TEXAS DATA CENTER LANDSCAPE

Known Deals, Permitting Status & Regulatory Framework

Research Compilation | January 2026

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This document is a compilation of public information about current data center deal activity in Texas, organized and described in lay terms. It is intended to serve as:

1. An informational resource for elected officials, appointed commissioners, and municipal/county staff considering data center land use policies
2. A starting point for public discussion regarding appropriate standards for large-scale industrial development in sensitive environmental areas

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Executive Summary

Texas has become the epicenter of U.S. data center development, driven by land availability, relatively low energy costs, a deregulated power market, and business-friendly regulatory environment. However, the scale of proposed development has created significant tension between economic opportunity, grid reliability, water resources, and community impacts.

Metric	Value
ERCOT Large Load Queue (Dec 2025)	**230+ GW** (70%+ data centers)
Actually Connected/Approved	**~7.5 GW**
State Tax Subsidies (FY 2025)	**$1 billion+** (projected $9B through 2030)
Operational Data Centers	**375+** (70+ under construction)
ERCOT Peak Demand Growth Forecast	**70%+ by 2031**

1. Major Confirmed Texas Projects

Stargate Project (OpenAI/Oracle/SoftBank)

The largest data center initiative in U.S. history, with Texas hosting 3 of 7 announced U.S. sites.

Abilene (Taylor County) - Flagship Campus

- **Status:** Operational (Phase 1); Phase 2 under construction
- **Developer:** Crusoe Energy (Lancium campus)
- **Investment:** ~$12 billion construction cost (not including GPUs)
- **Capacity:** 1.2 GW at full buildout (8 buildings, 4M sq ft)
- **Site:** 875-940 acres (larger than Central Park)
- **Timeline:** Phase 1 (200 MW, 2 buildings) energized Sept 2025; Phase 2 (1 GW, 6 buildings) expected mid-2026
- **Power:** On-site 360 MW natural gas plant ($500M); grid connection; West Texas wind
- **Water:** Closed-loop cooling; 8M gallon initial fill from Abilene municipal supply
- **Jobs:** 6,000+ construction workers; 357-1,700 permanent positions (varying claims)
- **Tax Status:** Property tax abatement granted by Taylor County
- **GPUs:** Up to 400,000 Nvidia GB200 (Blackwell) planned
- **Financing:** $2.3B JPMorgan loan (May 2025); Blue Owl, Sumitomo Mitsui, Goldman Sachs

Shackelford County - Frontier Campus

- **Status:** Announced September 2025
- **Developer:** Oracle
- **Capacity:** 1+ GW planned

Milam County - SoftBank Data Center

- **Status:** Announced September 2025
- **Developer:** SoftBank Group Corp
- **Capacity:** 1+ GW planned

Abilene Expansion

- **Status:** Announced September 2025
- **Capacity:** Additional 600 MW on adjacent site

Google - $40 Billion Texas Investment

- **Announced:** November 14, 2025 (Gov. Abbott press conference)
- **Investment:** $40 billion through 2027
- **Locations:** Three new data centers (will make Texas Google's largest data center market globally)
- **Midlothian:** Existing facility, announced expansion site
- **Energy:** 6,200+ MW of renewable energy PPAs contracted; $30M Energy Impact Fund
- **Environmental:** Concerns raised about West Texas water/electricity consumption

Other Major Texas Projects

Project	Location	Capacity	Timeline	Status
Advanced Energy & Intelligence Campus	Amarillo (Panhandle)	**11 GW**	First 1 GW: 2026; Nuclear: 2032	Geotechnical started June 2025
Data City Texas	Near Laredo	**5 GW**	Construction: 2026	Planning
Tract Caldwell County	Between Austin & San Antonio	**2 GW**	Initial 360 MW: 2028	Land acquired May 2025
Provident/PowerHouse DFW	Dallas-Fort Worth	**200 MW**	Phase 1: May 2026	500 MW ERCOT approved
Stream San Antonio III	San Antonio	**200 MW**	Q2 2025	Under construction
TCDC/Sharon AI	Ector County (Permian)	**250 MW**	Phase 1: Dec 2026	Off-grid natural gas
Anthropic/Fluidstack	Texas (site TBD)	TBD	TBD	$50B plan announced Dec 2025

2. Texas Regulatory Framework

Senate Bill 6 (Effective June 21, 2025)

Nicknamed the "Kill Switch Bill" - represents a major policy shift requiring large loads to share grid responsibility.

