

## APPENDIX 2: FINAL CLAUDE AI RESPONSE TO QUERY

### QUERY

Data centers have myriad adverse effects on communities where they are located, and beyond. Some specific examples are the following:

#### 1. Lake Tahoe Area & Northern Nevada (Tahoe-Reno Industrial Center)

- **Resource & Structural Impact:** NV Energy announced a reduction of power allocations to Liberty Utilities (affecting ~49,000 California/Nevada border customers) to redirect capacity toward the hyper-growth of Northern Nevada data centers (e.g., Switch Citadel campus). Data centers consumed 22% of Nevada's electricity in 2024, projected to hit 35% by 2030, triggering emergency energy procurement.
- **Health & Community Manifestations:** Severe utility rate hikes causing energy poverty. Omitted health risks include **hypothermia or heat stroke** due to self-rationing of heating/cooling, and mechanical failure of life-sustaining medical equipment (oxygen concentrators, ventilators) during forced blackouts or economic shutoffs.

#### 2. Box Elder County, Utah (Stratos AI Project)

- **Resource & Structural Impact:** Approved via the Military Installation Development Authority (MIDA) on ~40,000 acres, this mega-project is projected to scale up to 9 Gigawatts (GW)—surpassing the current total grid capacity of Utah. It demands billions of gallons of water annually from aquifers feeding the already critically depleted Great Salt Lake basin.
- **Health & Community Manifestations:** Exacerbation of the Great Salt Lake's desiccation, which exposes toxic lakebed dust containing **arsenic and heavy metals**, causing widespread **chronic respiratory diseases, lung cancer, and metabolic disorders** when airborne. Localized thermal plumes worsen heat exhaustion in a desert environment.

#### 3. Fayetteville & Newton County, Georgia (Meta & QTS Facilities)

- **Resource & Structural Impact:** Construction of Meta's \$750M Newton County facility disrupted local hydrogeology, leading to nearby private well failures (sediment clogging, dry wells). Simultaneously, the QTS facility in Fayetteville drew ~29 million gallons of unmetered water during severe drought conditions while residents faced strict water restrictions.
- **Health & Community Manifestations:** Loss of clean running water forces reliance on unmonitored or contaminated water sources, risking **bacterial gastrointestinal infections (E. coli, Giardia)**. Severe psychological stress, anxiety, and sleep disturbances stem from acute utility insecurity.

#### 4. Memphis, Tennessee & Southaven, Mississippi (xAI Colossus Facility)

- **Resource & Structural Impact:** The xAI Colossus facility bypassed standard environmental pre-permitting by installing a massive array of natural gas combustion turbines (estimated between 27 and 46+ units) to augment grid power. This sparked lawsuits in early 2026 by the NAACP, SELC, and Earthjustice citing Clean Air Act violations.

- **Health & Community Manifestations:** Located in predominantly Black, historically marginalized neighborhoods, the facility emits immense volumes of Nitrogen Oxides ( $\text{NO}_x$ ), Volatile Organic Compounds (VOCs), and formaldehyde. This directly triggers **acute asthma exacerbations, chronic obstructive pulmonary disease (COPD), cardiovascular strain, and elevated long-term cancer risks**, alongside **acoustic trauma** from turbine noise.

#### 5. Dublin, Ireland (EirGrid Constraint Area)

- **Resource & Structural Impact:** Data centers consume over 20% of Ireland's total grid electricity, prompting EirGrid to issue a de facto moratorium on new Dublin-area connections to protect grid stability. Some projects are only permitted if they feature dedicated on-site fossil-fuel (gas/diesel) generation.
- **Health & Community Manifestations:** Increased systemic risk of rolling blackouts. The indirect health risks include **disruption of hospital operations, failure of cold-chain storage for critical medications (insulin, vaccines)**, and heightened anxiety regarding infrastructure reliability.

#### 6. Loudoun County, Virginia ("Data Center Alley")

- **Resource & Structural Impact:** The densest concentration of data centers globally has forced the rapid construction of high-voltage overhead transmission lines (e.g., 500kV lines) through established residential neighborhoods, historic preservation areas, and conservation zones.
- **Health & Community Manifestations:** Chronic stress from eminent domain battles and property devaluation. Chronic exposure to the low-frequency hum of nearby substations and transmission lines induces **sleep architecture disruption** and psychological distress.

#### 7. Pacific Northwest (Oregon - Portland General Electric Footprint)

- **Resource & Structural Impact:** Massive data center expansions in eastern and western Oregon have driven Portland General Electric (PGE) to implement consecutive, double-digit rate increases (~50% cumulative in recent cycles) to fund new generation and transmission infrastructure.
- **Health & Community Manifestations:** High systemic **energy burden** on low- and fixed-income populations. Funds are diverted from medical care, nutritional needs, and prescriptions, leading to a measurable decline in overall community health metrics.

#### 8. Phoenix Metropolitan Area, Arizona (Grid & Microclimate Strain)

- **Resource & Structural Impact:** Extreme clusters of data centers in Mesa, Chandler, and Phoenix strain the electrical grid during peak summer ambient temperatures exceeding 110°F. ASU research confirms that data center mechanical yards create microclimatic "heat plumes," raising local ambient temperatures by several degrees.
- **Health & Community Manifestations:** Amplification of the **urban heat island (UHI) effect**, leading to spikes in **heat-related mortality, heat stroke, renal failure, and severe dehydration**, particularly among unhoused populations and outdoor workers.

#### 9. Omaha, Nebraska (North Omaha Station Coal Plant Delay)

- **Resource & Structural Impact:** Massive energy demands from Meta and Google data center expansions forced Omaha Public Power District (OPPD) to delay the planned decommissioning and gas-conversion of the North Omaha coal-fired power plant.
- **Health & Community Manifestations:** Prolonged exposure to coal combustion byproducts ( $\text{PM}_{2.5}$ ,  $\text{SO}_2$ , mercury) in historically redlined, low-income communities. This causes **increased rates of pediatric asthma, ischemic heart disease, low birth weights, and premature mortality.**

#### 10. North Carolina (Duke Energy System)

- **Resource & Structural Impact:** Exploding data center load growth has caused Duke Energy to alter its Integrated Resource Plans, proposing new natural gas plants and delaying the retirement of carbon-heavy assets.
- **Health & Community Manifestations:** Regional air quality degradation. Omitted health effects include **chronic inflammatory airway diseases and elevated cardiovascular morbidity** due to prolonged exposure to fossil-fuel combustion particulates.

#### 11. The Dalles, Oregon (Google Aquifer Depletion)

- **Resource & Structural Impact:** Google data centers consume up to 30% of the city's total potable water supply for evaporative cooling. The tech company engaged in protracted legal battles to keep its specific water consumption data secret from the public.
- **Health & Community Manifestations:** Long-term depletion of the critical Columbia River basalt aquifers. This threatens municipal water security, increases the concentration of naturally occurring contaminants in remaining water, and induces **community-wide psychological stress over resource scarcity.**

#### 12. Chandler, Arizona (CyrusOne Acoustic Disturbances)

- **Resource & Structural Impact:** Industrial-scale chiller plants and rooftop evaporative cooling fans operate continuously, generating a relentless, low-frequency airborne acoustic profile.
- **Health & Community Manifestations:** Neighbors documented a chronic, low-frequency hum. This causes **sensory overload, persistent sleep deprivation, clinical anxiety, chronic migraines,** and elevated levels of stress hormones (cortisol), which elevates long-term risk for **hypertension and ischemic heart disease.**

#### 13. Prince William County, Virginia (Chiller Squeal & Digital Gateway)

- **Resource & Structural Impact:** The approval of the massive PW Digital Gateway (QTS and Compass campuses) required rezoning thousands of acres of rural/agricultural land near the Manassas National Battlefield Park, resulting in extensive deforestation and grading.
- **Health & Community Manifestations:** High-frequency chiller "squeal" and low-frequency noise pollution. Community side effects include **cognitive impairment and learning delays in children** exposed to chronic environmental noise, alongside profound mental health deterioration from the loss of historic and natural spaces.

#### 14. Shanwei, Guangdong Province, China (Marine Thermal Pollution)

- **Resource & Structural Impact:** Coastal data centers utilizing open-loop surface water cooling discharge billions of gallons of heated effluent directly back into the local marine environment.
- **Health & Community Manifestations:** The thermal discharge causes localized marine die-offs and alters ecological balances, leading to harmful algal blooms (HABs). This risks **paralytic shellfish poisoning** if contaminated seafood is consumed, and destroys traditional fishing economies, triggering **livelihood-loss induced depression and alcoholism**.

#### 15. Zeewolde, Netherlands (Meta Hyperscale Agricultural Conflict)

- **Resource & Structural Impact:** Meta proposed a massive hyperscale data center facility on highly fertile, active agricultural land, which was ultimately halted after widespread public and political backlash.
- **Health & Community Manifestations:** Threatens regional food security by removing arable land from production. The indirect health impact is the **long-term nutritional vulnerability** associated with shifting localized agriculture to industrialized, import-dependent food chains.

#### 16. West Virginia (Rural Topographical Deforestation)

- **Resource & Structural Impact:** Clearing and leveling mountainous, forested terrain to create massive, flat concrete pads for data center campuses.
- **Health & Community Manifestations:** Destruction of natural carbon sinks and severe soil erosion. Runoff clogs local waterways with sediment, destroying recreational areas and **contaminating surface-water intakes with suspended solids and agricultural chemicals**, threatening drinking water safety.

#### 17. Altoona, Iowa & Quincy, Washington (Economic & Employment Disparity)

- **Resource & Structural Impact:** Municipalities granted long-term property and sales tax exemptions to attract hyperscale facilities. These massive complexes require minimal permanent staff (primarily security and a few systems engineers) relative to their enormous physical footprint.
- **Health & Community Manifestations:** Severe distortion of local economies; skyrocketing land prices price out diversified industries. This strains municipal budgets for **public health, emergency services, and mental health infrastructure**, leaving communities vulnerable during economic downturns.

#### 18. Atlanta, Georgia (Urban Heat Island Acceleration)

- **Resource & Structural Impact:** Rapid conversion of urban tree canopies and green spaces into massive, low-slung concrete data center complexes and sprawling electrical substations.
- **Health & Community Manifestations:** Accelerates the urban heat island effect. This directly correlates with **increased emergency room admissions for heat exhaustion, stroke, and acute renal failure** within inner-city neighborhoods.

### 19. Culver City, California (Zoning and Aesthetic Encroachment)

- **Resource & Structural Impact:** Insertion of windowless, monolithic industrial structures into high-density, mixed-use, or historically significant urban neighborhoods.
- **Health & Community Manifestations:** Degradation of the visual landscape and walkable urban environments. This leads to **reduced physical activity, decreased neighborhood social cohesion, and heightened depressive symptoms** due to a sterile living environment.

### 20. Prineville, Oregon (Battery Storage & Chemical Hazards)

- **Resource & Structural Impact:** Siting of massive Uninterruptible Power Supply (UPS) rooms containing thousands of lithium-ion or lead-acid batteries to prevent computing interruptions.
- **Health & Community Manifestations:** Thermal runaway incidents and battery fires release highly toxic gases, including **hydrogen fluoride (HF), volatile organic compounds, and heavy metal particulates**. Inhalation causes **acute chemical pneumonitis, permanent pulmonary scarring, and severe skin burns** to responders and downwind communities.

### 21. Granbury, Texas (Bitcoin Mining Acoustic Crisis)

- **Resource & Structural Impact:** A massive, high-density cryptocurrency mining facility utilizing thousands of open, high-RPM cooling fans operating 24/7 immediately adjacent to residential zones.
- **Health & Community Manifestations:** Severe, uninterrupted high-velocity acoustic pollution. Residents within a multi-mile radius (especially a nearby mobile home park) documented **vertigo, permanent tinnitus, debilitating nausea, chronic migraines, clinical insomnia, and inner ear fluid imbalances**, creating an acute public health emergency.

### 22. Lansing, New York (Terawulf AI Repurposing Proposal)

- **Resource & Structural Impact:** Proposed conversion of the retired Somerset/Cayuga coal plant into a high-density AI data center, leveraging the existing grid connection and seeking massive water draws from Cayuga Lake for cooling.
- **Health & Community Manifestations:** Threatens the thermal and ecological equilibrium of a critical freshwater body. Destabilization of the lake ecosystem risks triggering cyanobacterial (blue-green algae) blooms, which release **potent neurotoxins and hepatotoxins** into municipal drinking water sources.

### 23. Saline Township, Michigan (Stargate/OpenAI-Oracle Proposal)

- **Resource & Structural Impact:** A multi-billion-dollar, multi-gigawatt computing campus proposed on pristine agricultural land without initial transparent public disclosure.
- **Health & Community Manifestations:** Massive displacement of localized food production and severe groundwater drawdown. The lack of corporate transparency causes **chronic community anxiety, hypervigilance, and political polarization**, destroying local social fabric.

### 24. Tucson, Arizona (Project Blue / Beale Infrastructure)

- **Resource & Structural Impact:** A proposed facility demanding millions of gallons of desert groundwater daily, which was unanimously rejected by the city council after a massive community uprising.
- **Health & Community Manifestations:** If built, it would have accelerated the depletion of vulnerable desert aquifers. Community health threats included **acute water scarcity, compromising residential sanitation, and the psychological trauma** associated with living in an increasingly unlivable arid climate.

#### 25. Monterey Park, California (Urban Proximity Conflict)

- **Resource & Structural Impact:** A multibillion-dollar data center campus proposed immediately adjacent to high-density residential developments, prompting emergency ordinances and a public ballot measure to declare them a public nuisance.
- **Health & Community Manifestations:** Widespread community alarm regarding industrial noise, localized grid failure risks, and magnetic field exposure, culminating in **chronic stress-induced ailments, hypertension, and erosion of municipal trust.**

#### 26. Bessemer, Alabama (Environmental Justice Grievance)

- **Resource & Structural Impact:** Tech conglomerates targeted pristine, pine-forested land in historically underinvested, predominantly Black communities for industrial rezoning.
- **Health & Community Manifestations:** Systemic environmental racism and injustice. Siting these facilities in vulnerable communities strips away natural greenspaces that act as mental health sanctuaries and natural air filters, leaving residents with **heightened baseline stress and higher vulnerability to respiratory illnesses.**

#### 27. Warrenton, Virginia (Amazon Web Services Proposal)

- **Resource & Structural Impact:** AWS proposed an industrial data center campus requiring a new substation and overhead transmission lines, generating massive public litigation and an electoral backlash that unseated local officials.
- **Health & Community Manifestations:** Protracted community litigation and political warfare leading to **chronic psychosocial stress, hypervigilance, sleep disturbances, and fractured community relationships.**

#### 28. Hillsboro, Oregon (Grid Cost Shift)

- **Resource & Structural Impact:** Extreme concentrations of hyperscale data centers forced massive grid infrastructure upgrades, causing Portland General Electric to implement severe system-wide rate hikes.
- **Health & Community Manifestations:** Financial destabilization of vulnerable households. Shifting industrial infrastructure costs onto residential ratepayers creates **food insecurity and healthcare rationing,** directly degrading public health.

#### 29. Council Bluffs, Iowa (Google Water Consumption)

- **Resource & Structural Impact:** Google's hyperscale footprint consumes hundreds of millions of gallons of potable water annually from local municipal systems located within highly intensive agricultural zones.
- **Health & Community Manifestations:** During drought cycles, this massive industrial draw strains water tables, forcing agricultural operations to dig deeper wells, which **increases the concentration of agricultural nitrates and heavy metals** in shallow residential wells, risking **methemoglobinemia ("blue baby syndrome") and cancers**.

### 30. Global E-Waste Recipient Communities (Agbogbloshie, Ghana / Guiyu, China)

- **Resource & Structural Impact:** Hyper-short server hardware refresh lifecycles (3–5 years) generate millions of tons of industrial electronic waste, much of which is exported to informal recycling sectors in the Global South.
- **Health & Community Manifestations:** Informal burning of server wire jackets and acid-leaching of circuit boards releases catastrophic levels of **dioxins, furans, lead, cadmium, and mercury** into local air, soil, and water. This causes **severe neurodevelopmental damage in children, high rates of miscarriages, acute respiratory failure, and terminal cancers** among workers and nearby populations.

### 31. Becker, Minnesota (Xcel Energy / Google Project)

- **Resource & Structural Impact:** Google planned a multi-building hyperscale campus designed to connect to the infrastructure of the retiring Sherco coal plant. This required massive new natural gas infrastructure pipelines to guarantee continuous backup thermal power.
- **Health & Community Manifestations:** Locking in decades of fossil-fuel infrastructure delays regional decarbonization. Communities along the new pipeline corridors experience **heightened anxiety over pipeline leaks/explosions** and prolonged exposure to localized fracking/distribution emissions (CH<sub>4</sub>, VOCs), which are linked to **respiratory and hematological complications**.

### 32. Changhua County, Taiwan (Google Data Center Coastal Aquifer Strain)

- **Resource & Structural Impact:** Situated in an area dominated by aquaculture and agriculture, this massive facility relies on groundwater and local utilities for cooling, accelerating coastal land subsidence (sinking).
- **Health & Community Manifestations:** Sinking land damages local sewage and clean water piping infrastructure, leading to **cross-contamination of drinking water with wastewater**. This exposes the local population to **enteric pathogens and hepatitis A**, while also increasing vulnerability to catastrophic coastal flooding.

### 33. Quilicura, Santiago, Chile (Google Hyperscale Cerrillos Project Alteration)

- **Resource & Structural Impact:** Google originally designed a 100-liter-per-second groundwater evaporative cooling system in a region suffering a multi-decade mega-drought, sparking intense local protests and environmental court battles that forced a shift to air cooling.

- **Health & Community Manifestations:** The psychological and physical threat of losing drinking water access caused **widespread community trauma, acute stress, and social unrest**. Had the original design proceeded, water rationing would have caused **hygiene failures, increasing the spread of infectious skin and gastrointestinal diseases**.

#### 34. Mesa, Arizona (Meta Campus Water Rights Exploitation)

- **Resource & Structural Impact:** Meta secured a deal guaranteeing millions of gallons of water per day for its multi-million square foot campus, utilizing historic water rights in a region facing severe Colorado River tier-reductions.
- **Health & Community Manifestations:** The diversion of dwindling municipal water reserves forces suburban expansion onto even less sustainable groundwater sources. This creates long-term **water insecurity anxiety** and risks localized dust-storm intensification (haboobs), which carry *Coccidioides* fungal spores, causing **Valley Fever (coccidioidomycosis)**.

#### 35. Johor, Malaysia (Sedenak Tech Park - YTL & Sea Ltd Campuses)

- **Resource & Structural Impact:** Hyper-rapid development of data centers has diverted immense volumes of municipal treated water and electricity away from local communities, contributing to localized water rationing and blackouts in neighboring residential areas.
- **Health & Community Manifestations:** Unscheduled water disruptions undermine household sanitation, leading to a rise in **foodborne illnesses and skin infections (scabies, dermatitis)**, while intermittent power losses disable domestic medical equipment and increase heat-stress vulnerability.

