakers should aim to finalize market reforms promptly and stick to them, to reduce uncertainty.

Navigating Policy Under Different Federal Regimes

Given the potential swings in federal policy, Texas can take steps to chart its own course:

- If federal policy goes pro-fossil and anti-renewable, Texas might double down on gas but should also protect its renewables advantage. One option is state-driven transmission (like CREZ 2.0) that ensures wind/solar can still be developed by reducing one of their major hurdles (grid connection). Texas could also promote its renewables as part of an "all-of-the-above" rather than a transition – framing it as enhancing energy supply differentiation (which might resonate even with a fossil-friendly federal admin that at least publicly says "all energy").
- If federal policy continues to functionally be pro-clean, Texas will receive a lot of support via funding and incentives, which it should utilize to its fullest extent. For instance, ensure Texas projects capture as much IRA credit as possible (through awareness and facilitation), and push for federal grants for things like hydrogen hubs (which Texas did, winning a share in the HyVelocity Gulf Coast Hub).

It's also important to consider that large companies (utilities, tech firms investing in data centers, etc.) have their own decarbonization goals. Even if government incentives drop, companies like Google, Amazon, etc., may still demand renewable energy for their Texas operations (via power purchase agreements). Thus, market demand for clean energy is likely to remain strong. Texas policymakers might not need to subsidize but should at least allow those projects. For example, removing impediments like onerous local restrictions or ensuring the grid can accept corporate renewables purchases will help keep that investment flowing.

Finally, policy consistency is key for investor confidence. The swings at the federal level are largely out of state control, but the state can strive for consistency. Over the past decade, Texas policy has been fairly steady (hands-off market, support for O&G, build transmission, etc.). Recently, some interventions have been proposed that worry investors (like forcing certain reserves or penalizing renewables). It will be important to strike a balance: send a signal that Texas welcomes *all* energy investment – whether it's a gas peaker plant or a wind farm or a battery or a refinery – as long as it contributes to reliability or economic growth. That pro-investment stance, if clear and predictable, will attract the capital needed for energy abundance.

In conclusion, Texas's policy and market environment should aim to harness the positive aspects of any federal scenario while mitigating negatives. Texas has a tradition of asserting its own approach – that tradition can serve it well in maintaining focus on energy supply adequacy and market-driven solutions, regardless of what happens in Washington.

The next section will discuss the economic perspectives of pursuing this energy abundance – essentially, what are the economic stakes (jobs, investments, risks) and how policy choices feed into those outcomes.

Economic Perspectives

Investing in energy abundance for Texas is not just an engineering and policy endeavor; it's fundamentally an economic strategy for the state's future. The decisions made will have far-reaching implications for job creation, industry competitiveness, and economic resilience. Here we examine the economic upsides of an energy-abundance approach as well as potential risks, particularly those arising from policy instability or market volatility.

Job Creation and Economic Growth Opportunities

Texas's energy sector is a major employer and wealth generator. As of 2022, nearly 936,000 Texans worked in energy-related jobs (including production, electricity generation, transmission, energy efficiency, and motor vehicles).[54] This workforce represented about 11.5% of all U.S. energy jobs – underscoring Texas's dominance in this arena.[55] Pursuing energy abundance will likely increase these numbers. Key areas of job growth include:

- **Construction and Skilled Trades**: Building power plants (gas turbines, wind farms, solar arrays, batteries) and laying transmission lines and pipelines will require tens of thousands of construction workers, engineers, electricians, welders, etc. For instance, constructing a large combined-cycle gas plant can employ 500+ workers over several years; building 100 GW of wind and solar might employ many thousands (though those are more short-term construction jobs, followed by smaller O&M teams). Transmission projects similarly create jobs for linemen, civil construction crews, and equipment manufacturing. Given the magnitude of infrastructure proposed (like doubling the grid's transfer capacity), we could see a *sustained boom in energy infrastructure jobs* through the 2020s and 2030s. These jobs are often well-paying middle class jobs. Texas will need to ensure it has the trained workforce to meet this demand – possibly through workforce development programs in community colleges focusing on energy trades (line workers, solar installers, etc.). The payoff is not only lower unemployment but also the development of a skilled labor pool that can attract further industry.
- **Manufacturing and Supply Chain**: If Texas invests heavily in energy, it could attract manufacturers of energy equipment. For example, companies might build factories in Texas to produce transformers, solar panel components, wind turbine parts, or battery storage systems to supply the local market and export. Texas already has some of this (several wind turbine component plants in the Panhandle, Tesla's large battery and EV factory near Austin), but there's room to grow. The IRA has incentives for domestic manufacturing of renewables; Texas could capitalize on that by luring those factories (creating stable year-round manufacturing jobs). Moreover, expanding O&G production means more demand for rigs, pipes, and machinery – much of which is made in Texas (e.g., Houston's oilfield equipment industry). High levels

54 https://comptroller.texas.gov/economy/economic-data/energy/2023/texas.php

55 https://comptroller.texas.gov/economy/economic-data/energy/2023/texas.php

of drilling and pipeline construction translate to high employment in those supporting industries.

- **New Industrial Development Enabled by Cheap Energy:** A core thesis of energy abundance is that cheap, plentiful energy will draw energy-intensive industries to Texas. We are already seeing glimmers of this: companies building data centers in the state because power is cheaper than other regions like California; proposals for new aluminum or steel recycling facilities that need lots of electricity (since Texas power prices are relatively low and could stay low if we keep building capacity). In the mid-20th century, the availability of cheap Texas natural gas spurred the growth of the petrochemical industry along the Gulf Coast (and cheap gas with carbon capture for hydrogen production is also imminent). Similarly, abundant electricity could spur growth of industries like green hydrogen production (for ammonia, fertilizers), direct air capture of CO_2 (industries that might pay landowners to put molecules back in the ground), or advanced manufacturing (semiconductor fabs consume enormous electricity – having reliable power is a factor in site selection). Each new industrial facility means permanent jobs, local tax base expansion, and economic diversification. For example, if Texas successfully becomes a leader in hydrogen, it could host not just production facilities but also related R&D and supply chain, capturing a market that Goldman Sachs estimates could be worth trillions globally by 2050.[56]

- **Energy Exports and Trade:** Energy abundance implies Texas can export surplus energy commodities – be it LNG, refined fuels, or even electricity (if it builds ties to other states/Mexico). Exports bring revenue from outside the state. In 2023, Texas LNG exports were valued at $9.1 billion;[57] with more terminals coming online, this could double or triple by 2030, benefiting Texas companies and workers at those terminals and along the supply chain. Similarly, if Texas can produce excess electricity cheaply, selling power to neighbors (Mexico, the Eastern or Western U.S. via potential DC ties) could bring additional income (though ERCOT's independent stance limits this for now) while reducing pressure on shared watersheds and airsheds. The economic perspective is that energy abundance can reinforce Texas's position as a net energy exporter – not just in oil & gas but potentially in electrons and emergent fuels (like hydrogen or ammonia). This strengthens trade balances and state revenues (through severance taxes on O&G and potentially new tax streams from hydrogen or others).

- **Innovation and Entrepreneurial Activity:** A dynamic energy sector fosters innovation. Texas's universities and start-ups are deeply involved in energy tech – from carbon capture to geothermal to grid software. By creating a market big enough to incorporate new technologies (like a grid large enough to pilot advanced reactors or vast enough to deploy new storage tech at scale), Texas can be the proving ground for the next generation of energy innovations. This can attract research funding and high-tech jobs (for example, if advanced geothermal companies want to test in Texas's oil wells, they'll hire engineers locally). We've already seen companies like NET Power (inventor of an oxy-combustion gas plant with carbon capture) building their pilot scale

56 https://www.aon.com/industry-insights/hydrogen-and-the-energy-transition

57 https://comptroller.texas.gov/economy/fiscal-notes/industry/2024/lng-info/

demonstrations in Texas.[58] A commitment to build many diverse energy projects essentially turns Texas into an energy innovation lab by virtue of scale, which could spin off new businesses.