Key Provisions

- **Threshold:** Applies to loads ≥75 MW at single site (PUCT may lower)
- **Disclosure:** Must reveal duplicate interconnection requests elsewhere in Texas
- **Financial Commitment:** Security deposit ($/MW); proof of site control required
- **Study Fees:** Minimum $100,000 for initial transmission screening
- **Backup Generation:** Must disclose on-site generation capable of serving 50%+ of load
- **Cost Recovery:** Large loads must contribute to interconnection costs (reduces ratepayer burden)

Curtailment Requirements (Post-Dec 31, 2025)

- **Remote Disconnect:** Must install equipment allowing ERCOT to remotely curtail during emergencies
- **Firm Load Shed:** Data centers curtailed BEFORE residential rotating outages
- **Notice:** 24-hour notice required before curtailment
- **Exceptions:** Critical industrial customers and critical natural gas facilities exempt
- **Voluntary Program:** ERCOT developing competitive demand response procurement service

Co-Location Rules

- Net-metering arrangements with existing generators (as of Sept 1, 2025) require ERCOT study + PUCT approval
- 120 days for ERCOT study; 60 days for PUCT decision
- Exemption: Generation under majority ownership of large load's parent as of Jan 1, 2025
- PUCT may impose conditions including callable dispatchable capacity and curtailment

Tax Incentives

Sales and Use Tax Exemption (Texas Comptroller)

- **Scope:** 6.25% state sales/use tax exemption on equipment, including electricity purchases
- **Cost to State:** $1 billion in FY 2025 alone
- **Projected:** $1.7 billion in 2030; $9 billion cumulative 2025-2030
- **Forecast Error:** FY 2025 projection revised from $130M to $1B in 23 months
- **Disclosure:** Texas reports company names but no project-level subsidies, jobs, or locations

Local Incentives

- Property tax abatements (county/municipal)
- Chapter 380/381 economic development agreements
- Tax Increment Financing (TIF) districts

3. ERCOT Grid Status & Infrastructure

Interconnection Queue (December 2025)

- **Total Large Load Requests:** 230+ GW (up from 63 GW in Dec 2024 - nearly 4x increase)
- **Data Center Share:** 70%+ of requests
- **Per-Site Scale:** "Many" requests exceed 1 GW per site
- **Applications (2025):** 225 through mid-November vs. 152 for 2022-2024 combined
- **Study Status:** ~128 GW have not submitted studies for ERCOT review
- **Actually Approved/Connected:** Only ~7.5 GW

Expert Assessment

"There's not enough stuff to serve that much load on the equipment side or the consumption side... There's just no way we can physically put this much steel in the ground to match those numbers." - Joshua Rhodes, UT Austin energy researcher; Beth Garza, former ERCOT Independent Market Monitor Director

Approved Infrastructure Projects

Project	Investment	Scope	Timeline
STEP Phase 1 - Eastern TX "Superhighway"	$9.4 billion	1,109 miles 765-kV lines	Early 2030s
West Texas Network	$13.8 billion	Transmission expansion	Multi-year
Full STEP Plan	$33 billion	2,468 miles 765-kV	10+ years

Cost Allocation Concern: Transmission costs spread across all ERCOT customers. Large industrial users can strategically reduce usage at peak times to avoid paying for new infrastructure, shifting burden to residential ratepayers.

4. Community Opposition in Texas

San Marcos / Hays County Cluster

Three separate data center proposals within 3 miles of each other have sparked intense community resistance.

CyrusOne/Highlander Project (Francis Harris Lane)

- **Proposal:** $1.5 billion, 200-acre data center campus
- **Status:** City Council paused in late 2025 after failing to secure supermajority; returned January 2026
- **Opposition:** 70+ public comments, 52 speakers against at March 2025 Planning Commission
- **Key Concerns:** Water (city under drought restrictions, may run out by 2047); Edwards Aquifer proximity
- **Developer Claims:** Closed-loop cooling; 60-70K gallon one-time fill; 20-35K gal/day non-cooling