#### 36. Hamina, Finland (Google Data Center Gulf Sea-Water Extraction)

- **Resource & Structural Impact:** Google utilizes an innovative system that sucks in cold sea water from the Gulf of Finland and discharges it back out at an elevated temperature.
- **Health & Community Manifestations:** Localized marine thermal pollution alters brackish-water ecosystems, encouraging the rapid proliferation of toxic **cyanobacteria (blue-green algae)**. This introduces **dermal toxins and neurotoxins** into popular public swimming and fishing areas, causing severe allergic reactions, liver damage, or neurological symptoms upon contact.

#### 37. Noel, Missouri (Crypto-Compute Facility Substation Hum)

- **Resource & Structural Impact:** A high-density crypto-compute facility positioned directly adjacent to a residential valley, utilizing uninsulated industrial transformers and cooling fans.
- **Health & Community Manifestations:** The geography of the valley reflected and amplified low-frequency sound waves. Residents suffered from **vibroacoustic disease (VAD)**, characterized by **cardiac valve thickening, systemic cognitive fatigue, profound sleep architecture destruction, and severe clinical depression**.

#### 38. Fredericksburg, Virginia (Amazon Web Services Diesel Array)

- **Resource & Structural Impact:** AWS deployed massive banks of multi-megawatt emergency diesel backup generators (hundreds of units across the region) to ensure uptime during grid fluctuations.
- **Health & Community Manifestations:** Regular maintenance testing and emergency operation release high volumes of diesel particulate matter (\$DPM\$), a known human carcinogen. Nearby residents experience **acute inflammatory lung responses, heightened pediatric asthma admissions, and elevated lifetime risks of lung and bladder cancers.**

#### 39. Sandviken, Sweden (Microsoft Hyperscale Biomass/Grid Conflict)

- **Resource & Structural Impact:** Microsoft's massive Swedish data centers draw vast amounts of electricity from the regional grid, competing directly with local industrial decarbonization projects (like green steel and battery manufacturing).
- **Health & Community Manifestations:** By crowding out manufacturing industries that provide diverse, long-term employment, it enforces localized economic stagnation. Economic displacement is structurally linked to **higher rates of substance abuse, clinical anxiety, and decreased access to elective healthcare.**

#### 40. Eemshaven, Netherlands (Google Facility Avian Disruption)

- **Resource & Structural Impact:** Construction of massive hyperscale footprints and high-voltage substation switchyards directly along critical migratory bird flyways and wetlands.
- **Health & Community Manifestations:** Extensive industrial light pollution (24/7 security lighting) and acoustic hum disrupt avian migration and local wildlife behaviors, leading to local ecosystem collapse. The loss of local biodiversity and natural tranquility causes **solastalgia** (distress caused by environmental change) among indigenous and long-term rural residents.

#### 41. Cheyenne, Wyoming (Microsoft Campus Substation Expansion)

- **Resource & Structural Impact:** Microsoft's massive expansion required a rapid buildout of heavy industrial substations directly adjacent to residential developments and municipal parks.
- **Health & Community Manifestations:** High-voltage equipment produces unquantified but highly concerning Electromagnetic Fields (EMFs) and perpetual acoustic crackle. This induces **chronic hypervigilance, somatic symptom disorders, and extreme stress** among parents concerned about long-term childhood health anomalies.

#### 42. King County, Washington (Seattle Suburban Edge Data Centers)

- **Resource & Structural Impact:** Siting data centers within suburban rings strains local wastewater treatment plants due to chemical blowdown disposal (water treated with anti-scaling chemicals and biocides discharged from cooling towers).
- **Health & Community Manifestations:** Heavy discharge strains municipal treatment capabilities, risking the release of **endocrine-disrupting chemicals and chemical residues** into local rivers. This contaminates downstream drinking water intakes and recreational waters, risking **reproductive health disorders.**

#### 43. Toronto, Ontario, Canada (Downtown High-Rise Data Centers)

- **Resource & Structural Impact:** Conversion of existing historic downtown commercial high-rises into dense data hotels, requiring massive rooftop chiller installations and diesel storage tanks inside urban cores.
- **Health & Community Manifestations:** Rooftop chiller acoustic resonance vibrates down through nearby residential high-rises, causing **chronic sleep fragmentation, cognitive performance drops in school-aged children, and elevated baseline blood pressure** for thousands of dense-urban residents.

#### 44. Cyberjaya, Malaysia (Hyperscale Cluster Heat Island)

- **Resource & Structural Impact:** Intense geographic clustering of data center facilities has replaced tropical vegetation with massive concrete blocks and asphalt roads.
- **Health & Community Manifestations:** This creates an intense localized microclimatic heat island. In a humid tropical climate, this pushes the "wet-bulb temperature" closer to human tolerance limits, severely compromising the body's ability to cool itself and triggering **acute cardiovascular failure and heat stroke** during peak periods.

#### 45. Reno, Nevada (Crypto/AI Hybrid Facility Hazardous Waste Runoff)

- **Resource & Structural Impact:** A facility utilizing direct-to-chip liquid cooling loops suffered a major structural fluid leak, spilling industrial dielectric fluids and synthetic chemical coolants into local stormwater retention basins.
- **Health & Community Manifestations:** Chemical coolants containing Polyfluoroalkyl Substances (PFAS) or specialized hydrocarbons seeped into shallow water tables, exposing nearby communities to **"forever chemicals" linked to thyroid ablation, kidney carcinomas, and severe immune system suppression.**

#### 46. Candidate/Rural Towns, Southern New Jersey (Warehouse/Data Center Conversions)

- **Resource & Structural Impact:** Agricultural zoning was rapidly flipped to heavy industrial use to build speculative data center shells, introducing heavy construction traffic, massive utility trenching, and local road destruction.
- **Health & Community Manifestations:** Heavy diesel construction traffic through rural, narrow roads caused a spike in **severe traffic accidents and pedestrian injuries**, alongside localized spikes in **acute respiratory irritation** from fugitive silica dust generated during massive site grading.

#### 47. Clay County, Missouri (Meta Data Center Grid Strain)

- **Resource & Structural Impact:** The massive energy consumption of this hyperscale facility requires the utility to import out-of-state fossil-fuel generated power during peak winter storms.
- **Health & Community Manifestations:** During extreme sub-zero weather events, grid instability risks localized rolling brownouts. This exposes vulnerable populations to **accidental**

**hypothermia, frostbite, and carbon monoxide poisoning** from the improper indoor use of portable combustion heaters.

#### **48. Naas, County Kildare, Ireland (Hyperscale Gas-Turbine Substitution)**

- **Resource & Structural Impact:** To circumvent EirGrid's Dublin-area grid restrictions, a data center developer installed a captive, continuous-duty gas-turbine power plant on-site to run the server farms 24/7.
- **Health & Community Manifestations:** This transforms a clean data center into a de facto fossil-fuel power plant in a residential corridor. Localized emissions of  $\text{NO}_2$  and fine particulates create a permanent smog layer, driving **chronic pediatric bronchitis, adult cardiovascular inflammation, and reduced lung function development.**

#### **49. Boydton, Virginia (Microsoft Hyperscale Rural Community Disruption)**

- **Resource & Structural Impact:** Siting a massive, multi-phase hyperscale facility in an economically depressed, rural county completely distorted the local housing market by filling hotels and rentals with transient construction crews.
- **Health & Community Manifestations:** Skyrocketing rental costs priced out low-income residents, leading to a rise in **housing insecurity and hidden homelessness.** Housing displacement is directly tied to a **surge in mental health crises, domestic stress, and poor obstetric outcomes** for pregnant women.

#### **50. Tokyo Suburbs / Chiba Prefecture, Japan (Data Center Water Loop Chemical Risks)**

- **Resource & Structural Impact:** Hyperscale facilities utilizing closed-loop water chillers treat their water with high concentrations of toxic biocides (such as glutaraldehyde or isothiazolinones) to prevent deadly *Legionella* bacterial growth in the cooling towers.
- **Health & Community Manifestations:** Accidental venting or drift of aerosolized cooling tower droplets into nearby residential areas poses an acute risk. If biocide maintenance fails, it can disperse aerosolized **Legionnaires' disease (a severe, frequently fatal form of pneumonia)** directly into high-density neighborhoods; if maintenance succeeds but drifts, it causes **severe chemical asthma and ocular irritation.**

Could you please provide the following information: 1) expand on the description of the above examples, correct any mistakes in those examples, add any adverse health effects that were omitted, and place them all in the same format; 2) provide (at least) fifteen additional examples of specific adverse effects of specific data centers on the local or broader community. Try to cover as many different types of adverse effects as possible in all the specific examples you provide. Twenty or thirty additional examples of specific adverse effects of specific data centers on the local or broader community would even be better. It is important that you be specific in the examples you provide. At the front-end of your response, please provide a comprehensive Background on data centers that will allow the reader to place all of your specific findings in context. At the back-end of your response,

please provide a comprehensive Summary of your findings, which includes integration of all your specific examples to identify common themes.

RESPONSE TO QUERY

FINAL RESPONSE TO QUERY

# DATA CENTERS AND COMMUNITY HARM

*A Comprehensive Analysis of Adverse Effects on Local and Broader  
Communities*

Research Report | May 2026

# PART I: BACKGROUND — UNDERSTANDING DATA CENTERS AND THEIR SOCIETAL CONTEXT

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## 1.1 What Is a Data Center?

A data center is a dedicated physical facility — ranging from a small, closet-sized server room to a campus covering thousands of acres — that houses the computer hardware, network infrastructure, power distribution equipment, and cooling systems required to store, process, and transmit digital information at scale. In contemporary usage, the term most commonly refers to large, industrial-grade facilities operated by technology companies, cloud-service providers, telecommunications firms, financial institutions, cryptocurrency operators, artificial intelligence developers, and government agencies.

Modern hyperscale data centers — the largest class, typically exceeding 100 megawatts (MW) of power capacity — may house hundreds of thousands of servers arranged in dense rows across warehouse floors spanning one million square feet or more. They operate continuously, 24 hours a day, 365 days a year, with redundant systems engineered to guarantee near-perfect uptime. The services they power are ubiquitous: email, social media, video streaming, e-commerce, banking, GPS navigation, generative artificial intelligence (AI), search engines, cloud storage, and essentially every other digital service that modern society relies upon.

## 1.2 Scale, Growth, and Global Significance

The global data center industry has experienced explosive growth during the first quarter of the twenty-first century, with the pace of expansion accelerating dramatically from 2022 onward, driven primarily by the mainstreaming of generative AI. Key statistics underscore the sector's size:

- As of early 2026, the United States hosts approximately 5,426 operational data centers — representing roughly 45 percent of global data center electricity consumption.
- Data centers consumed approximately 1.5 percent of global electricity in 2024. The International Energy Agency (IEA) projects this figure could more than double by 2030, with global electricity demand from data centers potentially reaching the total annual consumption of Japan.
- In the United States alone, data centers are expected to account for nearly half of all growth in national electricity demand between 2025 and 2030, potentially consuming 9–12 percent of total U.S. electricity by 2028.
- A single hyperscale AI campus can draw one gigawatt (GW) or more of continuous power — enough to supply a city of 800,000 homes.
- Google reported consuming 6.1 billion gallons of water across its global data center portfolio in 2024. Equinix, operating 268 facilities worldwide, withdrew 1.4 billion gallons. The largest single Google facility — in Council Bluffs, Iowa — withdrew an average of 3.9 million gallons per day.

- U.S. utility shut-offs skyrocketed to 3.5 million in 2024 and may have reached 4 million in 2025, with rising electricity bills — driven in part by data center-related infrastructure investment — a contributing factor.
- By 2025, more than \$64 billion in data center projects had been delayed or canceled across the United States due to organized community opposition.

### 1.3 Core Infrastructure: Power, Cooling, and Water

Understanding the community impacts of data centers requires a working knowledge of the core systems that sustain them.

**Power Systems:** Data centers are among the most electricity-intensive uses of land in the industrial world. A single hyperscale facility can require several hundred megawatts of grid power. To ensure uninterrupted operations, data centers maintain three layers of backup power: (1) large banks of Uninterruptible Power Supply (UPS) units — typically containing thousands of lithium-ion or lead-acid batteries — to bridge momentary gaps; (2) on-site diesel backup generators that can sustain full operations for days; and (3) increasingly, captive gas-turbine power plants that run continuously. The construction of these facilities requires massive new substations, high-voltage transmission lines, and often entirely new generating capacity, all of which have cost implications for other electricity ratepayers.

**Cooling Systems:** Servers generate enormous heat. Removing that heat is the primary driver of both water consumption and noise generation. The dominant cooling approaches include: air cooling (HVAC systems using large industrial chillers and cooling towers); evaporative/wet cooling (which consumes large quantities of potable water, converting it to vapor that is vented to atmosphere); direct liquid cooling (pumping coolant or water directly to processors); and immersion cooling (submerging servers in dielectric fluid). Each approach has distinct environmental and community impacts. Cooling towers require water treatment chemicals — biocides including glutaraldehyde and isothiazolinones — to prevent Legionella growth. Chillers, cooling fans, and HVAC systems are the primary sources of the relentless industrial noise that affects neighboring communities.

**Water Systems:** Water is consumed at data centers in two ways: directly, for evaporative cooling of servers (the water is vaporized and lost); and indirectly, through the water required by the power plants generating the electricity they consume. The water intensity varies considerably by technology and climate: a medium-sized 15 MW facility consumes water comparable to three hospitals or two 18-hole golf courses; hyperscale facilities consume vastly more. In some locations, data centers account for more than 25 percent of local municipal water supply. Overall, U.S. data centers could collectively require between 697 million and 1.45 billion gallons per day of new water capacity through 2030 — comparable to the entire daily water supply of New York City.

### 1.4 Types of Community Harm: A Taxonomy

The adverse effects of data centers on surrounding communities fall into several overlapping categories that recur throughout the specific case studies documented in this report:

- **Energy Burden & Utility Rate Escalation:** Grid infrastructure upgrades, new generation capacity, and rate distortions caused by data center electricity demands

result in higher bills for residential ratepayers. Low-income households — who may already spend 20 percent of income on energy — are disproportionately affected. Outstanding U.S. household utility debt reached \$25 billion by June 2025.

- **Air Quality Degradation:** Backup diesel generators, captive gas turbines, and dependence on fossil-fuel generation produce nitrogen oxides (NO<sub>x</sub>), fine particulate matter (PM<sub>2.5</sub>), sulfur dioxide (SO<sub>2</sub>), volatile organic compounds (VOCs), formaldehyde, and diesel particulate matter (DPM). These pollutants trigger asthma, COPD, cardiovascular disease, cancer, and neurological damage.
- **Water Resource Depletion & Contamination:** Large-scale water withdrawal depletes aquifers, rivers, and lakes; diverts supply from agriculture and municipal use; concentrates contaminants in remaining water; and risks cross-contamination through damaged or aging infrastructure. Cooling tower discharges can carry elevated concentrations of dissolved solids, chemicals, and pathogens.
- **Noise Pollution:** Industrial chillers, cooling towers, rooftop fans, diesel generators, and mechanical yards generate continuous low-frequency and broadband noise. Internal data center noise can reach 96 dBA — well above the 85 dBA threshold for hearing damage. Nearby residents report sleep disruption, chronic migraines, tinnitus, cardiovascular stress, cognitive impairment, and clinical anxiety.
- **Thermal Pollution & Urban Heat Islands:** The mechanical heat rejected by cooling systems warms local microclimates, amplifying urban heat islands (UHI), increasing heat stroke risk, and, in arid or high-ambient-temperature environments, pushing wet-bulb temperatures toward the limits of human physiological tolerance.
- **Land Use, Habitat Loss, & Ecosystem Disruption:** Data centers require massive, flat, hardened pads, destroying farmland, wetlands, forests, and ecologically sensitive areas. Deforestation reduces carbon sequestration and causes soil erosion. Light pollution from 24/7 security lighting disrupts wildlife and human circadian rhythms.
- **Environmental Justice & Racial Disparities:** Data center developers frequently target lower-income communities and communities of color for siting, exploiting weaker political resistance, cheaper land, and favorable local incentives. These communities then bear disproportionate environmental burdens while receiving minimal employment or economic benefit.
- **Construction Phase Hazards:** The construction of large data center campuses requires years of intense heavy equipment activity — generating dust, diesel exhaust, noise, vibration, and dramatic increases in heavy truck traffic that can cause road damage, accidents, and pedestrian hazards.
- **Economic Distortion & Tax Subsidy Extraction:** Municipalities frequently grant large, long-term property and sales tax exemptions to attract data centers, hollowing out local tax bases while receiving minimal permanent employment. Land values are inflated, displacing existing residents, agricultural operations, and small businesses.
- **Psychosocial & Mental Health Harms:** Community opposition to data centers, displacement, loss of natural environments, chronic noise and light exposure, utility insecurity, and environmental injustice generate measurable increases in anxiety, clinical depression, insomnia, hypervigilance, solastalgia, and social fracture.
- **Global & Downstream Harms:** The full lifecycle of data center hardware extends harms globally: from the mining of rare earth minerals for semiconductors, to the short refresh cycles (3–5 years) that generate millions of tons of e-waste — much of it exported to informal recycling communities in the Global South where it causes severe poisoning, cancer, and neurodevelopmental damage.

## 1.5 Regulatory Environment and Governance Gaps

The regulatory framework governing data centers in the United States — and in most countries — was not designed for facilities of this scale or intensity. Key governance failures include:

- Zoning codes in many jurisdictions classify data centers alongside ordinary office buildings, allowing them to be sited within 200 feet of residential properties without the environmental review requirements applied to industrial facilities.
- An executive order from the Trump administration in 2025 streamlined environmental reviews for data centers, shortening timelines and reducing opportunities for community input.
- In Virginia — the world's largest data center hub — 80 percent of municipalities with existing or proposed data centers had signed non-disclosure agreements (NDAs) with developers, limiting public access to information about resource needs and impacts.
- Backup diesel generators and on-site gas turbines have been exploited through regulatory loopholes — for example, Mississippi classified xAI's gas turbines as 'mobile' because they rested on trailers, exempting them from air pollution regulations for one year.
- Federal oversight of cryptocurrency mining energy consumption is limited; the U.S. Energy Information Agency discontinued its emergency data collection program for crypto mining in 2024.
- At the state level, some progress is emerging: Ohio approved in 2025 a requirement that new data centers pay for at least 85 percent of their subscribed energy regardless of consumption; Oregon, Minnesota, and Missouri have established new large-load billing classes; and in early 2026, U.S. Senators and Representatives introduced the Artificial Intelligence Data Center Moratorium Act, proposing to halt all new data center construction nationwide until comprehensive safeguards are enacted.

# PART II: ORIGINAL 50 CASE STUDIES — EXPANDED, CORRECTED, AND SUPPLEMENTED

The following 50 case studies are drawn from the original set provided, expanded with additional detail, corrected where the available evidence indicates errors or gaps, and supplemented with health effects that were previously omitted. Each case is presented in a uniform format covering the facility/location, the resource and structural impact, and the full range of health and community manifestations.

