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High Level Impact of SB 715 on the ERCOT System

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Executive Summary

Senate Bill 715 (SB 715), introduced in the 89th Texas Legislature, significantly alters the grid reliability mandates originally enacted under HB 1500 (2023). By retroactively applying firming requirements to existing power plants and exempting most thermal resources, SB 715 shifts the compliance burden almost entirely to renewable energy generators, primarily wind and solar. This shift is expected to lead to widespread retirements and a slowing down of renewable development, particularly as grid-scale firming resources, such as natural gas plants, face supply chain bottlenecks and limited availability.

We modeled five scenarios, with 75 scenario sensitivities, that incorporated different levels of wind and solar retirements, future load growth, and constrained natural gas buildouts. **Our results suggest that by 2030, the ERCOT grid could face capacity shortfalls between 14 GW and 25 GW on average, with some scenarios reaching up to 50 GW of unmet or unrealized load growth (shown in Figure 1 below)**, more than double the 20 GW shortfall during Winter Storm Uri. These deficits are paired with rising electricity prices and reduced reliability, especially in high-demand futures.

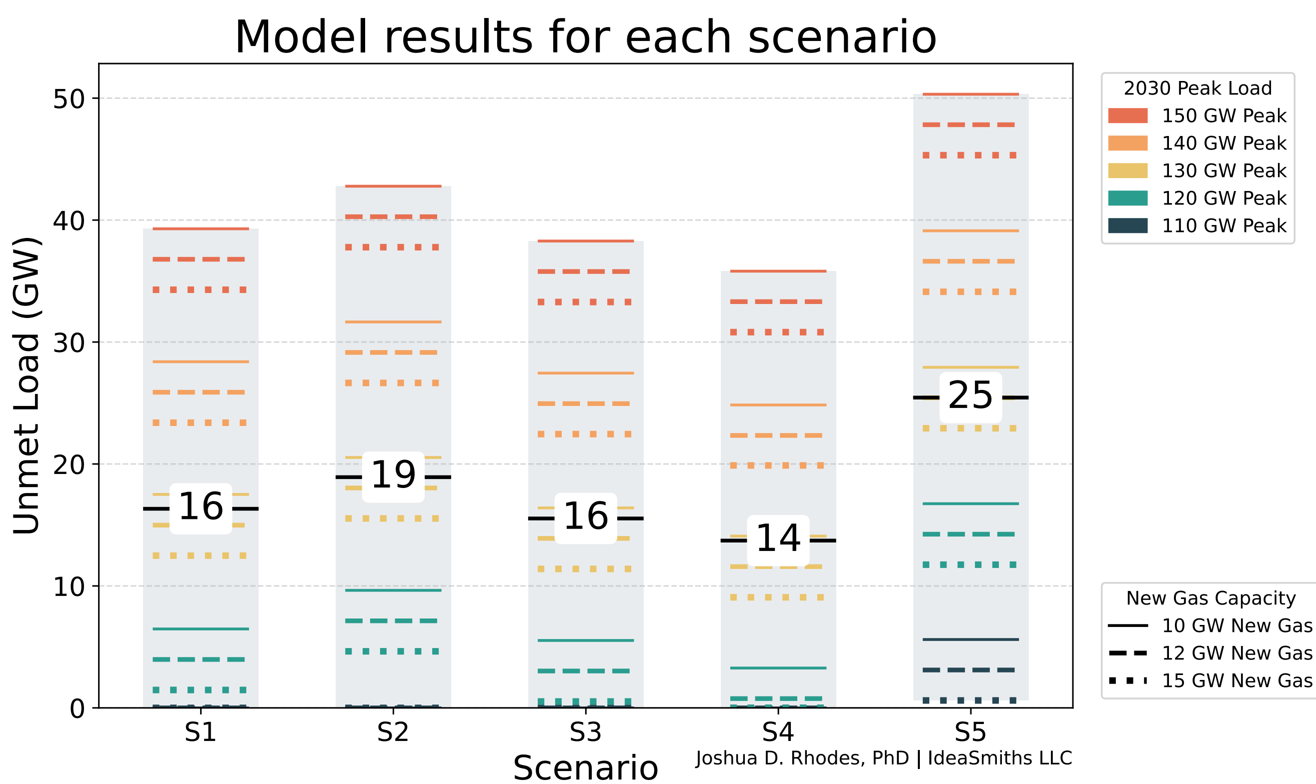

Figure 1: Summary of the 75 grid simulations, grouped by scenario, showing the range of unmet load for each scenario sensitivity (colors denoting peak demand levels and type of line denoting natural gas build limits) in 2030 as well as the average across each scenario (black line with value). Total expected unmet load in 2030 as a result of SB 715 is estimated

between 14 to 25 GW but could be as high as 50 GW in some cases. For comparison, the unmet load during Winter Storm Uri deepest load shed hours was about 20 GW.[1]

Texas's rapidly growing power demand, driven by AI data centers, population increases, and industrial electrification, needs more energy sources, not less. Without a system-wide strategy that accommodates both infrastructure realities and load growth, SB 715 could likely compromise reliability, elevate costs, and hinder economic growth. Because the need for firming resources (ancillary services) has been shown to be driven by the system-wide dynamic of both supply and demand, a system-wide solution is likely to be a more efficient alternative for managing grid firming, rather than rigid plant-by-plant mandates.

Introduction

Senate Bill 715 (SB 715), introduced in the 89th Texas Legislature, would edit and add requirements to the firming requirements that were passed in 2023 by the 88th Texas Legislature in HB 1500. HB 1500 (2023) required that new electricity generation resources, those that entered into standard generator interconnection agreement on or after January 1, 2027 ***"shall demonstrate to the commission the ability of the owner or operator's portfolio to operate or be available to operate when called on for dispatch at or above the seasonal average generation capability during the times of highest reliability risk, as determined by the commission, due to low operation reserves, as determined by the commission."***[2]

