POWERING TEXAS' DIGITAL ECONOMY: DATA CENTERS AND THE FUTURE OF THE GRID

Part Two

HARC

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TERMS

Data Center	A facility that houses computing infrastructure like IT equipment and servers.
CCUS	Carbon capture, utilization and storage (CCUS) refers to a suite of methods or technologies that prevent carbon dioxide from being released into the atmosphere.
Greenfield	Previously undeveloped land.
Interconnection	The process through which an energy resource is connected to the electricity grid.
Load	A component that requires or consumes electrical energy. Load growth refers to increasing demand for energy.
Peak Demand	The highest electricity demand within a specified time period.

INTRODUCTION

Part One of Powering Texas' Digital Economy: Data Centers and the Future of the Grid took an introductory look at the factors that have led to rapid data center growth in Texas, data center typology and how they operate. As previously discussed, many of the necessary factors to create favorable conditions for data center growth already exist in Texas, but policy, regulation, and governance lag behind data center development.

How resource intensive are these facilities? How will their growth impact the state's energy system and its natural resources? What policy currently exists to govern data centers in Texas? What strategic policy decisions should Texas make to maintain or grow its leadership in the digital age? We explore those questions in Part Two of Powering Texas' Digital Economy: Data Centers and the Future of the Grid.

The growth of data centers presents a multifaceted challenge: maintaining grid reliability and natural resource availability while enabling continued digital and economic development. However, questions remain about the scale and impact of that growth. These data points are vital to inform public policymaking efforts.

To illuminate the technical, economic, and environmental implications of the data center boom, UH Energy at the University of Houston conducted comprehensive research on the subject. The key findings of their technical report, **The Future of the Electric Grid in Texas**, are summarized in the following section.[1]

QUANTIFYING DATA CENTER IMPACTS

01 BY 2035, LARGE LOADS WILL INCREASE ELECTRICITY DEMAND BY 25–360%, COMPARED TO A 2022 BASELINE.

Large loads include data centers, public charging infrastructure for electric vehicles, industrial demand, and decarbonization technologies like carbon capture, utilization, and storage (CCUS).

02 TEXAS COULD FACE AN ELECTRICITY SHORTAGE OF 40 GW BY 2035.

Without major new investments in supply and energy infrastructure, generation shortfalls and supply chain constraints could threaten grid reliability.

03 DATA CENTERS ARE RESHAPING REGIONAL DEMAND AND INFRASTRUCTURE NEEDS.

Over half of large-load growth is concentrated in the West, Far West, and North Texas ERCOT weather zones — regions not historically considered high-demand areas.

