A COMMUNITY GUIDE

# DISPELLING THE CONCERNS OVER DATA CENTERS

## Straight Answers About Power, Water, Noise, and Your Community




POWER | WATER | NOISE | PLAIN ENGLISH

ANDREW DOMINGUEZ

STRAIGHT ANSWERS FROM PUBLIC SOURCES

TRINFINITY Enterprises

# Dispelling the Concerns Over Data Centers

*Straight Answers About Power, Water, Noise, and Your Community*

Andrew Dominguez

Dispelling the Concerns Over Data Centers: Straight Answers About Power, Water, Noise, and Your Community

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# A Word Before We Start

If you've heard that a data center is coming to your area, you probably have questions. Maybe you've read that these buildings use as much power as a city, or that they drink up rivers, or that they hum all night. Maybe a neighbor is worried about the electric bill. Maybe you are.

Those are fair worries. You're being asked to live near a very large building you'll probably never go inside, run by a company you may not know, using power and water that matter to you and your family. Anyone would want answers.

This booklet gives you those answers in plain language, using facts from public sources such as the U.S. Department of Energy, national laboratories, government agencies, state regulators, and the companies themselves. I name the source for every key number, and you'll find the full list at the back so you can check them yourself. When a number comes from a company's own statement, or from a research paper that hasn't finished peer review, I say so.

Here's my promise to you. Where a fear is bigger than the facts, I'll show you why. Where a concern is real, I'll say so plainly and tell you what can be done about it. You deserve the whole picture, not a sales pitch.

## Who this is for

This booklet is for anyone: neighbors, parents, business owners, local officials, reporters, and anyone who simply wants to understand what a data center is and what it means for a community. You don't need any technical background.

## How to use it

Chapter 1 explains what a data center is and what all that computing is actually used for. Chapters 2 through 17 each take one common concern: electricity, bills, the grid, water, heat, noise, air, health, fire and spills, taxes, jobs, home values, land, the climate, empty buildings, and secrecy. Each explains what's true, gives my verdict, and ends with questions you can ask at a public meeting or of your local officials. Chapter 18 checks the viral claims you'll see online, in one table. Chapter 19 covers what data centers and regulators are doing about these concerns, and the last chapter puts it all together in a checklist of what a good-neighbor data center looks like.

This edition adds nine new chapters and updates the rest with what changed through November 2026.

Much of the same material, with more detail for people who work in or invest in data centers, is in Chapter 27 of my book Where the Cloud Lives: A Plain-English Guide to Data Center Critical Infrastructure.

> **Tip:** This booklet is free. Please share it with anyone who might find it useful.

# Chapter 1: What Is a Data Center, Anyway?

A data center is a building full of computers, called servers, that store and process information for all of us. Every time you send a text, stream a show, check your bank balance, pay with your phone, see a doctor through a video visit, or ask a question online, a data center somewhere does the work.

Those computers run all day, every day, and they can't be allowed to stop. So a data center is really two things working together: a building that brings in a steady supply of electricity, and a building that carries away the heat those computers make. Almost all the electricity a computer uses turns into heat, so a data center that uses a lot of power also has a lot of heat to get rid of.

## What's inside

- **Rooms full of servers**, in tall metal cabinets lined up in rows.
- **Electrical equipment**, such as transformers and switchgear, that brings power in from the utility and spreads it through the building.
- **Battery systems** that keep the computers running for a few minutes if the power blinks.
- **Backup generators** that take over if the utility power goes out for longer.
- **Cooling equipment**, such as large fans, chillers, and outdoor cooling units, that carries the heat out of the building.

## What all that computing is for

People often ask me what these buildings actually do all day. Is it social media? AI? Banking? Here's the honest answer first: nobody publishes an exact breakdown like "social media 30%, banking 10%." Companies don't report it, and one cloud data center may run a bank's records, a streaming service, a hospital's files, and an AI model all at the same time. What we do have are a few good measurements that come at the question from different angles. Each table below is ranked from highest to lowest share. Don't add the tables together, because each one measures something different.

**1. What the traffic inside data centers was for.** The best public breakdown by type of use comes from Cisco's Global Cloud Index, a forecast published in 2018 for the year 2021. It measured the data moving around inside data centers, not electricity, and it was made before the AI boom, so treat it as a general picture.

| Type of use | Share of traffic inside data centers (Cisco forecast for 2021) |
|---|---|
| Social networking | 22% |
| Search | 20% |
| Big data and analytics | 20% |
| Video streaming | 10% |
| Everything else, not broken out by Cisco (business software, banking and payments, email, online shopping, games, cloud storage and backups, health care, government, and more) | about 28% |

**2. How much of the electricity goes to AI.** This is the newest and best measured split. The Electric Power Research Institute (EPRI) said in February 2026 that AI accounts for an estimated 15% to 25% of data center electricity use. LBNL's December 2024 report found that AI servers in U.S. data centers used more than 40 terawatt-hours in 2023, out of 176 for all data centers. Everything else is the everyday computing we've relied on for years.

| Type of computing | Share of data center electricity (EPRI, 2026) |
|---|---|
| Everyday computing: websites, apps, email, banking, streaming, business software, storage, and more | about 75% to 85% |
| Artificial intelligence, both training new AI models and answering questions with them | about 15% to 25% |

LBNL also found that answering questions, not training, used nearly 60% of the electricity that went to AI servers in 2023.

**3. Who runs the space.** Synergy Research Group, a market research firm, estimated in April 2026 how the world's data center capacity is split by who runs it.

| Who runs it | Share of worldwide data center capacity (Synergy, 2026) |
|---|---|
| Hyperscale companies, the giant cloud and internet companies such as Amazon, Microsoft, Google, and Meta | 48% |
| Businesses running their own data centers for their own work, such as banks, hospitals, retailers, and governments | 32% |
| Colocation companies that rent space and power to many customers | 20% |

**4. What people pull out of data centers onto the internet.** Sandvine, a network company, reported in 2024 that on-demand streaming video, such as movies and shows, was about 54% of all the data flowing down to users worldwide, and that social media was about 35% of the data flowing to mobile phones. That's internet traffic, not the computing work inside the building, but it shows how much of what we pull from data centers is video.

Put together, here's what I take from it. Most of what data centers do is the everyday digital life we all use: social media, search, streaming, shopping, banking, email, and business records. AI is the fastest-growing piece and is why so many new data centers are being built, but it's still the smaller share of the electricity today. And crypto mining, which the EIA estimated used about 0.6% to 2.3% of U.S. electricity in early 2024, is a separate business usually counted apart from these numbers. Chapter 2 has more on that.

## Why there are suddenly so many

People have used data centers for decades, but demand has jumped in the last few years. More of our lives run online, more businesses rent computing from cloud companies instead of keeping their own

computers, and artificial intelligence (AI) needs a great deal of computing power. That's why you're hearing about new data centers in places that never had one before.

## Why they choose certain towns

Data center builders look for a few things: a strong supply of electricity, land, fiber-optic internet lines, water or a cooling plan that works without much water, low risk of floods and other disasters, and a community and local government willing to work with them. Taxes and incentives play a part too. That's why data centers often cluster in certain regions.

# Chapter 2: "They're Using Up All the Electricity"

Data centers do use a lot of electricity, and the amount is growing fast. Let's look at the real numbers, nationally and where data centers cluster.

## The national picture

In December 2024, the U.S. Department of Energy (DOE) released a report, prepared by Lawrence Berkeley National Laboratory (LBNL), on how much electricity data centers use. It found that U.S. data centers used about 176 terawatt-hours of electricity in 2023. That was about 4.4% of all the electricity used in the country. The report projected that share could grow to somewhere between about 6.7% and 12% by 2028.

A terawatt-hour is a billion kilowatt-hours, so these are big numbers. According to the U.S. Energy Information Administration (EIA), the average American home buys about 10,791 kilowatt-hours of electricity a year (2022, the latest EIA average). At that rate, 176 terawatt-hours is about what 16 million homes use in a year.

Put another way, a little over 4 of every 100 kilowatt-hours used in the United States go to data centers. Homes, stores, offices, schools, hospitals, and factories use the other 96.

## Where the growth shows up

The national share is modest. The growth is not. The North American Electric Reliability Corporation (NERC), which watches over the reliability of the power grid, said in its January 2026 long-term outlook that summer peak demand is expected to grow by about 224 gigawatts over the next 10 years. That's about 69% more growth than it forecast the year before, and NERC named data centers as a main driver in many regions.

Growth is also uneven. Data centers cluster where power, land, and fiber lines come together. Northern Virginia is the biggest example. A June 2026 trade report on a regional planning effort counted about 265 operating data centers there, with a combined peak electric load of about 2.8 gigawatts in 2022, forecast to reach about 14 gigawatts by 2038. In a place like that, data centers are a big share of new demand.

## So what's the truth?

The honest answer has two parts.

- Data centers are not using up the nation's electricity. They are a modest share of the total today.
- Their growth is real and fast, and in regions where many of them cluster, they drive much of the new demand. That growth has to be planned for and paid for fairly, which is what the next two chapters are about.

## "One AI question uses as much power as..."

You'll see claims that one chatbot question uses ten times the electricity of a web search, or runs a lightbulb for minutes. The independent research group Epoch AI estimated in February 2025 that a typical ChatGPT question uses about 0.3 watt-hours, and said the widely repeated figure of 3 watt-hours was likely about ten times too high. Google said in August 2025 that a typical text prompt to its Gemini AI used about 0.24 watt-hours, about the same as watching TV for under nine seconds. OpenAI's chief executive gave a figure of about 0.34 watt-hours. The company numbers weren't independently checked, and long or complicated requests use more.

So one question is tiny. The total isn't, because billions of them are asked. The International Energy Agency (IEA) estimated in April 2025 that data centers worldwide used about 415 terawatt-hours in 2024, about 1.5% of the world's electricity, and could reach about 945 terawatt-hours by 2030. That growth is the real story, not your one question.

## Bitcoin mines are a different animal

People often lump cryptocurrency mines in with data centers. They're both buildings full of computers, but they're different businesses. The EIA estimated in early 2024 that crypto mining used about 0.6% to 2.3% of U.S. electricity. Many of the loudest noise and power complaints in the news are about crypto mines, which are often open sheds or shipping containers full of fans. When a project is proposed, ask which one it is.

## Where the power comes from

Most data centers don't make their own electricity. They buy it from the local utility, the same as you do. Many large technology companies also sign long contracts to buy power from new wind, solar, nuclear, and other plants, which adds supply to the grid. Some sites now plan to build power plants on site. That brings its own air questions, which Chapter 8 covers.

## Questions you can ask

- How much electricity will this data center use when it's fully built, in megawatts?
- Where will the power come from, and does the utility have it today?
- Will the company buy or build new power supply to match its use?
- Will it build any power plants on site, and what fuel will they burn?

# Chapter 3: "My Electric Bill Will Go Up"

This is the most common worry, and it deserves a careful answer, because nobody wants a bigger bill to pay for someone else's building.