Major changes, among others, made by SB 715 include A) striking the "January 1, 2027" provision of the code and B) adding that resources that can ***"demonstrate the ability to operate when called upon for dispatch for 24 continuous hours at or above the seasonal average generation capability through the resource's own generation capability or through a contract with an on-site or off-site resource, including a battery energy storage resource,"***[3] would be exempt from firming requirements. Essentially A makes the firming requirements of HB 1500 (2023) retroactive, and B would serve to exempt most, if not all, thermal resources from firming requirements. SB 715 does include a provision that would exempt electric generation facilities with a power purchase agreement (PPA) in place by the effective date of the bill to meet the firming requirements until the PPA expires.

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[1] https://www.ercot.com/news/february2021
[2] https://www.legis.state.tx.us/tlodocs/88R/billtext/html/HB01500F.HTM
[3] https://legiscan.com/TX/text/SB715/id/3233221

IdeaSmiths modeled the impact of HB 1500 (2023) and found that, based on our understanding of the firming requirements definition, "***Firming requirements were computed at each resource class level, except for storage, as per HB1500 language. Firming requirements for each resource class were computed as the difference between the worst performance across any simulation to the median performance… [m]ore firming capacity [was] needed in the winter than in the summer for every resource class, except for solar.***".[4] However, as per language in HB 1500 (2023), we only calculated these cost implications for new resources. That analysis found that, system-wide costs for firming would be between approximately $200M and $300M per year with the majority of the costs allocated to wind.

However, many things have changed since 2023. In particular, the amount of expected load growth in ERCOT has risen significantly and supply chains for natural gas power plants have become significantly constrained, resulting in much higher costs for the firming resources required, likely natural gas.

Additionally, given the retroactive nature of SB 715, it is expected that existing resources would now have to compete with new resources for scarce new firming resources. Further, resources that are contracted for firming are not expected to be able to participate in the energy or ancillary services market[5], which could further constrain the ability of the grid to operate efficiently. Thus, given the constraints facing the grid, we make the assumption in this analysis that most wind and solar projects that would require firming from SB 715 would not be able to either procure or afford it and would instead opt to retire.

