

AI Data Center Debate: Lubbock's Concerns

<https://gemini.google.com/app/d07df18393b1e463>

User prompt: Good morning, Gemini. My hometown of Lubbock is facing a difficult situation. It seems that our community is in the midst of the AI revolution, so to speak, and that against community sentiment, a deal for an AI data center has been set up between CORVA Infrastructure Services, LLC and our economic development group, LEDA. Can you give me an overview of the positive and negative effects of this?

Response: It is completely understandable why this issue is causing friction in the community. When major infrastructure agreements are negotiated behind closed doors or finalized before full public discussion, it naturally creates distrust—especially in West Texas, where resource decisions around power and water carry huge stakes.

Developments like CORVA Infrastructure Services' proposed **SyncHub** facility (and similar high-capacity AI data center builds across the region) represent a massive shift in how municipalities weigh economic growth against local resources.

Here is a breakdown of the primary positive and negative impacts being weighed in this debate.

The Potential Positives (The Economic Case)

Economic development agencies like LEDA typically pursue these deals because AI data centers offer staggering capital investment metrics that are hard to match with traditional commercial real estate.

- **Expanded Tax Base Without Population Burden:** Data centers represent tens or hundreds of millions of dollars in taxable physical equipment and infrastructure on a relatively compact physical footprint. Unlike residential or commercial retail developments, they generate substantial property tax revenue for local schools and services without requiring expanded city services like public schooling for hundreds of new families or heavy road maintenance.
- **Boost to Local Construction and Supply Chains:** The build-out phases for high-density computing facilities require multi-year construction timelines. This injects capital directly into local trade unions, specialized contractors, equipment suppliers, and hospitality businesses during construction.
- **Strengthened Network Infrastructure:** CORVA's model focuses on "carrier-neutral" interconnection—essentially building the digital highway interchange between remote AI training facilities and urban centers. This can significantly upgrade the region's broader fiber-optic and digital infrastructure, making the area more attractive for future tech initiatives and research partnerships (such as with Texas Tech).

The Potential Negatives (Community Concerns)

The pushback against AI data centers in West Texas generally stems from resource intensity, low long-term employment density, and the transparency of the development process.

- **Strain on the Electrical Grid:** AI computing, especially high-density processing, requires enormous amounts of continuous power (often tens of megawatts per facility). Residents

frequently worry about whether this extra demand will put pressure on the regional grid or ultimately drive up electricity rates for residential and small-business ratepayers.

- **Water Conservation Friction:** Cooling thousands of high-performance GPUs generates massive amounts of heat. In dry regions reliant on local aquifers, the choice between traditional evaporative cooling (which consumes high volumes of water) versus advanced closed-loop/air-cooling systems is a critical sticking point. Without explicit restrictions, water usage remains a major community concern.
- **Low Long-Term Job Density:** While construction brings a temporary labor boom, a fully operational data center is highly automated. Relative to its massive energy footprint and physical land use, a facility might only employ a few dozen permanent staff (facility managers, network engineers, security).
- **Transparency and Public Governance:** Economic development alliances often use non-disclosure agreements (NDAs) during preliminary negotiations to remain competitive. However, when tax abatements, utility concessions, or zoning changes are presented as a *done deal*, residents feel disenfranchised from decisions that affect their neighborhood's long-term future.

The Bottom Line: The debate in Lubbock mirrors a national conversation: cities want the tax revenues and modern infrastructure that AI development brings, but residents want ironclad guarantees that local power grids, water tables, and taxpayer interests are protected first.

Which specific side of this project are you or your neighbors most concerned about right now—is it the impact on local utilities (power and water), or more about how the deal was handled publicly?

Sources

1. [Texas Data Center Campus in Hale County: Project Caprock - Aligned Data Centers](#)
2. [CORVA Infrastructure Services](#)

User prompt: Currently, Lubbock is on water restrictions. Also, I think this entire West Texas area is in a drought. Can you line out the realistic ways this potential data center, in its current proposed iteration, will impact our community's water table?