## How your bill is set

Your electric rate pays for what it costs the utility to run the system: power plants, the big transmission lines, substations, and the poles and wires on your street. When a large new customer arrives, two things happen at once:

- The utility may need to build more, and that costs money.
- The utility gains a big new customer who pays large bills, which spreads the fixed costs of the system over more sales.

Which effect is bigger depends on how the costs are divided up. That's decided by your state utility commission, in public, with a record you can read.

## What has actually happened

In November 2025, LBNL looked at electricity prices across all the states from 2019 to 2024. It found that the states where electricity use grew the fastest generally saw average prices go down after inflation, and the states where use shrank tended to see prices go up. For home electric rates by themselves, the effect was weaker and not statistically clear.

The researchers found that a primary driver of rising prices was utility spending on power lines and local wires, much of it to repair or replace aging equipment, not to serve new customers. They also said it isn't clear whether that pattern will hold if electricity use grows very quickly across the whole country.

In plain words: across the country through 2024, new customers like data centers were not the main thing pushing bills up, and in many states growth helped spread costs. That isn't a promise about the future, and how costs are shared matters a great deal.

## Where the worry is real: the PJM region

There is one big part of the country where data centers are clearly pushing costs up. PJM Interconnection runs the grid and the power markets for all or part of 13 states and Washington, D.C., from New Jersey and Virginia to Ohio and Illinois. Each year it holds an auction to pay power plants to be available in future years, and that cost ends up in customers' bills.

- The price jumped from about $29 per megawatt-day for 2024/25 to about $270 for 2025/26, then hit the price cap of about $329 for 2026/27 and about $333 for 2027/28. PJM said the 2027/28 price would have been near $530 without the cap.
- PJM said nearly 5,100 of the roughly 5,250 megawatts of growth in its forecast peak demand for that auction came from data centers.

- PJM's independent market monitor, which watches the market for the public, said in January 2026 that data centers accounted for about $6.5 billion, or 40%, of the $16.4 billion cost of the 2027/28 auction, and about 45% of the cost of the last three auctions combined. It called data center growth "the primary reason" for these market conditions.

Some PJM customers were expected to see bills go up about 1.5% to 5% starting June 2026 from this alone.

Nationwide, the U.S. Energy Information Administration (EIA) put the average home electric price at about 17.3 cents per kilowatt-hour in 2025, up from 16.5 cents in 2024, and forecast about 18.2 cents for 2026. Utilities point to fuel prices and grid spending as well, so data centers are one reason among several. Studies disagree on what comes next. A Carnegie Mellon projection in 2025 said data center and crypto growth could raise average U.S. generation costs about 8% by 2030, and more than 25% in parts of Virginia. A study done for Amazon by the consulting firm E3 found that the Amazon sites it looked at were paying their own way and not being subsidized by other customers. Harvard's Electricity Law Initiative warned in 2025 that secret special contracts between utilities and tech companies could be shifting costs onto the public.

My verdict: partly valid. In the PJM region it's a real cost that families are already paying. Elsewhere it depends on how your state sets the rules, which is the next section.

## How households are protected

Many utilities and state regulators now use special rate plans for data centers and other very large customers, often called large-load tariffs. A September 2026 review by LBNL and The Brattle Group found these plans often require long contracts, from 5 years to a proposed 20 in the examples reviewed, minimum monthly bills, money set aside as a guarantee, and fees if the customer leaves early.

Here's one real example. On July 9, 2025, the Public Utilities Commission of Ohio (PUCO) approved a data center rate plan for AEP Ohio. New data centers above 25 megawatts must pay for at least 85% of the power capacity they sign up for, whether they use it or not, for up to 12 years, with a four-year ramp-up period. They must post financial guarantees, and they pay exit fees if they leave early. The commission said the plan keeps the cost of new lines and equipment with the customers who caused it, instead of shifting it to everyone else.

Texas went further with a state law. Senate Bill 6, signed in June 2025, requires very large new customers of 75 megawatts or more to pay a minimum $100,000 fee to start the connection study, to share in the cost of connecting, and to accept equipment that lets the grid shut them off during a grid emergency.

In 2026, more states wrote protections into law. Florida's SB 484, signed in May 2026, tells its Public Service Commission to set rates for very large users so their costs are not shifted to everyone else. Oklahoma's Data Center Consumer Ratepayer Protection Act of 2026 requires separate rate terms for large loads, including crypto mines.

The idea behind all of these is simple and fair. If a data center asks the utility to build for it, the data center pays for that, and it keeps paying even if it leaves, so the cost doesn't fall on your household.

## Some companies now promise this in writing

In January 2026, Microsoft announced what it called a Community-First plan for its new data centers. Among other things, it said it will pay its full electricity costs so that its data centers don't raise residents' bills, and it will pay for the grid upgrades its sites need. That's a public company promise, not a law, but it gives communities something specific to ask for in writing. Chapter 19 has more on what companies are doing.

## Questions you can ask

- Who pays for the new lines, substations, and power plants this data center needs?
- Is there a large-load rate plan, and what does it require: contract length, minimum bill, guarantee, exit fee?
- What protects home customers if the data center closes or leaves early?
- Is the utility signing a special contract with this company, and will its terms be public?
- Will the company put its promise not to raise residents' bills in a signed agreement?

The best place to ask is your state utility commission, which approves electric rates, and your local utility.

# Chapter 4: "The Grid Can't Handle It, and We'll Have Blackouts"

It's natural to wonder whether one huge new customer could overload the system that keeps your lights on.

## How a data center gets connected

A large data center can't just plug in. Before the utility connects it, the utility runs studies to check whether the power lines, substations, and power supply can serve the new load without hurting anyone else's service. If they can't, the utility requires upgrades first, and the data center waits until they're built. In many parts of the country, data center developers wait years for power. That waiting is frustrating for them, but it shows the system is protecting existing customers.

## The worry is fair, and the people in charge share it

NERC, the national grid reliability organization, warned in January 2026 that reliability risks are growing in many regions because demand is climbing faster than new power plants and power lines are being built, and it named data centers as a main driver. That's not a reason to panic. It's the reason grid operators, utilities, and states are changing the rules, as the rest of this chapter shows.

## Data centers can step back when the grid is stressed

Data centers have batteries and backup generators so they can keep running if the grid goes down. That same equipment can help the grid during its hardest hours.

- **By law, in Texas.** Senate Bill 6 requires new customers of 75 megawatts or more to install equipment that lets them be disconnected during a grid emergency, before rolling blackouts reach homes. It also created a program where these customers can cut back or switch to their own backup power when asked, with at least 24 hours' notice.
- **By agreement.** In 2025, Google announced agreements with Indiana Michigan Power and the Tennessee Valley Authority (TVA) to cut back the power its data centers use during times of peak demand, when the grid needs it most. This is called demand response.

Done well, a data center that can step back for a few hours is a help to the grid instead of a strain on it.

## Has a data center ever caused a blackout?

I couldn't find a documented case of a data center causing a blackout for homes. But there was a close call worth knowing about. On July 10, 2024, a fault on a 230,000-volt line in Northern Virginia caused about 1,500 megawatts of data center load, reported as roughly 60 data centers, to switch over to their own backup power at the same moment. That's like a mid-sized city disappearing from the grid in an instant. The grid held, and frequency was back to normal in about four minutes, but the

North American Electric Reliability Corporation (NERC) said the risk of problems like this grows as more large loads connect. In 2026, NERC issued a rare Level 3 alert, its strongest kind, requiring grid operators to study and plan for large computing loads.

You may also have seen a 2025 Department of Energy report that said the risk of power outages could rise 100 times by 2030. That figure is a projection that assumed a large number of power plants retire and few new ones are built after 2026. Other analysts, such as the research group GridLab, said those assumptions don't match the government's own data on planned retirements. Treat it as a warning about what happens if planning fails, not a prediction.

## The honest part

Fast growth does put pressure on grid planning, especially where demand is climbing quickly. That pressure is real. The answer is good planning, fair rules about who pays, emergency rules like the ones above, and new power supplies and power lines built in time. Pretending the growth isn't happening doesn't help, and neither does panic.

## Questions you can ask

- Has the utility finished its studies for this data center, and what upgrades are required?
- Who pays for those upgrades, and when will they be done?
- Will the data center agree, in writing, to reduce its grid use during emergencies?
- If it switches to its own generators during a grid emergency, what does that mean for the air? (See Chapter 8.)

# Chapter 5: "They'll Drain Our Water"

Water is precious, especially in the dry parts of the country, and people are right to protect it. This is also the concern that's most often bigger than the facts, and the one where the type of cooling makes the biggest difference. Let's go through it carefully.

## Why data centers use water at all

Computers turn electricity into heat, and the heat has to go somewhere. Many data centers have used cooling towers, which get rid of heat by letting some water evaporate, the same way sweating cools your body. The evaporated water is gone, so the site keeps adding more. That's where most of a data center's water use comes from. This is called evaporative cooling.

The other main approach is a closed loop, where the water stays sealed inside pipes and goes around and around, like the coolant in your car's radiator. The heat leaves through big fans and coils instead of by evaporating water. These two designs use very different amounts of water, so the first question to ask about any data center is which one it uses.

## How much water, nationally

LBNL estimated that U.S. data centers used about 17 billion gallons of water on site in 2023, mostly for cooling. That's a lot of water, but here's some perspective:

- The Golf Course Superintendents Association of America estimated that U.S. golf courses used about 532 billion gallons of water in 2024. That's about 30 times as much as data centers.
- The U.S. Geological Survey (USGS) estimated that the country withdrew about 322 billion gallons of water per day in 2015, for farms, power plants, homes, businesses, and industry.

These figures aren't measured in exactly the same way, so treat the comparisons as rough. But they show the scale: nationally, data centers are a small water user.

## The water numbers you'll hear, checked one by one

Water is the claim I hear most, and it's where the numbers get stretched in both directions. So let's take the common ones one at a time.

**"A data center uses up to 5 million gallons a day, as much as a town of 10,000 to 50,000 people."** This line shows up everywhere. The Environmental and Energy Study Institute repeated it in June 2025, citing a 2023 Washington Post story that said a large data center "can gobble up anywhere between 1 million and 5 million gallons of water a day," based on unnamed researchers. I couldn't find the study behind the town comparison. The math roughly works at the top end: the EPA says an average family uses about 300 gallons a day at home, so 5 million gallons is about what 16,700 families use. But 5 million gallons is the high end for the biggest sites that cool by evaporation. All U.S. data centers together used about 48 million gallons a day on site in 2023, by my math from

LBNL's yearly total. My verdict: true for the largest water-cooled sites, misleading if you think it's typical. Ask for the number for the site in front of you.

**"Data centers use only a few swimming pools of water a year."** This one gets stretched the other way. In March 2026, the fact-check project Gigafact, with Wisconsin Watch, rated a claim that a massive Wisconsin data center would use only about four Olympic pools a year as false. City projections put the first building at about 2.8 million gallons in 2026, rising to about 8.4 million gallons a year for the full site, and those numbers leave out the water used to make the site's electricity. A closed-loop site really can use little water on site, but nobody should tell you the water footprint is zero.