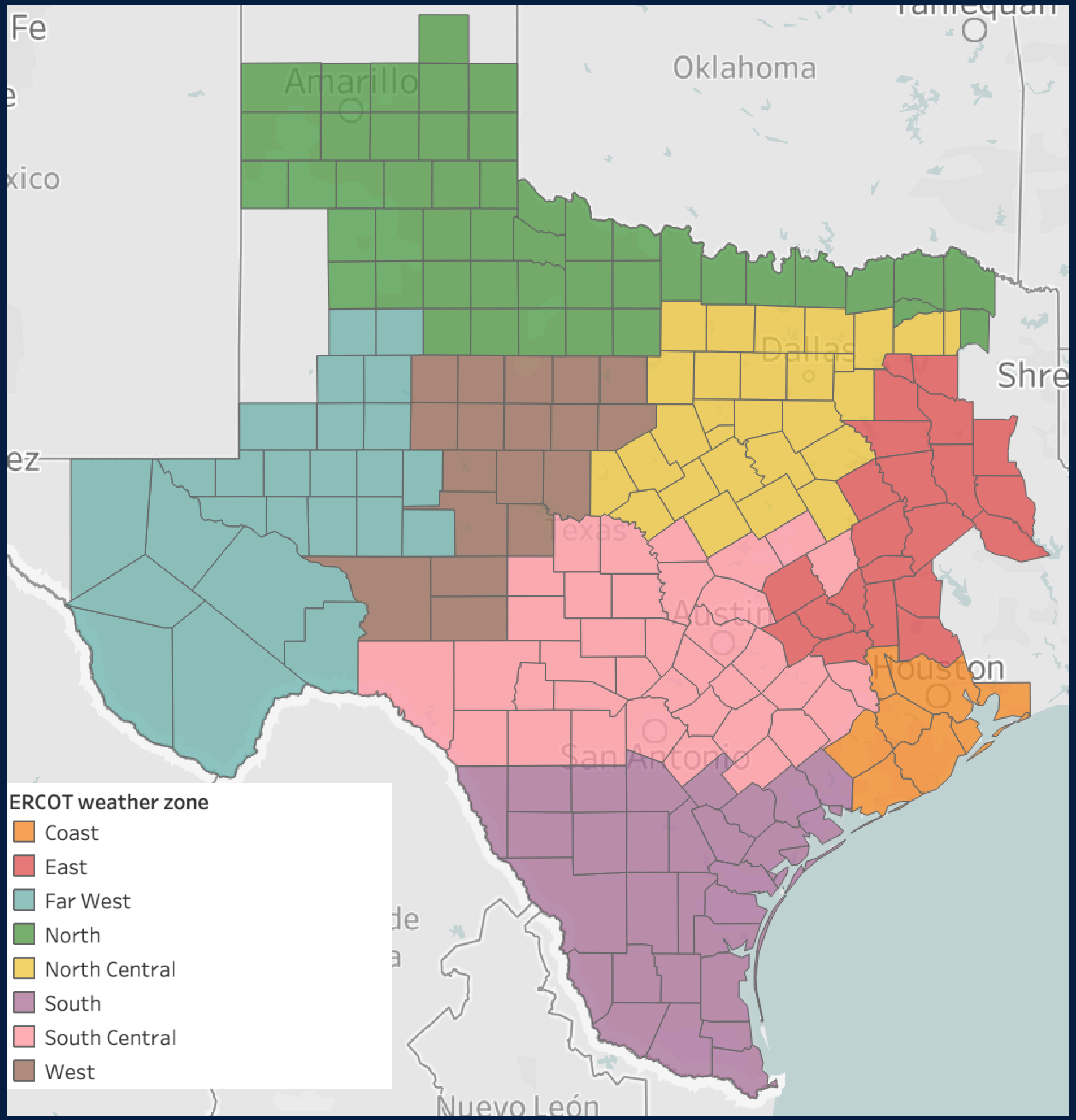

Image Source: University of Houston

04 WATER AND LAND IMPACTS WILL BE SUBSTANTIAL, BUT THEIR SEVERITY WILL DEPEND ON THE ENERGY RESOURCES CHOSEN TO MEET RISING DEMAND.

Data center growth will exacerbate Texas' water deficit if the industry predominantly leverages natural gas generation to meet demand; this effect will be amplified if CCUS is deployed in tandem. Land impacts will be the largest if the state prioritizes utility-scale wind generation to meet data center load growth. Unsustainable water and land impacts can be minimized with a balanced energy portfolio, but all pathways will require tradeoffs and careful consideration of the increasing competing uses for valuable and limited resources.

MEETING DATA CENTER LOAD WITH NATURAL GAS COUPLED WITH CCUS WOULD USE THE MOST WATER.

50x more water than solar generation

1000x more water than wind generation

MEETING DATA CENTER LOAD WITH WIND ENERGY WOULD REQUIRE THE MOST LAND.

4x more land than solar generation

42x more land than natural gas generation

QUANTIFYING WATER USE

Data centers require water resources primarily for electricity generation (indirect use) and cooling (direct use). Data from publicly traded companies quantifies the direct and indirect water demand of data centers in Texas at about 793 gallons per MWh.[2] In a worst case scenario, the total water demand intensity of data centers can be as high as 45,701 gallons per MWh. In a water-stressed state like Texas, these metrics highlight the urgent need for a robust policy framework that governs energy and water use in data centers and provides for their sustainable development.