Response: Given that Lubbock and much of West Texas rely on vulnerable groundwater sources during periods of drought, introducing a high-capacity user like an AI data center directly impacts local water management.

While the exact operational parameters of the proposed CORVA SyncHub facility (planned up to 72 MW) are still being reviewed by local officials, a facility of this scale affects the regional water table in several distinct ways.

1. Direct Municipal Draw and Groundwater Drawdown

Lubbock's municipal water supply relies on a combination of surface water (such as Lake Alan Henry) and groundwater (including the **Ogallala Aquifer** and the Roberts County Well Field).

- **Shifting Supply During Drought:** During drought conditions, surface water levels drop, forcing the city to rely more heavily on groundwater pumping. Any large industrial user drawing from municipal water lines increases the total base load on the city system, accelerating the rate at which local aquifers are drawn down.
- **Peak Summer Strain:** Data centers generate the most heat during the hottest months—precisely when residential water restrictions are active and agricultural/residential demand is highest.

2. Impact Depends on the Cooling Technology

The actual volume of water drawn directly from Lubbock's supply depends almost entirely on the cooling design CORVA and its tenants choose:

Cooling Method	Direct Water Usage	Impact on Water Table
Traditional Evaporative (Wet) Cooling	Very High (Often 100,000 to 1M+ gallons/day depending on load)	High: Uses massive fresh water volumes that evaporate into the atmosphere and are lost from the local watershed entirely.
Closed-Loop / Air Cooling (Dry)	Very Low (Initial system fill + minor top-offs)	Low Direct Impact: Recirculates cooling fluid, keeping direct water draw minimal.
Direct-to-Chip / Immersion Liquid Cooling	Minimal Direct Use	Low Direct Impact: Uses closed-loop dielectric fluids or liquid cold plates to pull heat directly from GPUs.

Key Context: In recent municipal briefings, estimates near **100,000 gallons per day** were raised during public discussions. If wet evaporative cooling towers are used, that water is lost to evaporation and cannot be treated or returned to the local aquifer.

3. The "Virtual Water" Impact (Power Generation)

Even if a facility uses dry/air-cooling to save water on-site, it requires significantly more electricity to run fans and chillers. This triggers an indirect water impact through the power grid:

- **Thermoelectric Power Generation:** Much of the electricity supplied to the West Texas grid (ERCOT) relies on natural gas and power plants that use steam turbines, which require millions of gallons of cooling water themselves.
- **The Energy-Water Nexus:** Shifted cooling demand from *on-site water* to *grid electricity* often means the water consumption is simply transferred to the power plants supplying the site.

4. Wastewater Discharges and Local Aquifer Health

When evaporative cooling systems operate, water continuously evaporates while minerals stay behind. To prevent mineral buildup, facilities must periodically flush out concentrated wastewater ("cooling tower blowdown").

Discharging high-mineral wastewater into municipal treatment systems or local drainage basins can pose challenges for local water reclamation systems, complicating efforts to purify and reuse effluent water for irrigation or recharge projects.

Summary

If the proposed facility is bound by strict development agreements requiring **air-cooled or closed-loop technology**, its direct impact on Lubbock's water table will remain relatively low. However, if traditional evaporative cooling is permitted, the facility could draw millions of gallons of fresh groundwater monthly during an ongoing West Texas drought—compounding the restrictions already faced by local residents and agriculture.

Sources

1. [Texas residents lash possible data centers over water, power fears: 'You don't serve billionaires' - The Cool Down](#)
 2. [Texas Data Centers Use 50 Billion Gallons of Water as State Faces Drought - Newsweek](#)
-

User prompt: That is a really in-depth answer—thank you.

Response: You are very welcome! I'm glad it helped clarify what's at play. Balancing regional economic growth with natural resource conservation is a tough tightrope, especially when drought is already putting real pressure on daily life.