**The water you don't see: power plants.** This is the part most people miss. Most power plants use water too, mainly for cooling. LBNL estimated that the indirect water footprint of U.S. data centers, from the power plants that make their electricity, was nearly 800 billion liters in 2023, about 211 billion gallons. That's roughly 12 times the water used on site. Wisconsin Watch, citing the same research, put it as about 92.5% for electricity and 7.5% for cooling. So a data center that uses no water on site still has a water footprint, and it's mostly at power plants that may be far away. That's also why cleaner, less water-hungry power, such as wind and solar, lowers a data center's total water use.

**"Data centers are draining America's water."** Here's the national scale, from the U.S. Geological Survey's 2010 to 2020 water report for the lower 48 states. The country consumed about 82.8 billion gallons of fresh water a day, meaning used up and not returned, and irrigation for crops was about 91% of that. By my math, data centers' on-site use of about 48 million gallons a day is well under one tenth of 1% of that total, and adding the power plant water brings it to about 0.7%. My verdict: false nationally. But water is local, and a big site can be a big share of a small town's system, as the next sections show.

**How fast is it growing?** LBNL found that big cloud and rental data centers (hyperscale and colocation) used 84% of the 66 billion liters, about 17.4 billion gallons, of on-site water in 2023, and it projected the big cloud sites alone could use 60 to 124 billion liters by 2028, roughly 16 to 33 billion gallons. Growth is real, and that's why the design choices in this chapter matter.

**What one big site really uses.** The Congressional Research Service, citing the International Energy Agency, gave the example of a 100-megawatt U.S. data center using about 2 million liters a day counting power plant water, about 530,000 gallons, with a little less than 40% of that, about 190,000 gallons a day, used on site. That split is different from the national 92.5% figure above because it describes one water-cooled site; how much is on site versus at the power plant depends on how a site cools and what kind of power plants serve it.

Even some industry voices agree the concern is fair. In June 2026, a Google executive told Axios that many companies "are not doing it the right way, so people's concerns are legitimate." I agree with him. The answer isn't panic or denial. It's asking for real numbers, in gallons, for the site in your town, and asking for the low-water design where water is short.

## Evaporative cooling versus closed loop, side by side

Here's what the numbers look like for a single large building. The evaporative figures come from a 2026 community briefing prepared for Candler County, Georgia, for a 100-megawatt site. The closed-loop figures come from that same briefing and from the companies named. The household comparison uses the U.S. Environmental Protection Agency (EPA) WaterSense figure that the average American family uses more than 300 gallons of water a day at home, which is about 110,000 gallons a year.

| What | Evaporative cooling (cooling towers) | Closed-loop cooling |
|---|---|---|
| Water to start up | Small; the system is topped off as it runs | One-time fill of about 350,000 to 600,000 gallons for a 100 MW building (Candler County); about 615,000 gallons, roughly one Olympic pool, for a QTS building |
| Water on a typical day | About 900,000 gallons (100 MW site) | Close to none for cooling |
| Water in a year | Roughly 300 million gallons or more (100 MW site) | Makeup of up to about 1% of the system per year, about 5,000 gallons (Candler County planning figure) |
| In household terms | About 3,000 families' daily use, every day | The one-time fill is about 3 to 6 families' use for a year; yearly makeup is about 17 days of one family's use |
| Where the water goes | Most of it evaporates; the rest is sent to the sewer as blowdown | Stays in the pipes; replaced fluid is hauled away or treated |

QTS, a data center company, says the ongoing water use for its closed-loop buildings is less than what five households use, and that the design can avoid up to 300 million gallons of water a year compared with evaporative cooling. Oracle said in February 2026 that the new sites it is building in New Mexico, Michigan, Texas, and Wisconsin will use closed-loop cooling with no evaporation, no blowdown, and no continuous makeup water, and that top-offs will be rare and happen only under abnormal conditions.

## How much water does a closed loop need to add each year?

A closed loop isn't perfectly sealed forever. Small amounts are lost through valve and pump seals, maintenance, and sampling, and the fluid is drained and replaced every several years.

- The Candler County briefing used up to about 1% of system volume per year as its planning allowance, with a full fluid change about every five years.
- A technical bulletin from the National Institutes of Health (NIH) Office of Research Facilities says makeup for closed-loop systems is typically less than 5% of the system's total volume in a year.

So a fair range is about 1% to 5% of the loop each year. For a loop holding 500,000 gallons, that's about 5,000 to 25,000 gallons a year. At the high end, that's less than three months of one family's home use. Even with a full refill every five years, a closed loop uses a tiny fraction of what a cooling tower evaporates.

## Do they fill the loop with treated wastewater?

You might ask whether data centers fill these loops with effluent, the treated wastewater from a sewer plant. I looked for a public example and didn't find one. The public examples point the other way:

- QTS says its fills come from approved municipal supplies.
- The Candler County briefing says the fill comes from an approved local source and is filtered on site.
- Oracle says its fill is delivered by tanker truck.

There's a practical reason. Water in a closed loop has to be very clean and treated against corrosion, because it runs through the cooling equipment for years. Some loops also use a mix of water and propylene glycol, a common antifreeze. Treated wastewater is better suited to cooling towers, where the volume is large and the water is used once. That's where data centers do use it, as the next section shows.

## Treated wastewater for cooling towers

Some data centers that do use cooling towers use treated wastewater, also called reclaimed or recycled water, instead of drinking water.

- Google's data center in Douglas County, Georgia, was reported in 2012 to cool with treated wastewater from a nearby treatment plant, about 30% of that plant's output, that would otherwise have gone into the river.
- Amazon Web Services (AWS) says it uses recycled water for cooling at 24 data centers, plans to expand that to more than 120 U.S. locations by 2030, and that the program will keep more than 530 million gallons of drinking water a year for communities.
- Microsoft says a water reuse facility at its Quincy, Washington, sites has cut its use of drinking water there by about 75%.
- In April 2026, the EPA launched an updated Water Reuse Action Plan that includes data center cooling, and it pointed to Loudoun County, Virginia, where reclaimed water from the Broad Run Water Reclamation Facility is supplied for data center cooling.

## How water use is reported, and why the numbers don't always line up

This is where a lot of confusion starts, so I want to be plain about it.

The industry's main yardstick is Water Usage Effectiveness (WUE). It's the water a site uses in a year divided by the electricity its computers use, in liters per kilowatt-hour. LBNL found the average across U.S. data centers was just over 0.36 liters per kilowatt-hour through 2023. AWS reported 0.12 for its own data centers. A lower number means less water for the same work.

The problem is that there's no single required way to report it. Companies and studies differ on:

- **Withdrawal or consumption.** Water taken in is withdrawal. Water evaporated and gone is consumption. Researchers estimate data centers evaporate about 75% of what they take in, compared with about 12% for other water users, so the choice matters a lot.
- **Drinking water or reclaimed water.** Some reports count all water; some count only drinking water.
- **On site or at the power plant.** Power plants use water too, so some studies add that in and some don't.

- **One-time fill.** A closed loop's first fill is a one-time amount. In a yearly report it shows up in one year, or it isn't broken out at all. A single yearly total can make the start-up year look like a heavy water year when it isn't.
- **Average day or peak day.** A yearly average hides hot summer days. A March 2026 research paper that hasn't been through full peer review found that peak-day water use at evaporative sites can run about 3 to 10 times the average, and that one closed-loop campus still reserved 8 million gallons a day of water capacity for peak days.

In plain words: when you see a data center water number, ask what it counts. For a fair comparison, a site should report the one-time fill, the yearly makeup, the yearly total, the peak day, and what kind of water it is, all in gallons. That way you can put it right next to an evaporative site, or your town's supply, and see the difference for yourself.

## Why local still matters

Water is local. What matters to you isn't the national total, it's your aquifer, your river, and your water system on the hottest day of the year. A large evaporative data center in a dry area can be one of the bigger users on a local system, and that's a fair concern. A closed-loop site in the same place barely registers after its first fill.

## To be fair about it

- Closed-loop cooling usually uses somewhat more electricity than evaporative cooling, because fans and chillers do the work evaporation used to do.
- Power plants use water too, so a data center's electricity carries some water use with it, even when the building itself uses very little.
- Many existing data centers still use evaporative cooling, and some new ones use a mix. Microsoft, for example, says its Georgia sites cool with outside air about 85% of the year and use evaporative cooling on about 55 hot days.

There's a trade-off between water and energy, and the right balance depends on the place. In a dry region, a low-water design is usually the right call.

## "Every AI question uses a bottle of water"

You've probably seen this one on social media. It traces back to a research paper from the University of California, Riverside, first posted in 2023, and a 2024 news story built on it that said writing a 100-word email with an AI chatbot could use about a bottle of water. Depending on where the data center was, the estimates ranged from about 235 milliliters to more than 1,400 milliliters for that one email.

Here's what most people sharing it didn't know. Those numbers count the water used at the power plants that make the electricity, not just the water at the data center, and they were based on older AI models and equipment. The paper itself said a 500-milliliter bottle covers roughly 10 to 50 medium-length answers, not one. Later figures from the companies are far lower. Google said in August 2025 that a typical text prompt to its Gemini AI used about 0.26 milliliters of water, about five drops, and about 0.24 watt-hours of electricity. OpenAI's chief executive said an average ChatGPT

query uses about one fifteenth of a teaspoon. Those are company figures that weren't independently checked, and they count only water used on site.

My verdict: the bottle-per-email claim is overblown. One question uses very little water. What matters for your town is the total for a whole site, where it gets its water, and how it cools, which is what the rest of this chapter is about.

## "A data center dried up my well"

In July 2025, the New York Times reported on a family in Newton County, Georgia, who live about 1,000 feet from a Meta data center and whose well began having sediment and pressure problems after construction started in 2018. In 2026, four families sued. Their complaint is that clearing, blasting, and digging during construction disturbed the ground and put silt in their wells, not that the data center is pumping their groundwater. Meta buys its water from the local utility, and its study said groundwater flows away from those homes. The case is in court, and nobody tested those wells before construction, so there's no "before" picture to compare with.

The same reporting raised a bigger and well-supported point: the county's water system is expected to run short by about 2030, and some data center applicants asked for up to 6 million gallons a day, more than the whole county uses now. That's the kind of number a community has every right to question.

## Dry places, and towns that pushed back

Bloomberg News reported in 2025 that about two-thirds of the data centers built or in development since 2022 are in places with high water stress. That's a fair concern, and some communities have acted on it.

- **Tucson, Arizona.** In August 2025, the city council voted against bringing a large data center project, called Project Blue, onto city water. The developer later switched its plans to air cooling. In September 2026, Pima County passed a 120-day pause on new data center projects while it studies water, air, land, and light.
- **Ypsilanti, Michigan.** In April 2026, the local utility authority approved a 12-month ban on supplying water and sewer service to large data centers while it studies its capacity.
- **The Dalles, Oregon.** Records released in 2022 showed Google used about 29% of the city's water in 2021. Chapter 17 has more on that one.

These show the system working. Water is local, and local governments can and do say no, or ask for a better design.

## Questions you can ask

- What kind of cooling will this data center use: evaporative, closed loop, or a mix?
- How many gallons for the first fill, where will it come from, and when?
- How many gallons a year after that, and how much on the hottest day?
- Will it use drinking water, treated wastewater, or no water for cooling?
- Will it report all of that to the public every year, in gallons?