CloudBurst Data Center

- **Proposal:** 96 acres straddling Hays/Guadalupe counties (outside city jurisdiction)
- **Status:** Groundbreaking ceremony November 2025
- **Power:** On-site natural gas plant (Energy Transfer deal for 1.2 GW capacity)
- **Opposition:** Data Center Action Coalition; local families including multi-generational residents
- **Regulatory Gap:** County officials say they have no authority to stop project
- **Activist Quote:** *"Every single neighbor in that area has either approached us or city council to say, why are you letting this happen?"*

Sabey Data Center

- **Proposal:** 786 acres southeast of Old Bastrop Road
- **Status:** City Council appointed negotiating committee June 2025
- **Location:** Directly across from CyrusOne site

Abilene Health Concerns

- **Issue:** $500M on-site natural gas plant co-located with Stargate campus
- **Capacity:** 360 MW from burning natural gas
- **Pollutants:** NOx, particulate matter, other combustion byproducts
- **Population:** 130,000 residents in semi-rural community with limited regulatory pushback
- **Job Reality:** 1,500 construction jobs → only 357 permanent positions promised
- **Analysis:** *"Economic impacts are overstated, and the health effects are under-acknowledged"* - Texas Observer

Organized Resistance

- **Data Center Action Coalition:** Active in San Marcos area
- **March for Water (Aug 2025):** Protesters marched from San Marcos City Park to City Hall
- **National Movement:** 142 grassroots groups in 24 states opposing data centers (Data Center Watch)
- **Texas Blocked/Delayed:** Part of $64B+ national project impacts (May 2024-March 2025)

5. Water & Resource Concerns

State-Level Projections

- **Current (2025):** ~25-46 billion gallons/year (0.4-0.7% of state water use)
- **2030 Projection:** Up to 399 billion gallons/year (~7% of total state use)
- **Equivalent:** Water consumption of 1.3 million average U.S. households
- **Average Facility:** 300,000 gallons/day (equivalent to ~1,000 homes)
- **Data Gap:** Texas does not require data centers to disclose water consumption

Planning Gaps

- Texas Water Plan does not account for data center growth
- No state-level disclosure requirements for water use
- San Marcos under Stage 3 drought restrictions; could run out of water by 2047
- **Expert Quote:** *"If Texas is looking at this as a business growth opportunity... water should be one of the paramount considerations."* - Julie Nahrgang, Water Environment Association of Texas

Mitigation Technologies

- **Closed-Loop Cooling:** Used by Stargate Abilene; ~8M gallon initial fill, minimal makeup
- **Direct-to-Chip Liquid Cooling:** Crusoe's "zero-water-evaporation" system
- **Two-Phase Immersion:** UT-Arlington research on vapor cooling (no water)
- **Reality Check:** Not all developers adopt water-saving technologies; often developer choice, not required

6. Key Takeaways for Strategic Planning

Queue vs. Reality Gap

230+ GW in ERCOT queue vs. ~7.5 GW actually connected/approved. Majority of applications are speculative; SB 6's transparency requirements aim to filter "phantom load." Infrastructure planning based on inflated demand forecasts risks stranded costs passed to ratepayers.

Regulatory Arbitrage

Projects exploit jurisdictional gaps (CloudBurst straddling Hays/Guadalupe counties). Unincorporated areas have fewer regulatory hurdles. Behind-the-meter natural gas generation avoids some grid oversight.

Community Leverage Points

Rezoning requires supermajority votes (San Marcos model). Water utility/Edwards Aquifer concerns provide environmental standing. Annexation agreements create negotiation opportunities for restrictive covenants.

Investment Opportunity Signals

Power is the bottleneck, not capital. Sites with existing grid capacity command premiums. Rural/semi-rural areas with power access are targets. Water-efficient technology adoption is differentiator. Companies offering grid flexibility (curtailment-ready) have regulatory advantage under SB 6.

Conservation-Commerce Integration Angles

SB 6's cost-sharing requirements create openings for projects that reduce ratepayer burden. Water stewardship positioning resonates with community concerns. Renewable energy PPAs (Google's 6,200 MW model) provide ESG narrative. Behind-the-meter battery storage addresses curtailment requirements while reducing grid dependence.

