Data Centers: How Dangerous Are They for the Environment
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I was asked a few weeks ago to investigate the growth of data centers in the United States and present the findings to SSAFE leadership.

Data Centers are buildings or building complexes that house computer systems, servers, and data storage networks to power the global internet, cloud computing, and artificial intelligence. There are now about 12,000 data centers worldwide with the U.S. having the most data centers by far, some 4,500, over a third of all the data centers in the world. While the first data center in the U.S. was built in the late 1940s, the purpose-built centers did not begin until the 1990s. The largest data center currently operating is the China Telecom cluster containing 10.7 million square feet. In the U.S. it is the Citadel Complex in Reno containing 7.7 million square feet occupying buildings that in total could accommodate over 150 football fields.

In the United States, these centers are clustered in eight states. Virginia (primarily three counties in Northern Virginia outside Washington, DC) has 398—about a third—of the centers that are now operational with another 287 in the pipeline, many of which are already under construction. Texas is second with 296 centers and 170 planned or under construction followed by California (277/54), Ohio (165/84), New York (148/6), Georgia (92/141), Illinois (105/123), and Arizona (76/86).

Data centers are windowless structures typically having 1-3 stories, with the larger centers containing 250,000-500,000 square feet per floor, which in some centers amounts to more than 10 acres. In many cases, states and localities have courted these centers and given them breaks on property and sales taxes. This is somewhat surprising since the data centers hire very few workers once the construction has been completed, often as few as 15-20 for a small facility of around 150,000 square feet. The proposed Meta complex covering six square miles will employ fewer than 1,000 workers.
Here are my conclusions:

1. **Data centers are negatively impacting the environment.**

   There are four ways that data centers affect the environment. The first is that they use excessive amounts of water. The second is that they release excessive heat into the atmosphere. The third is that they make a loud, unrelenting humming noise and the fourth is that they disturb the natural environment. I could add a fifth that they are ugly monstrosities but that is a matter of perception.

   - **Water.** Data centers hurt the environment by depleting local freshwater supplies, reducing river flows through evaporation, and straining aquatic ecosystems with warm, chemical-treated wastewater. Most experts agree that using drinking-quality water for

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industrial cooling in data centers is a major concern. Aquifer and basin strain are also at work. Large facilities pull millions of gallons daily from local watersheds, acting like a giant straw that lowers water tables in drought-prone areas.

Many sites tap clean municipal drinking water instead of recycled alternatives, reducing clean water availability for nearby communities. Up to 80% of cooling water evaporates into the atmosphere, meaning it does not return to local rivers and streams, disrupting downstream base flows.

Discharged liquid effluent often contains high concentrations of dissolved minerals and anti-corrosion chemical additives that can harm aquatic life.
Also**,** generating the massive electricity required to run servers and backup chillers indirectly consumes vast amounts of water at off-site fossil fuel power plants.

- **Heat.** Data center heat hurts the environment by creating localized "heat islands", driving massive water depletion, and increasing fossil fuel energy demands. Waste heat expelled by powerful cooling systems can raise land surface temperatures by up to 16°F near facilities.

  Air temperature spikes: Nearby neighborhoods can experience ambient air temperature increases of up to 4°F from thermal plumes.
  Stressed ecosystems: Localized thermal pollution alters microclimates, harming nearby plants, soil moisture, and wildlife habitat.

- **Noise.** Data center noise hurts the local environment and surrounding communities by creating chronic noise pollution that disrupts wildlife behaviors, damages human health, and ruins outdoor habitats. Large industrial fans, chillers, and HVAC units run 24/7 to prevent servers from overheating, creating a constant low-frequency hum. Backup diesel generators and on-site gas turbines produce loud rumbles that can reach up to 105 decibels—as loud as a jet engine—during routine testing or operation. Most local ordinances prohibit noise which exceeds 65 decibels. Round-the-clock noise exposure leads to sleep deprivation, chronic stress, high blood pressure, and cardiovascular risks for nearby residents. If you happen to live within a half mile of one of the large data centers you cannot escape the unrelenting drone and are likely to go crazy.
- **The natural environment.** Persistent mechanical noise interferes with animal communication, forces species to alter their natural migration routes, and drives wildlife away from adjacent habitats. Constant industrial drone reduces the usability of local parks, yards, and green spaces for both people and animals. And the large sites of the new mega data centers are mostly in rural areas where habitats of animals are being destroyed.

2. Data Centers are becoming increasingly unpopular with the American public.

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The unpopularity of these centers is relatively new due mainly to all of the factors noted above: the gigantic size of some facilities, their dismal appearance consisting of massive windowless structures that in many cases now dwarf large warehouses, the loud humming noise that emanates from them, the heat they emit and the vast amounts of water they use to cool the thousands of machines they house, working 24/7. The rise in utility bills in some areas where data centers are active is also a major issue. A fledging grass roots movement is emerging aimed at stopping the most onerous proposed facilities from being built and mitigating the impact of the ones that are the worst polluters and the most unpleasant. Legislation to regulate data centers has been proposed by Senator Mark Warner of Virginia, Bernie Sanders of Vermont, and by other Democratic senators. Regulatory activity is being explored in many states.