The economic multipliers from these activities are significant. Each energy-sector job often supports additional jobs in other sectors (hospitality, retail, etc., due to increased local income). Regions like the Permian or the Gulf Coast that see energy booms experience broad uplift (though also strains like housing demand – something policymakers must manage).

Economic Risks and Managing Them

While the economic upside is large, there are risks to consider:

- **Capital Investment and Cost Recovery Risk:** The scale of required investment is huge – on the order of hundreds of billions of dollars by 2035 (roughly estimating: $200-250 billion for generation (wind/solar/gas), tens of billions for transmission, similar for gas infrastructure). These will largely be private investments[59], but investors need to see a path to returns. If market or regulatory conditions change adversely, there's a risk of stranded assets or unprofitable projects. For instance, if we massively overbuild capacity and demand doesn't rise as fast as expected (say AI doesn't increase power use as dramatically or crypto collapses), wholesale electricity prices could become very low, which is great for consumers but could make some power plants uneconomic. There is a balance to strike – energy "abundance" shouldn't turn into severe oversupply that deters future investment due to consistently depressed prices. Texas's energy-only market handles oversupply by letting prices fall (benefiting consumers short term). But if prices stay too low for too long, some capacity might exit or investors shy away, potentially threatening long-term adequacy. To mitigate this, Texas might consider mechanisms to gently stabilize revenues (like increased ancillary services) – not to guarantee profits, but to avoid too harsh of boom-bust cycles. An abundant system likely means average prices will be lower, but volatility might still be high. This is actually an advantage for attracting industry (they like stable low prices) and storage (they like volatility).
- **Policy Instability and Investment Chilling Effects**: From an economic perspective, policy uncertainty is costly. If investors fear that every 2 years the rules might change (new fees on renewables, new market design, etc.), they may delay or require a higher return (raising costs). Announcing then reversing policies creates more uncertainty. This effect applies at the state and federal level. A clear, consistent Texas policy will yield more investment at lower cost of capital. If Texas dithers or gives conflicting signals, projects will be delayed. Each year of delay in adding capacity could mean price spikes and lost opportunities (like an industry choosing another state). Thus, policy stability is an economic advantage. Texas should aim to create the conditions the give market participants clarity, such as assessing transmission expansion and permitting reform.

58 https://netpower.com/

59 Transmission is usually a public investment unless merchant.

- **Reliability Incidents and Economic Disruption**: If energy abundance is not achieved and Texas experiences reliability problems (rolling blackouts or severe shortages), the economic consequences can be enormous. The February 2021 blackout cost the state estimated $130 billion in economic damages and tarnished its reputation as a business-friendly location. Companies consider reliable electricity as a given when investing; failure to provide that can lead to loss of business (industries might relocate or expand elsewhere, or not come at all if they fear power issues). So there is an economic imperative to avoid such crises. Ensuring adequate capacity – a buffer above expected demand – is essentially an insurance policy for the economy. The cost of extra infrastructure must be weighed against the cost of even a single large outage. It is possible that the latter outweighs the former. Therefore, even if some capacity is underutilized in normal times, having it for extreme events protects the broader economy. The key is to allocate those costs fairly and provide the needed market signals to achieve them.

- **Global Market Dependencies:** Texas's energy economy is tied to global markets – oil prices set globally, LNG linked to global gas demand, etc. This introduces external risk. For instance, if global oil prices crash (as in 2020), Texas's oil sector contracts, affecting employment and state revenues. Conversely, if global demand for LNG dips (due to European decisions to avoid Texas gas if it's perceived to be too dirty or a warm winter), some Texas LNG exports might idle, affecting local jobs. Diversifying within energy (not just oil/gas but also wind/solar equipment manufacturing, etc.) can hedge against some global swings. Additionally, an abundant electricity supply can shield local industries from global energy price shocks. For example, if natural gas prices spike internationally, Texas – by having enough gas production and alternatives like wind – could keep its domestic electricity prices relatively stable[60], giving its industries a competitive edge (versus, say, European industries that suffer when gas is scarce). In that sense, energy abundance is economic defense: it decouples Texas's cost structure from global volatility to a degree.