Would you like to explore how community members typically advocate for environmental commitments (like closed-loop cooling restrictions) or transparency in these municipal development agreements?

User prompt: I would like to look into that topic, but first, when you pointed out, "If the proposed facility is bound by strict development agreements requiring air-cooled or closed-loop technology, its direct impact on Lubbock's water table will remain relatively low." What are the real-world effects of low-level impacts on the water table? Also, can you describe what might be seen at the other end of the spectrum relating to high-level impacts?

Response: Understanding what these impacts actually look like on the ground helps put technical numbers into real-world context—especially in a semi-arid region like West Texas that relies on groundwater storage.

Low-Impact Spectrum (Closed-Loop / Air Cooling)

If a facility relies on closed-loop dielectric cooling or dry air-cooling systems, direct groundwater extraction is kept to a minimum.

- **Negligible Local Aquifer Drawdown:** Because water is continuously recirculated rather than lost to the atmosphere, the direct draw on city supply lines or local wellfields remains minimal after the initial system fill. The water table level in surrounding rural or municipal wells shows no noticeable decline attributable to the facility.

- **Stable Regional Water Rates:** Low base volume demand means municipal water utilities do not need to drill new wellfields or alter existing surface-water allocation strategies specifically to support the facility.
- **Shift to the "Power-Grid Water Footprint":** The primary real-world trade-off of dry cooling is lower efficiency in extreme summer heat, requiring more electricity to run fans and chillers. The impact on water moves *off-site* to the thermal power plants (such as natural gas plants on the ERCOT grid) that supply the extra electricity, which use water for their own cooling processes.

High-Impact Spectrum (Evaporative Wet Cooling Towers)

If a facility uses traditional evaporative cooling, hundreds of thousands to millions of gallons of fresh water are pulled daily, converted to steam, and lost to the atmosphere entirely. In a region where the southern Ogallala Aquifer recharges at extremely low rates, this creates noticeable physical and economic changes.

- **Cones of Depression and Shallow Well Failure:** Heavy, continuous pumping creates a localized "cone of depression"—a localized drop in the water table surrounding the pumping source. Nearby shallow agricultural, residential, or livestock wells can experience sudden drops in water pressure or dry up completely, requiring owners to drill significantly deeper wells at high personal cost.
- **Accelerated Permanent Depletion:** Groundwater in the southern High Plains is essentially a non-renewable resource on human timescales. Water evaporated into the atmosphere is lost from the local watershed, permanently shrinking the remaining lifetime of the regional aquifer.
- **Degraded Water Quality:** As water tables drop and pumping pulls from deeper geological layers, the remaining groundwater often contains higher concentrations of dissolved solids, minerals, and salts. This increases treatment costs for city water systems and accelerates wear on municipal infrastructure.
- **Higher Pumping Costs for Surrounding Users:** As the water table drops across a broader radius, pumps throughout the area must work harder and draw more electricity to pull water to the surface, raising operational costs for nearby farms and municipalities.
- **Immediate Civic Strain:** Adding a massive continuous water user during an active drought accelerates municipal restriction triggers. This often translates directly into stricter residential outdoor watering bans, higher tiered water rates for households, and heightened friction between residents and local government.

Key Takeaway: Low-impact models shift the resource burden primarily onto the electrical grid, while high-impact models directly subtract non-renewable groundwater from the local community's drought buffer.

User prompt: Okay, with shifting the burden to the electrical grid, ERCOT, what are the realistic impacts of that shift during the summer months?

Response: When a facility shifts its cooling burden away from water and onto dry air systems, it essentially trades local groundwater consumption for heavy electrical draw.

Because data centers run continuously at near-maximum capacity, adding a high-density facility (such as a 70+ megawatt project) to the ERCOT grid creates a distinct set of operational and economic impacts during West Texas summer heatwaves.