Sources

Primary Sources:

- ERCOT Large Load Interconnection Reports (December 2025)
- Texas Comptroller Data Center Tax Exemption Reports
- Good Jobs First: "Cloudy with a Loss of Spending Control" (April 2025)
- Texas Legislature: Senate Bill 6 (89th Session)
- PUCT Project No. 58317 (SB 6 Implementation)
- Houston Advanced Research Center water consumption estimates

News & Industry Sources:

- Texas Tribune, Houston Chronicle, Texas Observer
- Data Center Dynamics, Data Center Frontier, Data Center Knowledge
- CNBC, Bloomberg, Wall Street Journal
- OpenAI corporate announcements
- Community Impact (San Marcos/Buda/Kyle)
- Law firm analyses: McGuireWoods, Weil, Pillsbury, Bracewell, Baker Botts, Mayer Brown, Perkins Coie

APPENDIX A: POWER GENERATION OPTIONS FOR DATA CENTERS

This section evaluates power generation technologies for data center applications, with specific consideration for Central Texas deployment.

1. Natural Gas

Technology Overview

Natural gas-fired generation includes combined-cycle plants (most efficient, using waste heat for additional generation), simple-cycle turbines (fast-start "peakers"), and reciprocating engines. Currently the dominant behind-the-meter solution for data centers due to proven technology, rapid deployment, and dispatchable output.

General Pros

- **Proven, mature technology:** Decades of operational experience
- **Dispatchable:** On-demand power, 24/7 availability
- **Rapid deployment:** 12-24 months typical construction
- **Cost-effective:** ~$37/MWh (combined cycle) before carbon costs
- **Scalable:** Modular from 1 MW reciprocating engines to 500+ MW combined cycle

General Cons

- **Emissions:** NOx, particulates, CO2 (health and climate concerns)
- **Fuel price volatility:** Exposed to commodity markets
- **Community opposition:** Air quality concerns (Abilene, San Marcos examples)
- **ESG conflicts:** Inconsistent with corporate net-zero commitments
- **Turbine lead times:** Large gas turbines now have multi-year wait times

Central Texas Considerations

- **Advantage:** Abundant natural gas infrastructure; proximity to Permian Basin and Eagle Ford Shale
- **Advantage:** Existing pipeline network throughout region
- **Challenge:** Edwards Aquifer region air quality sensitivity
- **Challenge:** San Marcos and Hays County community opposition to gas-fired facilities
- **Regulatory:** TCEQ air permits required; relatively permissive environment

Timeline to Power: 12-24 months (available now)

LCOE: $37-50/MWh (combined cycle); $90-124/MWh (with potential carbon costs)

2. Solar + Battery Storage

Technology Overview

Utility-scale photovoltaic arrays paired with lithium-ion battery energy storage systems (BESS). Can provide ~80% of data center load with 4-6 hours of storage; requires backup for overnight and cloudy periods. Texas leads nation in solar deployment with 900+ projects in development.

General Pros

- **Lowest LCOE:** $25-26/MWh for generation; competitive with fossil fuels
- **Zero emissions:** Supports corporate sustainability goals
- **Scalable:** Modular deployment from MWs to GWs
- **Federal incentives:** 30% ITC for solar + storage (IRA provisions)
- **Rapid deployment:** 12-18 months for utility-scale

General Cons

- **Intermittency:** ~6 hours/day average production; requires firming
- **Land intensive:** ~5-7 acres per MW; 500 MW facility = 2,500-3,500 acres
- **Battery degradation:** Li-ion batteries degrade over time; replacement costs
- **Cannot provide 24/7:** Requires backup generation for baseload reliability
- **Fire risk:** BESS facilities have experienced thermal runaway incidents

Central Texas Considerations

- **Advantage:** Excellent solar irradiance; Texas #1 in solar capacity additions
- **Advantage:** Land availability in surrounding counties
- **Challenge:** Hill Country terrain less optimal than West Texas flat land
- **Challenge:** Political headwinds against renewables in Texas legislature
- **Opportunity:** Hybrid with gas backup satisfies both reliability and ESG

Timeline to Power: 12-18 months (available now)

LCOE: $26-50/MWh (solar alone); $87/MWh (with storage for near-24/7)

3. Wind Power

Technology Overview

Utility-scale wind farms using horizontal-axis turbines. Texas leads the nation in wind capacity (40+ GW installed). Wind production peaks at night, complementing solar's daytime profile. Typically contracted via long-term PPAs.

