A COMMUNITY GUIDE

DATA CENTERS AND WATER USE:
WHAT YOU NEED TO KNOW

hill country alliance

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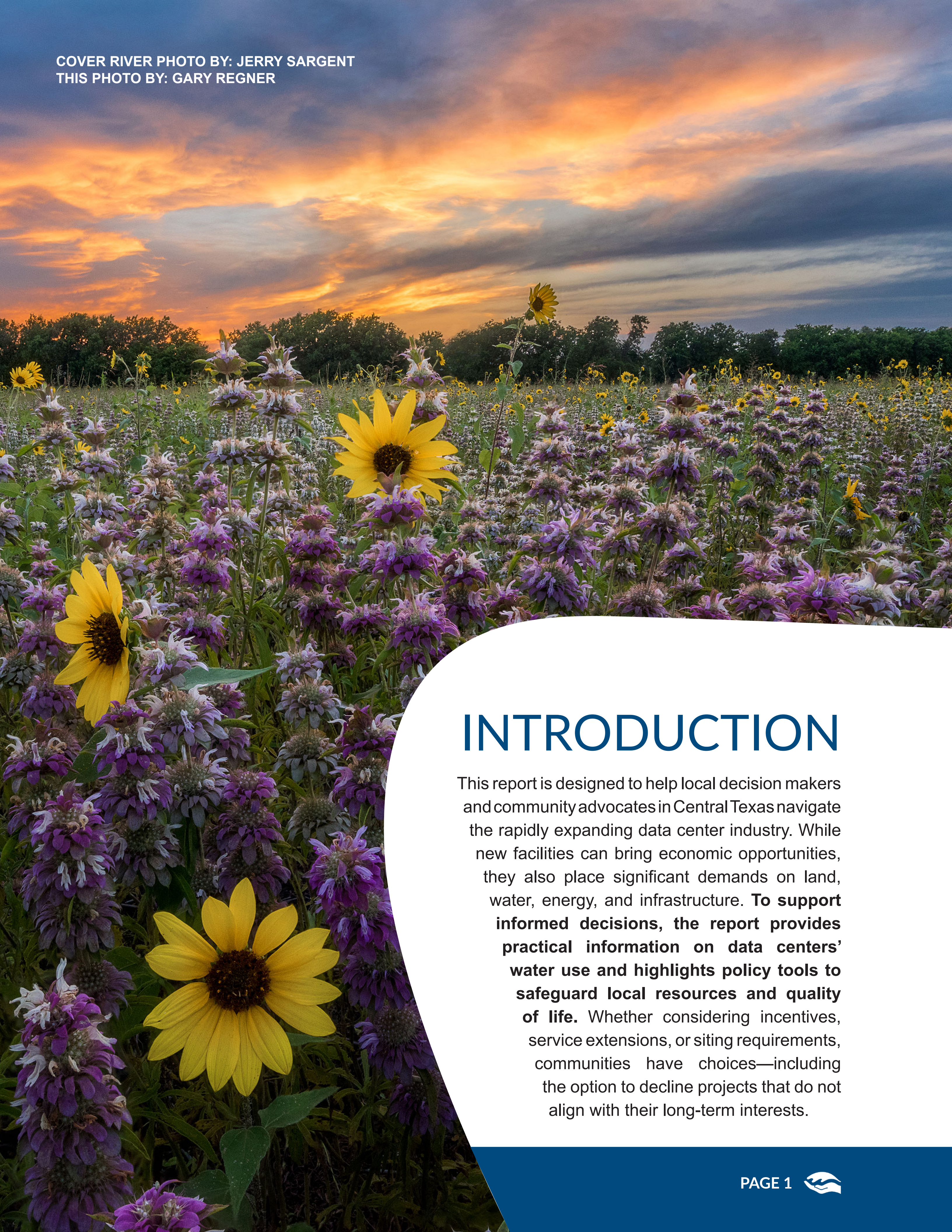

INTRODUCTION

This report is designed to help local decision makers and community advocates in Central Texas navigate the rapidly expanding data center industry. While new facilities can bring economic opportunities, they also place significant demands on land, water, energy, and infrastructure. **To support informed decisions, the report provides practical information on data centers' water use and highlights policy tools to safeguard local resources and quality of life.** Whether considering incentives, service extensions, or siting requirements, communities have choices—including the option to decline projects that do not align with their long-term interests.

DATA CENTERS IN CENTRAL TEXAS

A **data center** is a specialized facility—typically a building or network of buildings—designed to house computer servers, storage devices, and networking equipment, which act as the backbone of digital services. Data centers enable everything from cloud apps and AI modeling to online banking, email, and social media. They can vary drastically in size, from 1,000 square feet for a small data center, to over a million square feet for a hyperscale center (see Table 1, Types of Data Centers).