1. The "Peak-on-Peak" Solar Sunset Ramp

During summer afternoons, Texas generates significant power from solar farms across West Texas. However, the most vulnerable window for the ERCOT grid isn't noon—it is **between 6:00 PM and 9:00 PM**.

- **The Sunset Drop:** As the sun goes down, solar generation drops off rapidly. At the exact same time, residential air conditioners are working overtime to cool hot homes, and families return home from work.
- **Continuous Load Friction:** Unlike a factory that might shut down evening shifts or a home that turns down AC at night, an AI facility draws heavy power around the clock. Adding tens of megawatts of non-stop "baseload" demand makes that evening solar-to-thermal transition window much narrower and harder for ERCOT operators to balance.

2. Local Infrastructure and Transformer Strain

Grid strain isn't just a statewide metric; it happens on a local physical level right in Lubbock.

- **Heat Derating:** Electrical equipment—such as substation transformers and high-voltage transmission lines—becomes physically less efficient at carrying electricity when ambient temperatures exceed 100°F.
- **Thermal Stress:** Running high continuous power loads through local substations during triple-digit heat waves leaves very little headroom for equipment to cool down, increasing the risk of localized equipment failures or blown transformers.

3. Wholesale Price Volatility and Residential Utility Rates

ERCOT operates on an energy-only market where wholesale power prices fluctuate based on real-time supply and demand.

- **Price Spikes:** On summer days when grid reserves run tight, wholesale electricity prices can jump from a normal \$30–\$50 per megawatt-hour to the state cap of thousands of dollars per megawatt-hour.
- **Cost Offloading:** While large data centers usually negotiate wholesale or specialized industrial contracts, continuous high demand during peak grid hours drives up overall market capacity costs. Over time, utilities and retail electric providers may pass these higher grid management and transmission upgrade costs down to residential and small-business ratepayers.

4. Emergency Operations and the "Demand Response" Tool

To prevent rolling blackouts during extreme summer heat, ERCOT relies on agreements called **Demand Response** (or Controllable Load Resources).

- **Curtailment Agreements:** Many large data centers agree to enter interruptible power contracts. When ERCOT issues a grid alert, the data center agrees to shut down non-essential AI model training or power down servers in exchange for financial incentives.
- **On-Site Backup Generators:** If a facility is forced to dial back grid power during a heatwave, it often switches to large on-site backup diesel or natural gas generators to keep critical hardware running. While this protects the power grid, running industrial backup generators during a summer heatwave introduces temporary localized air quality and noise impacts.

Summary: Shifting from wet cooling to dry cooling protects local groundwater, but it places the facility directly into competition with Texas households during the hottest hours of the year. The primary real-world trade-offs become potential pressure on long-term electricity rates, local substation strain, and an increased reliance on grid emergency programs during August heat spikes.

Sources

1. [Texas on track to see record-breaking power demand amid triple-digit heat](#)
 2. [Texas Pushes AI Data Centers to Pay Their Own Grid Costs](#)
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User prompt: Honestly, this information kinda makes me sick to my stomach, as in having a huge feeling of anxiety. Isn't there a better way?

Response: It is completely understandable to feel overwhelmed by this. When you live in a drought-prone area, learning that major developments could put additional pressure on your local water table or power grid can feel scary and deeply unsettling.

However, **there are much better ways to build data centers**, and the industry is actively shifting toward them as communities and policymakers demand stricter standards. The negative scenarios outlined earlier are not inevitable—they happen when projects are built using outdated standards, but modern technology and smart local policies offer far better paths forward.

Here is how data center development is evolving to protect local resources:

1. Advanced Cooling Technologies (Slashing Water Use)

Traditional evaporative cooling—where millions of gallons of freshwater are evaporated into the air—is rapidly becoming an outdated standard.