In terms of numbers, if energy abundance is achieved, Texas could see:

- Electricity rates stabilizing or even declining in real terms due to efficient use of new tech – making it one of the lowest-cost power states. That attracts heavy industry which can add *billions* to GDP and tens of thousands of jobs.

- Possibly tens of billions in new tax revenue over a decade. For example, more gas plants and wind and solar farms pay property taxes to school districts and counties (wind and solar farms, as well as storage, have boosted rural county revenues significantly in West Texas[61]). More O&G production means more severance tax flowing into the state's Rainy Day Fund and school fund (the recent high prices gave Texas a record surplus; continued robust output, even at moderate prices, funds state coffers).

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60 https://static1.squarespace.com/static/652f1dc02732e6621adb2a3a/t/654c1889d23c9b5e380aa6bf/1699485834626/Impact-of-Renewables-in-ERCOT_FINAL.pdf

61 https://static1.squarespace.com/static/652f1dc02732e6621adb2a3a/t/678c0be1d3dc1c42cd14be89/1737231331280/FINAL_2025_Renewable_Energy_Storage_in_Texas.pdf

- Workforce development opportunities: hooking a new generation into skilled energy jobs. Texas can lead in both traditional energy employment and new sectors, keeping unemployment low.

Lastly, affordability for consumers is an economic perspective. Abundance should result in reasonable power prices for consumers and businesses, which in turn leaves more disposable income to circulate in the economy. Texas residential electric rates are just under the national average.[62] With wise investments, Texans could enjoy some of the cheapest electricity in the world, especially relative to other developed economies – a huge quality of life and business selling point. This is an economic goal: make energy a competitive advantage for every sector in Texas. Contrast that with places where energy can be a bottleneck or major expense (e.g., California has very high rates that sometimes push businesses out). Texas has an opportunity to solidify its reputation as a low-cost energy state for the long run. Furthermore, Texas could burnish its reputation as a clean energy provider, which will be attractive to large buyers (e.g. the tech industry) and export markets in Southeast Asia and Europe.

In summary, the economic case for energy abundance in Texas is compelling: it promises job creation across a spectrum of skill levels, industrial growth, and increased global influence in energy markets. The key is managing the inherent risks by maintaining a stable and inviting policy environment and not losing sight of reliability and sustainability, which underpin economic resilience. Texas policymakers should consider the energy sector as the engine of future prosperity – with proper stewardship, the energy abundance strategy can make Texas the place for energy-intensive innovation and manufacturing in North America.

62 https://www.chooseenergy.com/electricity-rates-by-state/

Conclusions

Texas stands at an energy crossroads with a unique chance to harness its full portfolio of resources to power unprecedented economic growth. The analysis in this report leads to several strategic conclusions and recommendations for state policymakers as they strive for energy abundance:

1. **Embrace a High-Growth Planning Mindset:** The days of assuming flat or modest growth in electricity demand are over – Texas should plan for rapid load increases and avoid underestimating future needs. That means raising ERCOT's planning targets and reserve margins proactively. Policymakers should encourage scenario-based planning (like the one in this report) to stress-test the grid against very high demand cases. It's better to over-build capacity (for power generation and transmission) than to fall short in the face of surging demand. In practice, this means, within reason, supporting ERCOT's recent "new era of planning" efforts that integrate prospective large loads into forecasts.[63] Texas should regularly update 10-year outlooks and share them transparently with the public and industry so that everyone understands the scale of build-out required.

2. **Accelerate Infrastructure Development:** Make transmission and gas pipeline infrastructure a top priority through 2035. Specifically,

   - The state, through the PUCT and ERCOT, should identify priority transmission projects (the "no-regrets" segments that will be needed under almost any scenario) and work to expedite their completion by streamlining routing and permitting at the state level. Consider designating certain critical transmission corridors as projects of statewide significance with accelerated processes. If legislative support is needed (e.g., to assist with right-of-way acquisition or to allow higher voltage construction), pursue it. The *Permian Basin Transmission Initiative* is a good start; expand that approach to other regions (e.g., Panhandle export lines).