General Pros

- **Low LCOE:** $25-30/MWh in favorable locations
- **Zero emissions:** Clean energy for ESG compliance
- **Night production:** Complements solar for round-the-clock renewable profile
- **Texas advantage:** Robust wind resources, especially in West Texas/Panhandle

General Cons

- **Intermittency:** ~9 hours/day average; variable output
- **Location-dependent:** Best resources in West Texas, far from Central Texas load centers
- **Transmission constraints:** Congestion on lines from West Texas to Austin/San Antonio
- **Political uncertainty:** Texas legislation targeting renewable intermittency

Central Texas Considerations

- **Challenge:** Central Texas has lower wind speeds than West Texas/Panhandle
- **Challenge:** On-site wind generally not feasible; must rely on PPAs from remote projects
- **Opportunity:** Long-term contracts with West Texas wind farms via ERCOT market
- **Opportunity:** Google's 6,200 MW renewable PPAs include significant Texas wind

Timeline to Power: 18-36 months for new projects; immediate via PPAs

LCOE: $25-30/MWh (generation only)

4. Nuclear Power

Technology Overview

Nuclear fission generates heat to produce steam and drive turbines. Options include: (a) large conventional plants (1+ GW), (b) life extensions/restarts of existing plants, and (c) Small Modular Reactors (SMRs). Only 3 new U.S. plants commissioned since 2000 (Watts Bar 2, Vogtle 3 & 4). SMRs (1-350 MW) are emerging as data center solution due to smaller footprint and modular deployment.

SMR Technology Status

- **NuScale:** 77 MW modules; NRC design certified 2023; Utah project canceled 2023 due to cost overruns
- **TerraPower Natrium:** 345 MW sodium-cooled; Wyoming construction began 2024; operational ~2030
- **X-energy Xe-100:** 80 MW high-temperature gas; Amazon partnership for 5 GW by 2039
- **GE Hitachi BWRX-300:** 300 MW boiling water; Ontario project approved 2025; first operation ~2029
- **Westinghouse AP1000:** 1 GW proven design; Advanced Energy Campus (Amarillo) planning 4 units

General Pros

- **Zero carbon emissions:** Clean baseload power
- **Highest capacity factor:** ~93%; 24/7/365 reliability
- **Small footprint:** SMRs can achieve 57,000 MWh/acre/year
- **Long operating life:** 60-80 years for modern plants
- **Behind-the-meter potential:** NRC supports smaller Emergency Planning Zones for SMRs

Nuclear Power General Cons

- **Long development timeline:** 7-15 years from decision to operation
- **High capital costs:** SMRs: $3,000-6,000/kW FOAK; conventional: $7,675-12,500/kW
- **Cost/schedule risk:** Vogtle: 7 years late, $17B over budget
- **Regulatory complexity:** NRC licensing can take 3-5+ years
- **Public opposition:** NIMBY concerns; waste storage unresolved
- **Uranium supply chain:** Some advanced designs require HALEU fuel not yet commercially available

Central Texas Considerations

- **Challenge:** No existing nuclear infrastructure in Central Texas region
- **Challenge:** Public perception and siting concerns near populated areas
- **Opportunity:** Texas legislature supportive; Texas Energy Fund could apply
- **Opportunity:** Advanced Energy Campus in Amarillo could establish Texas nuclear expertise
- **Mid-term option:** PPAs from existing plants (Comanche Peak in Somervell County, ~100 miles from Austin)

Timeline to Power: SMRs: 2030-2035 earliest; Conventional: 10-15 years

LCOE: $77/MWh (existing plants); $89-331/MWh (SMR FOAK); declining with NOAK

5. Fuel Cells

Technology Overview

Electrochemical devices converting fuel (natural gas, hydrogen, biogas) to electricity without combustion. Primary types: Solid Oxide Fuel Cells (SOFCs) for continuous power, Proton Exchange Membrane (PEM) for hydrogen/backup applications. Goldman Sachs estimates 6-15% of incremental data center power could come from fuel cells by 2030.