- **Direct-to-Chip & Immersion Liquid Cooling:** Instead of evaporating water, modern high-density AI facilities use closed-loop dielectric fluids or liquid cold plates applied directly to the processors. The fluid captures the heat, transfers it through a heat exchanger, and recirculates inside a closed system, reducing direct water consumption by up to **90% to 95%**.
- **Air-Cooled Condensers (Dry Cooling):** Many modern facilities operate completely water-free on-site, using closed systems similar to a giant car radiator powered by high-efficiency fans.

2. Smart Water Sourcing (Protecting Aquifers)

Rather than tapping into municipal drinking water or pulling fresh groundwater from fragile aquifers, forward-thinking developments use alternative water supplies:

- **Recycled Municipal Effluent (Gray Water):** Facilities can be required to use treated wastewater from municipal sewage plants or industrial runoff for cooling, ensuring zero fresh groundwater is subtracted from the local drinking supply.
- **Closed-Loop Water Recycling:** Cities can require facilities to continuously treat and reuse their own internal cooling water, eliminating the need for high daily water intake.

3. Off-Grid & Hybrid Power Generation

To avoid putting the entire burden on ERCOT or local municipal substations during hot summer evenings, modern facilities are increasingly required to bring or build their own energy solutions:

- **Co-Located Clean Microgrids:** Pairing data centers directly with dedicated solar, wind, and industrial-scale battery storage allows them to power their own operations during peak grid hours (6:00 PM – 9:00 PM) without drawing from the residential power grid.
- **Demand Response Automation:** Smart AI workloads can be automatically throttled or shifted to other geographic regions during periods of high grid stress, allowing the facility to instantly drop its energy draw when local AC units peak.

4. Community-First Governance and Binding Agreements

The most effective "better way" comes down to how local leaders negotiate the development agreement. Cities like Lubbock do not have to accept off-the-shelf proposals; they can attach strict conditions to zoning and utility approvals:

Key Civic Safeguards:

- **Mandatory Water Usage Metrics:** Enforcing a strict Water Usage Effectiveness (WUE) cap that legally forbids traditional evaporative cooling.
- **Prohibition on Groundwater Extraction:** Barring the facility from drilling private wells into local aquifers or drawing treated municipal drinking water.
- **Infrastructure Cost Guarantees:** Requiring the developer to pay for any necessary electric substation or water line upgrades upfront, ensuring local taxpayers don't foot the bill.

The Takeaway

The technology exists right now to build AI infrastructure without threatening West Texas groundwater or crashing local power grids. The key difference between a good project and a bad project comes down to **public transparency and binding local requirements** that force developers to use these sustainable solutions before ground is ever broken.

When you look at advocacy or civic engagement in your community, would you like to explore what specific legal protections or cooling mandates local residents can push LEDA and the City Council to include in the final agreement?

Sources

1. [Resolution to Require Artificial Intelligence Data Centers to Adhere to Oil and Gas Industry Water Protocols and Use Recycled Water - Republican Party of Texas](#)
 2. [Energy Efficiency Solutions for Data Centers: 2025 and Beyond](#)
 3. [East Texas data center project pulled after facing community backlash](#)
-

User prompt: Yes, please. Also, very important, more than likely this potential data center is going to be developed in the City of Lubbock's District 1 or 2. This area is historically burdened with commercial developments, with little to no say about where these developments are built. If the lowest impact options are used to develop and build the CORVA AI data center, what impacts will be felt by those in close and general proximity to it?

Response: The frustration and anxiety surrounding this project are entirely valid. For decades, Districts 1 and 2 in East and North Lubbock have disproportionately borne the footprint of heavy commercial, industrial, and utility infrastructure—ranging from industrial processing plants and salvage yards to heavy rail corridors.

When economic development alliances place another large industrial asset in neighborhoods that have historically felt overlooked during city planning, it raises serious environmental justice questions.

Even if CORVA and its partners adopt the **lowest water-impact technology** (such as closed-loop liquid or dry-air cooling), a 72-megawatt data center is still a massive industrial utility campus. Living in close or general proximity to a facility like this comes with real, everyday impacts on neighboring residents.