- Will private wells near the site be tested before construction starts?
- What happens during a drought?

A company with nothing to hide will answer all of them.

# Chapter 6: "All That Heat Will Warm Up Our Neighborhood"

This one doesn't come up as often as power and water, but it's a fair question, and the answer helps explain everything else in this booklet.

## Why heat is the whole story

Almost all the electricity a computer uses turns into heat. So a data center that draws 100 megawatts of power gives off about 100 megawatts of heat, all day and all night. To put that in everyday terms, a typical home furnace puts out about 80,000 BTU (British thermal units) an hour, which is about 23 kilowatts. A 100-megawatt data center gives off about as much heat as more than 4,000 home furnaces running flat out.

That heat has to leave the building, or the computers fail. Every cooling system in Chapter 5 is just a way of moving that heat outdoors: by evaporating water in a cooling tower, or by blowing air across coils in a closed loop.

## Why people worry about it

There are three real reasons.

- **Warm air near the site.** Cooling equipment pushes warm air out, and a large campus has a lot of it. People living right next door can notice warm air and the fans that move it.
- **Local warming.** A research paper posted in March 2026, which hasn't finished peer review, used satellite data and found that land surface temperatures around AI data centers rose by about 2 degrees Celsius (about 3.6 degrees Fahrenheit) on average after they started operating. Land surface temperature is how warm the ground and roofs are, not the air you feel, but it's a sign that a large site can warm its immediate area.
- **Big roofs and pavement.** Any large building with a big roof and parking lots soaks up the sun. The EPA says cities run about 1 to 7 degrees Fahrenheit warmer than outlying areas in the daytime, and 2 to 5 degrees warmer at night, because buildings, roads, and other structures absorb and give off the sun's heat. A data center campus is part of that same picture.

## Putting it in perspective

The heat from a data center mixes into the open air and spreads out quickly. The effect researchers found is local, close to the site, not a change in your town's weather. It's similar to what you'd expect from any large industrial campus, warehouse, or shopping center with a lot of roof and pavement, plus the warm air from the cooling equipment. That doesn't make it nothing. It means it can be planned for, the same way noise can.

## How data centers keep heat away from neighbors

- **Distance.** Setting buildings and outdoor equipment well back from homes. Fairfax County, Virginia, for example, now requires data center buildings to be at least 200 feet from residential property lines.
- **Placement.** Putting cooling equipment on the roof or on the side of the building away from homes, and pointing warm air upward, where it mixes and cools faster.
- **Trees and lighter surfaces.** Trees, landscaped buffers, lighter-colored roofs, and less pavement, the same tools cities use to fight heat islands.
- **Liquid cooling.** Newer chip-level liquid cooling carries heat away in water that runs warm, which makes the heat easier to collect and use instead of just blowing it outdoors.

## Turning waste heat into something useful

Here's the part I find most encouraging. That heat is energy, and it can be put to work. In Europe, cities including Frankfurt, Copenhagen, and Paris already pipe heat from data centers into district heating systems that warm homes and buildings.

The U.S. is starting to follow. A June 2026 report described a Northern Virginia effort involving the Northern Virginia Regional Commission and the firm Ever-Green Energy to use data center heat in a district energy system, with a goal of a working project in 24 to 36 months. Heat that once just warmed the air could warm schools, greenhouses, pools, or homes.

## Questions you can ask

- How far will the building and its cooling equipment be from the nearest homes?
- Which way will warm air be discharged, and how high?
- What landscaping, tree buffers, and roof colors are planned?
- Has the company looked at sending its waste heat to a nearby user, such as a school, greenhouse, or district heating system?

# Chapter 7: "It Will Hum All Night"

This concern is real, and the industry hasn't always handled it well.

## Where the noise comes from

Data centers have large cooling fans, chillers, and outdoor cooling units that run around the clock, plus backup generators that are tested on a regular schedule. The sound is usually a steady, low hum rather than a loud bang. For people who live close by, that constant hum can be wearing, especially at night.

The Environmental and Energy Study Institute reported in March 2026 on neighbors' noise complaints near data centers. It noted that some local noise rules were never written with this kind of steady sound in mind. In Prince William County, Virginia, for example, the noise ordinance exempts air conditioning units.

## It can be fixed

Noise can be controlled when it's planned for from the start:

- Sound walls, earth berms, and rows of trees.
- Quieter fans and equipment rated for low noise.
- Enclosures and silencers on generators.
- Putting noisy equipment on the side of the building away from homes.
- Setting the building well back from property lines.
- Liquid cooling, which can reduce the number of fans.

The most effective tool is good planning: put large data centers in industrial areas with buffers from homes, and write clear noise limits, measured at the property line, into the approval.

What counts as a clear limit? For a sense of scale, the EPA said in 1974 that an outdoor average of 55 decibels over a full day and night, with nighttime sound counted more heavily, protects people at home with an adequate margin of safety. Local limits vary from place to place, so ask what number your community would use at the nearest homes, and whether it is lower at night.

## Some local governments are writing it into the rules

In September 2024, Fairfax County, Virginia, updated its zoning rules for data centers. Data center buildings now have to be at least 200 feet from residential property lines. Backup generators and similar equipment have to be 300 feet away, or shielded by the building. All outdoor equipment has to be enclosed or screened by a wall. And developers have to do noise studies before and after construction to show they meet the county noise ordinance. Those are the kinds of rules any community can ask for.

Chandler, Arizona, went a step further and requires yearly noise studies for five years after a data center opens. Chapter 9 covers that, along with the online claims that the hum makes people sick.

## Questions you can ask

- Has a noise study been done, and can the public see it?
- What will the noise limit be at the nearest homes, day and night?
- When will generators be tested, and for how long?
- Who do neighbors call if there's a problem, and how will it be measured and fixed?
- Will there be a noise study after the site is running, not just before it's built?

# Chapter 8: "The Generators Will Pollute the Air"

I'll be straight with you. Of all the concerns in this booklet, air pollution is the one where the industry has the most work left to do. It deserves more than a quick answer.

## Where the air pollution comes from

Large data centers keep backup generators so the computers keep running if the power goes out. Most burn diesel, and some burn natural gas. A big campus can have dozens of them, each about the size of a shipping container. Most of the time they sit quietly. They run for regular tests and maintenance, and during power outages or grid emergencies.

When they run, diesel engines give off nitrogen oxides (NOx), which help form smog, along with fine particles, carbon monoxide, and unburned fuel. Fine particles and smog are linked to asthma and to heart and lung problems, which is why the EPA and the states regulate them.

There's a second, bigger source that's easy to miss: the power plants that make the electricity a data center buys. And a newer third source: some sites are now building their own gas-fired power plants on site to run every day, not just in emergencies.

## How big is it?

Northern Virginia shows the scale. The Virginia Mercury reported in January 2026 that the region has more than 4,000 diesel generators at data centers, with more than 11 gigawatts of capacity. A single Amazon air permit there covers 173 generators and allows up to 10 million gallons of diesel a year. That's the most the permit allows, not what's actually burned in a normal year, but it shows why neighbors pay attention.

A research team from the University of California, Riverside, and the California Institute of Technology (Caltech) estimated the public health cost of this pollution in a paper first posted in December 2024. They estimated that air pollution tied to U.S. data centers, from both the power plants that supply them and their backup generators, could cause about 1,300 early deaths a year by 2030 (their range was 940 to 1,590), with public health costs approaching $20 billion a year. For Northern Virginia's backup generators alone, they estimated health costs of about $190 to $260 million a year at today's levels, and $1.9 to $2.6 billion a year if every generator ran as much as its permit allows. These are estimates from a model, not measured deaths, but they come from serious researchers, and they're worth taking seriously.

## The rules today

- **Hours limits.** Under EPA rules, emergency generators can generally run no more than 100 hours a year for anything other than a real emergency, including maintenance and testing, and no more than 50 of those hours for certain other non-emergency uses. State air permits often set tighter limits and require records.

- **Engine standards.** EPA rates diesel engines in tiers. Tier 4 engines are the cleanest and usually need add-on pollution controls. Emergency generators are allowed to meet the older Tier 2 standard, which has no add-on controls. That's a big part of why the pollution is higher than it needs to be.
- **Permits.** Generators need state or local air permits, and those permits are public records.

## Where the rules are being tested

- **Virginia.** In fall 2025, Virginia's Department of Environmental Quality (DEQ) widened its guidance on what counts as an emergency for running data center generators. It received more than 500 public comments, most of them opposed. In 2026, a bill was introduced to require batteries as the first line of backup and to phase out the older Tier 2 generators.
- **Memphis, Tennessee.** The artificial intelligence company xAI used gas turbines to power a large data center in Memphis. On July 2, 2025, the Shelby County Health Department permitted 15 turbines. The Memphis chapter of the NAACP and the group Young, Gifted & Green, represented by the Southern Environmental Law Center, appealed the permit. They said up to 35 turbines had been on the site, some running before they were permitted. Whatever the final outcome, the lesson is plain: a power plant on a data center site is a power plant, and it should go through full permitting and public review before it runs.

## What can be done, and is being done

The good news is that most of this pollution can be cut with tools that already exist.

- **Add-on controls.** Selective catalytic reduction (SCR) can cut NOx from diesel engines by up to 95%, and diesel particulate filters can cut particles, carbon monoxide, and unburned fuel by about 90%.
- **Cleaner engines.** Choosing Tier 4 engines, or fitting controls to Tier 2 engines, even though the rules don't require it for emergency use.
- **Batteries first.** Using large battery systems to ride through short outages and grid events, so the generators start less often.
- **Cleaner fuel.** Renewable diesel, made from waste fats and vegetable oils, can be used in many diesel generators. Data center companies Compass and Equinix have reported greenhouse gas reductions of up to 85% and 90% with it. That number is about climate gases over the fuel's life cycle, not local smog, so it isn't a substitute for pollution controls.
- **Smarter testing.** Testing fewer generators at once, for shorter times, during the day, and when the weather won't trap pollution near the ground.
- **Taller stacks and good placement.** Discharging exhaust high and away from homes, schools, and parks. Fairfax County, Virginia, requires generators to be 300 feet from homes or shielded by the building.
- **Clean grid power.** The health study above counted power plant pollution along with generators, so buying power from clean sources cuts pollution too, just not always in your neighborhood.

## Questions you can ask

- How many generators will the site have, what size, and what fuel?
- What engine tier are they, and will they have SCR and particulate filters?
- What does the air permit allow, in hours and in fuel, and where can the public read it?
- How often, how long, and at what time of day will generators be tested? How many at once?
- Will batteries handle short outages so the generators run less?
- Will the site run its generators during grid emergencies, and how will neighbors be told?

- Will the site have any power plant that runs every day, and has it gone through full permitting?

# Chapter 9: "The Hum and the Power Lines Will Make Us Sick"

Of all the fears going around about data centers, this is the one that spreads fastest online. In 2026, videos and articles claimed that an "undetectable hum" from AI data centers was causing dizziness, nausea, vertigo, and sleep loss in nearby neighborhoods. Other posts warn that the new power lines and substations will cause cancer. These are scary claims, and people who believe them aren't foolish. So let's take them one at a time and separate what's real from what isn't.