   - Leverage federal permitting reform if available. Should a new federal administration offer faster NEPA reviews or even funding for transmission (through DOE loans or grants), Texas should be ready to capitalize on it with "shovel-ready" projects.

   - For natural gas, convene stakeholders (pipeline operators, generators, LNG exporters) to map out potential bottlenecks and coordinate expansions. One recommendation is to establish a Texas Gas-Electric Coordination Task Force (ERCOT has taken steps in this direction[64]) that ensures gas supply plans align with power sector needs. This task force can facilitate data sharing (for instance, gas pipeline outage schedules with ERCOT, generator fuel contract status with state regulators) to pre-empt fuel issues.

   - Ensure the new gas plants built have firm fuel supply. This might involve incentivizing dual-fuel capability (where feasible) or on-site LNG storage

63 https://www.utilitydive.com/news/ercot-transmission-planning-2030-load-growth-projections/714104/

64 https://www.utilitydive.com/news/ercot-transmission-planning-2030-load-growth-projections/714104/

for critical plants as backup. The cost is small relative to the insurance it provides during extreme events.

3. **Maintain a Balanced Generation Mix:** The analysis clearly shows Texas benefits from an all-of-the-above strategy: continue to add renewables aggressively (to provide low-cost energy) while also adding clean-firm resources (natural gas with carbon capture, and exploring nuclear and long-duration storage). Policymakers should avoid policies that artificially limit one resource in favor of another. Instead, let the comparative advantages play out. For example, rather than capping renewables, implement measures that incentivize reliability contributions (like requiring adequate levels of performance-based grid services). Simultaneously, support the development of new dispatchable generation:

   - Natural Gas Plants: Use tools like the Texas Energy Fund to stimulate the construction of new high-efficiency gas plants, especially in areas where they support local grid strength (like near major load pockets).
   - Nuclear and Geothermal: Establish a clear roadmap for advanced nuclear evaluation. The PUCT's Advanced Nuclear Working Group progress is encouraging[65]; policymakers should act on its findings by reducing barriers to nuclear (e.g., streamline state-level licensing support, partner with DOE on an SMR pilot in Texas). While an SMR likely won't aid resource needs before 2035, laying groundwork now means Texas could have next-gen nuclear online in the late 2030s or 2040s, further bolstering abundance. Geothermal should be supported via research grants and pilot drilling projects – if even a few hundred MW of geothermal can be proven, it adds a perpetual firm energy source.
   - Energy Storage, Efficiency and Demand Response: These are force multipliers for abundance. Continue to encourage battery projects (perhaps via inclusion in any incentive program, or don't erect regulatory hurdles for storage participation in markets). Develop robust demand response programs (e.g., incentive large flexible loads like crypto miners and industrial processes to automatically reduce usage at ERCOT's request). The demand response workshops ERCOT plans should be backed by policies that allow aggregated load resources to bid into the market freely. Reducing peak by even by a few percentage points via demand response is equivalent to building several new peaker plants. Efficiency helps reduce peak demand, lowers energy bills for consumers, and keeps homes safe for longer in the event of an outage during extreme cold or hot weather events.

4. **Implement Market Reforms that Incentivize Reliability and Investment**: Finalize the design of the ERCOT market enhancements to incentivize capacity when Texas most needs it (extreme peak hours or emergency conditions). This support will give investors confidence to invest in reliability assets. However, design it in a way that is transparent and avoids excessive complexity or unintended consequences. Make sure that any new mechanism coexists with the energy-only market's strength of efficient price signals. Further, monitor and adjust as needed: if by late 2020s it appears the

65 https://www.utilitydive.com/news/ercot-transmission-planning-2030-load-growth-projections/714104/

market still isn't attracting sufficient new builds, be prepared to tweak incentives or take a different approach.