Direct Proximity Impacts (Even with Low Water Use)

1. Low-Frequency Acoustic Hum

Air-cooling requires arrays of hundreds of massive, industrial-grade cooling fans operating continuous 24/7 shifts.

- **The "Tonal Hum":** Unlike standard traffic or air conditioning noise, large data centers generate continuous, low-frequency sound waves (often between 30 and 100 Hz).
- **Residential Impact:** Low-frequency noise travels farther, penetrates residential walls and windows easily, and is often experienced indoors as a constant vibration or low hum. In quiet residential neighborhoods at night, this sound can cause sleep disruption and chronic stress if ambient decibel limits are not enforced at the property line.

2. Diesel Backup Generator Testing & Air Quality

To maintain continuous operation during power grid fluctuations, facilities of this scale install large banks of industrial diesel generators on-site.

- **Routine Maintenance Runs:** Generators must be routine-tested (often weekly or monthly). During these testing windows or actual grid emergency events, they emit diesel exhaust particulates, nitrogen oxides (NO_x), and high-decibel engine noise.
- **Neighborhood Impact:** Residents downwind may experience periodic localized exhaust odor and temporary drops in air quality during maintenance cycles.

3. Electrical Infrastructure & Visual Footprint

A facility drawing up to 72 megawatts requires high-voltage power infrastructure built right on or adjacent to the site.

- **Substation and Power Lines:** New high-voltage transmission lines, elevated towers, and a dedicated electrical substation are usually required to handle the load.
- **Aesthetics and Security:** The facility itself is typically a massive, windowless, concrete "big-box" structure surrounded by high-security fencing, motion-sensing floodlights, and security cameras. This replaces open space or lighter commercial zoning with a heavily fortified industrial block, contributing to night light pollution if shield lighting isn't mandated.

4. Construction Disturbance and Traffic

Building a multi-pad high-density computing site takes several years.

- **Heavy Equipment:** Years of heavy truck traffic, concrete pours, dust, road wear, and construction noise will affect local residential streets leading into Districts 1 and 2 during the build phase.

How Community Members Can Advocate for Standards and Transparency

Because the City of Lubbock has been reviewing updated development standards for large-scale data centers, residents still have levers to push for legally binding protections before final site permits and incentives are granted.

1. Push for Specific Municipal Ordinance Standards

Rather than trusting voluntary developer promises, residents can ask the Lubbock City Council to write strict, enforceable conditions directly into municipal zoning ordinances and data center development standards:

- **Decibel Caps at Property Lines:** Demand a strict nighttime noise limit (e.g., maximum 45–50 dBA at adjacent residential property boundaries) and specific restrictions on low-frequency acoustic vibration.
- **Mandatory Sound Walls and Setbacks:** Require substantial physical buffer zones, high-density tree canopies, and specialized acoustic sound barriers surrounding fan arrays and

generator banks.

- **Downward-Shielded Lighting:** Mandate dark-sky compliant, downward-facing lighting to prevent floodlight spillover into neighboring homes.
- **Zero-Groundwater Mandates:** Ensure the city ordinance legally bans traditional wet evaporative cooling towers and forbids private well drilling on the site.

2. Demand a Community Benefits Agreement (CBA)

A **Community Benefits Agreement** is a legally binding contract negotiated directly between neighborhood groups/coalitions and the developer (CORVA). If LEDA or the City provides tax abatements or zoning changes, residents can demand a CBA that guarantees direct local investment, such as:

- Local park improvements and tree canopy planting.
- Dedicated neighborhood infrastructure funds.
- Direct local hiring and apprenticeship commitments for district residents.
- Continuous off-site noise and air quality monitoring stations paid for by the developer.