793 gal/MWh Total data center water intensity[3,4]

05 THE GROWTH OF DATA CENTERS IS OUTPACING POLICY DEVELOPMENT.

Proposed market rules and introduced legislation signal that data centers are a key issue for policymakers. Promising reforms are on the table, including reducing regulatory delays in reviewing and approving new large load requests, interconnection standards, and curtailment requirements for data centers. However, key vulnerabilities remain, including lack of policy clarity on data center siting, onsite generation, efficiency, data reporting, forecasting, and transmission cost recovery.

EXISTING DATA CENTER POLICY

ERCOT

The Electric Reliability Council of Texas (ERCOT) recently approved the Large Load Interconnection Process (LLIP), a structured framework designed to manage the interconnection of large loads like data centers. This new process aims to provide updated standards, improved visibility and predictability, better risk assessment, and coordination for large electrical loads that may significantly impact grid reliability.[5,6]

Under the new rules, data center developers must engage with ERCOT earlier in the project lifecycle and must submit detailed information, including location, size, load characteristics, and timelines, when a data center exceeds defined thresholds or is located in areas of grid constraint. This structured process reflects a progressive approach that balances the rapid growth of digital infrastructure with the operational integrity of the Texas power system. The rules also acknowledge that Nodal Protocol Revision Requests (NPRRs) must continually evolve as more information about large loads and improved risk analyses becomes available. However, the rules do not cover assessments of regional or cumulative data center impacts, standards for load flexibility, or requirements for onsite generation. Additionally, ERCOT does not perform integrated analysis on water needs or impacts of new generation resources that seek interconnection.

LEGISLATURE

Large loads have also caught Texas legislator's attention. Their response? Senate Bill 6 (SB 6).

SB 6 introduces "large load customer" standards targeting new or expanded facilities with peak demand exceeding 75 MW, a threshold that encompasses hyperscale data centers.[7] While the bill does not name data centers explicitly, the bill's provisions clearly align with data center operations:

1. **Transmission Cost Allocation.** Large load customers must contribute to the cost of electric infrastructure.
2. **Transparency in Load Forecasting.** By requiring financial commitments earlier in the project lifecycle, SB 6 attempts to reduce speculative projects in the interconnection queue.
3. **Grid Protection Measures.** SB 6 requires large loads to share the load shed obligation during times of shortage. ERCOT can require deployment of backup power or curtail large loads, promoting grid reliability by integrating data centers into emergency response plans.

LEGISLATURE

Policymakers have begun to construct a policy framework that governs the growth of large loads and offers operators the opportunity to become active grid partners, balancing operational resilience with energy market participation. However, creating a **sustainable** data center future will require going beyond existing policy.

To support the sustainable growth of data centers, policymakers should incentivize the use of renewable energy and distributed generation to power facilities which will minimize water and infrastructure needs.

Policymakers can also address water stewardship by encouraging data center designs and technologies that minimize water use—an essential step as Texas continues to face prolonged drought conditions.

Finally, thoughtful policy can guide responsible siting by incentivizing development on previously developed land, helping to preserve natural landscapes and mitigate the environmental impact of new facilities.

SUSTAINABLE DIGITAL ECONOMY FRAMEWORK

As Texas enters a new phase of digital infrastructure development, existing policy tools must evolve to address not only economic prosperity and grid reliability but also environmental sustainability. State leaders should pursue a broader policy agenda centered on three strategic pillars: grid flexibility, resource sustainability, and planning transparency.

Flexibility	Sustainability	Transparency

Recommendation One: Incentivize Responsible Energy Use

Data centers have the potential to be grid assets if designed and operated with flexibility and sustainability in mind. Policymakers should adopt clear standards and financial incentives for participation in demand management programs, including mandatory demand response capabilities for large loads. Legislation should encourage or require investments in onsite generation and storage technologies, emphasizing resources that minimize emissions and water use such as solar-plus-storage. Future legislative efforts should prioritize low-emission alternatives and reward facilities that contribute to grid reliability while reducing their environmental footprint.