As the demand for cloud services, streaming, and artificial intelligence grows, so too does the need for data centers to meet that demand. Central Texas has emerged as a hotspot for new data centers due to the availability of low-cost energy resources, connectivity to fiber optic cables, tax incentives, and business-friendly policies, and to a skilled labor force to build the facilities.

According to Baxtel's "Texas Data Center Market" data, as of April 2025, Texas has more than 400 data center facilities, with more than 70 under planning and development. Of those, ~25% are in the San Antonio/ Austin area.

Table 1. Types of Data Centers (Bureau of Economic Geology, "Geospatial Suitability Analysis")

Type of Data Center (Ascending Order of Size)	Purpose	Energy Use	Size	Relative Size (Energy)	Servers
Edge Data Center	Distributed computing, enabling applications like IoT, 5G, and content delivery	20 – 500+ KW	100 – 5,000 sq.ft.	Small	5 – 100+
Enterprise Data Center	Primarily used to support the internal IT infrastructure and operations	0.5 MW – 10+ MW	1,000 – 25,000+ sq.ft.	Small	100 – 5,000+
Colocation Data Center	Designed to off-load the operational burden of managing IT infrastructure	1 MW – 100+ MW	10,000 – 100,000+ sq.ft.	Midsize	100 – 10,000+
Cloud Data Center	Provides virtualized computing resources and services over the internet	1 MW – 500+ MW	1,000 – 100,000+ sq.ft.	Large	1,000 – 10,000+
Hyperscale Data Center	Supports vast amounts of data processing and storage, typically for cloud services	100 MW – 1+ GW	10,000 – 1+ million sq.ft.	Hyper-scale	5,000 – 100,000+

WATER USE IN DATA CENTERS
THE BASICS

"A critical factor in energy-intensive data centers is thermal management, as cooling systems account for a substantial portion of total power consumption. **Every unit of electrical energy used by AI microprocessors is eventually converted into heat, requiring advanced cooling solutions to prevent performance degradation and hardware failure**." - Bureau of Economic Geology, *Geospatial Suitability Analysis for Data Center Placement*

With many Hill Country communities facing water shortages and declining aquifer and stream levels, the potentially enormous water demands of data centers have increasingly become a concern. Modern data centers can consume large amounts of water for cooling, and, indirectly, large amounts of water for energy production. The information on water and energy use in data centers is constantly evolving, making it difficult to understand the impacts that a new data center will have on local water resources and the energy grid. **This section aims to clarify how data centers *directly* use water for cooling and *indirectly* use water for energy production.**

When thinking about cooling in data centers, it can be helpful to think about it in two stages:

1) **Equipment Cooling or Heat Collection:** Heat is collected from servers by air or liquid medium.
2) **Facility Cooling or Heat Rejection:** Heat is removed from a building or liquid using various technologies.

DIRECT WATER USE - *COOLING*

One of the biggest direct uses of water in new data centers is cooling. Data centers can use vast amounts of water for cooling the constantly running servers and processors in their facilities. The amount of water used for cooling will depend on the technology used, as well as the location (hotter areas require more cooling).

It is critical to understand how water is used in both stages of cooling. Some data centers may use little water for the first stage of cooling (equipment cooling/heat collection), but vast amounts of water for the second stage of cooling (facility cooling/heat rejection).

It is also important to understand the relationship between water and energy use. Some of the more water-efficient cooling technologies use the most energy (see Table 3). Because energy production can use a lot of water, it is important to look at both direct water use for cooling and indirect water use for energy to understand the full picture of water consumption.

Table 2. Common Cooling Technology Terms

Equipment Cooling (Heat Collection)
Air Cooling: Using air as the direct *cooling medium*. Air is cooled and circulated within the data center to keep equipment at desired temperatures. Various cooling systems or heat exchangers may be used to cool the air. Air cooling is not suitable for large or hyperscale facilities..
Liquid Cooling : Using a liquid (usually water and/or refrigerant) as the direct *cooling medium*. The liquid flows through cold plates, pipes, or immersion tanks, then transfers heat to another cooling system (like a chiller, dry cooler, or cooling tower). This type of equipment cooling is commonly referred to as **“closed-loop” cooling.** Liquid recirculates through the system, though water or coolant may need to be added for maintenance purposes. **Most modern data centers use liquid cooling for heat collection.** Note: It’s important to clearly distinguish among the various types of liquid cooling options. Some high-performance systems—like two-phase immersion cooling—use PFAS-based fluids, which may pose environmental risks if leaks occur. In contrast, direct-to-chip cold plate systems rely on non-evaporative, typically safer fluids, offering high cooling efficiency with lower chemical risk.