While the bill provides an exemption for resources with active PPA agreements, PPAs generally do not last for the useful life of a power plant, generally lasting about 15 years, whereas wind and solar farms are expected to have a useful life of about 30 years.

Electricity Demand Growth in Texas

Multiple factors are driving Texas's electricity demand to grow at an unprecedented pace. Key demand drivers include:

- **Emerging Large Loads:** Such as 'hyperscale' data centers (including power-hungry AI computing centers), cryptocurrency mining, and factories are planning to

4 https://static1.squarespace.com/static/609af8d084bf40321374ca1c/t/660dcd19109dcd3cd80349a8/1712180505805/ERCOT_HB1500_SB2627_FINAL+4.3.24.pdf

5 https://static1.squarespace.com/static/609af8d084bf40321374ca1c/t/660dcd19109dcd3cd80349a8/1712180505805/ERCOT_HB1500_SB2627_FINAL+4.3.24.pdf

connect to the ERCOT grid. In fact, ERCOT's interconnection queue now contains almost 100 GW of proposed large industrial and digital load.

- **Population Growth:** Texas's population continues to rise quickly, with projections of around 35 million Texans by 2035. More people mean greater residential and commercial power consumption.
- **Industrial and Oil/Gas Electrification:** To lower the cost of producing, the oil and gas sector is looking to electrify operations (for example, drilling and pipeline infrastructure in West Texas) that traditionally relied on onsite fuel. Similarly, manufacturers and buildings are increasingly using electric equipment for heating and industrial processes instead of direct fossil fuel use, further increasing power needs.
- **LNG and Manufacturing Expansion:** Many of the approved (but not yet built) liquefied natural gas export terminals in Texas will require large amounts of electricity for compression and liquefaction. New manufacturing and high-tech facilities (spurred by re-shoring and economic growth) are also coming online with substantial electricity requirements.

As a result of these drivers, Texas's power demand is expected to increase far more rapidly than in the past. Since the implementation of HB 5066 (2023), coupled with the new load drivers mentioned above, load forecasts have risen significantly in magnitude and variability. Figure 2 shows five such load forecasts from four groups as well as annual averages of those forecasts. By 2030, load forecasts vary from 100 GW to 208 GW, with an average forecast of about 151 GW.