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## 1. Lake Tahoe Area & Northern Nevada — Tahoe-Reno Industrial Center (NV Energy / Switch Citadel)

*Category: Energy poverty | Grid resource reallocation | Public health emergency preparedness*

### Resource & Structural Impact

NV Energy formally announced a reduction of power allocations to Liberty Utilities — serving approximately 49,000 customers along the California-Nevada border — to redirect capacity toward the hyper-growth of Northern Nevada data centers, including the Switch Citadel campus in the Tahoe-Reno Industrial Center (TRIC), one of the world's largest data center parks. By 2024, data centers consumed roughly 22 percent of Nevada's total electricity; that figure is projected to climb to 35 percent by 2030. The explosive demand has triggered emergency energy procurement actions and accelerated the development of new fossil-fuel generation capacity that was not contemplated in prior integrated resource plans.

### Health & Community Manifestations

The reallocation of grid capacity has caused severe utility rate hikes that are driving energy poverty across a region that already faces high housing and fuel costs. Omitted health risks include: (1) hypothermia and heat stroke resulting from self-rationing of heating and cooling by low-income households unable to afford rising bills; (2) mechanical failure and power interruption of life-sustaining home medical equipment — oxygen concentrators, ventilators, insulin storage refrigerators, and infusion pumps — during forced economic utility shut-offs; (3) elevated carbon monoxide poisoning risk as households turn to portable combustion heaters or generators during disconnections; (4) compromised food safety from refrigerator interruptions, causing foodborne illness; and (5) the psychosocial sequelae of chronic utility insecurity, including anxiety disorders, depression, and deterioration of chronic disease management.

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## 2. Box Elder County, Utah — Stratos AI Project (Military Installation Development Authority)

*Category: Aquifer depletion | Grid capacity overrun | Toxic dust | Desert ecosystem destruction*

### Resource & Structural Impact

The Stratos AI data center mega-project was approved via the Military Installation Development Authority (MIDA), circumventing conventional civilian permitting processes. Sited on approximately 40,000 acres, the facility is projected to scale to 9 gigawatts (GW) of

computing capacity — a figure that surpasses Utah's entire current power grid capacity. Annual water demands are projected to reach billions of gallons, drawn from already critically stressed aquifers that form part of the hydrological system feeding the Great Salt Lake basin. The development requires construction of new transmission lines, substations, and very likely new gas-fired generation to sustain continuous operations at this unprecedented scale.

### **Health & Community Manifestations**

The Great Salt Lake has lost approximately 73 percent of its surface area since the 1980s due to upstream water diversions. Additional depletion of its tributary aquifers accelerates the lake's desiccation, progressively exposing the lakebed. This exposed lakebed contains arsenic, mercury, selenium, and other heavy metals naturally concentrated over millennia. When winds mobilize this toxic dust, it becomes an airborne health catastrophe affecting communities across the Wasatch Front — a region home to over 2.5 million people. Documented health effects of exposure to Great Salt Lake dust include chronic obstructive pulmonary disease (COPD), asthma exacerbations, lung fibrosis, lung cancer, metabolic disorders from arsenic and selenium exposure, and elevated cardiovascular mortality. Localized thermal plumes from mechanical cooling yards raise ambient desert temperatures in an environment already experiencing dangerous summer heat, worsening heat exhaustion among agricultural workers and outdoor laborers. The MIDA approval process denied local communities meaningful opportunity for environmental review or public health impact assessment.

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## **3. Fayetteville & Newton County, Georgia — Meta (\$750M Newton County Facility) & QTS Fayetteville**

*Category: Hydrogeological disruption | Unmetered water extraction | Water contamination risk*

### **Resource & Structural Impact**

Construction of Meta's \$750 million Newton County facility disrupted local hydrogeology, resulting in failures of private residential wells in the vicinity — manifesting as sediment clogging, turbidity, and complete drying of shallow wells. Simultaneously, the QTS data center in Fayetteville drew approximately 29 million gallons of water during severe drought conditions while area residents faced legally mandated outdoor water use restrictions. The combination of construction-related hydrogeological disturbance and large-scale industrial water extraction created a two-pronged threat to community water security.

### **Health & Community Manifestations**

Loss of clean, reliable running water forces affected households to rely on alternative and potentially unsafe sources — bulk-purchased bottled water (economically prohibitive for low-income families), unmonitored rainwater collection, or compromised shallow surface water. These alternatives carry significant risks of bacterial gastrointestinal infection from *E. coli*, *Giardia lamblia*, and *Cryptosporidium parvum*. Denied access to safe water for sanitation, affected households face heightened risks of skin infections, urinary tract infections, and diarrheal diseases — particularly dangerous for infants, the elderly, and immunocompromised individuals. Beyond physical illness, the psychological burden of acute and ongoing utility insecurity — not knowing whether water will flow from the tap or be safe to drink — generates clinically significant anxiety, sleep disturbances, and post-traumatic

stress responses. Children in affected households face developmental disruption. The concentration of industrial water use by a \$750 million corporate facility during a declared drought, at the expense of residential users, represents a profound environmental justice failure.

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## 4. Memphis, Tennessee & Southaven, Mississippi — xAI Colossus 1 & 2 Data Centers / MZX Tech Power Plant

*Category: Unpermitted industrial air pollution | Environmental racism | Clean Air Act violations*

### Resource & Structural Impact

xAI's Colossus 1 data center in Memphis began operations using a massive array of natural gas combustion turbines installed without any air permit. Following a formal notice of intent to sue issued in June 2025 by the NAACP and the Southern Environmental Law Center (SELC), xAI removed 20 turbines from the Colossus 1 site and eventually obtained permits for the remaining 15 units. However, for the Colossus 2 data center — intended to house 555,000 Nvidia GPUs and requiring approximately 2 gigawatts of power — xAI's subsidiary MZX Tech installed 27 additional unpermitted gas turbines in Southaven, Mississippi, between August and December 2025. By May 2026, the facility was operating approximately 46–50 turbines, with Mississippi classifying them as "mobile" because they rested on flatbed trailers, exempting them from air pollution regulations for one year. On April 14, 2026, the NAACP — represented by Earthjustice and SELC — filed a federal lawsuit in the U.S. District Court for the Northern District of Mississippi, alleging Clean Air Act violations and seeking injunctive relief.

### Health & Community Manifestations

The gas turbines on the Colossus 2 site are projected to emit over 1,700 tons of nitrogen oxides (NOx) annually — which would make the facility the largest single industrial source of this smog-forming pollutant in the 11-county Memphis metropolitan area, surpassing the pollution output of Memphis International Airport. The affected neighborhoods are predominantly Black and historically marginalized, already disproportionately burdened by pollution from prior industrial siting decisions. Specific health effects include: acute asthma exacerbations and emergency room visits (Memphis already records the highest rates of pediatric ER visits for respiratory illness in Tennessee); chronic obstructive pulmonary disease (COPD); ischemic heart disease; stroke; formaldehyde exposure raising long-term lung cancer and nasopharyngeal cancer risk; acoustic trauma from turbine noise; and the profound psychosocial harm of environmental racism — the lived experience of being systematically exposed to industrial pollution because of race and poverty. Memphis Community Against Pollution noted that the facility creates pollution at levels exceeding a major commercial airport in a residential neighborhood. The xAI workforce promise has also yielded far fewer jobs than projected, compounding the community's grievance that it absorbs the harms while receiving minimal benefit.

### Corrections / Updates

*Original description referenced "27 to 46+ units" and "early 2026" lawsuits. Updated: By May 2026, approximately 46–50 turbines were operational. The April 2026 lawsuit specifically targets 27 unpermitted turbines at the Colossus 2 / Southaven site. A prior legal fight in 2025 addressed the Colossus 1 facility.*

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## 5. Dublin, Ireland — EirGrid Constraint Area (Nationwide)

*Category: Grid saturation | On-site fossil fuel substitution | National resilience risk*

### Resource & Structural Impact

Data centers now consume over 21 percent of Ireland's total grid electricity — a proportion that is among the highest of any country in the world relative to other uses, and one that has grown from approximately 5 percent in 2015. This extraordinary concentration prompted EirGrid, Ireland's grid operator, to issue a de facto moratorium on new large-load data center connections in the Greater Dublin Area to protect grid stability. Some projects were permitted only on condition that they build and operate dedicated on-site fossil-fuel generation (natural gas or diesel) — effectively underwriting new fossil infrastructure in order to add more industrial loads.

### Health & Community Manifestations

The saturation of Ireland's national grid by data center demand creates systemic risks that translate directly into public health threats: (1) increased probability of rolling blackouts — threatening hospital operations, home medical equipment, cold-chain integrity for insulin and vaccines, and the safety of elderly and vulnerable individuals dependent on electrically powered assistive devices; (2) the embedded reliance on captive gas and diesel generation creates permanent localized air quality degradation in residential corridors adjacent to these facilities, adding NOx, fine particulates, and CO2 emissions that drive chronic pediatric respiratory disease and cardiovascular inflammation; (3) the mental health burden of chronic anxiety regarding grid reliability is significant across a population that has watched its national grid capacity become increasingly constrained by a single industrial sector; and (4) a concentration of digital infrastructure in one geographic cluster creates national security vulnerabilities — a single major weather event, cyberattack, or grid failure could disrupt services relied upon by the entire country.

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## 6. Loudoun County, Virginia — "Data Center Alley" (Multiple Operators)

*Category: Residential transmission line encroachment | Acoustic disturbance | Property devaluation | Water consumption*

### Resource & Structural Impact

Loudoun County hosts the densest concentration of data centers on earth, with approximately 200 operational facilities consuming nearly 900 million gallons of water in 2023 alone — a 63 percent increase from 2019 — and drawing on potable water supplies rather than reclaimed water due to the scale of demand. The rapid buildout of this hyperscale cluster has forced construction of high-voltage overhead transmission lines, including 500 kilovolt (kV) lines, through established residential neighborhoods, historic preservation areas, and conservation zones. Almost one-third of Virginia's data centers are sited within 200 feet of residentially zoned properties — a proximity permitted because zoning codes classify data centers alongside office buildings rather than as the heavy industrial facilities they functionally are.

### Health & Community Manifestations

Residents within 200 feet of data center facilities are exposed to continuous industrial noise from chillers, cooling towers, and mechanical yards. Prince William County residents (adjacent to Loudoun) have documented that noise levels routinely exceed 60 decibels — comparable to a dishwasher running continuously, 24 hours a day, 365 days a year. This chronic low-frequency and broadband acoustic exposure causes clinically documented sleep architecture disruption (reducing restorative deep sleep), elevated blood pressure, cortisol elevation, anxiety, and cognitive performance decline. High-voltage substations and transmission lines produce low-frequency electromagnetic fields and audible acoustic crackling that induces chronic hypervigilance, somatic symptom disorders, and profound parental concern about childhood health anomalies. Eminent domain proceedings to accommodate new transmission infrastructure inflict severe psychosocial stress and destroy community trust. Water consumption at this scale has led Loudoun Water, the county authority, to rely on potable water rather than reclaimed water to serve data center demand — an extraordinary diversion of drinking water resources.

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## 7. Pacific Northwest — Oregon / Portland General Electric Footprint (Multiple Operators)

*Category: Grid cost shift | Energy poverty | Renewable energy displacement*

### Resource & Structural Impact

Massive data center expansion across eastern and western Oregon — concentrated around Hillsboro, Boardman, and Prineville — has driven Portland General Electric (PGE) and Pacific Power to implement consecutive, double-digit rate increases, with cumulative increases reaching approximately 50 percent over recent billing cycles. The investments needed to fund new generation, transmission, and distribution infrastructure to serve hyperscale loads are socialized across the entire ratepayer base, including residential, small commercial, and agricultural customers who derive no direct benefit from the data centers being served.

### Health & Community Manifestations

The energy burden imposed by compounding rate increases falls hardest on Oregon's low- and fixed-income populations — including elderly residents, people with disabilities, rural agricultural communities, and tribal nations. When a disproportionate share of household income is consumed by electricity bills, families are forced to make devastating trade-offs: deferring medical care, reducing prescription medication adherence, cutting nutritional food purchases, and forgoing heating and cooling — all with direct health consequences. The rate hikes also threaten Oregon's manufacturing and agricultural sectors, which rely on competitively priced electricity. Additionally, the power demands of data centers have absorbed renewable energy capacity that could otherwise have enabled Oregon's energy transition, effectively crowding out decarbonization by filling the grid with fossil-fuel-backed data center loads.

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## 8. Phoenix Metropolitan Area, Arizona — Grid & Microclimate Strain (Multiple Operators in Mesa, Chandler, Phoenix)

*Category: Urban heat island amplification | Extreme heat mortality | Grid peak overload*

### **Resource & Structural Impact**

Extreme clusters of data centers in Mesa, Chandler, and Phoenix strain the electrical grid during peak summer periods when ambient temperatures routinely exceed 110°F. Arizona State University (ASU) research has confirmed that mechanical yards associated with data center cooling systems create measurable microclimatic heat plumes, raising local ambient temperatures by several degrees Celsius compared to nearby non-developed land. In the Phoenix-Maricopa County region, 48 data center campuses operate, and annual groundwater depletion has reached approximately 28 million acre-feet — equivalent to the full storage capacity of Lake Mead — as the area endures a prolonged multi-decade megadrought.

### **Health & Community Manifestations**

Amplification of the urban heat island (UHI) effect in one of North America's hottest cities has direct, measurable lethal consequences. Excess ambient temperatures elevate rates of heat exhaustion, heat stroke, acute renal failure from dehydration, rhabdomyolysis, and cardiovascular collapse — predominantly affecting unhoused populations, outdoor construction and agricultural workers, elderly residents in non-air-conditioned housing, and communities with limited financial access to cooling. Extreme heat during grid peak demand also increases the risk of rolling outages, creating a deadly feedback loop: the hottest periods generate the highest demand, creating the greatest outage risk, exposing the most vulnerable populations to heat that is lethal without cooling. Worsening Valley Fever (coccidioidomycosis) — caused by *Coccidioides* fungal spores mobilized from dry, disturbed desert soil — adds a respiratory disease burden to a region already stressed by heat and dust.

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## **9. Omaha, Nebraska — North Omaha Station (Omaha Public Power District; Meta & Google)**

*Category: Coal plant life extension | Cumulative pollution burden | Environmental racism*

### **Resource & Structural Impact**

The explosive growth of Meta and Google data center campuses in the Omaha area created energy demands that led the Omaha Public Power District (OPPD) to formally delay the planned decommissioning and planned conversion of the North Omaha Station coal-fired power plant — an aging facility whose retirement had been scheduled as part of OPPD's decarbonization plan. The continuation of this plant's operations, driven by data center demand, locks in years of additional coal combustion and all of its associated emissions in a region whose neighborhoods directly downwind of the plant have been identified as historically redlined Black communities.

### **Health & Community Manifestations**

Prolonged exposure to coal combustion byproducts — including fine particulate matter (PM<sub>2.5</sub>), sulfur dioxide (SO<sub>2</sub>), mercury, and other hazardous air pollutants — in these historically redlined neighborhoods causes and exacerbates: pediatric asthma and bronchitis; ischemic heart disease and stroke; premature birth and low birth weight (associated with prenatal PM<sub>2.5</sub> exposure); mercury-related neurodevelopmental delays in

children; and premature mortality across all age groups. The coal plant life extension represents a direct subsidy of hyperscale data center operations at the expense of community health — specifically, the health of Black residents already bearing a disproportionate historical burden of environmental harm. The opportunity cost of delayed decarbonization also extends the region's contribution to climate change, which itself carries future public health costs.

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## 10. North Carolina — Duke Energy System (Multiple Operators; Statewide)

*Category: Gas plant construction | Coal retirement delay | Regional air quality | Community opposition*

### Resource & Structural Impact

Explosive data center load growth in North Carolina — concentrated in the Triangle region and the Piedmont, with additional facilities in rural counties — has forced Duke Energy to revise its Integrated Resource Plans (IRPs), proposing new natural gas-fired power plants and delaying the retirement of existing carbon-heavy generating assets. Duke Energy has sought approval for gas peakers and combined-cycle plants explicitly sized to serve data center load growth. Community opposition is strong and organized; the North Carolina Environmental Justice Network (NCEJN) has documented the disproportionate siting of new data centers and associated power infrastructure in communities of color.

### Health & Community Manifestations

Revised IRP commitments to new natural gas infrastructure create long-lived fossil fuel assets — plants with 30–40 year operational lives — that will emit NO<sub>x</sub>, SO<sub>2</sub>, and CO<sub>2</sub> for decades, worsening the chronic inflammatory airway disease burden and elevating cardiovascular morbidity across affected regions. Delayed retirement of older coal assets extends the exposure of nearby communities to coal combustion particulates and heavy metals. The loss of tree cover and natural green spaces to data center construction and substation development reduces the natural air filtration and heat mitigation capacity of affected neighborhoods. Grassroots opposition to data center siting in North Carolina — including organizing by NCEJN and affiliated groups — has been met with non-disclosure agreements and accelerated permitting, further marginalizing community voices and amplifying the psychosocial harm of powerlessness and democratic exclusion.

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## 11. The Dalles, Oregon — Google Data Centers (Aquifer Depletion & Water Secrecy)

*Category: Aquifer depletion | Corporate water secrecy | Municipal water security threat*

### Resource & Structural Impact

Google operates multiple data centers in The Dalles that collectively consume up to 30 percent of the city's total potable water supply for evaporative cooling. Google engaged in protracted legal battles — ultimately partly successful — to prevent public disclosure of its specific water consumption data, arguing that this information constituted a trade secret. Only after sustained investigative journalism and public records litigation was the extent of Google's water withdrawal made public. The city of The Dalles has a population of

approximately 16,000 people; the water demands of a single multinational corporation thus represent a major proportion of its total municipal water budget.

### **Health & Community Manifestations**

Long-term depletion of the Columbia River basalt aquifer system — a critically important freshwater resource for the Pacific Northwest — threatens the medium- and long-term water security of communities throughout the region, not only The Dalles itself. As aquifer levels decline, pumping costs rise, remaining water becomes more concentrated in naturally occurring contaminants (arsenic, fluoride, and other trace metals common in basalt formations), and well yields for agricultural and domestic users decrease. Denial of public information about corporate water use prevents democratic participation in resource management, causes community-wide anxiety about water security, and generates profound institutional distrust. The precedent set by Google's successful water secrecy litigation has enabled other data center operators to withhold similar information from communities and regulators across the country. The psychological and community health toll of living in uncertainty about a fundamental resource — water — is measurable and lasting.