## The claim about the hidden hum

The sound you can't hear is called infrasound. It's sound below about 20 cycles per second, too low for the human ear to pick up. Wind, ocean waves, traffic, and even your own heartbeat produce it. The viral claim is that data centers put out enough of it to make people sick.

Here's what the research shows. The best large studies of this question were done on wind turbines, which are a much bigger source of infrasound than a cooling fan. Health Canada surveyed 1,238 households living near 399 wind turbines in Ontario and Prince Edward Island and published its results in 2014. It found that the illnesses people reported were not linked to how much turbine noise they were exposed to, and their sleep, measured as well as self-reported, wasn't linked either. It also found that the infrasound near homes was often below the infrasound that was already there in the background. Australia's National Health and Medical Research Council reviewed the research in 2015 and said there is no consistent evidence that wind farms cause health effects in people, and that infrasound and low-frequency noise in lab settings have few, if any, effects on the body.

The widely shared 2026 coverage I found didn't include measurements. One widely shared tech article that named a neighborhood in Chandler, Arizona, reported a sound level that came from what residents said, not from a measurement, and it quoted no sound experts or doctors.

## The part that's real

Now the other side, and it matters. The steady, low hum you can hear, from big fans, chillers, transformers, and on-site turbines, is real. The Health Canada study found that people did get more annoyed as noise levels went up, and annoyance and lost sleep from a sound that never stops are real harms, even if the sound isn't poisoning anyone. The Environmental and Energy Study Institute reported in March 2026 that low frequencies are hard to measure with an ordinary sound meter, that about one third of Virginia's data centers sit within 200 feet of land zoned for homes, and that cooling towers can reach about 70 decibels within 400 feet.

Chandler, Arizona, is a good example of a community that had a real problem and fixed the rules. After years of neighbor complaints about a high-pitched hum from one data center's cooling units, the city adopted a data center ordinance that took effect in January 2023. It requires a sound study before construction that is shared with residents, keeps noise at or below that starting level, requires

a noise study every year for five years at peak operation, limits generator testing, and requires an on-site contact for neighbors.

> **Tip:** Some of the worst noise stories in the news are about bitcoin mines, not the cloud and AI data centers this booklet covers. Bitcoin mines often run in open sheds or shipping containers with huge banks of fans. In Granbury, Texas, residents sued a bitcoin mine in 2024 claiming hearing loss, migraines, and vertigo. Those are claims in a lawsuit, not findings, and that site is a different kind of building. Ask which kind of facility is being proposed.

My verdict: the hum you can hear is a real nuisance that deserves real limits. The claim that a hidden hum is making people physically ill is not supported by the research we have today.

## Power lines, substations, and cancer

A large data center needs a substation and often new high-voltage lines, and some people worry about the electric and magnetic fields (EMF) around them. Here are the facts.

- In 2002, the International Agency for Research on Cancer (IARC) put power-frequency magnetic fields in its "possibly carcinogenic" group, Group 2B. That's the weakest of its "causes cancer" labels. The World Health Organization (WHO) explains that this rests mainly on studies that found a small rise in childhood leukemia in homes with average fields above about 3 to 4 milligauss, and that the evidence is not strong enough to say the fields cause it.
- The National Cancer Institute says no consistent link between any source of these fields and cancer has been found, and that fewer than 1% of children live with fields that high.
- The fields drop off fast with distance. Federal figures from the National Institute of Environmental Health Sciences (NIEHS) show the average field from a 230,000-volt line falls from about 57 milligauss at the edge of the right-of-way to about 7 at 100 feet, about 2 at 200 feet, and under 1 at 300 feet. The average American home has about 1 milligauss from ordinary wiring and appliances.
- Outside a substation's fence, the field from the equipment inside is usually no different from the background. The stronger fields come from the lines going in and out.

My verdict: this fear is mostly overblown. At the setbacks most communities require, fields from data center lines and substations fall to the same levels you already have in your kitchen.

## "Cancer clusters" and well water

In November 2025, Rolling Stone reported on Morrow County, Oregon, where Amazon runs data centers, and tied them to rare cancers and miscarriages. Here's what's solid and what isn't. The nitrate problem in that area's groundwater is real and decades old. State data cited in the story show the basin average rising from about 9 parts per million in 1992 to about 15 in 2015, above the federal limit of 10, and it has long been blamed on farm fertilizer, manure, septic systems, and food-processing wastewater. The story's claim is that data center cooling water, once some of it evaporates, leaves more concentrated nitrates in the wastewater that gets sprayed on fields. The health numbers came from a local survey of homes and residents' accounts, not from a health agency study. Amazon called the story misleading, said nitrates aren't something it adds, and said the

region's water problems long predate it. I could not find any health study showing that data centers caused the illnesses. The fair way to say it: a real water-quality problem, with a link to data centers that has not been proven. That's a reason to test water and track where wastewater goes, not a reason to panic.

## Questions you can ask

- Will there be a sound study before construction, shared with the public, and yearly studies after it opens, including low-frequency sound?
- What is the noise limit at the nearest homes, day and night?
- How far will new power lines and the substation be from homes and schools?
- Is this a cloud or AI data center, or a cryptocurrency mine?
- Will nearby private wells be tested before construction starts, so there's a record if something changes?

# Chapter 10: "It Could Catch Fire, Explode, or Leak"

This concern is fair, and I'm not going to wave it away. A data center stores a lot of energy in batteries and a lot of diesel fuel for its generators. Both can cause trouble if they aren't handled right.

## Battery fires

Most new data centers use lithium-ion batteries to carry the computers for a few minutes when the power blinks. When a lithium-ion battery fails badly, it can overheat, catch fire, and spread to the batteries next to it. That's called thermal runaway, and it has happened at data centers.

- In September 2024, a fire in the battery room of a Digital Realty data center in Singapore disrupted cloud services, and staff were evacuated. No injuries were reported.
- In September 2025, a lithium-ion battery fire at South Korea's National Information Resources Service data center in Daejeon knocked out many government online services, including mobile ID and postal services. Reports said a battery was suspected of failing during maintenance, nearly 400 battery packs were removed, and one worker had a minor injury.

Both of these fires mostly hurt the services inside the buildings and the people working there. Neither spread into a neighborhood. Still, a battery fire produces toxic smoke and needs a fire department that knows what it's facing.

The main safety standard for big battery systems in the United States is NFPA 855, from the National Fire Protection Association. Its 2026 edition makes a hazard study the normal starting point, requires large-scale fire testing to show a fire in one battery unit won't spread to the next, and requires emergency plans that are reviewed and practiced every year. Many places still enforce an older edition through their fire code, so it's worth asking which one applies.

## Diesel fuel and spills

A large data center keeps a large supply of diesel on site so its backup generators can run without a fuel delivery, often for a day or more. Federal spill rules under the Environmental Protection Agency (EPA) apply to sites that store more than 1,320 gallons of oil above ground. Those sites need a written spill prevention plan and containment, such as a basin or double-walled tank, that can hold a leak.

Spills still happen. In September 2026, more than 5,000 gallons of diesel leaked from an Equinix data center in Secaucus, New Jersey, into a stream that feeds the Hackensack River. Local officials said it was contained, and the company said it was investigating. That shows both sides: the risk is real, and the response plan is what keeps a leak from becoming a disaster.

## Cooling towers and Legionnaires' disease

Data centers that use cooling towers raise a fair question about Legionella, the bacteria that cause Legionnaires' disease. The Centers for Disease Control and Prevention (CDC) found that cooling towers were the source of about 22% of the U.S. outbreaks it investigated from 2000 to 2014, and that

every outbreak with enough information traced back to at least one maintenance problem. In other words, they were preventable. In August 2025, a New York City outbreak that killed four people was traced to cooling towers on ordinary buildings, including a hospital, not a data center. I could not find a documented outbreak traced to a data center cooling tower. The protection is a written water management plan with regular testing, and closed-loop or dry cooling avoids open cooling towers altogether.

## "Forever chemicals" in the coolant

A few data centers cool servers by dunking them in special fluids. Some of the fluids used in one type, called two-phase immersion cooling, are PFAS, the long-lasting "forever chemicals." 3M, a major maker, finished leaving PFAS manufacturing at the end of 2025. Most immersion systems use mineral or plant oils instead, and most data centers use water, glycol, or air. This is a narrow issue, but it's a fair one to ask about.

## What good looks like

- Batteries that meet the current NFPA 855 edition, in rooms built to contain a fire.
- A fire department that has walked the site, knows where the batteries and fuel are, and has trained for it.
- A spill plan, containment around every fuel tank, and leak alarms.
- A Legionella water management plan for any cooling tower.
- Clear answers about what coolant is used.

## Questions you can ask

- What kind of batteries will be used, how much, and which edition of NFPA 855 applies?
- Has the local fire department reviewed the plans, and will it get training and any special equipment it needs?
- How much fuel will be stored, how is it contained, and who gets called if it leaks?
- Is there a Legionella plan for the cooling towers, and are the test results available?
- Will any PFAS coolants be used?

# Chapter 11: "We Give Them Tax Breaks and Get Nothing Back"

Here the facts cut both ways, so let's look at both sides.

## What communities get

Data centers usually pay large property taxes, because the buildings, and especially the computers and equipment inside, are worth a great deal. At the same time, they use few public services. They don't send children to school, and they need little from local roads once they're built.

In Loudoun County, Virginia, home to one of the largest groups of data centers in the country, county staff said in 2025 that data centers bring in about 38% of the county's General Fund revenue. That money helps pay for schools, roads, and public safety, and it can help hold down property taxes for homeowners. Loudoun's real estate tax rate fell from $1.145 per $100 of value in 2016 to $0.805 in 2026, according to the county. A June 2026 trade report put Loudoun's data center tax revenue at about $1 billion a year, and neighboring Prince William County's at about $150 to $200 million a year.

There's a caution here too. A county that leans heavily on one industry takes on risk if that industry slows down or wins lower tax rates later. A healthy deal plans for that.

## What communities give

Many states offer tax breaks to attract data centers. An analysis by the policy group Good Jobs First, reported by Bloomberg Government in April 2025, found that 32 states offer data center tax incentives, and that states give up about $3 billion a year in revenue through them. Whether a particular deal is good for a community depends on its terms. A good deal is public, has an end date, and ties the break to real investment and jobs that can be checked. Some companies now go further. Microsoft said in January 2026 that it will not ask local governments for lower property tax rates for its new data centers.

## The breaks are getting bigger, and states are taking a second look

State sales tax breaks on data center equipment have grown much faster than lawmakers expected. Virginia's legislative watchdog, JLARC, found in December 2024 that the state's exemption saved data centers about $929 million in sales taxes in 2023, and that it brings back about 48 cents in state revenue for every dollar it costs. That's better than the average Virginia incentive, at 41 cents, but it's still less than it gives up. A year later, JLARC reported that data centers received more than half of all Virginia incentive spending from 2015 to 2024.