Technology Types

- **SOFC (Bloom Energy):** Runs on natural gas; 10-30% more efficient than turbines; lower emissions; 1+ GW of orders announced
- **PEM (Ballard, Plug Power):** Runs on hydrogen; zero-emission; emerging as diesel generator replacement
- **Molten Carbonate (FuelCell Energy):** Can use captured methane; 360 MW Virginia/WV project announced

General Pros

- **Rapid deployment:** <12 months installation; modular
- **Lower emissions:** No combustion; significantly cleaner than gas turbines
- **High efficiency:** 60%+ electrical efficiency (vs. 40-55% for gas turbines)
- **Quiet operation:** No combustion noise; suitable for urban/suburban
- **Compact:** Higher power density than solar/wind
- **Hydrogen-ready:** Can transition to green hydrogen as infrastructure develops

General Cons

- **Higher capital cost:** $7,000-10,000/kW currently
- **Operating costs:** Fuel + maintenance; stack replacement every 5-7 years
- **Scale limitations:** Typical installations 1-50 MW; larger requires multiple units
- **Still uses fossil fuel:** Most current deployments run on natural gas

Central Texas Considerations

- **Advantage:** Abundant natural gas supply for SOFC operation
- **Advantage:** Lower emissions profile than gas turbines; easier community acceptance
- **Advantage:** Rapid permitting compared to combustion plants
- **Opportunity:** CoreSite, Equinix already deploying; proven for Texas conditions
- **Future pathway:** Transition to hydrogen as Gulf Coast hydrogen hub develops

Timeline to Power: 6-12 months (available now)

LCOE: $80-120/MWh (current); declining with scale

6. Geothermal Energy

Technology Overview

Geothermal harnesses heat from Earth's subsurface. Conventional geothermal requires naturally occurring hot water/steam (limited locations). Enhanced Geothermal Systems (EGS) use fracking techniques to access heat in dry rock, vastly expanding potential sites. Texas has significant geothermal potential, especially along Gulf Coast corridor.

Texas Status

- **Current:** No utility-scale geothermal plants in Texas (as of 2025)
- **Austin Energy Pilot:** 5 MW project near Nacogdoches; expected online 2025
- **Fervo Energy:** EGS technology; Google partnership for enhanced geothermal
- **Sage Geosystems:** Meta-backed; Texas-based startup
- **Legislative support:** HB 3778, SB 1762, SB 879 passed 2025; Texas Energy Fund access; regulatory relief

General Pros

- **24/7 baseload:** ~92% capacity factor; true dispatchable renewable
- **Zero emissions:** Clean energy source
- **Small footprint:** Minimal surface area compared to solar/wind
- **Bipartisan support:** Oil & gas industry endorsement; applies existing drilling expertise
- **Long operating life:** 30-50+ years

General Cons

- **High upfront cost:** $150-200+/MWh currently (FOAK)
- **Exploration risk:** Subsurface uncertainty; not all wells produce economically
- **Unproven at scale:** EGS technology still emerging; limited commercial track record
- **Timeline:** 3-5+ years from exploration to operation

Central Texas Considerations

- **Moderate potential:** 100-mile-wide hot corridor runs from Rio Grande Valley through Houston; Central TX further from optimal zones
- **Direct-use opportunity:** Whisper Valley (East Austin) demonstrates geothermal HVAC viability
- **O&G workforce:** Texas drilling expertise directly transferable
- **Future option:** Worth monitoring as EGS technology matures and costs decline
- **Regulatory tailwind:** 2025 legislation positions Texas as emerging geothermal leader

Timeline to Power: 3-5+ years (emerging technology)

LCOE: $150-200+/MWh currently; expected to decline with scale

Power Generation Comparison Summary

Technology	LCOE ($/MWh)	Capacity Factor	Time to Power	Emissions	Central TX Fit
Natural Gas (CC)	$37-50	40-60%	12-24 mo	High CO2/NOx	Good (infrastructure)
Solar + Storage	$26-87	~25%*	12-18 mo	Zero	Good (irradiance)
Wind (PPA)	$25-30	~35%	Immediate	Zero	Moderate (remote)
Nuclear (SMR)	$89-331	~93%	5-10+ yr	Zero	Long-term option
Fuel Cells (SOFC)	$80-120	~95%	6-12 mo	Low	Excellent
Geothermal (EGS)	$150-200+	~92%	3-5+ yr	Zero	Emerging option

**Solar capacity factor reflects generation hours only; with storage can provide ~80% of 24/7 load.*

Central Texas Recommendations

Near-Term (0-2 years): Natural gas BTM generation or fuel cells provide fastest path to power. Solar+storage as supplementary clean source. PPAs with existing wind/solar for renewable energy credits.