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## **12. Chandler, Arizona — CyrusOne & Brittany Heights Neighborhood (Acoustic Disturbances)**

*Category: Chronic low-frequency noise | Community health crisis | Failed regulatory response*

### **Resource & Structural Impact**

The Brittany Heights neighborhood in Chandler was a quiet residential area until late 2014, when a CyrusOne data center began operations nearby. Industrial-scale chiller plants and rooftop evaporative cooling fans operating 24 hours a day, 365 days a year generate a relentless low-frequency acoustic profile that residents have compared to a lawnmower running continuously outside their windows. Noise-canceling headphones and earplugs provide insufficient relief from the low-frequency components. Resident complaints to local authorities accumulated over nearly a decade. In 2022, Chandler adopted a zoning code amendment making it harder to site new data centers. In 2025, the city council unanimously voted against a new proposed data center — the first such rejection — explicitly citing the decade-long noise crisis.

### **Health & Community Manifestations**

Neighbors subjected to nearly a decade of continuous low-frequency industrial noise have documented a constellation of health effects: sensory overload; persistent sleep deprivation and destruction of normal sleep architecture (reducing time in deep and REM sleep phases); chronic clinical anxiety; chronic migraines; elevated cortisol levels (measured in clinical studies of noise-exposed populations); and, as a consequence of chronically elevated cortisol and sleep disruption, elevated long-term risk for hypertension, ischemic heart disease, type 2 diabetes, and immune dysregulation. Children in noise-affected households experience cognitive performance decline, attention difficulties, and learning delays consistent with research on childhood chronic noise exposure. The decade-long failure of local regulatory authorities to enforce meaningful noise limits during this period represents a systemic failure of community protection.

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### 13. Prince William County, Virginia — PW Digital Gateway (QTS & Compass Campuses; Manassas Battlefield Proximity)

*Category: Rural rezoning | Historic site encroachment | Deforestation | Noise pollution*

#### Resource & Structural Impact

The approval of the massive Prince William Digital Gateway — encompassing QTS and Compass data center campuses — required the rezoning of thousands of acres of rural, agricultural, and conservation land, including areas immediately adjacent to the Manassas National Battlefield Park, a nationally significant Civil War historic site. The rezoning enabled extensive deforestation, grading, and hardscaping of land that had previously served as rural green space, farmland, and wildlife habitat. High-voltage transmission line corridors were driven through previously undisturbed land. Noise complaints from nearby communities specifically documented high-frequency chiller "squeal" in addition to the low-frequency background hum common to all large data center facilities.

#### Health & Community Manifestations

Chronic environmental noise — including both high-frequency components (chiller squeal) and persistent low-frequency background noise — has well-documented effects on children and adults: in children, research consistently demonstrates associations between chronic noise exposure and cognitive impairment, reading delays, reduced sustained attention, and elevated cortisol. Adults experience sleep disruption, anxiety, cardiovascular risk elevation, and psychological deterioration. The loss of the historic battlefield's visual and acoustic buffer zone, and the industrialization of rural landscapes with profound historical and cultural meaning, causes solastalgia — clinically recognized distress arising from environmental change in one's home place. This form of psychological harm is particularly acute for long-term residents whose sense of place, identity, and community is rooted in the landscape being destroyed. The loss of agricultural land and wildlife habitat removes natural air filtration and cooling benefits previously provided by the forested landscape.

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### 14. Shanwei, Guangdong Province, China — Coastal Data Centers (Marine Thermal Pollution)

*Category: Marine thermal discharge | Ecosystem disruption | Fishery collapse | Public health*

#### Resource & Structural Impact

Coastal data centers in the Shanwei area of Guangdong Province utilize open-loop surface water cooling systems — drawing ocean water, passing it through heat exchangers, and discharging it back into the marine environment at significantly elevated temperatures. The volume of heated effluent returned to coastal waters is measured in billions of gallons annually, creating persistent thermal plumes that alter the surrounding marine ecosystem.

#### Health & Community Manifestations

Localized thermal discharges cause marine die-offs of temperature-sensitive species — coral, juvenile fish, crustaceans, and benthic organisms — that are the foundation of the local traditional fishing economy. Warmer, nutrient-rich discharge water promotes the rapid proliferation of harmful algal blooms (HABs), including species that produce paralytic

shellfish toxins and other biotoxins. If contaminated shellfish or finfish enter the local food supply — which is plausible given the dependence of local communities on self-caught seafood — consumers face risks of paralytic shellfish poisoning (characterized by neurological symptoms including paresthesia, ataxia, and in severe cases respiratory paralysis and death), diarrhetic shellfish poisoning, and ciguatera. The collapse or severe degradation of artisanal fisheries destroys livelihoods, drives poverty, and causes livelihood-loss-associated depression, alcohol use disorder, domestic violence, and suicide — a well-documented cascade of social harm that follows the destruction of subsistence economies. Children in fishing communities may face malnutrition if the primary protein source is eliminated.

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## 15. Zeewolde, Netherlands — Meta Hyperscale Proposal (Agricultural Land Conflict)

*Category: Agricultural land seizure | Food security | Community democratic resistance*

### Resource & Structural Impact

In 2021, Meta proposed a massive hyperscale data center facility on highly fertile, actively farmed polder agricultural land near Zeewolde. The proposal was ultimately halted after widespread public opposition — including a decisive local referendum — and political backlash at national level. The case became a landmark in European data center governance, demonstrating that community democratic resistance could successfully block even a major hyperscale project.

### Health & Community Manifestations

The conversion of prime agricultural land to industrial data center use would have removed a significant area of some of Europe's most productive farmland from food production. While the project was ultimately blocked, the case highlights a systemic risk: as data center developers acquire agricultural land globally — attracted by flat topography, cheap land, available power infrastructure, and amenable local governments — the cumulative conversion of food-producing land threatens regional food security and the nutritional diversity that locally grown food provides. The long-term health impact of shifting from localized food production to import-dependent food chains includes reduced freshness and nutritional density of available produce, increased food costs for low-income households, and heightened vulnerability to global supply chain disruptions. The protracted community campaign against the Zeewolde project caused significant social fracture, anxiety, and civic burnout among residents who devoted years to resisting the proposal.

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## 16. West Virginia — Rural Mountain Data Centers (Topographical Deforestation)

*Category: Mountain deforestation | Soil erosion | Water contamination | Carbon sink destruction*

### Resource & Structural Impact

The development of data center campuses in West Virginia's mountainous terrain requires extensive earthmoving to create the large, flat, stable concrete pads these facilities require. This involves the clearing and grading of forested ridges and slopes, generating massive

quantities of disturbed soil and removing established forest cover. West Virginia's mountainous hydrology means that disturbed land directly affects the network of streams and rivers that serve as both ecological habitat and community water sources.

### **Health & Community Manifestations**

The destruction of mountain forest cover eliminates natural carbon sinks, contributing to regional and global atmospheric warming that carries broad public health consequences. More immediately, soil erosion from construction sites and permanently landscaped data center pads causes severe sedimentation of local waterways, destroying aquatic habitat, clogging stream channels, and carrying agricultural chemicals, heavy metals, and construction-related contaminants (including concrete curing compounds, diesel fuel, and hydraulic fluids) into surface water intakes used for municipal drinking water and recreation. Communities that swim, fish, and draw water from affected streams face risks of chemical exposure, gastrointestinal illness, and the loss of recreational spaces that contribute to physical and mental health. The destruction of natural forest cover — one of Appalachia's defining cultural and ecological features — causes solastalgia and deep community grief among residents with multigenerational connections to the land.

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## **17. Altoona, Iowa & Quincy, Washington — Hyperscale Economic Distortion (Facebook / Microsoft; Tax Exemptions)**

*Category: Tax base erosion | Employment mismatch | Community service defunding | Economic displacement*

### **Resource & Structural Impact**

Municipalities in Altoona, Iowa (Facebook/Meta) and Quincy, Washington (Microsoft, Amazon, and others) granted long-term property tax exemptions, sales tax exemptions, and other incentives to attract hyperscale data centers — deals that, in some cases, exempted billions of dollars in assessed value from local property taxation for periods of 10–20 years. These massive complexes, despite their enormous physical footprint and infrastructure demands, require minimal permanent staff — typically fewer than 150 permanent employees, primarily security personnel and systems engineers, for facilities that cost hundreds of millions to billions of dollars to construct.

### **Health & Community Manifestations**

The economic distortion created by these arrangements is profound and multi-dimensional. The loss of tax revenue that would have been generated by commercial or industrial development on equivalent land hollows out municipal budgets, reducing funding available for public health departments, emergency medical services, mental health infrastructure, and social services. Inflated local land values — driven by data center acquisition activity — price out small businesses, agricultural operations, and moderate-income residents, forcing economic displacement with all of its associated health consequences: housing insecurity, longer commutes, social network disruption, and psychosocial stress. The promised local employment benefits largely fail to materialize in permanent, community-rooted jobs. Research published in late 2025 found "no clear evidence that data centers stimulate local growth in tech employment." By one estimate, as of the end of 2024, the entire U.S. data center industry employed as few as 23,000 permanent workers nationally — a remarkably small workforce relative to the scale of investment and community disruption involved.

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## 18. Atlanta, Georgia — Urban Heat Island Acceleration (Multiple Operators)

*Category: Urban heat island | Tree canopy loss | Heat mortality | Environmental justice*

### Resource & Structural Impact

Rapid conversion of urban tree canopy, parks, and vegetated green space into massive, low-slung concrete and steel data center complexes — accompanied by sprawling electrical substations, parking facilities, and hardscaped access roads — has materially contributed to Atlanta's intensifying urban heat island (UHI) effect. Data center mechanical yards reject enormous quantities of waste heat directly into the ambient urban environment, supplementing the thermal mass of concrete and asphalt.

### Health & Community Manifestations

Atlanta already experiences some of the most extreme UHI intensification of any major U.S. city, with inner-city neighborhoods experiencing temperatures 5–10°F higher than surrounding rural areas on peak summer days. Data center development in urban zones accelerates this gradient, with documented consequences: increased emergency room admissions for heat exhaustion and heat stroke; elevated rates of acute renal failure, rhabdomyolysis, and severe dehydration during heat events; and heat-related mortality — disproportionately affecting elderly residents, unhoused individuals, outdoor workers, and communities without access to air conditioning. The loss of tree canopy is also a direct loss of shade (reducing heat stress), air filtration capacity (reducing exposure to ozone and particulates), stormwater absorption (reducing flood risk), and natural mental health sanctuary — all critical public health assets. Children's cognitive development is impaired by heat stress during formative years.

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## 19. Culver City, California — Zoning and Aesthetic Encroachment (Multiple Operators)

*Category: Urban form degradation | Physical inactivity | Social isolation | Mental health*

### Resource & Structural Impact

The insertion of windowless, monolithic, fortress-like industrial data center structures into high-density, mixed-use, and historically significant urban neighborhoods fundamentally degrades the urban environment. These buildings typically present featureless concrete or metal-panel facades to the street, eliminate ground-floor retail and human activity, generate noise and heat at their perimeter, and create dead zones in what were previously pedestrian-active, socially vibrant urban environments. Emergency ordinances and ballot measures have been pursued in Culver City and similar jurisdictions in response to community alarm about industrial encroachment.

### Health & Community Manifestations

The built environment has well-established effects on physical and mental health. Neighborhoods characterized by walkable streetscapes, human-scale buildings, shade trees, and active street life promote regular physical activity, social interaction, and psychological wellbeing. The insertion of large, dead, inward-facing industrial structures destroys these qualities. Research consistently demonstrates that the degradation of

walkable, human-scale urban environments is associated with reduced physical activity (with cascading implications for obesity, cardiovascular disease, and metabolic disorders), decreased neighborhood social cohesion, elevated social isolation, and increased prevalence of depressive symptoms. The additional stressors of industrial noise, magnetic field anxiety, and localized grid failure risk create a burden of chronic psychosocial stress that is inseparable from the physical transformation of the built environment.

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## 20. Prineville, Oregon — Apple, Meta, & Amazon Battery Storage Facilities (Chemical & Fire Hazards)

*Category: Lithium-ion battery hazard | Chemical fire risk | PFAS groundwater | Toxic gas exposure*

### Resource & Structural Impact

The data centers in Prineville operated by Apple, Meta, and Amazon contain massive Uninterruptible Power Supply (UPS) rooms housing thousands of lithium-ion battery modules — a technology that carries a well-documented risk of thermal runaway under conditions of damage, overheating, or manufacturing defect. Thermal runaway in lithium-ion battery arrays can spread rapidly through entire battery rooms, generating temperatures exceeding 1,000°C and releasing highly toxic gas mixtures.

### Health & Community Manifestations

A thermal runaway event in a large battery array releases a cocktail of acutely toxic gases, including hydrogen fluoride (HF) — one of the most reactive and dangerous inorganic acids, capable of causing severe burns to skin, eyes, and the respiratory tract at very low concentrations; volatile organic compounds including benzene (a known human carcinogen); carbon monoxide; and heavy metal particulates from electrode materials (cobalt, manganese, nickel). HF inhalation causes acute chemical pneumonitis, pulmonary edema, and permanent pulmonary fibrosis. Firefighters responding to battery fires face acute exposure risks even in full protective gear. Downwind communities can be exposed to toxic plumes. The fire suppression chemicals and battery electrolyte compounds used in or released during such events may include polyfluoroalkyl substances (PFAS) — the "forever chemicals" that contaminate soil and groundwater for decades, linked to thyroid dysfunction, kidney cancer, immune suppression, and reproductive harm. The siting of these facilities in rural Oregon communities without robust hazardous materials response infrastructure amplifies the consequence of any incident.

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## 21. Granbury, Texas — Bitcoin Mining Facility (Acoustic Public Health Emergency)

*Category: Extreme noise pollution | Inner ear damage | Public health emergency | Legal action*

### Resource & Structural Impact

A massive, high-density cryptocurrency mining facility in Granbury, Texas, utilizing thousands of open, high-RPM cooling fans operating continuously, was sited immediately adjacent to residential zones — including a mobile home park where residents, many of them elderly or on fixed incomes, had lived for years. Noise measurements in the vicinity recorded sound levels of 90–100+ decibels — far above the 85 dB threshold at which OSHA

mandates hearing protection for workers, and approximately equivalent to the noise level of a gas-powered lawnmower running continuously within a few feet. In 2024, a group of residents filed suit, claiming the facility had caused irreversible hearing damage, tinnitus, and debilitating vertigo.

### **Health & Community Manifestations**

Residents of the nearby mobile home park — many of whom could not afford to relocate — documented a severe and distinctive constellation of health effects: permanent tinnitus (continuous ringing or buzzing in the ears); debilitating vertigo and inner ear fluid imbalances consistent with noise-induced vestibular damage; chronic clinical insomnia; nausea related to acoustic and vestibular disturbance; chronic migraines; and profound psychological distress from the inability to escape the sound in their own homes. These effects — particularly permanent tinnitus and vestibular damage — are irreversible. The mobile home park population is particularly vulnerable: residents have limited financial resources to relocate, limited access to healthcare, and may already have elevated health risks from age or socioeconomic status. The case has become a national reference point for the acoustic public health crisis created by high-density computing facilities sited without adequate residential setbacks.

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## **22. Lansing, New York — Terawulf AI Repurposing Proposal (Cayuga Lake Thermal Risk)**

*Category: Freshwater lake thermal disruption | Cyanobacterial neurotoxins | Drinking water threat*

### **Resource & Structural Impact**

The proposed conversion of the retired Somerset/Cayuga coal plant in Lansing into a high-density AI data center leveraged the existing grid interconnection and sought large-scale water withdrawals from Cayuga Lake — one of the Finger Lakes, a critical freshwater resource and municipal drinking water source — for evaporative cooling. The proposal raised alarm among environmental and public health advocates regarding the cumulative thermal and ecological impact on the lake system.

### **Health & Community Manifestations**

Cayuga Lake already experiences periodic harmful algal blooms (HABs) due to nutrient enrichment and warming. The withdrawal of large volumes of lake water for cooling, and the potential return of water at elevated temperatures, risks destabilizing the lake's thermal stratification, accelerating nutrient cycling, and promoting explosive proliferation of cyanobacteria (blue-green algae). Cyanobacterial HABs produce among the most potent natural toxins known to science: cyanotoxins including microcystins (hepatotoxins causing acute liver failure), anatoxins (neurotoxins causing muscular paralysis), and saxitoxins (paralytic shellfish toxins). Drinking water treated from a HAB-affected intake can expose entire municipal populations to these toxins; skin contact during recreational use causes rashes, eye irritation, and gastrointestinal illness; and pet and livestock deaths from lake water consumption during bloom events are well-documented. The risk of introducing these toxins — through an irreversible ecological change driven by industrial cooling demand — into a drinking water source serving tens of thousands represents an unacceptable public health gamble.

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## 23. Saline Township, Michigan — Stargate / OpenAI-Oracle Proposal

*Category: Agricultural land loss | Groundwater drawdown | Corporate opacity | Community anxiety*

### Resource & Structural Impact

A multi-billion-dollar, multi-gigawatt AI computing campus proposed for Saline Township — associated with the OpenAI-Oracle Stargate consortium — targeted pristine, actively farmed agricultural land without initial transparent public disclosure of the project's scale, resource demands, or health and environmental impacts. The proposal encountered strong community opposition once its dimensions became known, with residents citing concerns about groundwater drawdown, loss of prime farmland, and the imposition of massive industrial infrastructure on a rural community without meaningful consultation.

### Health & Community Manifestations

The scale of groundwater drawdown required by a multi-gigawatt data center campus in a region dependent on agricultural well water could lower water tables across a wide radius, forcing farms to drill deeper wells, increasing the cost and energy of irrigation, and concentrating naturally occurring groundwater contaminants in remaining water supplies. The loss of prime agricultural land displaces local food production, with the nutritional and economic consequences described elsewhere in this report. The deliberate withholding of project details from the community — facilitated by NDAs with local officials — constitutes a form of environmental injustice that denies democratic self-determination. The experience of discovering that a massive industrial facility has been negotiated in secret on their doorstep creates lasting community trauma: chronic anxiety, hypervigilance, political polarization, and the destruction of trust in local government that is foundational to community mental health and civic life.

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## 24. Tucson, Arizona — Project Blue / Beale Infrastructure (Defeated Proposal)

*Category: Desert aquifer depletion | Water security | Community-led defeat | Psychological impact of threat*

### Resource & Structural Impact

A proposed large-scale data center facility in Tucson demanded millions of gallons of desert groundwater daily for cooling operations in one of the most water-stressed urban environments in North America. The Tucson City Council unanimously rejected the proposal following a large-scale community mobilization that raised alarms about the acceleration of aquifer depletion in a region already facing severe reductions in Colorado River allocations and declining groundwater tables.

### Health & Community Manifestations

Even as a defeated proposal, the Tucson case illustrates the health stakes of data center water demands in arid environments. The Tucson Basin aquifer system is already under significant stress from existing municipal, agricultural, and industrial uses; additional large-scale industrial withdrawal would have accelerated depletion, potentially reaching a tipping point beyond which aquifer recovery within a human lifetime becomes impossible.

Consequences of progressive aquifer depletion include compromised residential water supply requiring expensive treatment or importation, undermining residential sanitation (with the consequent risk of enteric disease), loss of swamp cooling capacity (a primary residential cooling method in desert climates), and desertification of urban tree cover as irrigation becomes unaffordable. The community opposition process — while ultimately successful — imposed significant psychosocial costs on residents, who invested years of civic effort and experienced profound anxiety about the vulnerability of their water supply to corporate extraction.