By 2026, a number of states were pulling back. Bloomberg Tax reported in June 2026 that Ohio's governor paused new exemption requests, Illinois suspended new agreements, Arizona agreed to a

three-year pause, and Washington ended one of its breaks, while about two dozen states saw bills to repeal or limit them. In July 2026, North Carolina ended its sales tax break on the electricity data centers use. In June 2026, Pennsylvania's House voted 197 to 5 to end its equipment exemption, though the Senate had not acted.

That doesn't mean every incentive is a bad deal. It means the public is right to ask what each one costs and what it buys.

## About jobs

Jobs come up in almost every tax debate, so they get their own chapter. See Chapter 12.

## Questions you can ask

- How much will this data center pay in local taxes each year, after any incentives?
- What tax breaks is it getting, for how long, and what does it promise in return?
- Has anyone estimated what the state and local tax breaks will cost each year, and for how long?
- What happens to the deal if the company doesn't meet its promises?

# Chapter 12: "They Promise Jobs That Never Come"

You'll hear two stories about data center jobs. Supporters talk about thousands of jobs. Opponents say a giant building ends up with a handful of workers. Both are partly right, depending on whether you're counting construction or the years after.

## Building it versus running it

The most careful public study I found is from Virginia's Joint Legislative Audit and Review Commission (JLARC), the state legislature's watchdog, in December 2024. It found:

- A typical 250,000 square foot data center building has about 50 full-time workers once it's running, about half employees and half contractors.
- Building one takes 12 to 18 months, with about 1,500 workers on site at the peak.
- Across Virginia, data centers supported more than 8,000 full-time operations jobs in 2023, and construction supported about 59,000 jobs a year, counting the spending that ripples through the economy.

So the big job numbers are mostly construction. Those are real paychecks for electricians, pipefitters, ironworkers, and equipment operators, but they last a few years, and many of those workers travel from job to job.

## What happens to a county's jobs over time

In 2026, researchers at the Brookings Institution compared U.S. counties that got their first large data center with counties where announced projects were later canceled. They found that jobs in data processing rose about 56% over a decade and telecom jobs rose about 43%. In a typical county, that works out to roughly 100 to 200 jobs. They didn't find a change in local wages. The authors said plainly that data centers do create local jobs, "with caveats," and that simpler studies tend to overstate the effect.

## The cost per job

This is where the "jobs that never come" complaint has teeth. When a state gives up hundreds of millions of dollars in sales tax and the site has a few dozen permanent workers, the cost per permanent job can be very high. An older study by the watchdog group Good Jobs First found subsidies that worked out to about $1.95 million per job on average across 11 large projects. That's a dated, advocacy-group figure, but the point stands: a tax break is a poor deal if it's sold mainly as a jobs program.

## My verdict

Partly valid. The permanent jobs are real, skilled, and well paid, but there are far fewer of them than the construction numbers suggest. Judge the project on its tax revenue, the terms of the deal, and its

effect on power, water, and neighbors, not on a jobs number alone. And if jobs are part of the pitch, get them in writing.

## Questions you can ask

- How many permanent, full-time jobs will there be once it's running, counting employees and contractors separately?
- How many construction workers, for how long, and how many will be hired locally?
- Will the company fund local training, such as electrical, HVAC, and technician programs at the community college?
- If the jobs don't show up, does any tax break shrink or end?

# Chapter 13: "It Will Tank My Home Value"

Your home is probably the biggest thing you own, so this worry makes sense. Here's what the studies show so far.

## What the studies found

- **Indiana, 2026.** A study by the appraisal firm Integra Realty Resources, using Zillow estimates from 2021 to 2026, looked at homes within 1.5 miles of four Indiana data centers. Homes near all four went up in value. Near three of them, homes rose a little less than their county overall; for example, near one LaPorte County site homes rose about 42% while the county rose about 48%. Near Amazon's New Carlisle site, nearby homes rose about 49% against about 32% for the county. Keep in mind this study was paid for by a data center developer that was seeking approval for a project.
- **Northern Virginia.** George Mason University's Center for Regional Analysis looked at 2023 home sales and found no statistical evidence that being near a data center lowered home values.
- **Nationwide.** In September 2026, the National Association of Realtors (NAR) reported that there is no single "data center effect" on housing. Counties with 10 or more data centers had higher home values and faster growth than counties with none, but NAR itself warned that this is a correlation, not proof of cause, since data centers locate in growing areas. In its survey of agents, about 25% saw a positive effect on nearby home values and about 22% a negative one.
- **The same NAR report** found home electric rates rose about 21% from 2020 to 2024 in counties with 10 or more data centers, compared with about 16% in counties with none. That's a correlation too, but it ties back to the bill question in Chapter 3.

## My verdict

Mostly overblown, with an honest gap. No study I found shows home values falling across the board near data centers, and many areas with data centers have seen strong price growth. Some homes very close to a site may gain a few percentage points less than the rest of the county. What the studies don't measure well is the house right next door, facing the cooling equipment. That's where setbacks, berms, noise limits, and lighting rules protect value the most.

## Questions you can ask

- How close will the building, cooling equipment, and substation be to the nearest homes?
- What buffers, berms, trees, and lighting rules will be required?
- Has anyone studied home sales near the company's other sites, and who paid for the study?

# Chapter 14: "They're Paving Over Our Farmland"

Some of the new campuses are huge, thousands of acres, and many are going up on farmland and open country. If you've watched fields turn into warehouses for years, this one hits home.

## The national picture

The U.S. Department of Agriculture's 2022 Census of Agriculture counted about 880 million acres of farmland in the country, down about 20 million acres, or 2.2%, from 2017. Most of that loss came from many causes over many years, such as houses, roads, shopping centers, and farms going out of business, long before the data center boom.

Data centers are a small piece of that national total. In Texas, for example, reporting in August 2026 said three big projects were expected to use at least 16,000 acres combined, and the first phase of one Panhandle campus was 3,700 acres. Texas has about 126 million acres of farmland. By my own math, 16,000 acres is about one hundredth of 1% of the state's farmland.

## Why it still matters locally

National numbers don't help much if the field being rezoned is the one behind your house. A campus of a few thousand acres can change the look, traffic, and character of a whole rural county. And how the land is approved matters.

The best-known example is the Prince William Digital Gateway in Virginia, a plan for about 37 data center buildings on about 2,000 acres next to Manassas National Battlefield Park. Neighbors and the American Battlefield Trust sued. In August 2025, a judge voided the rezoning because the county hadn't given proper public notice, and the Court of Appeals upheld that in March 2026. By July 2026, the developers had dropped their appeals, which ended the project as approved. The county spent nearly $2 million defending it. The lesson: the process has to be done right and in the open.

## Construction, dust, and lights

The building years bring their own problems: truck traffic, blasting, dust, and bright lights at night. In Georgia, four families sued Meta in 2026, saying clearing and blasting for a data center put silt in their wells, along with dust and night lighting. Meta disputes the claims, the case is in court, and I can't tell you who's right. But it shows why communities should set rules for construction hours, dust control, truck routes, and lighting before the first tree comes down.

Once a site is running, light can be handled with shielded, downward-facing fixtures and motion sensors, and those can be written into the approval.

## My verdict

Overblown as a national threat to farmland. Valid as a local question about where a campus goes, how big it gets, and whether the approval process is fair and public.

## Questions you can ask

- How many acres will the full campus use, in every phase, not just the first?
- What's the land zoned for now, and what buffers will protect nearby homes, farms, streams, and historic sites?
- What are the rules for construction hours, blasting, dust, and truck routes?
- Will outdoor lights be shielded and pointed down?
- Will nearby wells be tested before construction starts?

# Chapter 15: "It's Bad for the Climate"

This is a concern where I have to tell you the short-term news isn't good, and then show you the other side.

## The honest part first

In the near term, data center growth is keeping fossil fuel plants running and getting new ones built.

- **New gas plants.** In August 2025, Louisiana regulators approved three new Entergy gas plants to serve Meta's large data center in Richland Parish, which needs about 2,500 megawatts.
- **Coal plants kept open.** The U.S. Department of Energy has ordered the J.H. Campbell coal plant in Michigan to keep running past its planned 2025 closure, renewing the order five times through May 2026 and pointing to demand that includes AI data centers. Michigan Public reported the extra cost had reached about $180 million by March 2026.
- **Company emissions are up.** Google reported its emissions rose about 18% in 2025 and are more than 80% above 2019. Microsoft reported its emissions rose about 25% in its 2025 fiscal year, mainly from data center expansion.
- **Projections.** Carnegie Mellon researchers projected in 2025 that data center growth could raise carbon dioxide from U.S. power plants about 30% by 2030, compared with no data center growth.

## The other side

- **Nuclear plants coming back.** The Three Mile Island Unit 1 reactor in Pennsylvania, now called the Crane Clean Energy Center, is being restarted with a 20-year power deal with Microsoft, with a restart possible in 2027. Palisades in Michigan became the first U.S. nuclear plant to move from decommissioning back to operating status in August 2025. NextEra and Google announced a deal in October 2025 to restart the Duane Arnold plant in Iowa.
- **Clean power contracts.** Large tech companies also sign long contracts to buy power from new wind, solar, and nuclear plants, which adds clean supply to the grid.
- **Efficiency.** Google said the energy used per AI prompt fell about 33 times in one year. Newer chips and cooling do more work per kilowatt-hour.
- **Perspective.** Data centers used about 4.4% of U.S. electricity in 2023 (Chapter 2). Nationally, the EPA says transportation is the largest direct source of greenhouse gases, and that burning fossil fuels for electricity, heat, and transportation is the largest source overall. Data centers are one user of that electricity among many.

## What about old computers and e-waste?

Servers are usually replaced every few years, so people ask where they go. A peer-reviewed 2024 study in the journal Nature Computational Science estimated that AI could add about 1.2 to 5 million metric tons of electronic waste between 2020 and 2030, and that reuse and recycling could cut that by up to 86%. For scale, the world throws away more than 60 million metric tons of electronics every year. Microsoft says it reused or recycled about 91% of its servers and parts in 2024, and Google says

it diverted 84% of its data center operational waste from landfills in 2024. Those are company figures, and smaller operators publish much less.

## My verdict

Valid in the near term. The fast buildout is adding demand that's being met partly with gas and by keeping coal plants open. Whether data centers end up helping or hurting the climate over time depends on how much new clean power gets built and how fast the machines get more efficient. A community can ask a project where its power will come from and hold it to the answer.

## Questions you can ask

- Where will this data center's power come from, and is any of it new clean power?
- Is any power plant being built or kept open because of this project?
- Will the company report its energy use and emissions for this site every year?
- What happens to the old servers and batteries?

# Chapter 16: "When the AI Boom Ends, We'll Be Stuck With Empty Buildings"

People remember other booms that went bust and left empty factories behind. It's a fair thing to plan for.

## What's actually happening

Plenty of announced projects never get built. In April 2025, Microsoft said it was slowing or pausing some early-stage projects, including a $1 billion plan in Licking County, Ohio, where two of the three sites were being kept as farmland for now. In May 2026, the research service Heatmap reported that at least 20 projects worth more than $41.7 billion were canceled after local pushback in just the first three months of 2026, and about 25 were canceled in 2025.