5. **Leverage Federal Support but Prepare for Its Absence:** In the next few years, Texas has an opportunity to harness federal funds (from the IRA, IIJA, etc.) to build out clean energy and infrastructure. State policymakers should facilitate this by helping Texas companies and municipalities apply for these funds and by removing any state-level impediments. For example, if federal grid resiliency grants are available, ERCOT or Texas utilities should apply. If hydrogen hub funding is granted (it has been preliminarily), ensure those projects move forward smoothly in Texas with state cooperation (permitting, workforce training in those areas, etc.). However, Texas should also plan for self-reliance in case federal priorities shift. This could mean:

- Maintaining state incentives for key industries if federal ones fade (e.g., perhaps reviving the Chapter 313 property tax abatement program or a successor to attract big energy-intensive manufacturing, since the IRA's domestic manufacturing incentives might sunset by 2030).

- Continuing to invest in R&D at state institutions (higher education, research consortia, etc. have strong energy programs) to drive innovation even if federal R&D funding is cut. The state's own grants (e.g., through the Texas Emerging Technology Fund or new initiatives) can sustain momentum in energy tech innovation.

- Ensuring Texas's regulatory environment remains welcoming to investment regardless of federal shifts. If, say, federal solar tax credits vanished and solar installations slowed, Texas could see if any state action (even temporary, like fee waivers or expedited approvals) could help viable projects proceed. Similarly, if federal pressure on emissions disappears, Texas should still hold to reasonable standards to prevent local environmental backlash and keep clean energy customers willing to buy from Texas projects. A stable moderate regulatory approach from the state can fill the void of extremes from DC.

6. **Focus on Workforce and Education:** With so many energy projects on deck, Texas should continue investing in training programs to fill the skilled jobs. Partner industry with community colleges to create more certificate programs for solar farm technicians, wind turbine maintenance, powerline installers, electricians, etc. The energy boom can only materialize if labor is available; otherwise projects face delays and cost overruns. Also, training Texans for these jobs ensures the economic benefits stay local (rather than having to import specialized labor from out of state). This forward-thinking approach keeps unemployment low and spreads the prosperity of the energy build-out to communities statewide.

7. **Communicate the Vision of Energy Abundance**: State leadership should clearly articulate to citizens and businesses the strategy of energy abundance – that Texas is aiming for an "energy abundance" that guarantees reliability and attracts jobs. By framing it positively ("more power to fuel more jobs" or "an engine for Texas growth"), it builds public support for the sometimes disruptive infrastructure developments (people may be more accepting of a new transmission line if they understand it's critical for the region's growth and reliability). A well-communicated vision can also help avoid the NIM-

BYism that sometimes blocks projects. When locals see benefit (maybe via direct incentives or community benefits agreements for hosting infrastructure), they're more likely to support them.

8. **Monitor, Adapt, and Lead**: Finally, Texas should measure progress. Are new loads materializing as expected? Are generation and grid projects keeping pace? If not, intervene early by adjusting market incentives. By staying flexible and adaptive, Texas can correct course as needed. Given Texas's size, the state's actions often set precedents. By succeeding in an energy abundance strategy, Texas can lead the nation (even the world) in showing how to grow an economy while maintaining affordable, reliable, and cleaner energy. This leadership can attract even more investment (companies wanting to be where innovation and growth are happening).

In conclusion, Texas has the resource endowment, the market experience, and the economic imperative to pursue energy abundance decisively. The next 10–15 years will require bold action: building infrastructure at a record pace, aligning policies to encourage all useful energy sources, and keeping the grid stable amidst change. The reward is a Texas that powers its expanding population and industries with ease, a beacon to businesses worldwide that reliable and cheap energy can be found here in Texas. By following the strategies outlined – expanding infrastructure, balancing the resource mix, stabilizing markets, and fostering an environment of investment certainty – Texas policymakers can ensure the state's energy sector remains the cornerstone of its prosperity. An energy-abundant Texas will be one where the lights stay on, the economy stays competitive, and the opportunities are as vast as the Texas horizon.

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