3. **The worst is yet to come.**

As the saying goes, "Baby you ain't seen nothing yet." There are over 1,500 data center projects currently planned or under development across the United States. Driven primarily by the massive infrastructure demands of artificial intelligence (AI), this development pipeline is set to drastically expand the nation's digital footprint over the next several years.
Some centers now under construction are enormous and the ones in the pipeline are even larger. Meta announced recently a complex in northern Louisiana that will cover over six square miles! It will consume five *gigawatts* of energy (or 5,000,000 *kilowatts* planned via utility agreements). OpenAI plans to construct a $20 billion, 3,200-megawatt data center near Savannah, Georgia—a single facility that will require roughly the same power output as three nuclear reactors.
New data centers are moving from urban to rural hubs where the land is cheaper and there is less opposition. While roughly 90% of existing data centers operate inside urban metro areas, 67 percent of the planned data centers are in rural areas and they tend to be much larger. Furthermore, 39% of these projects are being built in counties that have never hosted a data center before. Some of the sites are in dry areas where water availability in the future is uncertain. Nearly three-quarters of all upcoming construction is concentrated in the U.S. South and Midwest.

- **The South:** Leading with over 750 planned facilities (a 62% projected increase in regional inventory), heavily driven by massive expansions in Texas, Virginia, and Georgia.
- **The Midwest:** Following with over 415 planned facilities, acting as a key relief valve for constrained coastal power grids.
- **Texas:** Dominating overall scale, commanding a planned pipeline of over 96 gigawatts of upcoming capacity.

4. **While the pressure points for stopping or influencing a data center are mainly political and local, activity is increasing at all levels of government to regulate or contain the development of these data centers.**

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State and Local Actions

- **New York:** Gov. Kathy Hochul signed an executive order enacting a one-year pause on environmental permits for hyperscale data centers (50 MW+) following the legislature's passage of the Responsible Data Center Development Act.
- **South Carolina and Maryland:** Enacted rate negotiation laws in 2025 to protect residential ratepayers from heavy energy burdens.
- **Minnesota:** Established separate water permitting requirements for data centers in 2025.
- **Local Municipalities:** Over 500 local US counties and municipalities have enacted stricter zoning restrictions, noise limits, or construction moratoriums.

Federal Proposals

- **AI Data Center Moratorium Act**: Introduced by Senator Bernie Sanders and Representative Alexandria Ocasio-Cortez to temporarily halt large AI data center construction/expansion until federal safety guardrails are enacted.
- **No Harm Data Centers Act (H.R. 8033**): Introduced in the House to protect residential electricity consumers from bearing infrastructure costs driven by data center usage.
- **Local Control Protection Act:** Introduced to prevent large tech developers from overriding local municipal decisions and zoning denials in federal court.

5. For data centers that already exist or are in the pipeline, there may be some room to mitigate the adverse impact.

Mitigating the harm caused by existing data centers requires upgrading cooling and power systems, reusing waste resources, and enforcing strict local oversight. Key strategies focus on upgrading cooling efficiency, reducing emissions and noise, and reusing waste heat.

I. Cooling and Water Conservation

- **Liquid Cooling:** Retrofit facilities with direct-to-chip or immersion cooling systems to drop reliance on heavy water evaporation.
- **Alternative Water Sources:** Switch from potable municipal water to recycled wastewater, harvested rainwater, or closed-loop setups.
- **Advanced Monitoring:** Use automated sensors and AI controls to match cooling levels precisely with real-time IT loads.
- **Clean Fuel Alternatives:** Replace traditional diesel in backup generators with cleaner options like hydrotreated vegetable oil (HVO) to limit toxic particulate pollution.
- **Grid Support:** Operate facilities flexibly to support local energy grids, or co-locate with dedicated renewable generation sources.
- **Efficiency Audits:** Routinely track and optimize Power Usage Effectiveness (PUE) and Water Usage Effectiveness (WUE) metrics.

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II. Community and Neighborhood Integration

- **Waste Heat Recovery:** Redirect excess thermal energy from servers into local district heating networks, nearby businesses, or agricultural greenhouses.
- **Noise Mitigation:** Install natural acoustic barriers, better generator insulation, and high-grade HVAC baffles to lower decibel levels near residential zones.
- **Transparent Monitoring:** Establish ongoing public reporting on actual water/energy consumption and enforce strict local environmental compliance checks.

Resources:

- ***How to Fight a Data Center*** by Michael J. Bommarito II. Book published early this year with specific recommendations for taking on the fight to control these centers.
- **Earthjustice.** Leading national non-profit environmental law organization scaling up enforcement litigation to challenge data centers utilizing unpermitted backup generators, pushing back on lax air-permit rules, and intervening in large energy load tariffs.
- **Southern Environmental Law Center & NAACP**: Frequently partner on regional and civil rights-based legal actions (such as contesting unpermitted industrial buildouts and environmental justice violations).
- **Climate Justice Alliance & Center for Biological Diversity***:* Coordinates national coalitions and policy pushes to block federal or state fast-tracking of data center infrastructure.
- **Local grassroots groups***:* Organizations like Memphis Community Against Pollution and Young, Gifted & Green spearhead community-level opposition and zoning fights. There are probably groups like this in every state where a SSAFE community is located.
- **Chesapeake Legal Alliance.** Group focuses on the Chesapeake Bay region.
- **Law Firms and Legal Teams Handling Opposition**

  While large corporate defense firms (like Vinson & Elkins or WilmerHale) typically represent tech and energy companies, a distinct group of boutique and plaintiffs' law firms represents local and community alliances*:*
  - **Cohen & Riechelson** and **Liddle Sheets**: Represents resident class-actions targeting continuous noise pollution, public nuisance, and property value loss tied to regional data center operations.
  - **Hofmeyr Wang**: Boutique firm representing local community coalitions challenging industrial and data center footprints in sensitive regional areas*.*
  - More firms could be added to the list as needed depending on where the data centers are located*.*

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