Notice the difference, though. Those were projects canceled before they were built. I could not find a documented case of a large, finished cloud or AI data center in the United States sitting empty and abandoned. That doesn't mean it can't happen. Technology changes, companies merge, and some smaller or older sites do close.

## How a community protects itself

- **Decommissioning rules.** Some local governments now write them in. A draft 2026 ordinance in Greenwood County, South Carolina, said a site that stops operating for 6 months, or runs below 10% of capacity for 12 months, must be taken down within 6 months, and the owner must post a bond worth 125% of the estimated cost to do it.
- **Utility contracts.** The large-load rate plans in Chapter 3 require minimum bills for many years and exit fees, so households don't pay for power lines built for a customer that leaves.
- **Tax deals.** Tie any tax break to the building being used, with clawbacks if it isn't.
- **A building worth reusing.** A data center site has big power lines, fiber, and a sturdy building, which can make it useful to the next owner. That's not a guarantee, so don't count on it in place of a bond.

## My verdict

Partly valid. The risk isn't so much empty buildings today as promises that change. A community that requires a decommissioning bond, a long utility contract, and tax breaks with strings attached is protected either way.

## Questions you can ask

- If the site stops running, who takes it down, how fast, and who pays? Is there a bond?
- How long is the utility contract, and what's the exit fee?
- Does the tax deal end or claw back money if the site is idle?

# Chapter 17: "They're Doing It in Secret"

This one is real, and I think the industry has brought a lot of distrust on itself here.

## How the secrecy works

It's common for a data center developer to use a code name and a company name that doesn't reveal who's behind it, and to ask local officials to sign a non-disclosure agreement (NDA) before the public knows anything.

- **Minnesota.** The Star Tribune reported in December 2025 that Meta's project in Rosemount was code-named "Project Bigfoot" and run through a company called Jimnist LLC, and that eight cities and two counties had signed NDAs. A state bill to ban them failed on a tie vote.
- **Wisconsin.** Wisconsin Watch reported in January 2026 that Beaver Dam signed an NDA with "Balloonist LLC" in December 2023, and the public learned 14 months later that it was Meta.
- **Louisiana and Virginia.** NPR reported in August 2026 that Louisiana officials had signed at least 54 NDAs since 2024, and that NDAs were found in 25 of 31 Virginia projects reviewed.
- **Oregon.** The city of The Dalles went to court to keep Google's water use secret, then dropped the suit in December 2022. The records showed Google used about 355 million gallons in 2021, about 29% of the city's water.

## Why companies do it, and why it backfires

The usual reasons given are that secrecy keeps land prices from jumping and keeps competitors from learning a company's plans. Those are real business reasons. But a community that finds out late feels tricked, and it often fights harder. In November 2026, Route Fifty reported that opponents won virtually all of more than 40 local ballot measures on data centers in 10 states, though some were advisory only. Many of the canceled projects in Chapter 16 fell apart after local opposition grew.

## My verdict

Valid. Secrecy before a land deal may be normal business, but secrecy from the public during approvals isn't acceptable. By the time a project goes before a planning board, the public should know the company, the size, the power and water needs, and the deal.

## Questions you can ask

- Who is the actual company behind this project?
- Has any official signed an NDA, and when will it be lifted?
- Will the power, water, noise, and tax numbers be public before the vote?
- Will there be public hearings before anything is approved, with proper notice?

# Chapter 18: Viral Claims, Checked

A lot of what people hear about data centers comes from a video, a meme, or a post shared a thousand times. Some of it is true, some is half true, and some is made up. Here are the ones I see most, in one place, with where to read more.

| Claim | What the facts show | My verdict | See |
|---|---|---|---|
| "One AI email uses a bottle of water." | The estimate counted power plant water and older equipment. The same paper said one bottle covers roughly 10 to 50 answers. Company figures are a few drops per question. | Overblown | Ch. 5 |
| "One AI question uses ten times a web search." | Independent and company estimates put a typical question at about 0.24 to 0.34 watt-hours. The total grows because of the huge number of questions. | Overblown per question, real in total | Ch. 2 |
| "Data centers use most of our electricity." | About 4.4% of U.S. electricity in 2023, possibly 6.7% to 12% by 2028. | False today, fast growth is real | Ch. 2 |
| "Data centers raise electric bills 30% to 40%." | PolitiFact found no public data showing increases that size and rated the claim Half True. Costs are rising in the PJM region, where the market monitor ties about 40% of recent capacity costs to data centers. | Half true | Ch. 3 |
| "Data centers drink millions of gallons a day." | PolitiFact said a typical mid-sized data center uses about 300,000 to 500,000 gallons a day and large AI sites can use up to about 5 million. Closed-loop and air-cooled sites use far less. | Depends on the design | Ch. 5 |
| "Data centers use only a few swimming pools of water a year." | Gigafact rated this false for a large Wisconsin site, which is projected at about 8.4 million gallons a year on site, not counting power plant water. | False | Ch. 5 |
| "Data centers are draining America's water." | All U.S. data centers' on-site water is well under one tenth of 1% of the nation's freshwater consumption, about 0.7% counting power plant water. Local systems can still be strained. | False nationally, can be real locally | Ch. 5 |
| "Data centers are mostly for AI." | AI is an estimated 15% to 25% of data center electricity. Most of the work is everyday computing such as social media, search, streaming, banking, and business software. | False today, AI is the fastest-growing part | Ch. 1 |
| "Jeff Bezos said data centers should get water before people." | Lead Stories found no such quote. It came from an Instagram account that calls itself a joke. | False | This chapter |
| "Data centers dried up our wells." | One Georgia case is in court. The families blame construction silt, not pumping, and no wells were tested beforehand. | Unresolved | Ch. 5 |
| "The hidden hum is making people sick." | Large studies of infrasound find no consistent health effect. The audible hum is a real nuisance. | Not supported, but the noise is real | Ch. 9 |
| "Power lines and substations cause cancer." | Weak evidence at high exposures, not shown to cause cancer. Fields drop to household levels within a few hundred feet. | Mostly overblown | Ch. 9 |
| "Data centers caused a cancer cluster in Oregon." | The nitrate problem is real and decades old. No health study shows data centers caused the illnesses. | Unproven | Ch. 9 |
| "Data centers will cause blackouts." | No documented blackout caused by one. A 2024 close call in Virginia has grid planners changing rules. | Overblown, but grid risk is real | Ch. 4 |
| "A data center will tank your home value." | Studies so far show no broad drop. Homes very close by may gain a little less. | Mostly overblown | Ch. 13 |

| Claim | What the facts show | My verdict | See |
|---|---|---|---|
| "They're paving over America's farmland." | A small share nationally, but single campuses of thousands of acres reshape a county. | Overblown nationally, real locally | Ch. 14 |
| "It will bring thousands of jobs." | Mostly construction jobs. A typical building has about 50 full-time workers once running. | Partly true | Ch. 12 |
| "When the AI boom ends we'll have empty buildings." | Many announced projects get canceled. I found no large finished site left abandoned. | Partly valid, plan for it | Ch. 16 |
| "They're keeping it secret." | Code names, shell companies, and NDAs signed by officials are well documented. | True | Ch. 17 |

## How to check a scary claim yourself

- **Find the original source.** A news story about a study is not the study. Look for the report, the permit, or the commission order.
- **Check the units and what's counted.** Withdrawal or consumption? Average day or peak day? On-site water only, or power plant water too?
- **Check the date.** Equipment and numbers change fast. A 2023 estimate may not fit a 2026 building.
- **Ask if it's a projection.** "Could" and "by 2030" mean a forecast, not a measurement.
- **Ask what kind of building.** A crypto mine, a cloud data center, and an AI campus with its own power plant are different things.
- **Look for the other side.** If a claim only quotes one side, or only the company, look for the other.

# Chapter 19: What Data Centers Are Doing to Work With Communities

After all these chapters of concerns, it's fair to ask whether the industry is listening. The short answer is yes, more than it used to, though not every company and not every site. Here's what's happening, concern by concern, with the source for each.

## A word about promises

Most of what follows are public commitments made by companies. I'm reporting what they said, not vouching that every promise will be kept at every site. A company announcement is not a law or a contract. The way a community makes a promise stick is to write it into the zoning approval, the permits, the utility contract, or a signed development agreement. Keep that in mind as you read.

## On electric bills and the grid

- **Microsoft** said in January 2026, in its Community-First plan, that it will pay its full electricity costs so its data centers don't raise residents' bills, and that it will pay for the grid upgrades its sites need.
- **Google** has agreements with Indiana Michigan Power and the Tennessee Valley Authority to cut back its data centers' power use during peak demand, when the grid is under the most strain.
- **States and regulators** are setting rules that apply to everyone. Ohio's commission approved a data center rate plan with minimum bills, guarantees, and exit fees. Texas passed a law that makes very large customers share connection costs and lets the grid shut them off in an emergency. (See Chapters 3 and 4.)
- **More states in 2026.** Florida and Oklahoma passed laws in 2026 to keep large users' power costs from being shifted to households, and North Carolina ended its sales tax break on data center electricity. (See Chapters 3 and 11.)

## On water

- **Closed-loop designs** are spreading. Microsoft says its new designs since August 2024 use closed-loop, chip-level cooling that evaporates no water for cooling. Oracle and QTS describe closed-loop sites with one-time fills and little or no ongoing cooling water.
- **Recycled water.** AWS says it uses recycled water at 24 data centers and plans to reach more than 120 U.S. locations by 2030, keeping more than 530 million gallons of drinking water a year for communities.
- **Replenishing what they use.** Google reported consuming about 7.2 billion gallons of fresh water in 2024 and replenishing about 4.5 billion gallons, about 64% by Google's count, through local water projects. In June 2026 it released a framework that says it will avoid water-heavy cooling in water-stressed areas, use reclaimed water, report water use every year, help fund local water systems, and replenish more than it consumes by 2030. AWS said it reached 75% of its own water-positive goal in 2025.
- **Paying into local systems.** Microsoft said it will replenish more water than it withdraws, publish water data for each region, and improve its water use per unit of computing by 40% by 2030. It committed more than $25 million to water and sewer projects in Leesburg, Virginia.
- **Public reuse programs.** The EPA's April 2026 Water Reuse Action Plan update includes data center cooling, which helps utilities and companies set up recycled water supplies.

## On heat

- **Heat reuse.** A Northern Virginia effort involving the regional commission and the firm Ever-Green Energy is working on a project to put data center heat to work in a district energy system, with a goal of 24 to 36 months. European cities already do this.
- **Liquid cooling** makes heat easier to capture and reuse.

## On noise and siting

- **Local rules** are getting clearer. Fairfax County, Virginia, now requires setbacks of 200 feet for buildings and 300 feet for generators from homes, screened equipment, and noise studies before and after construction.
- **Noise rules with follow-up.** Chandler, Arizona, requires a sound study before construction, noise kept at or below that level, and yearly studies for five years after opening. (See Chapter 9.)
- **Plans for the end.** Some counties now require decommissioning bonds, so a site that shuts down gets cleaned up at the owner's cost. (See Chapter 16.)