3. Utilize Public Information Requests and City Hearings

- **File Texas Public Information Act (PIA) Requests:** Residents can request copies of communications, draft utility agreements, traffic studies, and environmental assessments exchanged between LEDA, the City of Lubbock, and CORVA Infrastructure Services.
- **Organize at City Council & Planning Meetings:** Attending Planning and Zoning Commission meetings and City Council public hearings ensures that the concerns of District 1 and 2 residents are on the official public record—making it politically difficult for leaders to approve unchecked industrial developments.

Sources

1. [Developers withdraw zoning request for proposed AI data center - The Daily Toreador](#)

User prompt: Thank you, that's all great information. This may be naive, but isn't there an even better way to manage the explosive growth of data centers while also having zero negative impact on communities where centers are built?

Response: It is not naive at all—in fact, asking that exact question is leading a global shift in how digital infrastructure is designed.

Engineers, urban planners, and environmental scientists are pushing for a model called the **Circular Data Center** (or Net-Positive Data Center). The goal isn't just to minimize damage, but to design facilities that actively give back more resources to the host community than they consume.

Here is what a truly "community-first" approach to data centers looks like when done right.

1. Waste Heat Recovery (Turning Waste into a Resource)

Every watt of electricity a computer chip consumes turns into heat. In traditional facilities, millions of dollars are spent trying to throw that heat away into the atmosphere or water towers.

In a circular model, that captured thermal energy is piped directly to nearby community needs:

- **District Heating & Agriculture:** Waste heat is redirected to warm nearby homes and public buildings during winter, or to heat commercial greenhouses and vertical farms year-round.
- **Industrial Synergy:** Nearby manufacturing or food-processing facilities can use the high-grade exhaust heat for their own industrial processes, lowering overall regional carbon emissions.

2. Off-Grid Siting (Co-Locating with Power)

Instead of dropping a 70+ megawatt load onto an existing municipal electric grid or near residential neighborhoods, progressive planning mandates **"Stranded Power" Co-Location**:

- **Building at the Source:** Facilities are placed directly adjacent to major remote renewable generation sites—such as large wind fields, utility-scale solar parks, or nuclear sites—far outside suburban or residential zones.
- **Dedicated Microgrids:** The facility operates on its own dedicated power generation and battery storage, drawing zero electricity from the local residential utility grid during peak hours.

3. Waterless Architecture and Closed-Loop Systems

A zero-water-impact data center uses zero municipal drinking water or groundwater.

- **Two-Phase Liquid Immersion:** Servers are submerged in specialized, non-conductive fluid that vaporizes and condenses continuously inside a sealed, closed-loop system.
- **WUE of 0.0:** By pairing closed-loop dielectric fluid systems with dry-air heat exchangers, the facility's Water Usage Effectiveness (WUE) drops to zero—meaning not a single drop of local freshwater is lost to evaporation.

4. The Data Center as a "Grid Stabilizer"

Instead of being a liability to the local power grid during a summer heatwave, modern sustainable facilities are built to act like a giant, community-stabilizing battery:

- **Grid Support via On-Site Storage:** During peak evening hours, the data center can disconnect from ERCOT completely and run on its own massive, on-site utility battery reserves.
- **Power Injection:** In extreme emergencies, the facility can actually discharge its stored battery energy *back into the local community grid*, helping prevent residential rolling blackouts.

5. Intentional, Community-Driven Zoning

The biggest failure in traditional data center rollouts isn't just the technology—it's **where** they are placed. A zero-impact approach requires city leadership to establish proactive zoning *before* developers arrive:

The Gold Standard for Zoning:

- Explicitly banning data centers in or adjacent to historic, residential, or historically burdened neighborhoods (such as Districts 1 and 2).
- Restricting development strictly to heavy industrial corridors or rural energy parks with mandatory multi-hundred-foot vegetated acoustic buffers.
- Requiring binding Community Benefits Agreements (CBAs) signed *before* any land deal or tax incentive is granted.

Why Isn't This Everyday Practice Yet?