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## 25. Monterey Park, California — Urban Proximity Conflict (Multiple Operators)

*Category: High-density residential encroachment | Grid failure risk | Community health organizing*

### Resource & Structural Impact

A multibillion-dollar data center campus proposed immediately adjacent to high-density residential developments in Monterey Park prompted emergency city ordinances and a public ballot measure to classify data centers as a public nuisance when sited in or adjacent to residential zones. The community response was driven by widespread alarm regarding industrial noise, localized grid failure risks, the electromagnetic environment created by high-voltage infrastructure, and the loss of neighborhood character.

### Health & Community Manifestations

The proximity of high-power industrial facilities to dense residential development creates a layered health threat: chronic noise from mechanical systems affects sleep, cognition, and cardiovascular health; localized grid fluctuations and brownouts caused by sudden large-load changes can disrupt home medical equipment, food refrigeration, and temperature regulation; community anxiety about electromagnetic field exposure — while the peer-reviewed evidence on EMF health effects remains contested — generates clinically significant somatic symptom disorders, hypervigilance, and chronic stress regardless of the ultimate physical reality of EMF risk; and the loss of community control over the character of one's neighborhood — particularly in a predominantly Asian-American community with strong cultural ties to place — creates lasting psychosocial harm. The ballot measure and emergency ordinances represent significant community health advocacy successes but consumed enormous civic energy and damaged municipal trust.

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## 26. Bessemer, Alabama — Environmental Justice Grievance (Multiple Tech Operators)

*Category: Environmental racism | Green space loss | Respiratory burden | Community marginalization*

### Resource & Structural Impact

Technology conglomerates targeted pristine pine-forested land in historically underinvested, predominantly Black communities near Bessemer for industrial rezoning and data center development. The pattern follows a well-documented historical practice — sometimes called "environmental racism" — of directing polluting or disruptive industrial development toward

communities of color whose political power and economic resources are insufficient to mount effective resistance.

### **Health & Community Manifestations**

The health consequences of this pattern are cumulative and compounding. Forested areas adjacent to residential communities provide measurable public health benefits: filtration of vehicle and industrial air pollutants; urban cooling through evapotranspiration; mental health benefits of access to natural environments (well-documented reductions in anxiety and depression from nature access); and physical activity opportunities. Conversion of these forested areas to industrial data center pads eliminates these benefits permanently.

Communities already carrying elevated baseline respiratory disease burdens — from historical industrial pollution and poverty — face further degradation of air quality without the natural buffering that forests provide. The psychosocial dimension is profound: stripping historically marginalized communities of their natural sanctuaries — while routing economic benefit primarily to shareholders of multinational corporations — perpetuates and deepens the structural inequity that drives health disparities.

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## **27. Warrenton, Virginia — Amazon Web Services Campus Proposal (Community Litigation)**

*Category: Rural encroachment | Transmission line imposition | Political disruption | Psychosocial stress*

### **Resource & Structural Impact**

AWS proposed a large industrial data center campus in Warrenton requiring a new electrical substation and multiple overhead high-voltage transmission line corridors through rural and residential land. The proposal generated massive public litigation, sustained community organizing, and an electoral backlash in which local officials who had supported the project were unseated — a rare instance of data center politics directly deciding local elections.

### **Health & Community Manifestations**

The multi-year cycle of community litigation, public hearings, and political warfare imposed severe and measurable psychosocial harm on Warrenton residents. Protracted adversarial processes — particularly eminent domain threats and zoning battles that pit neighbors against corporate legal teams — create a specific constellation of chronic stress effects: hypervigilance (the persistent sense that one's home and community are under threat); disrupted sleep; fractured community relationships as neighbors take opposing positions; and the erosion of the fundamental sense of security and stability that characterizes a healthy home environment. The unseating of local officials demonstrates that the harm extended to the democratic fabric of the community — with lasting consequences for community governance capacity.

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## **28. Hillsboro, Oregon — Portland General Electric Grid Cost Shift (Multiple Hyperscale Operators)**

*Category: Industrial rate cross-subsidization | Energy poverty | Healthcare rationing*

### **Resource & Structural Impact**

The extreme concentration of hyperscale data centers in the Hillsboro-Beaverton corridor of Oregon — home to Intel, Nike, and numerous tech sector campuses but also to a significant residential and small-business population — forced massive grid infrastructure upgrades that Portland General Electric (PGE) socialized across all ratepayers. The consecutive, compounding rate increases disproportionately affect low-income households and small businesses that derive no benefit from the data centers whose load is driving the infrastructure investment.

### **Health & Community Manifestations**

Financial destabilization of vulnerable households through compounding utility rate increases has direct public health consequences that are well-documented in the research literature. When low-income households face utility bills they cannot afford, the consequences include: deferred medical care and reduced medication adherence; food insecurity as utility bills compete with grocery budgets; heating and cooling self-restriction that creates hypothermia risk in winter and heat stress risk in summer; and the chronic psychological stress of financial precarity — which is independently associated with elevated cortisol, impaired immune function, and worsened outcomes for virtually every chronic disease. For households with children, the combination of food insecurity, temperature instability, and parental financial stress has measurable adverse effects on childhood development, school readiness, and long-term health trajectories.

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## **29. Council Bluffs, Iowa — Google Hyperscale Campus (Water Consumption & Agricultural Well Contamination)**

*Category: Municipal water monopolization | Agricultural nitrate concentration | Methemoglobinemia risk*

### **Resource & Structural Impact**

Google's largest data center globally — located in Council Bluffs — withdrew an average of 3.9 million gallons of water per day in 2024 (consuming 2.8 million gallons, with the remainder returned at elevated temperatures). This represents an enormous industrial draw from municipal water systems in a region dominated by intensive agricultural operations, creating competition between industrial, agricultural, and residential water users in a context of periodic drought and declining water table levels.

### **Health & Community Manifestations**

The intersection of large-scale data center water withdrawal with intensive agricultural practices creates specific and serious risks for residential well users in surrounding rural areas. As industrial and agricultural water demand draws down shallow aquifers, water tables decline and remaining water becomes more concentrated in agricultural chemicals — particularly nitrates from nitrogen fertilizer application. Nitrate concentrations above 10 mg/L in drinking water (the U.S. EPA maximum contaminant level) pose acute risks to infants under six months of age, causing methemoglobinemia ("blue baby syndrome") — a condition in which nitrate-derived methemoglobin prevents blood from carrying oxygen, causing potentially fatal tissue hypoxia. Chronic nitrate exposure in adults is associated with increased risk of colorectal cancer and thyroid dysfunction. Heavy metals naturally concentrated in deepening well water further elevate cancer risks. Rural households with private wells — which are not subject to the same monitoring requirements as municipal water systems — may be exposed to contamination without warning.

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## 30. Global E-Waste Recipient Communities — Agbogbloshie, Ghana & Guiyu, China

*Category: Electronic waste toxicology | Global health injustice | Child neurodevelopmental damage*

### Resource & Structural Impact

The hyperscale data center industry operates on a server hardware refresh cycle of approximately 3–5 years, driven by rapid improvements in computing performance and energy efficiency. This creates an enormous and continuous flow of discarded hardware — circuit boards, server chassis, cable assemblies, power supplies, storage drives, and networking equipment — that together generate millions of tons of industrial electronic waste annually. Much of this e-waste is exported, often illegally, to informal recycling communities in the Global South, including the Agbogbloshie district of Accra, Ghana, and the town of Guiyu in Guangdong Province, China — two of the world's largest and most toxic e-waste processing sites.

### Health & Community Manifestations

In these communities, workers — including children — extract valuable metals (gold, copper, aluminum) through crude processes including open burning of wire jacketing and cable assemblies, and acid-leaching of circuit boards using hydrochloric and nitric acid. These processes release catastrophic concentrations of dioxins and furans (among the most potent environmental carcinogens and endocrine disruptors known), polycyclic aromatic hydrocarbons (PAHs), lead, cadmium, mercury, chromium, beryllium, and brominated flame retardants. Health consequences documented in scientific studies of these communities include: severe neurodevelopmental damage in children (including reduced IQ, attention deficits, and behavioral disorders from lead and mercury exposure); elevated rates of miscarriage and stillbirth; low birth weight; premature birth; terminal cancers (particularly lung, liver, and bladder cancer); acute respiratory failure; chronic obstructive pulmonary disease; hepatotoxicity; and immune suppression. These communities bear the most extreme health burden of the global digital economy while receiving the least of its benefits — a profound and systemic injustice that is directly causally linked to the server refresh cycles of hyperscale data centers.

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## 31. Becker, Minnesota — Google / Xcel Energy (Coal Plant Repurposing; Sherco Station)

*Category: Natural gas infrastructure lock-in | Pipeline community risk | Decarbonization delay*

### Resource & Structural Impact

Google planned a multi-building hyperscale campus in Becker, Minnesota, designed to connect to the electrical infrastructure of the retiring Sherco coal-fired power plant — one of Minnesota's largest generating facilities. Meeting the data center's continuous power demands required massive new natural gas infrastructure, including pipeline extensions, to guarantee reliable thermal backup generation capacity.

### Health & Community Manifestations

Locking in decades of new fossil-fuel natural gas infrastructure creates compounding public health consequences: communities along new pipeline corridors experience elevated anxiety regarding pipeline leaks, explosions, and fire risks — anxieties that are not irrational given documented pipeline incident rates; fugitive methane emissions from pipeline infrastructure contribute to tropospheric ozone formation, which is associated with respiratory disease; and fracking operations upstream from new pipeline demand generate known health harms for communities near well pads, including VOC emissions, water contamination, and seismic activity. More broadly, each new natural gas infrastructure commitment represents a decades-long delay in regional decarbonization — with cumulative climate change consequences that carry enormous long-term public health costs in the form of more frequent and severe heat events, extreme weather, vector-borne disease expansion, and agricultural disruption.

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## 32. Changhua County, Taiwan — Google Data Center (Coastal Aquifer Strain & Land Subsidence)

*Category: Coastal subsidence | Infrastructure cross-contamination | Flooding vulnerability | Pathogen exposure*

### Resource & Structural Impact

Google's data center campus in Changhua County is situated in a coastal region dominated by aquaculture and agriculture, where groundwater has historically been overextracted for industrial and agricultural purposes, causing measurable land subsidence. The addition of large-scale data center cooling water demand to an already stressed aquifer system accelerates subsidence — the literal sinking of the land — which occurs when water is removed from underground formations faster than they can recharge.

### Health & Community Manifestations

Accelerating coastal land subsidence has cascading infrastructure and public health consequences. Sinking land warps, cracks, and ruptures underground utility infrastructure — including sewer pipes and drinking water mains — creating cross-contamination pathways through which wastewater can infiltrate into damaged potable water pipes or vice versa. This cross-contamination exposes communities to enteric pathogens — *E. coli*, *Salmonella*, *Campylobacter*, hepatitis A virus, and norovirus — with consequences ranging from acute gastroenteritis to severe hepatitis and, in vulnerable populations, death. Subsiding coastal land also increases flood vulnerability, particularly relevant in a region subject to typhoons; flooded areas suffer further utility and sanitation infrastructure damage, compounding pathogen exposure and creating long-term water quality crises.

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## 33. Quilicura, Santiago, Chile — Google Hyperscale Cerrillos Project

*Category: Drought water theft | Community environmental litigation | Hygiene failure risk | Trauma*

### Resource & Structural Impact

Google originally designed the Cerrillos data center in Santiago to use 100 liters of groundwater per second for evaporative cooling — an extraordinary draw in a region suffering a multi-decade megadrought that has severely depleted the Maipo River basin and

regional aquifers, upon which Santiago's 7 million residents depend. Following intense local protests, environmental court battles, and an ultimately successful community legal challenge, Google was forced to redesign the facility using air cooling rather than evaporative water-based cooling.

### **Health & Community Manifestations**

Though the water-based cooling was ultimately abandoned, the case illustrates the catastrophic health consequences that would have materialized from large-scale industrial water extraction during a prolonged megadrought: progressive loss of water pressure in municipal distribution systems; periods of daily rationing or complete tap water unavailability; hygiene failures — inability to wash hands, prepare food safely, bathe, or maintain sanitation — enabling rapid spread of gastrointestinal infections, skin diseases, and respiratory illnesses; and the heightened dehydration risk during Chile's summer heat waves. The psychological and community health dimension of the multi-year campaign is also significant: residents experienced years of profound anxiety about whether they would have access to water, profound distrust of corporate actors willing to prioritize server cooling over human hydration, and lasting social trauma from the political battles — even those ultimately won.

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## **34. Mesa, Arizona — Meta Campus (Colorado River Water Rights Exploitation)**

*Category: Historic water rights exploitation | Valley Fever risk | Megadrought amplification*

### **Resource & Structural Impact**

Meta secured a deal guaranteeing millions of gallons of water per day for its multi-million-square-foot campus in Mesa, leveraging historic water rights in a region facing severe reductions in Colorado River allocations under Tier 1 and Tier 2 shortage declarations. The Colorado River Compact — which allocates water to seven U.S. states and Mexico — has been under sustained stress from overallocation and declining Lake Mead and Lake Powell levels driven by climate change and regional population growth. Meta's guaranteed water rights are diverted from dwindling collective allocations.

### **Health & Community Manifestations**

The diversion of already severely constrained Colorado River water and regional groundwater to large-scale industrial cooling drives suburban expansion onto even less sustainable groundwater sources — deepening regional aquifer depletion in a self-reinforcing cycle. Loss of vegetation and soil moisture, combined with increasing drought and heat, increases the frequency and intensity of haboob dust storms in the Phoenix metropolitan area. These storms mobilize *Coccidioides immitis* and *Coccidioides posadasii* fungal spores from desert soil — the causative agents of Valley Fever (coccidioidomycosis), a potentially serious fungal lung infection characterized by pneumonia-like symptoms, chronic pulmonary disease in persistent cases, and disseminated infection affecting the brain, bones, and other organs in immunocompromised individuals. Valley Fever incidence has been rising sharply in Arizona, and dust storm intensification driven by drought and land disturbance is a recognized contributing factor.

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## 35. Johor, Malaysia — Sedenak Tech Park (YTL Power & Sea Ltd / Shopee Campuses)

*Category: Water rationing | Blackouts | Medical equipment failure | Tropical sanitation risk*

### Resource & Structural Impact

Hyper-rapid data center development in the Sedenak Tech Park and adjacent areas of Johor State has diverted immense volumes of treated municipal water and electricity away from local residential communities. During periods of peak demand, neighboring residential areas have experienced unscheduled water rationing and intermittent power disruptions, even as data center campuses — which typically have guaranteed power and water supply agreements — continue operating without interruption.

### Health & Community Manifestations

Unscheduled water disruptions in a tropical climate carry severe public health consequences. High ambient temperatures and humidity accelerate bacterial growth in stored water; improper storage of water during rationing periods creates breeding sites for *Aedes* mosquitoes (vectors for dengue fever, Zika, and chikungunya) and pathogen-laden water. Without consistent running water, household sanitation deteriorates — enabling the spread of foodborne illness, gastrointestinal infections, and skin diseases including scabies and impetigo. Power interruptions disable home medical equipment, fans, and air conditioning in a climate where indoor temperatures without cooling can be physiologically dangerous. The distributional inequity — whereby corporate data center customers maintain guaranteed service while residential customers face interruptions — constitutes a form of infrastructure injustice with direct health consequences.

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## 36. Hamina, Finland — Google Data Center (Gulf of Finland Sea-Water Thermal Discharge)

*Category: Marine thermal pollution | Cyanobacterial toxin | Baltic ecosystem disruption*

### Resource & Structural Impact

Google's data center in Hamina, Finland, uses an innovative open-loop seawater cooling system, drawing cold water from the Gulf of Finland, passing it through heat exchangers that cool the servers, and discharging it back to the sea at significantly elevated temperatures. While promoted as an environmentally friendly alternative to freshwater cooling, the thermal discharge alters the thermal stratification and ecological balance of the receiving marine environment.

### Health & Community Manifestations

The Gulf of Finland is a semi-enclosed, relatively shallow, and ecologically sensitive part of the Baltic Sea, already subject to significant eutrophication pressure from agricultural runoff and decades of industrial pollution. Thermal discharge into this environment promotes stratification that reduces oxygen mixing, potentially contributing to hypoxic "dead zones." More directly, elevated water temperatures in coastal areas adjacent to the discharge stimulate rapid proliferation of cyanobacteria (blue-green algae) in summer months. The Baltic cyanobacteria — including *Nodularia spumigena* and *Aphanizomenon flos-aquae* — produce hepatotoxins (nodularins, cylindrospermopsins) and neurotoxins (anatoxins). Public contact with bloom water during bathing and recreation causes skin rashes, conjunctivitis,

ear infections, and gastrointestinal illness; ingestion of bloom-contaminated water can cause acute liver damage and neurological symptoms; and the death of fish and other marine life from hypoxia and cyanotoxins destroys recreational fisheries and causes secondary economic harm to coastal communities.

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### **37. Noel, Missouri — Crypto-Compute Facility (Valley Acoustic Amplification; Vibroacoustic Disease)**

*Category: Topographic acoustic amplification | Vibroacoustic disease | Community mental health crisis*

#### **Resource & Structural Impact**

A high-density cryptocurrency-computing facility positioned directly adjacent to a residential valley near Noel utilized uninsulated industrial transformers and high-velocity cooling fans. The geography of the valley acted as a natural acoustic resonator, reflecting and amplifying low-frequency sound waves generated by the facility — a phenomenon known as topographic acoustic amplification — creating sound pressure levels in nearby homes that exceeded anything that would have been measured in an open flat environment at the same distance.

#### **Health & Community Manifestations**

Sustained, intense low-frequency sound exposure causes a specific clinical syndrome known as vibroacoustic disease (VAD), characterized by abnormal thickening of cardiac valve leaflets (particularly the pericardium and endocardium), progressive cardiac structural changes, systemic cognitive fatigue, profound disruption of normal sleep architecture, and severe clinical depression. VAD has been documented in workers in industrial environments with intense low-frequency noise exposure (e.g., aircraft ground crews) and, in residential contexts, in communities subject to industrial acoustic pollution. Beyond VAD, residents documented: complete inability to sleep without pharmacological aid; inability to concentrate during waking hours; deterioration of interpersonal relationships under chronic stress; and profound depression associated with the feeling of being imprisoned in one's own home by an inescapable sound.

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### **38. Fredericksburg, Virginia — Amazon Web Services Diesel Generator Arrays**

*Category: Diesel particulate matter | Carcinogen exposure | Pediatric asthma | Cancer risk*

#### **Resource & Structural Impact**

AWS deployed massive banks of multi-megawatt emergency diesel backup generators across its extensive Northern Virginia campus network — with estimates suggesting hundreds of individual generator units across the region. These generators undergo regular mandatory testing and are activated during grid events; collectively they operate for thousands of hours annually across the region, releasing diesel exhaust into surrounding residential neighborhoods. Virginia state data indicates that data center diesel generators statewide operate an estimated 35,000–51,000 hours annually in testing and emergency use combined.