## On air

- **Cleaner fuel.** Companies including Compass and Equinix have switched some generators to renewable diesel.
- **Batteries first** and add-on pollution controls are available today, and a bill introduced in Virginia in 2026 would put batteries first and phase out the older Tier 2 generators. This is the area with the most room to improve, as Chapter 8 explains.

## On safety

- **Newer fire codes.** The 2026 edition of NFPA 855 tightens the rules for large battery systems, including large-scale fire testing and yearly emergency plan reviews. Communities can ask that new sites meet it. (See Chapter 10.)

## On openness

- **Pressure on secrecy deals.** Bills to ban or limit NDAs with local officials were filed in several states, including Minnesota and Wisconsin, though none had passed as of the reporting cited in Chapter 17. Voters made themselves heard too: by early counts, opponents won nearly all of the more than 40 local data center measures on November 2026 ballots.

## On taxes, jobs, and being a neighbor

- **No tax-rate fights.** Microsoft said it will not ask local governments for lower property tax rates for its new data centers.
- **Training local workers.** Microsoft said it will work with the building trades unions on job training, and offer artificial intelligence (AI) skills training in its communities.
- **Someone to call.** Microsoft said it will name local community liaisons for its sites. Ask any company for the same: a real person, with a phone number, who answers.

## What this tells me

The industry has heard the concerns, and the best companies are changing how they build. The tools to protect households, water, quiet, clean air, and safety exist today. The job for each community is to ask for them by name and get them in writing.

# Chapter 20: What a Good-Neighbor Data Center Looks Like

After all of this, here's where I come down. A data center can be a good neighbor, a strong taxpayer, and a source of skilled jobs. Whether it is depends on how it's planned, built, and run, and on whether the company treats the community with respect.

Here's what I think any community can reasonably expect.

## The good-neighbor checklist

- ☐ **It pays its own way on power.** It covers the full cost of the grid upgrades it needs, under a rate plan or contract that protects households if it leaves early.
- ☐ **It's careful with water.** It uses closed-loop or low-water cooling where water is scarce, or treated wastewater instead of drinking water. Every year it reports, in gallons, its first fill, its yearly makeup, its total use, its peak day, and what kind of water it uses.
- ☐ **It handles its heat.** Its cooling equipment sits back from homes and discharges warm air up and away, with trees and buffers, and it looks for ways to reuse its waste heat.
- ☐ **It keeps the noise down.** It meets clear noise limits at the property line, day and night, with noise studies before and after it's built and a way to fix problems.
- ☐ **It keeps the air clean.** It uses batteries first, Tier 4 engines or add-on pollution controls, cleaner fuel where it can, and a sensible test schedule. Its air permit is public, and any power plant on site goes through full permitting and public review.
- ☐ **It's in the right place.** It's sited in an industrial area with buffers from homes, and its lighting and looks are designed with neighbors in mind.
- ☐ **It's safe.** Its batteries meet the current NFPA 855 edition, its fuel tanks have containment and leak alarms, any cooling tower has a Legionella plan, and the local fire department has reviewed the site and trained for it.
- ☐ **It protects neighbors' wells and land.** Nearby private wells are tested before construction, and there are rules for construction hours, blasting, dust, trucks, and lighting.
- ☐ **It plans for the end.** A decommissioning bond covers the cost of taking it down if it ever closes.
- ☐ **The deal is clear.** Any tax breaks have clear terms, an end date, and clawbacks, and the expected tax revenue and real permanent job count are shown to the public.
- ☐ **It talks to people.** The company names itself, no officials stay bound by secrecy agreements once a project goes public, and it meets with the public early, answers questions in plain language, and names a person to call with problems.

- ☐ **It puts its promises in writing.** Its commitments on power, water, noise, and air are written into the approval, the permits, or a signed agreement, not just a press release.

## Questions to bring to a public meeting

## A last word

It's okay to have questions about something new and big in your community. Asking them isn't being against progress, and supporting a project isn't being naive. The best outcomes happen when neighbors ask good questions, companies give straight answers, and local leaders hold both sides to the facts.

I hope this booklet helps you do exactly that.

# Glossary

**AI inference.** Using a finished AI model to answer questions or do tasks.

**AI training.** Building an AI model by running huge amounts of data through it, which takes a great deal of computing.

**Air permit.** A state or local permit that limits the pollution a source such as a generator may release.

**Backup generator.** An engine-driven generator that supplies power when the utility power fails.

**Blowdown.** Water drained from a cooling tower to carry away minerals that build up as water evaporates.

**BTU.** British thermal unit, a measure of heat. 3,412 BTU equals one kilowatt-hour.

**Capacity auction.** A yearly auction in which a grid operator pays power plants to be ready to supply power in a future year. The cost is passed on to customers.

**Clawback.** A clause that makes a company pay back a tax break if it doesn't keep its promises.

**Closed-loop cooling.** Cooling in which the water stays sealed in pipes and goes around and around, so little or no water is used up after the first fill.

**Colocation.** A data center that rents space, power, and cooling to many different customers.

**Consumption (consumptive use). Water that is used up, mostly by evaporation, and not returned to a river, lake, or aquifer.**

**Cooling tower.** Equipment that gets rid of heat by letting some water evaporate.

**Data center.** A building that houses servers along with the power and cooling systems that keep them running.

**Decommissioning.** Taking a facility out of service and removing its equipment and buildings, or making the site safe.

**Demand response.** An agreement for a customer to cut back its electricity use when the grid is under stress.

**DEQ.** Department of Environmental Quality, the state agency in Virginia and several other states that issues air permits.

**Development agreement.** A signed contract between a local government and a developer that spells out what the developer will do, and can be enforced.

**Diesel particulate filter.** An add-on filter that traps soot from diesel engine exhaust.

**District heating.** A system that pipes heat from a central source to many buildings.

**E-waste.** Discarded electronics, such as old servers, circuit boards, and batteries.

**EMF.** Electric and magnetic fields, which surround anything that carries electricity, from power lines to house wiring.

**Engine tier.** An EPA rating for how clean a diesel engine must be. Tier 4 is the cleanest.

**Evaporative cooling.** Cooling that works by evaporating water, as in a cooling tower.

**Fine particles.** Tiny bits of soot and other material in the air, small enough to be breathed deep into the lungs.

**General Fund.** A local government's main budget for everyday services.

**Gigawatt.** 1,000 megawatts.

**Heat island.** An area, usually built-up, that is warmer than its surroundings because buildings and pavement absorb and give off heat.

**Hyperscale.** The largest cloud and internet companies and their very large data centers.

**IARC.** The International Agency for Research on Cancer, part of the World Health Organization.

**IEA.** The International Energy Agency, an intergovernmental group that tracks world energy data.

**Immersion cooling.** Cooling servers by submerging them in a special liquid that doesn't conduct electricity.

**Indirect water.** Water used at power plants to make the electricity a data center buys, as opposed to water used at the data center itself.

**Infrasound.** Sound too low for the human ear to hear, below about 20 cycles per second.

**Interconnection study.** A utility study of whether the grid can serve a new large customer, and what upgrades are needed.

**JLARC.** Virginia's Joint Legislative Audit and Review Commission, the state legislature's watchdog agency.

**Kilowatt-hour.** The unit of electricity on your bill: 1,000 watts used for one hour.

**Land surface temperature.** How warm the ground, roofs, and pavement are, as measured by satellites. It is not the same as air temperature.

**Large-load tariff.** A special utility rate plan for very large new customers, with long contracts, minimum bills, guarantees, and exit fees, so other customers don't carry their costs.

**Legionella.** Bacteria that can grow in poorly kept water systems, including cooling towers, and cause Legionnaires' disease, a serious lung infection.

**Level 3 alert.** NERC's strongest kind of alert, which sets out essential actions grid operators must take and report on.

**Lithium-ion battery.** A rechargeable battery like the one in your phone, built in large racks at a data center.

**Low-frequency noise.** Deep sound you can hear, like a hum or rumble, roughly 20 to 200 cycles per second.

**Makeup water.** Water added to a cooling system to replace what is lost.

**Market monitor.** An independent watchdog that reviews a power market for fairness and reports to regulators and the public.

**Megawatt.** 1,000 kilowatts. A large data center building often needs tens to hundreds of megawatts.

**Milligauss.** A unit for measuring the strength of a magnetic field.

**Moratorium.** A temporary pause on new approvals while a government studies an issue.

**NDA.** Non-disclosure agreement: a contract promising to keep information secret.

**NERC.** The North American Electric Reliability Corporation, which sets reliability standards for the power grid and publishes long-term outlooks.

**NFPA 855.** The National Fire Protection Association's safety standard for installing large battery and energy storage systems.

**Nitrate.** A chemical that can get into well water from fertilizer, manure, and septic systems; high levels are unsafe to drink, especially for infants.

**Noise ordinance.** A local law that sets limits on how loud a sound may be, often measured at the property line.

**NOx.** Nitrogen oxides, gases from burning fuel that help form smog.

**PFAS.** A family of long-lasting man-made chemicals, often called forever chemicals.

**PJM.** PJM Interconnection, the organization that runs the power grid and wholesale markets for all or part of 13 states and Washington, D.C.

**Preprint.** A research paper shared publicly before it has finished peer review.

**PUCO.** The Public Utilities Commission of Ohio.

**Renewable diesel.** A diesel fuel made from waste fats and vegetable oils that can run in many diesel engines.

**SCR.** Selective catalytic reduction, an add-on control that cuts nitrogen oxides from engine exhaust.

**Server.** A computer that stores and processes information for other computers over a network.

**Terawatt-hour.** A billion kilowatt-hours of electricity.

**Thermal runaway.** When a failing battery heats itself up faster and faster, which can cause a fire that spreads to nearby batteries.

**Treated wastewater.** Sewage water that has been cleaned at a treatment plant and can be reused for things like cooling. Also called reclaimed water, recycled water, or effluent.

**TVA.** The Tennessee Valley Authority, a federally owned utility serving Tennessee and parts of nearby states.

**Utility commission.** The state agency that approves electric rates and oversees utilities.

**Water positive.** A goal of returning more water to communities and watersheds than a company uses.

**Water stress.** When the demand for water in an area comes close to, or exceeds, the supply that is available.

**Watt-hour.** One watt used for one hour. A thousand watt-hours is a kilowatt-hour.

**Withdrawal.** Water taken from a river, lake, aquifer, or water system. Some may be returned.

**WUE.** Water Usage Effectiveness: a site's yearly water use divided by the electricity its computers use, in liters per kilowatt-hour.

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# About This Book

This booklet takes the questions people ask when a data center is coming to town, and the scary claims that spread online, and answers them in plain words using public sources. It covers electricity use, your power bill, the grid, water, heat, noise, backup generators, health claims, fire and spills, taxes, jobs, home values, land, the climate, empty buildings, and secrecy. Each chapter states the concern, gives the facts and my verdict, and shows where the facts came from.

A chapter of viral claims, checked, puts the most common ones in one table. The last chapters show what data centers are doing to work with their communities and what a good-neighbor data center looks like. The goal is not to sell you on data centers or scare you off them. It is to give you the facts so you can decide for yourself.