Facility Cooling (Heat Rejection)
Air-Cooled Chiller: A refrigeration-based *cooling system* that uses fans to blow outdoor air over condenser coils to remove heat. It requires no evaporative water use but can consume more electricity, especially in hot climates. .
Dry Cooler: A *cooling system* that cools water or coolant using only ambient air, without a refrigeration cycle. It can only cool fluid close to the outdoor air temperature, so it is often paired with other cooling systems for hot days. It saves water and energy, but it is not efficient in hot climates.
Water-Cooled Chiller: A *cooling system* that uses water to absorb heat and then rejects that heat somewhere else—usually through evaporative coolers, or adiabatic coolers. Requires make-up water to replace water lost through evaporation and drift. It saves energy, but consumes a lot more water.

Table 3. Facility Cooling Water & Energy Use

Facility cooling method	Water use	Relative energy use
Dry cooling*	Low	Low
Air-cooled	Low	High
Air-cooled with evaporative or adiabatic assist	Medium	Medium-High
Water-cooled (evaporative or adiabatic)	High	Medium

**Dry Cooling needs consistently cool outside ambient air, so it’s not feasible for most data center locations.*

INDIRECT WATER USE - *ENERGY PRODUCTION*

In addition to the water directly used for cooling, it is critical to account for the **indirect water consumption** associated with data centers—primarily the water used to generate the electricity they consume. A single data center can use as much electricity as a small town, and the water required to cool the power plants supporting that energy demand can be substantial. In fact, depending on the energy source, this indirect water use can be larger than the water used directly for cooling within the facility. For a breakdown of water use for different energy sources, see Table 4.

Table 4. Amount of water used to produce energy for data centers (ERCOT)

Energy Source	Water Needs (gal/kWh)*	Indirect Water Use of Large-Sized Data Center (Using 600 million kWh of electricity annually)
Coal	~0.3–0.7	180-420 million gallons
Nuclear	~0.55-0.65	330-390 million gallons
Natural Gas	~0.05-0.7	30-420 million gallons
Wind & Solar PV	~0	~0

**Note: Water consumption rates vary based on the cooling technology used to generate each of these energy sources.*

MINIMIZING WATER USE & PROTECTING WATER QUALITY AT DATA CENTERS

The water and energy use behind data centers is complex. When working with a proposed data center, take the time to gather information:

- **What size is the data center?**
- **What is the proposed cooling technology?**
- **What is the energy source?**
- **What is the water source?**
- **What are anticipated water and wastewater demands?**

Once you have this information, there are a few requests a community can make to help conserve and protect local water resources.

1. Request water and energy efficient cooling technologies.

If a data center developer plans to use local water supplies, encourage them to adopt the most water-efficient cooling technologies appropriate for their size and location. A closed-loop liquid cooling system, paired with air chillers as the primary heat rejection method, tends to be the most water-efficient cooling strategy for large data centers in Central Texas. Although this option could be more energy intensive, if a data center is committed to maximizing energy efficiency and procuring high quality renewable electricity from the grid, it could use relatively small amounts of water in both operations and electricity generation.

Ultimately, there is no one-size-fits-all solution: the optimal approach depends on local climate, grid mix, and site constraints—but the goal should always be to minimize water use in cooling. Where possible, consider offering incentives that encourage both water and energy efficiency.

2. In water-scarce environments, discourage onsite electricity generation unless using renewables. Encourage or incentivize renewable energy sources where possible.

In most cases, a data center producing electricity onsite will build a natural gas-powered plant. These plants can require significant amounts of water (depending on the technology used) and contribute to local air pollution. In contrast, when a data center is connected to the grid, it can access renewable energy and energy produced *outside* of water-scarce environments–which can make the grid a more water-friendly choice for the Hill Country. For that reason, onsite energy generation, with the exception of *renewable* onsite energy generation, should be avoided in water-scarce communities.

Note: Where possible, encourage or incentivize data centers to supplement their energy source with rooftop solar, which does not use water.

3. *Encourage the use of reclaimed water and onsite water reuse to meet nonpotable demands and reduce strain on local water supplies.*

Data centers have several nonpotable water demands, including cooling, irrigation, and toilet flushing. To reduce strain on local water supplies, communities should encourage data centers to connect to reclaimed (purple pipe) water systems where available, and capture and reuse onsite water sources—such as rainwater and air conditioning condensate—to further reduce demand on water supplies. Because reclaimed (purple pipe) water is a limited resource, *onsite* reuse should be prioritized as a supplemental water source wherever feasible. The Hill Country Alliance's "One Water Building Checklist" and Texas Water Trade's "Net Zero Water Toolkit" are good resources on onsite water capture.

4. *Encourage data centers to minimize landscape watering by using native and drought-adapted plants.*

Like cooling, landscape watering can represent a significant source of water demand in data centers. Communities should encourage data centers to minimize landscape watering by using native and drought-adapted plants, and to use only nonpotable water sources to meet irrigation needs.