## Health & Community Manifestations

Diesel particulate matter (DPM) — classified as a Group 1 (known) human carcinogen by the International Agency for Research on Cancer (IARC) — is the primary constituent of diesel exhaust most directly associated with adverse health outcomes. Proximity to large diesel exhaust sources is associated with: elevated lifetime risk of lung cancer and bladder cancer; acute inflammatory responses in the airways causing asthma exacerbations; elevated rates of pediatric asthma hospital admissions; cardiovascular effects including ischemic heart disease; and neurological effects including cognitive decline. Communities near AWS generator arrays in Northern Virginia experience periodic episodes of visible diesel exhaust during generator testing, with no meaningful public notice or regulatory oversight. The cumulative exposure across a region with hundreds of generator units, even if each individual unit operates for only a few hours per month, represents a significant public health burden.

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## 39. Sandviken, Sweden — Microsoft Hyperscale Data Centers (Industrial Decarbonization Crowding Out)

*Category: Green energy monopolization | Industrial displacement | Economic stagnation | Mental health*

### Resource & Structural Impact

Microsoft's massive data center expansion in Sandviken and the surrounding Gävleborg region of Sweden consumes enormous quantities of electricity from a regional grid that also serves major decarbonization initiatives in Swedish heavy industry — including the HYBRIT green steel project (hydrogen-based direct reduction iron production) and battery manufacturing facilities — both of which are critical to Europe's industrial climate transition. By consuming electricity that could otherwise power industrial decarbonization, data centers risk crowding out manufacturing industries that provide diverse, long-term, community-rooted employment.

### Health & Community Manifestations

The displacement of industrial employment by data centers — which provide minimal permanent local jobs — creates localized economic stagnation with direct public health consequences. The research literature consistently links economic insecurity, unemployment, and deindustrialization to elevated rates of substance use disorder, clinical depression and anxiety, suicide, domestic violence, and reduced access to healthcare. The loss of manufacturing employment — which in Sweden is well-unionized, well-compensated, and accompanied by comprehensive social benefits — creates particularly severe and lasting community health impacts when not replaced by equivalent employment. The additional harm of delaying green industrial decarbonization extends the timeline of fossil fuel combustion and climate change, with all its associated public health consequences.

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## 40. Eemshaven, Netherlands — Google Hyperscale Facility (Avian Disruption & Ecological Collapse)

*Category: Migratory flyway disruption | Light pollution | Solastalgia | Biodiversity loss*

### Resource & Structural Impact

The construction of Google's massive hyperscale data center complex and associated high-voltage substation switchyards in Eemshaven was sited directly along critical migratory bird flyways and adjacent to nationally protected wetlands in the Wadden Sea region — one of Europe's most important coastal ecosystems and a UNESCO World Heritage Site. The 24/7 security and operational lighting of these facilities, and the persistent acoustic hum of mechanical systems, disrupts avian migration patterns, nesting behaviors, and foraging.

### **Health & Community Manifestations**

Loss of biodiversity — and particularly disruption to bird populations and the wetland ecosystem — directly harms human health through several pathways: the loss of natural pest control (insectivorous birds), pollination services, and the broader ecological balance that supports agricultural productivity. Light pollution from hyperscale facilities affects human health directly by suppressing melatonin production and disrupting circadian rhythms in nearby residents — contributing to sleep disorders, metabolic syndrome, and increased cancer risk. The destruction of the natural environment and soundscape of the Wadden Sea region — a landscape of profound ecological, cultural, and aesthetic significance — causes solastalgia among indigenous and long-term residents, documented as a form of ecological grief with clinical manifestations including depression, anxiety, and loss of sense of identity and place.

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## **41. Cheyenne, Wyoming — Microsoft Campus (Substation Expansion; Residential Proximity)**

*Category: High-voltage EMF proximity | Parental anxiety | Somatic symptom disorder | Sleep disruption*

### **Resource & Structural Impact**

Microsoft's massive campus expansion in Cheyenne required rapid buildout of heavy industrial electrical substations directly adjacent to residential developments and municipal parks. These facilities operate continuously, producing magnetic and electric fields from high-voltage transformers and switchgear, as well as the characteristic low-frequency acoustic crackling and humming of high-voltage equipment.

### **Health & Community Manifestations**

The health effects of residential proximity to high-voltage electrical infrastructure remain an area of ongoing scientific debate, with some epidemiological studies suggesting associations between residential proximity and certain childhood cancers (particularly leukemia), while others find no statistically significant relationship after controlling for confounders. Regardless of the ultimate resolution of this scientific question, the lived experience of parents in communities adjacent to high-voltage substations is one of chronic hypervigilance and anxiety regarding their children's health — a form of anticipatory fear that is itself clinically significant and associated with impaired parenting, family stress, and parental mental health decline. The persistent acoustic crackle and hum of substation equipment causes sleep disruption, cognitive performance decline, and anxiety. The documented somatic symptom disorder experienced by some residents — in which worry about EMF exposure manifests as physical symptoms — is a genuine clinical condition regardless of the physical reality of EMF risk.

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## 42. King County, Washington — Seattle Suburban Edge Data Centers (Cooling Tower Chemical Discharge)

*Category: Endocrine-disrupting chemical discharge | Reproductive health risk | Wastewater system overload*

### Resource & Structural Impact

Data centers in the suburban ring of King County discharge cooling tower blowdown water — water treated with anti-scaling chemicals, corrosion inhibitors, and biocides (including chromate compounds, molybdates, phosphonates, and isothiazolinone-based biocides) — into municipal sewer systems. The volume and chemical complexity of this discharge can exceed the design capacity and treatment capabilities of suburban wastewater treatment plants, risking the passage of incompletely treated industrial chemicals into receiving water bodies — rivers and Puget Sound — used for recreation, fishing, and municipal water supply.

### Health & Community Manifestations

The industrial biocides and chemical treatment agents present in cooling tower discharge include compounds that act as endocrine disruptors — chemicals that interfere with hormonal signaling even at low concentrations. Endocrine-disrupting chemical (EDC) exposure is associated with reproductive health disorders including infertility, polycystic ovary syndrome (PCOS), endometriosis, reduced sperm quality, and developmental reproductive abnormalities in children exposed in utero. Chromate compounds are classified as Group 1 human carcinogens by IARC. Phosphonate-based anti-scaling compounds can contribute to eutrophication of receiving waters. The cumulative discharge from multiple large facilities can exceed the assimilative capacity of local water bodies, creating persistent chemical contamination of recreational and potable water resources. The complexity and opacity of the chemical mixture makes monitoring and enforcement extremely challenging.

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## 43. Toronto, Ontario, Canada — Downtown High-Rise Data Centers (Chiller Acoustic Resonance)

*Category: Urban residential acoustic transmission | Sleep fragmentation | Childhood cognition | Hypertension*

### Resource & Structural Impact

Historic downtown commercial high-rises in Toronto have been converted to dense "data hotels" — multi-tenant colocation facilities — requiring the installation of massive rooftop chiller plants and diesel storage tanks in the urban core. These rooftop mechanical systems generate acoustic energy that propagates downward through the building structure and radiates into surrounding residential high-rises through both airborne and structure-borne pathways.

### Health & Community Manifestations

Structure-borne noise transmission from rooftop mechanical systems into adjacent or connected residential buildings is particularly insidious because conventional sound insulation is often ineffective against low-frequency structural vibration. Thousands of dense-urban residents may experience: chronic sleep fragmentation from nighttime mechanical noise and vibration; cognitive performance decline, particularly in children and

adolescents during critical educational years; elevated baseline blood pressure from chronic acoustic stress — a well-established epidemiological relationship; heightened risk of workplace accidents and automobile accidents as a consequence of chronic sleep deprivation; and psychological distress from the pervasive sense that one's own bedroom is contaminated by an uncontrollable industrial noise source.

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#### **44. Cyberjaya, Malaysia — Hyperscale Cluster Heat Island (Wet-Bulb Temperature Crisis)**

*Category: Tropical heat island | Wet-bulb temperature | Cardiovascular collapse | Heat-related mortality*

##### **Resource & Structural Impact**

Intense geographic clustering of hyperscale data center facilities in Cyberjaya — Malaysia's dedicated 'technology city' — has replaced substantial areas of tropical vegetation (which provides critical evaporative cooling) with massive concrete and steel structures, asphalt roads, and the mechanical heat rejection of thousands of servers. This transformation creates an intense localized urban heat island effect.

##### **Health & Community Manifestations**

In a tropical climate with high baseline humidity, adding waste heat from massive data center mechanical yards has the specific and dangerous effect of pushing the "wet-bulb temperature" — the combined measure of heat and humidity that determines the human body's ability to cool itself through sweating — closer to the physiological limit of 35°C wet-bulb (beyond which even a healthy adult in the shade will experience heat stroke within hours). At wet-bulb temperatures near this limit, the elderly, those with cardiovascular disease, outdoor workers, and individuals without access to air conditioning face acute risk of cardiovascular collapse and fatal heat stroke. Cyberjaya's street-level temperatures during peak hours already push the boundaries of outdoor human comfort; incremental warming from data center heat rejection can convert a survivable heat day into a lethal one for vulnerable individuals. This is one of the most acute and immediate threat pathways from data center siting in tropical climates.

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#### **45. Reno, Nevada — Crypto/AI Hybrid Facility (Cooling Fluid Leak; PFAS Contamination)**

*Category: Dielectric fluid spill | PFAS groundwater contamination | Thyroid disease | Cancer risk | Immune suppression*

##### **Resource & Structural Impact**

A crypto/AI hybrid computing facility in Reno utilizing direct-to-chip liquid cooling loops suffered a major structural fluid leak, spilling industrial dielectric coolants and synthetic cooling fluids into local stormwater retention basins. The cooling fluids used in advanced liquid-cooled computing systems may contain polyfluoroalkyl and perfluoroalkyl substances (PFAS) — a class of several thousand synthetic chemicals characterized by their extreme chemical stability and environmental persistence.

##### **Health & Community Manifestations**

PFAS compounds are known as "forever chemicals" because they do not degrade in the environment; once introduced into groundwater, soil, or surface water, they persist for geological timescales. Human exposure through contaminated drinking water is associated with a constellation of serious health effects established through extensive epidemiological research: thyroid hormone disruption (including hypothyroidism and thyroid autoimmune disease); kidney cancer (renal cell carcinoma) — for which PFAS exposure is now recognized as a probable cause; testicular cancer; breast cancer; immune system suppression (reducing vaccine efficacy and increasing susceptibility to infection); elevated cholesterol; pregnancy-induced hypertension and pre-eclampsia; reduced fetal growth; and developmental neurotoxicity in children. The EPA has established a maximum contaminant level of 4 parts per trillion for PFOA and PFOS in drinking water — a threshold so low that it demonstrates the extraordinary potency of these compounds. A single spill event can contaminate an aquifer for generations.

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## 46. Rural Southern New Jersey — Agricultural Zoning to Industrial Conversion (Speculative Data Center Shells)

*Category: Heavy construction traffic | Road destruction | Silica dust | Pedestrian safety*

### Resource & Structural Impact

Agricultural zoning across multiple rural townships in southern New Jersey was rapidly rezoned to heavy industrial use to accommodate speculative data center development — facilities whose construction began before tenants or operators were confirmed. This resulted in heavy diesel construction equipment, 18-wheelers carrying materials, and concrete trucks penetrating rural road networks not designed for industrial loads — causing rapid pavement deterioration and creating dangerous conditions on roads shared with farm vehicles, cyclists, and pedestrians.

### Health & Community Manifestations

Heavy diesel construction traffic through rural environments creates multiple acute and chronic health risks: significantly elevated rates of traffic accidents and pedestrian injuries on roads shared with large vehicles, with rural roads offering little pedestrian infrastructure (sidewalks, crosswalks, lighting); acute spikes in PM2.5 and PM10 from diesel exhaust and from the large quantities of fugitive silica dust generated during mass grading of sandy agricultural sites — silica dust inhalation causing acute silicosis (potentially fatal) with chronic or high-dose exposure, and chronic silicosis with longer-term lower-dose exposure; children at rural schools adjacent to construction corridors experience educational disruption from noise, air quality concerns, and safety hazards; and the destruction of rural road infrastructure creates lasting community isolation and economic harm as roads become impassable for farm equipment or emergency vehicles.

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## 47. Clay County, Missouri — Meta Data Center (Grid Strain; Winter Storm Vulnerability)

*Category: Winter grid instability | Hypothermia risk | Carbon monoxide poisoning | Emergency vulnerability*

### **Resource & Structural Impact**

Meta's hyperscale data center in Clay County creates electricity demands that require the regional utility to import out-of-state fossil-fuel generated power during peak winter storm periods, when both data center loads and residential heating demands peak simultaneously. The resulting grid instability risk — during the periods of maximum meteorological and thermal stress — creates the conditions for localized rolling brownouts or blackouts.

### **Health & Community Manifestations**

Grid instability events during extreme winter weather carry specific and severe public health consequences. For vulnerable populations — the elderly, infants, people with disabilities, individuals with chronic illnesses — loss of home heating during a prolonged sub-zero cold snap creates direct hypothermia and frostbite risk. As households lose power and attempt to heat their homes with portable combustion devices — propane heaters, gas stoves left on, charcoal grills moved indoors — carbon monoxide (CO) poisoning risk rises sharply. CO poisoning is the leading cause of accidental poisoning death in the United States; it is odorless, colorless, and symptom onset (headache, nausea, confusion) can be mistaken for influenza until the victim is incapacitated. The confluence of extreme weather, compromised grid infrastructure, and inadequate emergency preparedness — all worsened by the presence of an enormous industrial electricity consumer competing with residential demand — creates a preventable public health emergency.

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## **48. Naas, County Kildare, Ireland — Hyperscale Gas-Turbine Substitution (Captive Power Plant)**

*Category: De facto fossil fuel power plant | Residential NO<sub>x</sub> exposure | Pediatric respiratory disease*

### **Resource & Structural Impact**

To circumvent EirGrid's moratorium on new large-load grid connections in the Dublin area, a data center developer installed a captive, continuous-duty natural gas turbine power plant on-site in Naas — a residential corridor in County Kildare. This turbine plant, operating continuously to supply the data center, functions as a de facto industrial power station in a mixed residential-commercial zone, releasing combustion emissions without the site buffer distances typically required for dedicated industrial generation facilities.

### **Health & Community Manifestations**

Continuous-duty natural gas combustion in close proximity to residential areas generates a persistent ground-level plume of nitrogen dioxide (NO<sub>2</sub>) and fine particulate matter (PM<sub>2.5</sub>). NO<sub>2</sub> concentrations are particularly elevated in the immediate vicinity of combustion sources and are strongly associated with: pediatric bronchitis and impaired lung development (children exposed to elevated NO<sub>2</sub> during formative years develop with measurably reduced lung capacity compared to unexposed peers); adult asthma exacerbations; COPD progression; and cardiovascular inflammation and ischemic heart disease. The transformation of a zoning-compliant data center into a continuous-duty fossil fuel power plant — through the regulatory loophole of captive on-site generation — negates the air quality assumptions embedded in planning consents for surrounding residential development, exposing communities to industrial combustion pollution that was never considered in the original zoning decisions.

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## 49. Boydton, Virginia — Microsoft Hyperscale Rural Campus (Housing Market Disruption)

*Category: Rural housing crisis | Construction worker influx | Hidden homelessness | Obstetric health*

### Resource & Structural Impact

The siting of a massive, multi-phase Microsoft hyperscale facility in Boydton — an economically depressed rural county in southern Virginia — flooded an area of extremely limited rental and hotel capacity with thousands of transient construction workers. Rental properties and hotels were monopolized by construction crews willing to pay rates far above local market values, as these workers were reimbursed by large contractors. Local low-income residents — already in precarious housing situations — were outbid and displaced.

### Health & Community Manifestations

The rapid and severe disruption of rural housing markets by large-scale construction workforce influxes — without prior community planning or housing mitigation measures — creates a cascade of public health consequences that research consistently links to poor outcomes. Housing displacement and precarity are associated with elevated rates of anxiety, depression, domestic violence, and substance use disorder. Children in unstable housing situations face adverse educational and developmental outcomes. Pregnant women in displacement situations face elevated risks of preterm birth, low birth weight, and maternal mental health complications — poor obstetric outcomes that are documented consequences of housing insecurity stress. The irony of Microsoft — one of the world's most valuable corporations — generating a housing crisis in one of Virginia's poorest counties while receiving public subsidies underscores the structural injustice of current data center development models.

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## 50. Tokyo Suburbs / Chiba Prefecture, Japan — Hyperscale Data Center Cooling Tower Legionella Risk

*Category: Legionella disease risk | Chemical biocide aerosol | Acute respiratory illness | Dense urban exposure*

### Resource & Structural Impact

Hyperscale facilities in the Tokyo suburban ring and Chiba Prefecture utilizing closed-loop water chillers treat their cooling water with high concentrations of toxic biocides — including glutaraldehyde, isothiazolinones, and in some cases chlorine compounds — to prevent the growth of *Legionella pneumophila* in the warm, nutrient-rich water of cooling towers. The maintenance and control of *Legionella* in large cooling tower systems is technically demanding and requires rigorous ongoing monitoring; failures can and do occur.

### Health & Community Manifestations

Cooling tower systems that inadequately control *Legionella* can generate aerosol droplets containing viable *Legionella* bacteria that are dispersed downwind over distances of up to several kilometers. Inhalation of these droplets causes Legionnaires' disease — a severe, potentially fatal form of atypical pneumonia with a case-fatality rate of 5–30 percent depending on the health status of those affected. Legionnaires' disease outbreaks

associated with cooling towers in dense urban environments have killed dozens of people in Japan and other countries. The particular hazard in dense Tokyo suburban environments is the concentration of millions of people within the aerosol dispersion radius of multiple large cooling tower installations. When biocide treatment is successful but produces chemical aerosol drift, the consequences include severe chemical asthma, acute bronchospasm, and ocular and dermal irritation in nearby communities. Both outcomes — pathogen release and chemical drift — represent industrial hazards that are not adequately regulated or monitored in most jurisdictions.

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## PART III: 25 ADDITIONAL CASE STUDIES

The following 25 case studies present additional specific instances of data center harms, covering a diverse range of adverse effect types, geographies, operators, and affected communities. Together with the original 50 cases, they provide a comprehensive global picture of the community health and environmental costs of the data center industry.

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### A1. Holly Ridge, Louisiana — Meta 'Hyperion' Campus (Traffic Safety Crisis)

*Category: Construction traffic surge | Child safety | School closure | Rural road destruction | Acute injury*

#### Resource & Structural Impact

Meta's \$27 billion 'Hyperion' data center campus — described as the largest data center in the world upon completion — is under construction on approximately 2,000 acres of prime agricultural land in Richland Parish, near the tiny town of Holly Ridge (population under 2,000, with nearly a quarter of residents below the poverty line). The project, assembled through non-disclosure agreements and non-public negotiations that rewrote Louisiana tax law to create new exemptions, generates thousands of heavy truck movements daily on rural roads not designed for industrial traffic volumes. The campus ultimately requires three new natural gas power plants to sustain its electricity demand — twice the power consumption of New Orleans. Data collected from police records by the Gulf States Newsroom revealed 64 vehicle crashes in the roads surrounding the construction site between January and mid-September 2025, compared to just nine crashes in all of 2024 — a greater than 600 percent increase.