The technology to do all of this exists right now. The main obstacle is **cost and speed**: building closed-loop, heat-recovering, off-grid facilities takes more upfront capital and longer planning cycles than building a standard "big-box" warehouse.

Unless local governments pass strong ordinances *requiring* these high standards, developers will often default to the cheapest, fastest option available.

Would you like to look into how other Texas or U.S. cities have successfully passed local zoning ordinances to block data centers from residential areas?

Sources

1. [Circular Data Center Energy: Heat Reuse & Cooling](#)
2. [Circular Economy: Repurposing Data Center Waste Heat for Agriculture and Heating Systems](#)
3. [Catching Heat: The Opportunities and Challenges of Using Waste Heat from Appalachian AI Data Centers - ReImagine Appalachia](#)
4. [Seizing Data Center Heat Reuse Opportunities: Open Compute Project Foundation Guidelines for Local Authorities](#)

User prompt: I would like to look into that but for now, I'm going to close this conversation on one last question. Why does it seem like people in power always choose the option of convenience and maximum profit at the expense of the well-being of others?

Response: It is a heavy, frustrating realization, but feeling that way isn't cynical—it is a realistic reaction to how modern economic and political systems are built.

When decisions seem to consistently prioritize short-term profit and convenience over community well-being, it is usually not because every person involved is inherently malicious. Rather, it is

because the **systems and incentives** governing those decisions were explicitly designed to produce those exact outcomes unless someone actively forces a change.

Here is a breakdown of why this dynamic repeats itself so consistently:

1. Misaligned Metrics for "Success"

In both business and municipal governance, people are evaluated on short-term, easily quantified metrics:

- **For Economic Agencies (like LEDA):** Success is measured in total dollars brought to the city, new tax revenue numbers, and announcements made during an election or budget cycle. "Long-term aquifer health in 30 years" or "the quiet peace of a neighborhood at night" don't fit neatly onto a quarterly balance sheet or an annual report.
- **For Corporations:** Executive compensation and investor returns are tied to speed and cost-efficiency. Using existing, cheaper cooling methods or building where land and power hookups are easiest is the default choice because the economic system rewards maximum return with minimal friction.

2. Asymmetric Power, Time, and Resources

There is almost always a fundamental imbalance in who has the time and tools to influence decisions:

- **Full-Time Advocates:** Corporations and economic alliances have full-time lawyers, PR teams, and lobbyists working 40+ hours a week under non-disclosure agreements to structure deals smoothly.
- **Part-Time Defense:** Neighborhood residents are forced to react in their spare time—after work, while raising families, and without institutional funding—often finding out about deals after major terms have already been negotiated.

3. Diffusion of Responsibility ("Siloed" Decisions)

Large systems allow individuals to pass the moral bucket down the line:

- The economic agency says, *"Our job is just to attract investment; utility policy is the city's job."*
- The city council says, *"Our job is zoning compliance; grid stability is ERCOT's job."*
- The developer says, *"Our job is to build to existing code; setting strict standards is local government's job."*

When everyone operates strictly within their tiny silo, nobody feels accountable for the holistic, human impact on the people living across the street.

4. The Path of Least Resistance

Places like District 1 and District 2 often bear the burden of heavy industrial developments precisely because decision-makers assume those areas will offer the least political and legal pushback. Wealthier neighborhoods often have the financial resources, legal connections, and political capital to tie up developments in court for years. Developers and city planners know this, so they default to placing high-impact projects where they expect the least resistance.

The Grounded Reality

Systems default to convenience and profit because **that is the path of least resistance**.

The only thing that historically changes that default setting is public friction—when communities make the "convenient" option politically, socially, or legally expensive. Every major environmental regulation, noise ordinance, and community benefit agreement exists only because ordinary people got tired of being the default sacrifice and forced leaders to change the rules.

Asking these hard questions and seeing the machinery for what it is—that's where real civic accountability actually starts. Thank you for engaging in such a thoughtful conversation about your community.