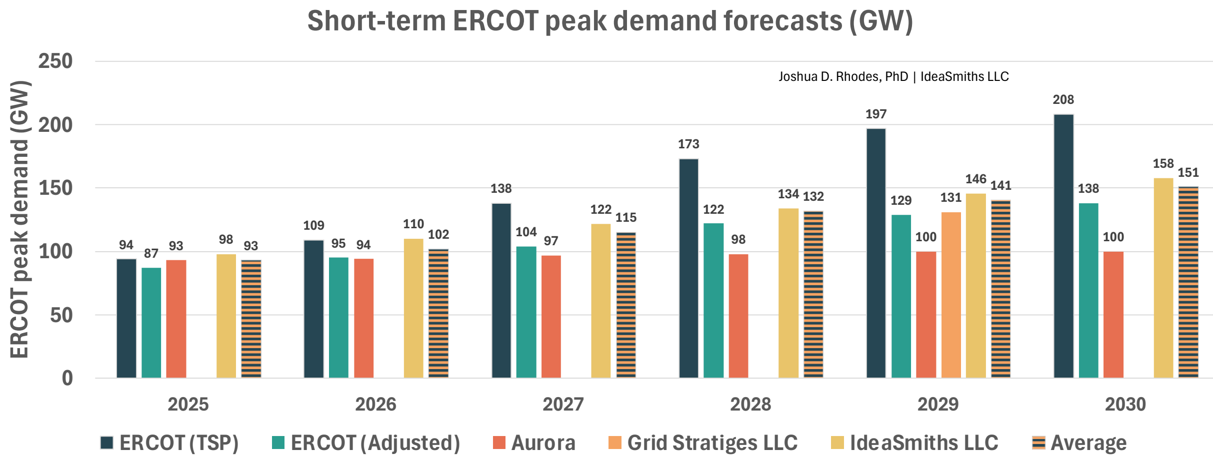

Figure 2: Load forecast projections for ERCOT from 2025 to 2030 from various sources including ERCOT[6], Aurora[7], Grid Strategies LLC[8], IdeaSmiths LLC[9], as well as an average of all sources.

Impacts of SB 715 on existing and new wind and solar capacity

Given the SB 715 Ex-post rule change requirements for existing generation and the changed start date of the original firming requirements of HB 1500 (2023) for new generation resources, it is likely to see some retirements of older wind and possibly solar generation resources as well as a slower deployment of new resources that did not think these requirements would apply to them.[10]

Each individual project, existing and potential, will have to assess their new requirements and costs. Because individual project timelines and finances are not publicly available, we provide a range of possible scenarios and assess the new firming requirements potential to impact the future levels of wind and solar in ERCOT, and later their impact on grid operations.

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[6] https://www.ercot.com/files/docs/2025/04/07/8.1-Long-Term-Load-Forecast-Update-2025-2031-and-Methodology-Changes.pdf

[7] https://auroraer.com/media/texas-consumers-face-10-increase-in-power-bills-and-higher-reliability-risks-without-renewables-expansion-aurora-finds/

[8] https://gridstrategiesllc.com/wp-content/uploads/National-Load-Growth-Report-2024.pdf

[9] https://static1.squarespace.com/static/609af8d084bf40321374ca1c/t/67fd79b6787d6744b6c436c5/1744665015515/Impact+of+SB+388+on+Texas+Energy+Development.pdf

[10] Even with the PPA "safe harbor" provision, costs for new firming requirements in the future will have to be considered in today's financial decisions.

Possible future scenarios analysis

Given the uncertainty of how SB 715 will be implemented, we developed five wind and solar retirement scenarios (shown in the Table 1 below), five future load growth scenarios for 2030 (110 GW, 120 GW, 130 GW, 140 GW, and 150 GW), and three natural gas build scenarios by 2030 (10 GW, 12.5 GW, and 15 GW). Taking all combinations of these three areas yields a total of 75 individual scenario sensitivities considered in this analysis. Table 1 shows a summary of the scenario groups.

Table 1: Table of future scenarios for EROCT in 2030 given multiple possible levels of impact of SB 715 on wind and solar, future load growth, and possible natural gas builds.

Scenario #	Retirement Rate Wind	New Build Wind	Retirement Rate Solar	New Build Solar	2030 Solar (MW)	2030 Wind (MW)	2030 Peak Demand (GW)	Gas Build (GW)
S1	15% Y1, 10% Y2, 5% Y3+	50% less	7.5% Y1, 5% Y2, 2.5% Y3+	25% less	41,223	31,000	110—150	10, 12.5, & 15
S2	20% Y1, 15% Y2, 5% Y3+	75% less	10% Y1, 7.5% Y2	37.5% less	36,613	26,827	110—150	10, 12.5, & 15
S3	10% Y1, 10% Y2, 5% Y3+	50% less	5% Y1, 5% Y2	25% less	42,193	32,721	110—150	10, 12.5, & 15
S4	10% Y1, 5% Y2, 5% Y3+	20% less	5% Y1, 2.5% Y2, 2.5% Y3+	10% less	46,539	35,646	110—150	10, 12.5, & 15
S5	20% / year retire	None	10% / year retire	All / no impact	28,190	17,354	110—150	10, 12.5, & 15

Note that for the purpose of this analysis, we will consider there to be five scenario groups (S1—S5) where the levels of wind and solar capacity in 2030 are held constant in each. We then run each of the scenario groups with 15 sensitivities to encompass all possible combinations of the five load growth assumptions and gas build levels. For example, a possible combination for S4 would include 140 GW of load in 2030 and 12.5 GW of natural gas builds and another combination would be 110 GW of load in 2030 and 15 GW of natural gas builds.