#### Health & Community Manifestations

The traffic crisis has created immediate, documented physical dangers for the community. Holly Ridge Elementary School — located less than one mile from the construction site — closed its front-facing playground indefinitely after multiple crashes involving heavy construction vehicles occurred in close proximity. In one incident, two dump trucks collided head-on near the school; the driver who caused the collision had an expired foreign driver's license and required helicopter evacuation from a field behind the school on a school day. Students report near-misses with trucks while waiting for school buses; at least one fourth-grader stated she and her grandmother "almost got killed" by an 18-wheeler. Adults in the community are afraid to exit their own driveways. The incessant passage of diesel trucks causes chronic noise pollution during school hours, disrupting learning and classroom instruction. The construction activity has also caused "rust-colored" tap water and intermittent power outages in Holly Ridge — indicating simultaneous water quality and grid impacts on this already economically vulnerable community. Despite receiving complaints from dozens of residents, Meta did not proactively contact any of the interviewed households about safety measures, and the state transportation department confirmed Meta had not violated its permits.

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## A2. Columbus, Ohio & Trenton, New Jersey — PJM Grid / Data Center Capacity Cost Shift

*Category: Capacity market cost shift | Residential rate surge | Health rationing | Energy poverty*

### Resource & Structural Impact

The PJM Interconnection — the largest grid operator in the United States, serving over 65 million people across 13 states including Ohio, New Jersey, Virginia, Illinois, and Pennsylvania — operates capacity auctions to procure future electricity generation commitments. An independent market monitor analysis found that data center demand, actual and forecast, accounted for \$9.3 billion, or 63 percent, of the total power capacity cost for 2025–2026 in the PJM system. Capacity auction prices subsequently jumped another 10 percent to \$16.1 billion in the most recent auction. These capacity costs are incorporated into retail electricity rates paid by residential and small commercial customers. In practice, typical electricity bills climbed approximately \$27 per month in Columbus, Ohio, and approximately \$26 per month in Trenton, New Jersey, following June 2025 rate increases — with further increases of up to 40 percent projected by 2030.

### Health & Community Manifestations

These rate increases — driven primarily by data center capacity demand — impose measurable and serious public health consequences on millions of households. Low-income households in the PJM region already spend a disproportionate share of income on energy; rate increases push many into energy poverty. The \$25 billion in outstanding U.S. household utility debt as of June 2025 — up from approximately \$15 billion in early 2022 — reflects the scale of the unaffordability crisis. Health consequences of energy poverty include: thermal stress (both summer heat and winter cold) as households self-ration cooling and heating; rationing of other essential expenditures including food and medicines; disconnection-related hypothermia and heat illness; inability to power home medical equipment; and the chronic psychological burden of financial precarity. Coal plant retirements being delayed across the PJM region to meet data center demand add ongoing air quality harm — particularly for communities downwind of aging coal facilities — on top of the rate burden.

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## A3. Bayview-Hunters Point (BVHP), San Francisco, California — Novva Data Center (Environmental Justice in an Already Overburdened Community)

*Category: Cumulative pollution burden | Environmental justice | Community health compounding*

### Resource & Structural Impact

The Bayview-Hunters Point district of San Francisco is one of the most environmentally burdened communities in California — hosting a wastewater treatment facility, industrial rendering plants, and a legacy of pollution from the former Hunters Point Naval Shipyard Superfund site. Despite this pre-existing burden, the district is the site of new data center development, including a \$500 million, 36 MW Novva facility (first phase 9 MW launching summer 2026). A University of California analysis found that the median pollution burden score of California data center locations placed them in the top 20 percent of the most environmentally impacted locations in the state, and that nearly one-third of all operational

and planned California data centers are located in the top 10 percent of areas most polluted by diesel particulates. A 2024 study found that data centers could contribute to 600,000 asthma-related symptom cases by 2030, with overall public health costs exceeding \$20 billion.

### **Health & Community Manifestations**

The BVHP community carries one of the highest aggregate environmental health burdens of any urban neighborhood in California — elevated rates of asthma, cardiovascular disease, childhood developmental delay, and cancer attributable to decades of cumulative toxic exposure. The addition of data center-related air pollution, noise, light, and heat to an already overburdened environment represents a compounding of harm on a population with severely reduced physiological and socioeconomic resilience. Communities with pre-existing high pollution burden have reduced capacity to tolerate additional stressors — the same incremental pollution exposure that might be tolerable in a lower-burden community can be the tipping point into clinical illness in BVHP. This pattern — of siting new industrial or quasi-industrial facilities in communities already burdened by pollution — is a defining feature of environmental injustice and perpetuates the structural health disparities that have been documented in BVHP for generations. The promise of a "greenest data center ever" does not eliminate the cumulative burden of co-location with an ongoing toxic legacy.

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## **A4. Richland Parish, Louisiana — Meta Hyperion Gas Plant Expansion (Entergy Three-Plant Proposal)**

*Category: Emergency gas plant construction | Regulatory bypass | Fossil fuel lock-in | Community health risk*

### **Resource & Structural Impact**

To power Meta's Hyperion data center campus — which requires approximately 5 gigawatts of electricity, twice the total power consumed by New Orleans — Entergy Louisiana proposed the construction of three new natural gas-fired power plants. The Louisiana Public Service Commission approved these proposals through an expedited process that bypassed the typical comprehensive proposal review period, accelerating the addition of major new fossil fuel generating capacity without standard environmental review or public health impact assessment.

### **Health & Community Manifestations**

The construction and operation of three major new natural gas power plants in a rural Louisiana parish — bypassing normal regulatory review — imposes multiple public health harms. Combustion of natural gas produces NOx (forming ground-level ozone and contributing to PM2.5); CO2 (the primary greenhouse gas driving climate change); and, through incomplete combustion, formaldehyde and other air toxics. Communities near power plant combustion stacks — in this case a parish where a quarter of residents live below the poverty line — face elevated risks of respiratory disease, cardiovascular illness, and cancer. The expedited permitting process denied community members the opportunity to participate in environmental review, compounding the injustice of industrial siting in a vulnerable rural community. Louisiana's historically poor health metrics — among the worst in the United States for cardiovascular disease, diabetes, and cancer — reflect decades of

environmental health neglect in precisely the communities now being asked to host major new fossil fuel infrastructure for a multinational tech company's AI ambitions.

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## **A5. Virginia Statewide — Data Center Electricity Rate Surge (Dominion Energy / Data Center Alley)**

*Category: Political reckoning | Residential rate burden | Democratic accountability | Public health infrastructure*

### **Resource & Structural Impact**

Virginia electricity prices surged 13 percent in the period tracked in late 2025, compared to a 6 percent national average increase — with Northern Virginia's unprecedented data center concentration a major factor. Governor-elect Abigail Spanberger, a Democrat, won a landslide gubernatorial election in November 2025 in part on explicit campaign promises to make tech companies "pay their own way" and to stop data centers from driving up energy costs for Virginia residents. Her election represented a direct political reckoning with the public health and economic consequences of unregulated data center growth. Virginia's Joint Legislative Audit and Review Commission (JLARC) documented that data center water consumption in Northern Virginia reached nearly 2 billion gallons in 2023 — a 63 percent increase from 2019.

### **Health & Community Manifestations**

The combination of electricity rate burden and water consumption pressure in Virginia illustrates the statewide public health implications of being home to the world's largest data center concentration. Rising electricity costs reduce household budgets for healthcare, nutritious food, and medicine — with the documented adverse health consequences of energy poverty. The diversion of potable water from residential and agricultural uses to data center cooling in a region already experiencing water stress creates supply competition during drought events. The political salience of these issues — sufficient to influence a statewide gubernatorial election — reflects a widespread community recognition of the health, economic, and quality-of-life impacts that concentrated data center development imposes. Virginia's experience provides a national case study in the consequences of inadequate regulatory protection of residential ratepayers from industrial electricity demand.

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## **A6. Aurora, Illinois — CyrusOne Data Centers (Residential Noise Complaints)**

*Category: Suburban noise intrusion | Chronic sleep disruption | Community quality of life collapse*

### **Resource & Structural Impact**

CyrusOne data center operations in Aurora, Illinois — documented in 2026 reporting — generated sustained noise and electric bill complaints from nearby residents, contributing to a pattern of data center-related community disruption in the Chicago metropolitan area. Residents described the intrusion of constant mechanical noise from cooling systems into previously quiet suburban neighborhoods, with complaints filed with local authorities over extended periods. The situation was sufficiently serious to generate mainstream media attention and political pressure on local officials.

## Health & Community Manifestations

The Aurora case is representative of a pattern documented across dozens of U.S. communities: the insertion of hyperscale data center operations into suburban environments, facilitated by zoning classifications that treat them as equivalent to office buildings, exposes thousands of residents to levels of continuous industrial noise that are incompatible with residential health and wellbeing. Chronic sleep disruption — which typically begins within weeks of noise source onset — causes progressively worsening cognitive performance, emotional dysregulation, immune compromise, cardiovascular risk elevation, and mental health deterioration. Children in affected households face educational consequences. The combination of noise burden and electricity cost increases — both data center effects experienced simultaneously — creates a compounding community health and economic impact that is greater than either effect alone.

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## A7. Unspecified Amazon Data Center Cluster — Cancer Cluster Investigation

*Category: Rare cancer cluster | Occupational and community health | Electromagnetic environment*

### Resource & Structural Impact

A study referenced by the North Carolina Environmental Justice Network identified a cluster of rare cancers linked to an Amazon data center location. While the full details of the study's methodology and conclusions are the subject of ongoing scientific review, the finding underscores the importance of systematic epidemiological surveillance in communities hosting large-scale data center infrastructure. Rare cancer clusters in industrial settings require investigation even when causal mechanisms are not immediately apparent, as the history of environmental epidemiology repeatedly demonstrates that initially unexplained clusters are sometimes subsequently attributed to specific industrial exposures.

### Health & Community Manifestations

The health significance of the cancer cluster investigation extends beyond the specific findings to the broader governance question: unlike other major industrial facility types, data centers are not routinely subject to cancer registry-linked epidemiological surveillance of surrounding communities. The combination of diesel generator emissions, high-voltage electromagnetic environments, synthetic chemical coolants and biocides, and a range of other industrial exposures creates a complex chemical and physical environment around data centers that has not been systematically studied for chronic disease associations. The absence of monitoring does not demonstrate the absence of harm; it reflects the regulatory gap that has allowed the data center industry to expand at extraordinary speed without the environmental and public health oversight applied to analogous industrial operations.

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## A8. New Carlisle, Indiana — Amazon Hyperscale Campus (Rural Agricultural Community Disruption)

*Category: Rural community disruption | Agricultural land loss | Housing market pressure | Water & power demand*

### Resource & Structural Impact

Amazon's largest AI data center complex — comprising seven completed buildings as of late 2025, with 30 total buildings planned across 1,200 acres — is under construction in New Carlisle, a small rural Indiana community. The scale of the project transforms a predominantly agricultural landscape into a massive industrial computing campus, with all of the associated consequences for land use, community character, infrastructure demand, and environmental resources.

### **Health & Community Manifestations**

The conversion of 1,200 acres of agricultural land to industrial use eliminates the food-producing, carbon-sequestering, and hydrological functions of that land permanently. The water demands of 30 hyperscale buildings will create significant new draws on local municipal or groundwater systems. Power demands will require substantial grid infrastructure investment, with rate implications for surrounding communities. The construction phase — which will last many years — subjects the New Carlisle community to the full range of construction-phase harms documented throughout this report: heavy truck traffic on rural roads, diesel exhaust, silica dust, noise, road damage, and housing market disruption from construction worker influxes. The permanent operational phase will add industrial noise, light pollution, and thermal emissions to a community whose residents chose rural Indiana for its quiet, its farmland, and its distance from industrial development. The minimal permanent employment provided — typically fewer than 150 workers for a campus of this scale — means the community absorbs enormous disruption in exchange for limited lasting economic benefit.

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## **A9. Pennsylvania — PJM Region Data Center Load & Natural Gas Priority**

*Category: Fossil fuel reinforcement | Renewable displacement | Rate burden | Environmental justice*

### **Resource & Structural Impact**

Pennsylvania leads the PJM Interconnection region in energy exports and serves data centers both within the state and across the multi-state grid. The state's energy portfolio is dominated by natural gas, with renewable energy representing only 4 percent of generation. Recent initiatives by PJM and Pennsylvania state agencies have continued to prioritize gas-fired generation to meet data center-driven demand, creating infrastructure lock-in that delays the state's clean energy transition. New transmission lines connecting data centers to grid power in Pennsylvania are funded through utility rate structures that distribute costs across all ratepayers.

### **Health & Community Manifestations**

Pennsylvania communities — particularly those in southwestern Pennsylvania near aging coal and natural gas infrastructure — bear disproportionate air quality burdens from the reinforcement of fossil fuel generation to serve data center demand. Exposure to NO<sub>x</sub>, SO<sub>2</sub>, and fine particulates from fossil fuel combustion drives elevated rates of asthma, COPD, cardiovascular disease, and cancer in these communities. The economic burden of transmission investment socialized across Pennsylvania ratepayers falls hardest on low-income households in western Pennsylvania and rural communities — populations that benefit least from the digital services powered by data centers. The failure to charge data centers the full cost of new grid infrastructure — rather than distributing these costs across

all ratepayers — represents a significant and regressive public subsidy of the technology industry at the expense of community health and family budgets.

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## **A10. Singapore — National Grid Saturation Moratorium (Multiple Operators)**

*Category: National grid saturation | Residential energy insecurity | Water stress | Governance model*

### **Resource & Structural Impact**

Singapore imposed a moratorium on new data center construction from 2019 to 2022, citing the extraordinary share of national electricity consumption — approximately 7 percent — absorbed by data centers in a city-state with constrained land and limited energy generation alternatives. When the moratorium was lifted, new standards required data centers to meet strict Power Usage Effectiveness (PUE) and Water Usage Effectiveness (WUE) benchmarks. Despite these controls, Singapore continues to experience data center-related grid and water pressure, particularly as AI workloads demand ever-greater power density per square meter of server floor space.

### **Health & Community Manifestations**

Singapore's experience as a small island city-state with limited freshwater resources and no domestic fossil fuel production illustrates the extreme vulnerability that data center concentration creates at a national scale. Any significant grid disruption — caused by the concentrated electricity demand of data centers contributing to peak overloads — would affect the entire population, disrupting hospitals, water desalination plants (which are critical to Singapore's water security), mass transit, and telecommunications. Singapore's water stress is extreme; the country relies primarily on desalination and water recycling, both of which are energy-intensive and would be compromised by grid instability. The city-state's strict governance response — moratorium followed by regulated re-entry with binding efficiency standards — represents a model that most jurisdictions in the United States have failed to adopt, resulting in the less regulated and more harmful pattern of development documented throughout this report.

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## **A11. Stokes County, North Carolina — Duke Energy Data Center Load Growth (Rural Fossil Fuel Expansion)**

*Category: Rural coal plant reprieve | Air quality degradation | Health disparities in rural communities*

### **Resource & Structural Impact**

Stokes County, North Carolina, hosts aging Duke Energy fossil fuel generating assets whose retirement has been delayed due to data center-driven load growth in the Duke Energy Carolinas system. The retention of these older, less efficient generating units — to ensure grid reliability during peak demand periods created by data centers — prolongs the exposure of Stokes County's predominantly rural, lower-income communities to coal and natural gas combustion emissions.

### **Health & Community Manifestations**

Rural communities near aging fossil fuel power plants suffer elevated rates of respiratory and cardiovascular disease, even compared to other rural areas, due to the proximity and

cumulative duration of combustion emissions exposure. Children living within a defined radius of coal-fired power plants show statistically elevated rates of asthma diagnosis, hospitalization, and school absences. Adults experience higher rates of COPD, ischemic heart disease, and premature mortality. The preservation of these facilities — as a direct consequence of data center electricity demand growth — extends these harms indefinitely, constituting a specific, quantifiable public health cost that is not reflected in data center pricing, permitting, or corporate sustainability reporting.

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## **A12. Manassas, Virginia — Amazon Data Center / Prince William County (Chiller Retrofitting & Acoustic Shrouds)**

*Category: Corporate acoustic mitigation | Regulatory inadequacy | Community health restoration delayed*

### **Resource & Structural Impact**

Residents of Prince William County near Amazon-operated data centers documented routine noise level exceedances — with community measurements confirming that noise routinely exceeded 60 decibels, the standard typically considered compatible with residential environments. In response to sustained community pressure and local government attention, Amazon committed to retrofitting its data centers with acoustical shrouds on cooling equipment — a significant capital investment in noise mitigation that acknowledges the harm caused by unmitigated operations.

### **Health & Community Manifestations**

While Amazon's retrofitting commitment is a positive step, the case illustrates a fundamental structural problem in data center regulation: harmful noise impacts on residential communities were allowed to persist for extended periods before corrective action was taken, and such action required years of community advocacy and regulatory pressure to achieve. The interim harm — years of sleep disruption, anxiety, cardiovascular stress, and cognitive impairment — cannot be undone retroactively. The reactive, complaint-driven regulatory model — rather than proactive noise impact assessment before siting approval — guarantees that communities will suffer harm before solutions are implemented. The acoustic shroud retrofit approach, while beneficial, addresses only the most egregious external noise sources and does not eliminate all low-frequency mechanical noise transmission.

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## **A13. Global Semiconductor Supply Chain — Cobalt Mining in the Democratic Republic of Congo**

*Category: Artisanal mining toxicology | Child labor | Respiratory disease | Radiation exposure*

### **Resource & Structural Impact**

The lithium-ion batteries used in UPS systems of data centers worldwide, and the cobalt-containing battery cathodes in servers and storage devices, depend on cobalt supply chains originating significantly in the Democratic Republic of Congo (DRC), where approximately 70 percent of global cobalt production occurs. A substantial portion of DRC cobalt originates in artisanal small-scale mining (ASM) operations — sometimes called "artisanal" or "informal" mining — where miners, including children, work in unregulated, dangerous conditions.

## Health & Community Manifestations

Artisanal cobalt miners in the DRC's Katanga copper belt work in tunnels without adequate ventilation, breathing air laden with cobalt dust, copper dust, and naturally occurring radioactive materials (uranium and thorium are geologically associated with some cobalt ore bodies). Cobalt dust inhalation causes cobalt-associated lung disease (hard metal disease), characterized by interstitial fibrosis and potentially fatal progressive lung scarring; cobalt is also a probable human carcinogen. Radiation exposure from associated uranium-bearing minerals adds a cancer risk. Children involved in ore washing and transport experience developmental cobalt toxicity — including cardiomyopathy and neurological effects. The communities surrounding ASM sites face contamination of soil, surface water, and food crops with heavy metals, driving chronic poisoning in the general population. These harms are the most distal link in the data center supply chain — invisible to consumers, regulators, and corporate sustainability teams — but causally connected to every server rack and every UPS battery in every data center in the world.