State programs should also support the adoption of advanced, energy efficient technologies for cooling and storage. Performance-based rebates, procurement incentives, or accelerated permitting could be tied to energy intensity benchmarks, benefitting data centers that meet or exceed efficiency standards. These policies would help curb and manage peak demand growth and reduce the total environmental burden of the sector.

Recommendation Two: Plan & Coordinate Water and Land Use

Sustainable data center policy must extend beyond energy use to account for Texas' increasingly strained water and land resources. Water-efficient cooling technologies should be actively promoted through both regulatory incentives and procurement standards. Given the growing importance of water conservation in regions prone to drought, data center developments should be evaluated not only for their energy use, but their total water use intensity as well.

Furthermore, policymakers should consider a siting framework that discourages unnecessary greenfield development. Incentives could be provided for locating new facilities on previously developed land or in areas that experience high curtailment of renewable energy due to grid constraints. Positioning data centers to offtake energy that would otherwise be curtailed would result in grid benefits and reduce energy waste. If siting in populated areas, policymakers should encourage mitigation of noise and other public health impacts.

Together, these measures would mitigate land use conversion, preserve natural ecosystems, and enable more coordinated infrastructure buildout in urban or industrial corridors.

Recommendation Three: Enhance Planning Transparency & Regional Coordination

Policymakers should require greater transparency and visibility into data center operations, especially related to energy and water demand use and forecasts. Voluntary disclosure frameworks, supported by regulatory guidance, would improve energy and water system planning without compromising proprietary information. Additionally, cumulative impact assessments should be included in planning models to evaluate the combined effects of multiple large load facilities in the same region.

A coordinated state strategy that links ERCOT, the Public Utility Commission, and local governments is necessary to ensure that data center growth aligns with development goals, environmental constraints, and future resource availability. This includes harmonizing permitting processes, transmission planning, and economic incentives across jurisdictions.

Table 1. Comparison of Data Center Policy in Development Vs. Policies Needed for a Sustainable Digital Economy

Category	Policies in Development	Policies Needed
Reliability	Updating ERCOT market rules to better integrate flexible load from data centers	Demand response participation requirements for large energy consumers
	Emergency response participation requirements for large energy consumers	Clear interconnection standards aligned with grid reliability and local constraints
	Exploring cost-sharing mechanisms for infrastructure upgrades (e.g., SB 6)	Ensuring transmission cost allocation is commensurate with demand from large loads and does not unfairly burden other consumers
Sustainability	Top-down pressure to incorporate onsite generation at large load facilities	Incentives for renewable onsite generation, storage, and microgrids
		Standards or incentives for energy and water efficient technologies
		Siting requirements that minimize greenfield development, and provide grid benefits (e.g. curtailment reduction).
Transparency	Disclosure of financial commitments earlier in project lifecycle	Voluntary transparency initiatives on data center energy use to aid load forecasting and planning
		Coordinated regional planning processes to evaluate cumulative grid impact of data center growth

CASE STUDY

ENGIE & Cipher Mining

Announced May 2025, ENGIE North America has entered into a preliminary agreement with Cipher Mining Inc. to supply up to 300 megawatts (MW) of clean energy from one of ENGIE's wind facilities to power a Cipher Mining data center in Texas.[8]

The data center will be co-located with a wind energy project, allowing direct use of renewable energy and reducing reliance on the congested transmission grid in West Texas. By consuming surplus wind energy during periods of excess generation, the facility supports grid stability and mitigates curtailment challenges common in regions with abundant renewable resources and limiting infrastructure.

This partnership demonstrates how the strategic siting of data centers with renewable generation can reduce grid strain and lower emissions. It serves as a model for coordinated infrastructure planning and advancing a sustainable digital economy in Texas.

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