Mid-Term (2-5 years): Fuel cell deployment scaling. Hybrid configurations (gas + solar + storage). Monitor geothermal pilot results. Nuclear PPAs from Comanche Peak.

Long-Term (5-10+ years): SMR deployment as technology matures. Enhanced geothermal if Texas pilot succeeds. Green hydrogen fuel cells as Gulf Coast hydrogen hub develops.

Conservation-Commerce Integration: Projects combining closed-loop cooling (water conservation), fuel cells or solar+storage (lower emissions), and SB 6-compliant curtailment capability will face least community opposition and fastest permitting in Central Texas markets.

APPENDIX B: GLOSSARY OF DATA CENTER & ENERGY TERMS

Grid & Interconnection Terms

Large Load Queue: The backlog of requests from major electricity consumers (data centers, industrial facilities, crypto mining) waiting for ERCOT approval to connect to the Texas grid. Each request undergoes transmission impact studies before approval. The queue exploded from 56 GW (Sept 2024) to 230+ GW (Dec 2025), with 70%+ being data centers. Most requests are speculative; only ~7.5 GW have actually been approved/connected.

ERCOT (Electric Reliability Council of Texas): Independent nonprofit managing the electric grid for ~90% of Texas (26+ million people). Operates the wholesale electricity market, coordinates power generation, and ensures grid reliability. Unique among U.S. grids for being largely isolated from the national interconnected system.

Interconnection: The physical and contractual process of connecting a new load (like a data center) or generator to the electric grid. Requires transmission studies, infrastructure upgrades, and regulatory approvals. Current wait times in Texas: 3-5+ years for large loads.

Firm Load Shed: Mandatory, controlled power cuts during grid emergencies when generation cannot meet demand. Under SB 6, new data centers must curtail before residential rotating outages begin.

Curtailment: Reducing or cutting power consumption on demand. Under SB 6, data centers connecting after Dec 31, 2025 must install remote-disconnect equipment allowing ERCOT to curtail their load during emergencies.

PUCT (Public Utility Commission of Texas): State agency regulating electric utilities and implementing energy policy. Oversees ERCOT and implements legislation like SB 6. Currently developing rules for large-load interconnection (Project No. 58317).

Transmission: High-voltage power lines (typically 69 kV to 765 kV) that carry electricity long distances from generators to substations. ERCOT's STEP plan calls for $33B in new transmission including 765 kV "superhighway" lines.

Substation: Facility that transforms voltage levels between transmission and distribution systems. Data centers typically require dedicated substations or major substation upgrades. Lead times for new equipment: 12-18+ months.

Power Measurement & Capacity Terms

MW (Megawatt): Unit of power equal to 1 million watts. One MW can power roughly 200 average Texas homes. A typical large data center: 50-200 MW. Hyperscale AI campuses: 500 MW to 1+ GW.

GW (Gigawatt): 1,000 megawatts. ERCOT's 2024 peak demand: ~85 GW. Stargate Abilene at full capacity: 1.2 GW (enough to power 750,000+ homes).

MWh (Megawatt-hour): Energy delivered by one megawatt over one hour. Used for billing and energy consumption tracking.

Peak Demand: Maximum electricity consumption at any moment, typically on hot summer afternoons in Texas. ERCOT's record: 85.5 GW (August 2023). Projected 2031: 70%+ increase.

Baseload Power: Minimum level of demand over 24 hours. Requires reliable, continuous generation (nuclear, natural gas, geothermal). Data centers need 24/7 baseload power with 99.999% uptime.

Capacity Factor: Ratio of actual output to maximum possible output over time. Nuclear: ~93%. Geothermal: ~92%. Natural gas: ~40-60%. Solar: ~25%. Wind: ~35%. Higher = more reliable.

LCOE (Levelized Cost of Energy): Total lifecycle cost of building and operating a power plant divided by total energy produced. Expressed as $/MWh. Useful for comparing generation options but doesn't capture intermittency costs.

Generation & Contracting Terms

Behind-the-Meter (BTM): On-site power generation that feeds directly into a facility without passing through the utility meter or grid. Bypasses interconnection queues. Examples: on-site natural gas turbines, fuel cells, solar arrays. 27% of data centers expected to be fully BTM-powered by 2030.

Co-Location (Power): Siting a data center adjacent to or directly connected with a power generation facility. Under SB 6, net-metering arrangements with existing generators require ERCOT study and PUCT approval.