Scenario group results for wind and solar

Given the retirement and new build scenarios laid out in Table 1, Figure 3 and Figure 4 show the resulting total capacity for wind and solar, respectfully, in ERCOT.

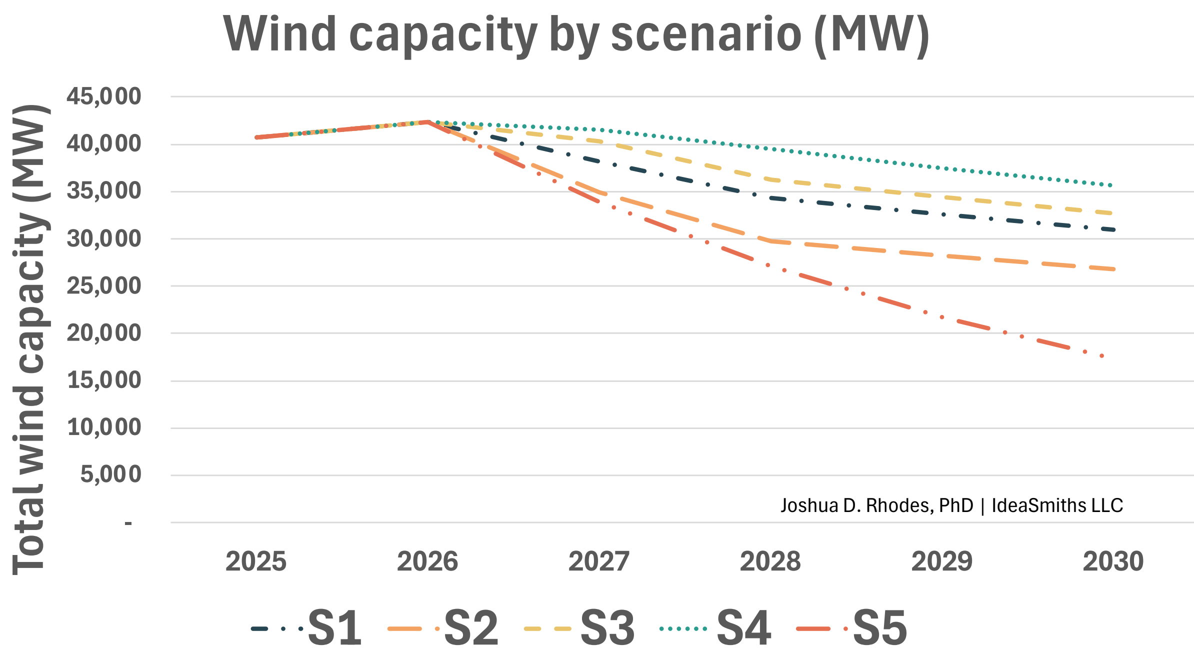

Figure 3: Chart showing the total installed capacity of wind in the ERCOT system under each scenario in Table 1.

Each scenario in Figure 3 shows an initial increase from 2025 to 2026, but then all scenarios show a decline in the total amount of wind capacity as retirements outpace new additions. Wind development began earlier than solar in ERCOT and thus there are more older projects that would have already lost the ability to utilize the Production Tax Credit and might have possibly outlasted their PPA. Across these scenarios, we find a range of total wind capacity on the ERCOT grid of between about 17.3 GW in the harshest scenario S5 to about 35.7 GW in the lightest touch scenario S4. However, all of our scenarios see a reduction in the total amount of wind capacity on the ERCOT grid, down from about 40 GW today.