5. *Encourage (or require) enhanced stormwater management to treat runoff from roofs and parking lots.*

Large data centers increase impervious cover significantly, and care should be taken to mitigate stormwater runoff and flooding. Request or require the data center to implement low impact development strategies to mitigate stormwater, such as rainwater harvesting, rain gardens, and bioretention basins.

6. *Encourage (or require) data tracking.*

Information about data center water and energy is constantly evolving. To help inform opportunities to improve efficiency, encourage (or require) the data center to install direct metering to track its water and energy usage for cooling.

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Data centers may bring direct benefit to the community in the form of tax revenues and through the data infrastructure that we rely on as a society. There are, however, important considerations that need to be measured against the benefits of this type of development. Beyond putting strain on water resources, new data centers can lead to increased water and energy rates, and impact quality of life (e.g. noise and air pollution, aesthetic changes). The following recommendations were developed to improve community outcomes and protect residents and ratepayers from unexpected costs.

IMPORTANT CONSIDERATIONS FOR MUNICIPALITIES, COUNTIES, AND WATER PROVIDERS.

1. If you are providing water or wastewater services to a data center, or incentivizing data center development, consider how this new water demand may impact your long-term water supply and plan accordingly.

Before agreeing to provide water or wastewater services to a data center, or incentivizing a new data center, assess the annual water and wastewater demands and consider its impact on your long-term water supply plan. If extending service to a data center will precipitate the need to expand water or wastewater treatment plants, protect utility ratepayers by requesting shared investments in this infrastructure. *Ultimately, if your community does not have the infrastructure to supply the data center and meet the demands of residents, you have the power to say "no."*

2. If the data center is in the extra-territorial jurisdiction (ETJ), consider a development agreement and annexation before extending services.

Texas law allows landowners to petition to have their property removed from the ETJ, which means that the property is no longer subject to municipal regulations. A development agreement and annexation protects a community from a data center requesting to leave the ETJ after water and/or wastewater services have already been extended.

3. Minimize greenfield development through a combination of siting requirements and incentives.

Data centers vary in size, but large data centers can range from 100,000 square feet to over a million square feet. Because of their massive footprint and accompanying impervious cover, it is best to avoid “greenfield” development– or, building on land that has never been previously developed, like ranches, farmland, or other open spaces. Consider incentivizing data centers to build on previously developed land that is vacant or underdeveloped (known as redevelopment, infill, or “brownfield” development).

4. Address air and noise pollution through siting, zoning, and monitoring requirements.

Data centers can generate significant air and noise pollution, particularly from diesel backup generators, which emit harmful pollutants like fine particulate matter (PM 2.5). Exposure to PM 2.5 has well-documented health impacts, especially for vulnerable populations. Cities should carefully evaluate air quality and noise impacts during the siting and permitting process, consider requiring nearby air quality monitoring, and update zoning ordinances and land development codes to ensure that data centers are appropriately located to protect public health. For example, cities might consider limiting data centers to high-intensity industrial zones.

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KATHY PALLADINI

CONCLUSION

As Central Texas continues to attract new data center development, communities face an important choice: how to balance economic growth with the protection of limited water resources and quality of life. By proactively addressing siting, cooling technology, energy sourcing, water reuse, and stormwater management, local governments and water providers can reduce the strain these facilities place on aquifers, rivers, and infrastructure. Encouraging redevelopment over greenfield construction, prioritizing renewable and water-efficient technologies, and requiring transparent tracking of water and energy use will help ensure that data centers contribute to the region's prosperity without compromising its environmental resilience or the needs of residents. And importantly, communities should recognize that it is sometimes best to say "no" to a proposed data center if it is not a good fit for local water resources, infrastructure, or long-term planning goals. Thoughtful planning today will determine whether tomorrow's digital infrastructure strengthens or undermines Central Texas communities.

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NICKY SCOTT

For more information on data centers, we recommend the following resources:

[Houston Advanced Research Center (HARC) Website: Powering Texas' Digital Economy: Data Centers and the Future of the Grid]

[Bureau of Economic Geology (BEG) Website: Advancing Sustainable Data Center Development in Texas]

SOURCES

Bureau of Economic Geology (BEG). *(2025). Geospatial suitability analysis for data center placement: A case study in Texas, USA. University of Texas at Austin.*

Bureau of Economic Geology (BEG). *(2025). Data center growth in Texas: Energy, infrastructure, and policy pathways. University of Texas at Austin.*

Lawrence Berkeley National Laboratory. *(2024). United States data center energy usage report. U.S. Department of Energy.*

Electric Reliability Council of Texas (ERCOT). *(2010). Water demand projections for power generation in Texas. ERCOT.*

Houston Advanced Research Center (HARC). (2025). *Powering Texas' digital economy: Data centers and the future of the grid. HARC.*

Baxtel. *(n.d.). Texas data center market. Retrieved August 31, 2025, from https://baxtel.com/data-center/texas*

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