PPA (Power Purchase Agreement): Long-term contract to buy electricity from a generator at a fixed or indexed price. Hyperscalers use PPAs to secure renewable or nuclear power. Example: Meta's 20-year PPA with Constellation for Clinton nuclear plant.

Virtual PPA (VPPA): Financial contract where buyer pays fixed price regardless of market price, receiving difference as payment or credit. Used to support renewable projects without physical delivery.

Dispatchable Power: Generation that can be turned on/off or ramped up/down on demand. Includes natural gas, nuclear, battery storage. Critical for grid stability. Contrasts with chrointermittent renewables (solar/wind).

Intermittent/Variable Renewable Energy (VRE): Generation dependent on weather conditions. Solar: ~6 hours/day average. Wind: ~9 hours/day average. Requires storage or backup for 24/7 operations.

Data Center Terms

Hyperscale Data Center: Massive facility (typically 100+ MW) operated by major cloud providers (Amazon, Google, Microsoft, Meta, Oracle). Designed for economies of scale with standardized, modular architecture.

Colocation (Colo): Third-party facility that leases space, power, and cooling to multiple tenants. Tenants own their servers; operator provides infrastructure. Examples: Equinix, Digital Realty, CyrusOne.

IT Load: Power consumed by computing equipment (servers, storage, networking). Typically 40-60% of total facility power; rest goes to cooling and infrastructure.

PUE (Power Usage Effectiveness): Ratio of total facility energy to IT equipment energy. PUE of 1.0 = perfect efficiency (impossible). Industry average: ~1.5. Best-in-class: 1.1-1.2. Lower = better.

Rack Density: Power consumption per server rack, measured in kW/rack. Traditional: 5-10 kW. AI/GPU workloads: 40-100+ kW. Drives need for advanced cooling.

Uptime/Availability: Percentage of time facility is operational. "Five nines" (99.999%) = ~5 minutes downtime/year. Requires redundant power, cooling, and connectivity.

N+1, 2N, 2N+1 Redundancy: Infrastructure backup configurations. N+1: one extra component. 2N: fully duplicated systems. 2N+1: duplicated plus spare. Higher redundancy = higher cost, higher reliability.

Cooling & Water Terms

Closed-Loop Cooling: System where coolant circulates in sealed circuit without evaporative loss. Used by Stargate Abilene. Requires initial fill (8M gallons for Abilene) but minimal ongoing water consumption.

Open-Loop/Evaporative Cooling: Traditional cooling using water evaporation (cooling towers). Can consume millions of gallons annually. ~80% of water evaporates; 20% requires treatment.

Direct-to-Chip Liquid Cooling: Coolant flows directly over processor surfaces via cold plates. Enables higher rack densities than air cooling. Crusoe's Stargate design uses this for "zero-water-evaporation."

Immersion Cooling: Servers submerged in dielectric (non-conductive) fluid. Two-phase systems use fluid that vaporizes on contact with hot components, then condenses. No water required.

WUE (Water Usage Effectiveness): Liters of water consumed per kWh of IT energy. Industry average: 1.8 L/kWh. Air-cooled facilities: near zero. Evaporative-cooled: 2-4+ L/kWh.

Regulatory & Financial Terms

SB 6 (Senate Bill 6): Texas legislation signed June 2025 establishing interconnection standards for large loads (≥75 MW). Requires disclosure of duplicate applications, financial commitments, backup generation, and mandates remote curtailment capability for new connections after Dec 31, 2025.

ETJ (Extraterritorial Jurisdiction): Area outside city limits where municipality has limited authority over zoning and development. Projects in ETJ (like CloudBurst in Hays County) face fewer regulatory hurdles.

Chapter 313/380/381: Texas Tax Code provisions enabling economic development incentives. Chapter 313 (expired 2022, replaced by Chapter 403): property tax limitations for large projects. Chapters 380/381: grants and loans from cities/counties.

TCEQ (Texas Commission on Environmental Quality): State agency regulating air, water, and waste. Issues permits for power plant emissions and water use. Environmental permits "very hard to get denied" according to legal experts.

Edwards Aquifer: Major underground water source in Central Texas serving San Antonio, Austin, and surrounding communities. Protected by federal Endangered Species Act requirements. Development near recharge zones faces heightened scrutiny.