Figure 4 shows the same impacts for each of the scenarios in Table 1, but for solar. Solar isn't impacted as much as wind given its smaller overall firming requirements and younger average age. Like wind, we find that scenario S5 results in the lowest amount of solar in 2030 and scenario S4 results in the highest. Scenario S4 is the only scenario where there is more solar in 2030 than 2026, but all trends show a general decline in capacity.

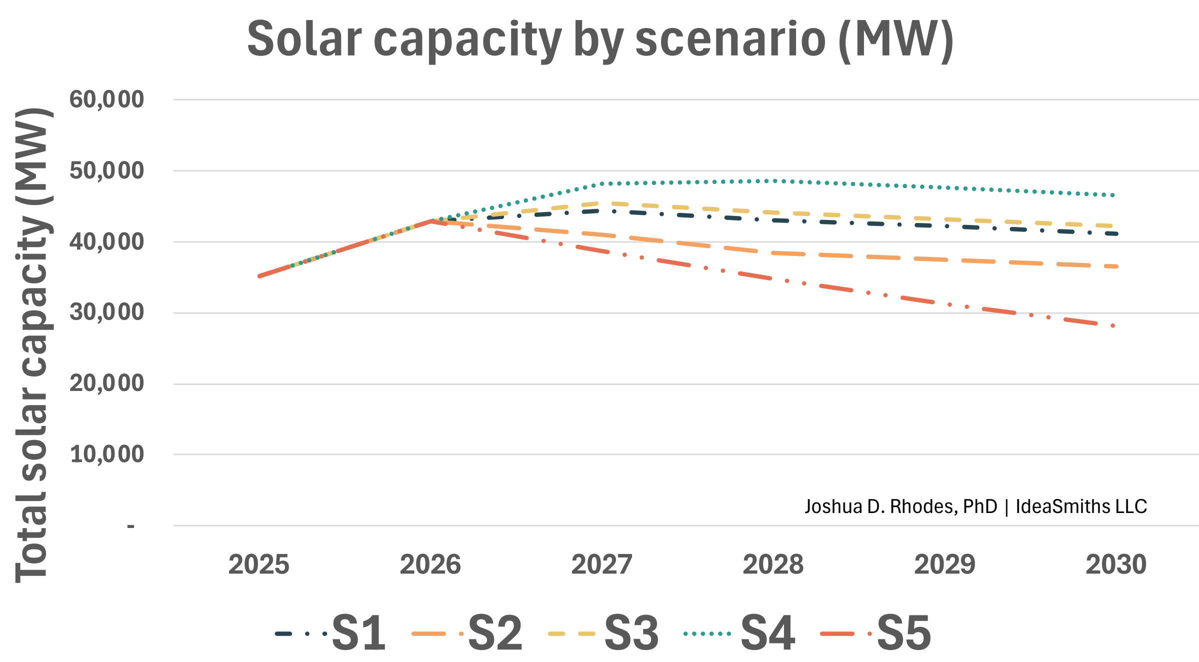

Figure 4: Chart showing the total installed capacity of solar in the ERCOT system under each scenario in Table 1.

Constraints on Natural Gas Generation Expansion

A previous report[11] on SB 388 (2025) discussed in detail how the **supply chain for new gas-fired generators is heavily constrained**, which bottlenecks the construction of new dispatchable thermal capacity. Major turbine manufacturers have accumulated long delivery backlogs due to surging global demand. For instance, GE Vernova recently reported a backlog of about \$119 billion in turbine orders and Siemens Energy reported a roughly €131 billion (\$145B) backlog. These record backlogs imply multi-year wait times for new gas turbines. Industry experts and companies that build power plants note that unless a project already has a place in the production queue, it will be very difficult to bring a new gas plant online before 2030. In other words, any Texas generator not already in line for major equipment is not likely to get a new plant up and running until after the end of this decade. Thus, we limit the ability of the model to build natural gas power plants between now and 2030 to 10, 12.5, and 15 GW.

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11 https://static1.squarespace.com/static/609af8d084bf40321374ca1c/t/67fd79b6787d6744b6c436c5/1744665015515/Impact+of+SB+388+on+Texas+Energy+Development.pdf

Modeling the impact of SB 715 on ERCOT

Each of the 75 sensitivities of the five model scenarios were modeled using our customized GenX capacity expansion model of ERCOT.[12] This model is designed to both match supply and demand for every hour of the year today as well as build new resources necessary to match supply and demand in the future in the most cost-optimal manor. In this analysis, we forced the model to follow the five policy outcome scenarios of SB 715 as defined above, i.e. the model was made to retire capacity as shown in Figure 3 and Figure 4. Further, the model was only allowed to build as much new gas capacity an allowed by each scenario, all while trying to match supply and demand in 2030.

We found that most of the scenario sensitivities would result in a capacity shortfall in 2030 when confronted with their respective levels of load growth and new natural gas build limits. Figure 5 shows a summary of all scenarios and their sensitivities considered in this analysis.

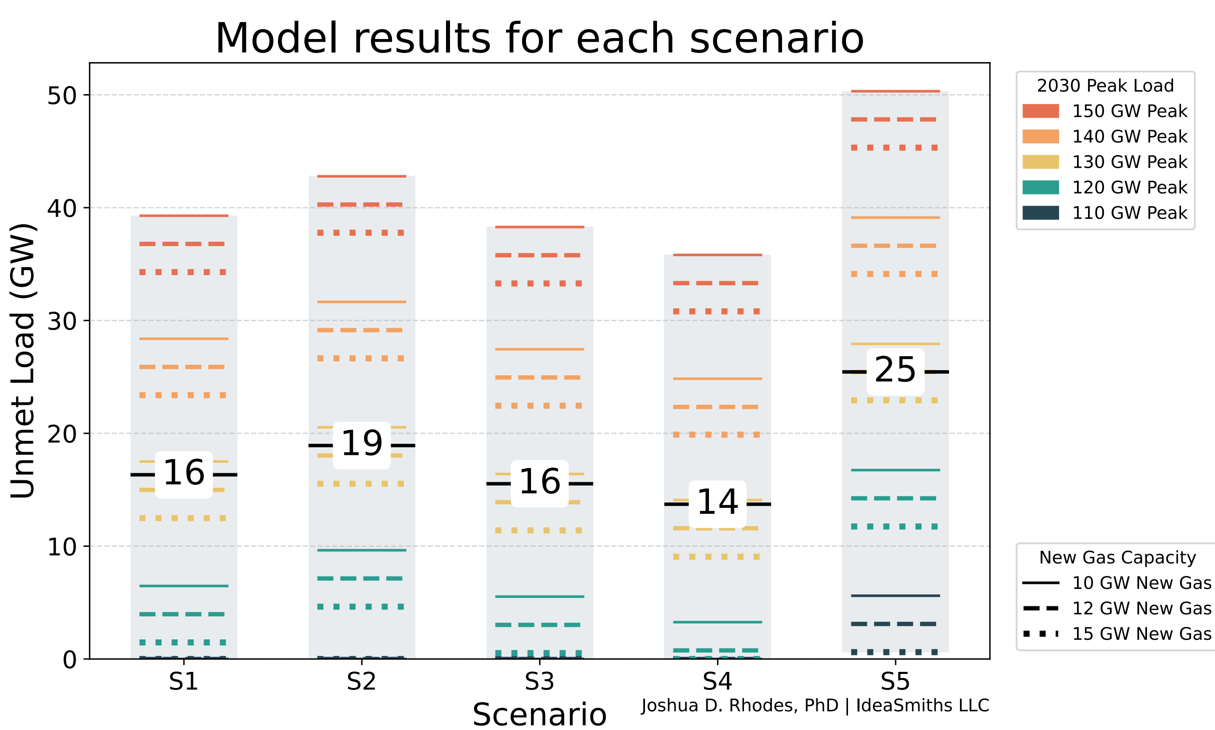

Figure 5: Summary of the 75 grid simulations, grouped by scenario, showing the range of unmet load for each scenario sensitivity (colors denoting peak demand levels and type of line denoting natural gas build limits) in 2030 as well as the average across each scenario (black line with value). Total expected unmet load in 2030 as a result of SB 715 is estimated

12 https://static1.squarespace.com/static/609af8d084bf40321374ca1c/t/67fd79b6787d6744b6c436c5/1744665015515/Impact+of+SB+388+on+Texas+Energy+Development.pdf

between 14 to 25 GW but could be as high as 50 GW in some cases. For comparison, the unmet load during Winter Storm Uri deepest load shed hours was about 20 GW.[13]

Of the 75 sensitivities considered, 62 resulted in some level of unmet load for their combination of peak demand and gas build limit, generally those with higher peak demand and lower gas builds. Across all scenarios, the average amount of unmet load varied from 14 GW to 25 GW with the lower amount of unmet load seen in the S4 scenario group and the higher in the S5 group, which aligns with the lower levels of renewables left in 2030 in those scenarios.

Although not the direct focus of this analysis, scenarios with higher levels of unmet load also see higher electricity prices. For example, even with scarcity prices associated with firm load shed removed, average prices in the Houston region are about 27% higher for the highest load shed sensitivity in scenario group S4 than in the lowest case. Further, previous research has shown that renewables have saved the EROCT grid billions of dollars in wholesale market costs, so it would follow that lower levels of renewables would result in higher costs.[14]

Conclusion

SB 715 supposedly represents a policy effort to encourage grid reliability. It attempts to do so by mandating plant-level firming requirements for both new and existing resources. Given the provisions in the bill, it would functionally only apply to wind and solar power plants. Modeling 75 sensitivities of five scenarios of how the bill could force the retirements of wind and solar capacity shows that most sensitivities result in a capacity shortfall by 2030.

These findings underscore the importance of aligning energy policy goals with the realities of infrastructure development. Ensuring grid reliability and meeting demand will likely require a more balanced approach – one that accelerates the build-out of dispatchable resources (by addressing supply chain delays and permitting, for instance) while also allowing the markets to invest in sufficient growth of the resources that can be built today, namely renewable generation and energy storage, not forcing it to retire.

The ERCOT grid has firming resources, but it is done on a system-wide basis through the ancillary services (AS) markets. Such an approach allows for a more optimized result as firming requirements can be considered across the entire system, which is likely to be

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[13] https://www.ercot.com/news/february2021

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

more efficient than allocating them on a plant-by-plant basis. ERCOT's own analysis states that ***"The importance of AS has grown and continues to grow as variability and uncertainty of both supply resources and customer demands on the grid continue to increase."***[15] This finding indicates that the increased need for AS products, which could be interpreted as the firming resources that this bill seeks is not just a supply side issue, but a system-wide issue. Thus, it would follow that a system-wide solution, like the AS markets we have today, would likely be the best approach.

A shortfall in development of new generation resources coupled with a reduction of existing ones will inevitably result in supply scarcity compared to the growth in demand. Subsequently, tighter electricity supplies will likely lead to higher wholesale electricity costs (and thus higher electricity rates) as well as more frequent conservation calls and higher potential for disruption. Unless the state also decides to put a firm limit on the amount of new load that can connect, the growth in demand could outstrip available power capacity. However, also limiting the growth of new loads would reduce overall economic activity in the state with the potential for severe impacts on the prosperity of Texans.

[15] https://www.ercot.com/files/docs/2024/10/07/ERCOT-Ancillary-Services-Study-Final-White-Paper.pdf

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IdeaSmiths LLC[17] was founded in 2013 to provide clients with access to professional analysis and development of energy systems and technologies. Our team focuses on energy system modeling and assessment of emerging innovations, and has provided support to investors, legal firms, and Fortune 500 companies trying to better understand opportunities in the energy marketplace.

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[16] https://www.texasconsumer.org/
[17] https://www.ideasmiths.com/