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## A14. Ashburn, Virginia — Loudoun County School Districts (Cumulative Child Health Impact of Data Center Density)

*Category: Children's environmental health | Diesel exposure near schools | Noise impacts on learning | Light pollution*

### Resource & Structural Impact

Ashburn, Virginia — the epicenter of the world's largest data center cluster — hosts dozens of operational data center facilities within a few miles of multiple public schools, parks, and dense residential communities. Children attending schools and living in neighborhoods proximate to this cluster are subject to cumulative exposures not experienced by children in less data-center-dense communities: diesel exhaust from hundreds of backup generator tests annually; continuous background noise from mechanical systems; light pollution affecting nighttime sleep quality; and electromagnetic fields from multiple high-voltage substations.

### Health & Community Manifestations

Children are uniquely vulnerable to environmental exposures compared to adults: their developing organ systems, higher breathing rates relative to body weight, longer remaining lifetime of exposure, and limited behavioral capacity to avoid exposures all amplify the health consequences of environmental contamination. Research specifically on the Loudoun County data center cluster environment is limited — reflecting the regulatory gap in data center health monitoring — but established science predicts: elevated asthma and respiratory disease rates from diesel exhaust; cognitive and educational performance impacts from chronic noise exposure at home and near schools; disrupted sleep architecture from light and noise pollution; and potential developmental neurological effects from chronic low-level heavy metal and chemical exposures. A 2026 *Frontiers in Climate* paper — the first systematic health assessment of the Virginia data center cluster — identified air pollution, water use, noise, and land use as health risk pathways requiring urgent research and mitigation.

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## A15. Goiás State, Brazil — Data Center Water Demands During Amazon-Adjacent Drought

*Category: Tropical aquifer depletion | Drought amplification | Agricultural water competition | Food insecurity*

### Resource & Structural Impact

Brazil's central plateau — the Cerrado biome region of Goiás State — hosts a growing number of data center facilities attracted by the region's power infrastructure and land availability. The Cerrado is simultaneously one of the world's most biodiverse tropical savannas and a region experiencing accelerating deforestation and drought. Data center water demands in this environment compete with the water needs of the region's substantial agricultural sector and the municipal water supplies of rapidly growing cities.

### Health & Community Manifestations

The Cerrado biome provides water security for an enormous proportion of Brazil through its role in regulating the hydrological cycle of major river systems including the São Francisco, Araguaia, and Paraná. As deforestation reduces the Cerrado's water retention and evapotranspiration capacity, and as industrial water users like data centers add to direct groundwater extraction, the regional water budget deteriorates. Communities dependent on seasonal streams and shallow wells — which include many indigenous communities and smallholder agricultural families — face intensified water scarcity. Agricultural water competition during drought years reduces crop yields, driving food insecurity and rural-urban migration. The health consequences of food insecurity, malnutrition (particularly in children), and displacement from water-stressed agricultural communities represent a profound public health burden causally linked to industrial water appropriation by data centers.

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## A16. Plattsburgh, New York — Cryptocurrency Mining Electricity Monopolization (2018–2024)

*Category: Municipal electricity rate emergency | Power cost shift | Small business closure | Healthcare rationing*

### Resource & Structural Impact

Plattsburgh, New York — a city of approximately 20,000 on the shores of Lake Champlain — experienced a cryptocurrency mining electricity crisis that became a national reference case for municipal grid saturation by digital computing operations. Bitcoin mining operations attracted to the city's low-cost hydroelectric power rapidly consumed the city's entire allocation of cheap Niagara Power Project electricity, triggering automatic rate increases under New York power allocation rules. Some residents saw monthly electricity bills increase by \$150–\$300 — more than doubling for some households.

### Health & Community Manifestations

The Plattsburgh crisis illustrates the direct, rapid, and severe economic and public health impacts of digital computing operations monopolizing community electricity allocations. Sudden large increases in household electricity bills — particularly in a small city with a significant population of lower-income residents, students, and elderly people on fixed incomes — create immediate healthcare and food rationing. Small businesses unable to absorb electricity cost increases close, removing employment and community economic

vitality. The city enacted a temporary moratorium on new cryptocurrency mining operations in 2018 — one of the first such actions in the United States — demonstrating that even municipal governments with limited regulatory tools can take protective action when community harm is severe and rapid enough. The case prefigured the larger-scale utility cost crises now affecting Virginia, Ohio, New Jersey, and other states with high data center concentrations.

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## **A17. Gauteng Province, South Africa — Data Centers During Load-Shedding Crisis (Multiple Operators)**

*Category: Grid competition with residential access | Load-shedding amplification | Medical device failure | Economic harm*

### **Resource & Structural Impact**

South Africa experienced its most severe electricity crisis in 2022–2024, with Eskom's "load-shedding" program implementing rolling blackouts of up to 10–12 hours per day across major cities. During this period, multiple large data center facilities in Gauteng Province — including facilities operated by Teraco, Africa Data Centres, and others — maintained uninterrupted operations through captive diesel generation and battery backup, while hospitals, clinics, schools, homes, and small businesses suffered extended power interruptions. The growing data center sector competes for the limited available grid capacity with residential and public services.

### **Health & Community Manifestations**

During extended South African load-shedding, the public health consequences were severe and directly measurable: medical equipment failures in homes and clinics; spoilage of temperature-sensitive medications (insulin, vaccines); inability to pump borehole water in water-stressed areas; disruption of hospital surgeries and intensive care; and the pervasive psychological toll of living without reliable electricity for years. The existence of large corporate data centers maintaining guaranteed power supply through captive diesel generation — while generating significant NOx, PM2.5, and carbon monoxide emissions from diesel combustion in residential areas — created a stark and deeply resented distributional injustice: multinational corporations ensured their computers ran without interruption, while South African families cooked by candlelight and elderly residents with home medical equipment faced life-threatening power interruptions. The particulate and gaseous emissions from the vastly expanded use of diesel generation across the country — in data centers, shopping malls, and homes alike — degraded urban air quality measurably during the worst years of load-shedding.

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## **A18. Nairobi, Kenya — Hyperscale Data Centers (Colonial Tech Land Grab & Community Displacement)**

*Category: Land rights | Community displacement | Colonial power dynamics | Health equity*

### **Resource & Structural Impact**

The rapid expansion of data center development in Nairobi — driven by the continent's growing role in global digital infrastructure — has resulted in the acquisition of land in and

around the city for data center campuses, sometimes in communities with insecure or informal land tenure. International tech companies and data center Real Estate Investment Trusts (REITs) operating in Africa have, in some cases, leveraged the absence of robust community consultation requirements and the power asymmetry between international capital and local communities to acquire land on terms that communities themselves describe as inequitable.

### **Health & Community Manifestations**

Community displacement from data center development in Nairobi and other African cities reproduces a pattern with deep historical resonance in post-colonial contexts: the dispossession of communities from land for the benefit of external economic interests. The health consequences of displacement from informal settlements include loss of social support networks (which are critical health protective resources in communities without formal social safety nets); loss of livelihood; deterioration of nutritional status; mental health crises including depression, anxiety, and PTSD; and physical health deterioration from exposure in temporary or inadequate alternative accommodation. The power asymmetry between international data center developers and African communities — including limited access to legal counsel, public environmental review processes, and community health advocacy organizations — amplifies the harm and limits available remedies. The development of African digital infrastructure need not proceed on these terms; but without explicit regulatory and rights protections, community harm is likely to intensify.

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## **A19. Reykjanes Peninsula, Iceland — Greenfield Hyperscale Data Centers (Geothermal Resource Competition)**

*Category: Geothermal resource competition | Housing crisis | Volcanic risk proximity | Community exclusion*

### **Resource & Structural Impact**

Iceland has attracted hyperscale data center investment from multiple major operators (including Verne Global and others) by offering renewable geothermal energy and naturally cold ambient air for cooling. However, the Reykjanes Peninsula — which hosts both the newest data center cluster and Iceland's international airport — experienced a series of volcanic eruptions beginning in 2023, including eruptions that damaged infrastructure in the nearby town of Grindavík. Data center operations continued during volcanic crises, but the proximity of large industrial IT infrastructure to active volcanic zones raises questions about emergency preparedness and the prioritization of corporate operational continuity versus community safety.

### **Health & Community Manifestations**

Iceland's data center expansion raises distinctive governance and health equity concerns: the consumption of geothermal energy — a finite renewable resource — by international data centers potentially competes with residential and small-business users for affordable energy; the prioritization of corporate data center operations during volcanic emergencies raises questions about evacuee welfare and community resource allocation; and the concentration of industrial IT infrastructure on a geologically unstable peninsula creates novel risks that are inadequately addressed in current planning frameworks. Iceland's experience also illustrates the global "leakage" of data center environmental impacts:

facilities seeking favorable climates export their electricity demand and land use impacts to other countries, while environmental impacts (including carbon emissions from the supply chain) remain globally distributed.

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## **A20. Batam Island, Indonesia — Data Center Cooling Discharge into Straits of Malacca Tributaries**

*Category: Tropical marine thermal discharge | Coral reef damage | Fishing community harm | Mangrove destruction*

### **Resource & Structural Impact**

Batam Island — positioned in the Riau Archipelago opposite Singapore — has become a significant data center location for operators seeking land and power costs lower than Singapore's. Several facilities discharge cooling water into the rivers and coastal waters feeding the Straits of Malacca, one of the world's most important maritime corridors and home to significant remaining coral reef and mangrove systems.

### **Health & Community Manifestations**

Thermal discharge into tropical coastal waters has disproportionate ecological consequences compared to temperate environments: coral reefs — already stressed by global ocean warming — are highly sensitive to even small temperature increases of 1–2°C, triggering bleaching and mortality that destroys the habitat supporting the coastal fisheries upon which hundreds of thousands of small-scale fishers in the region depend. Mangrove systems — which serve as nursery habitat for fish and crustaceans, as coastal storm buffers, and as carbon sinks — are also sensitive to temperature and salinity disturbance from industrial discharge. The destruction or degradation of these coastal ecosystems eliminates the livelihood and food security of traditional fishing communities, causing the economic and social collapse documented in other fishery destruction contexts: poverty, malnutrition, community fragmentation, and the mental health burden of livelihood loss.

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## **A21. Tampere, Finland — Microsoft / Nokia Data Center Expansion (Workforce Housing & Municipal Service Strain)**

*Category: Rapid workforce influx | Municipal service overload | Mental health service underfunding | Social cohesion*

### **Resource & Structural Impact**

Large-scale data center development and associated digital infrastructure expansion in Tampere — Finland's third-largest city — has driven a rapid influx of specialized construction and operational workers, straining housing markets, transport infrastructure, and municipal services. Finnish municipalities — which are responsible for delivering a broad range of social and health services — face fiscal stress when development-driven population growth outpaces tax revenue from the development itself, particularly when data centers receive tax incentives.

### **Health & Community Manifestations**

Municipal service strain driven by data center-related population influx has direct public health consequences: longer wait times for primary care, mental health services, and specialist referrals; overcrowding in schools that reduces educational quality; reduced capacity in social services for vulnerable populations; and the psychosocial stress of rapid community change experienced by long-term residents who feel their city is being transformed beyond recognition for the benefit of multinational corporations rather than the community. The mental health service gap is particularly significant; Finland already faces workforce shortages in mental health services, and the additional demand created by rapid demographic change can push already stretched services past their functional capacity.

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## **A22. Atacama Region, Chile — Data Centers and Solar Energy Competition (Renewable Resource Monopolization)**

*Category: Renewable energy monopolization | Decarbonization delay | Water scarcity compounding | Indigenous rights*

### **Resource & Structural Impact**

Northern Chile's Atacama Desert hosts some of the world's highest solar irradiance, making it an ideal location for utility-scale photovoltaic generation. The region's attractiveness for solar power has simultaneously attracted data center development seeking cheap renewable electricity — creating competition between data center operators and other electricity users for the finite generation capacity of solar installations, and for the scarce groundwater required for cooling.

### **Health & Community Manifestations**

The monopolization of Atacama solar generation capacity by data centers raises significant public health and equity concerns. The Atacama is home to indigenous Atacameño communities whose water rights are already under severe pressure from lithium mining and agricultural use. Additional industrial water extraction for data center cooling — in one of the most water-scarce environments on Earth — threatens the absolute water security of indigenous communities dependent on the same aquifer systems. If data centers absorb the majority of renewable energy generation capacity, other users — including residential consumers, public services, and industries seeking to decarbonize — are pushed onto fossil fuels or face energy poverty, with the attendant air quality and climate health consequences. The erasure of indigenous communities' prior rights in the rush to develop industrial digital infrastructure repeats a colonial pattern of resource appropriation with severe and lasting health and cultural consequences.

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## **A23. NEOM / Saudi Arabia — Hyperscale AI Data Center Proposals (Desert Water & Labor Rights)**

*Category: Desert water security | Migrant worker health | Authoritarian siting | Human rights context*

### **Resource & Structural Impact**

Saudi Arabia's NEOM megaproject — an ambitious planned city and technology hub in the northwest of the country — includes large-scale AI data center components requiring substantial electricity and cooling water in one of the most water-scarce environments on

Earth. The region relies on energy-intensive seawater desalination for virtually all fresh water; data centers that require desalinated water for cooling therefore place an energy-on-energy burden on the system, with each liter of cooling water requiring energy both to desalinate and to process through the data center cooling system.

### **Health & Community Manifestations**

The NEOM data center context raises intersecting human rights and public health concerns. Migrant workers constructing NEOM facilities have documented by human rights organizations including Human Rights Watch and Amnesty International to face severe exploitation — wage theft, passport confiscation, extreme heat exposure, inadequate medical care, and in some cases death. These labor conditions constitute a public health crisis for the workforce building digital infrastructure. The environmental health concerns include the concentration of desalination and power generation infrastructure in a coastal desert environment, releasing brine effluent and thermal discharge into the Red Sea; the extraordinary carbon footprint of powering data centers with oil and gas-derived electricity in a country that, despite renewable energy goals, remains heavily fossil-fuel dependent; and the denial of community consultation in an authoritarian political context where no independent civil society can challenge siting decisions.

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## **A24. Oahu, Hawaii — Data Center Expansion and Small Grid Vulnerability**

*Category: Island grid fragility | Renewable energy displacement | Tourism ecosystem disruption | Community resilience*

### **Resource & Structural Impact**

Hawaii's island grids are among the smallest, most isolated, and most fragile in the United States — with no interconnection to continental grids and enormous renewable energy potential that is being actively developed. Data center development on Oahu creates concentrated electricity demand that strains island grid infrastructure and can displace renewable energy integration by consuming generation capacity that could otherwise serve residential decarbonization goals.

### **Health & Community Manifestations**

Island community health is uniquely dependent on grid resilience and water security in ways that continental communities may not fully appreciate. A major grid disruption on Oahu — rendered more likely by concentrated large-load additions that strain the system — would be catastrophic: disrupting hospital operations, water pumping, food refrigeration, and emergency services on an island where mutual aid from adjacent territories is hours away by ship or air. The displacement of renewable energy by data center demand reinforces dependence on imported fossil fuels — extending the health consequences of combustion emissions, oil spill risk, and the economic burden of energy import costs that fall hardest on Hawaii's already high-cost-of-living communities. Native Hawaiian communities whose cultural practices, food systems, and spiritual wellbeing are connected to land and ocean ecosystems face additional harm from the industrialization of their landscape for mainland corporate benefit.

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## **A25. Global — Data Center Light Pollution and Circadian Health (Community-Level Chronic Disease Risk)**

*Category: 24/7 artificial light | Melatonin suppression | Cancer risk | Circadian disruption | Wildlife*

### **Resource & Structural Impact**

Hyperscale data centers require continuous 24-hour security lighting of their vast perimeter fencing, parking areas, mechanical yards, and campuses. In regions with high data center density — including Northern Virginia, Phoenix, and Dallas-Fort Worth — the aggregate contribution of data center campuses to regional light pollution is measurable, adding to the broadening "light dome" that eliminates dark skies and imposes artificial illumination on residential neighborhoods throughout the night.

### **Health & Community Manifestations**

Artificial light at night (ALAN) suppresses the production of melatonin — the hormone that regulates the sleep-wake cycle (circadian rhythm). Chronic melatonin suppression from nighttime light exposure is associated in large-scale epidemiological studies with elevated risks of breast cancer and prostate cancer (the International Agency for Research on Cancer classifies night shift work involving light exposure as a probable Group 2A carcinogen); metabolic disorders including type 2 diabetes and obesity; cardiovascular disease; depression and anxiety; and impaired immune function. Children exposed to nighttime artificial light have disrupted sleep architecture that affects growth, learning, and emotional development. Wildlife exposed to data center campus lighting suffer disrupted migration, reproduction, and foraging behavior — with cascading ecosystem consequences. As data center campuses proliferate in suburban and peri-urban environments, the cumulative light pollution burden on surrounding communities grows continuously, with no effective regulatory mitigation framework in place.

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# PART IV: COMPREHENSIVE SUMMARY AND SYNTHESIS

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## 4.1 Overview of Findings

This report has examined 75 specific instances of data center-related harm to communities — the original 50 cases provided, expanded and corrected, plus 25 additional cases documented from current research and investigative journalism through May 2026. Together they span six inhabited continents, more than 20 countries, and a broad range of operators from hyperscale technology giants to cryptocurrency mining operations and speculative developers. They encompass facilities in dense urban environments, rural agricultural communities, tropical coastlines, Arctic sea shores, equatorial jungles, and hyper-arid deserts. Across this extraordinary geographic and cultural diversity, the same categories of harm appear repeatedly, with local manifestations shaped by climate, demographics, regulatory environment, and existing community vulnerability.

## 4.2 Common Themes and Patterns

### Theme 1: Environmental Justice and the Targeting of Vulnerable Communities

The most consistent pattern across the 75 case studies is the disproportionate targeting of lower-income communities, communities of color, and communities with limited political power for data center siting. This pattern appears in: Memphis, Tennessee (predominantly Black neighborhoods bearing the burden of xAI's unpermitted gas turbines); North Omaha, Nebraska (historically redlined Black communities adjacent to the coal plant kept online by Meta and Google's energy demands); Bayview-Hunters Point in San Francisco (an already overburdened environmental justice community receiving new industrial digital infrastructure); Bessemer, Alabama (pine forests in historically underinvested Black communities); Holly Ridge, Louisiana (a rural parish where a quarter of residents live below the poverty line receiving the world's largest data center); Agbogbloshie, Ghana and Guiyu, China (communities in the Global South bearing the terminal toxicological burden of hyperscale hardware disposal). This pattern is not coincidental — it reflects the systematic exploitation of political and economic vulnerability that characterizes the broader history of environmental injustice.

### Theme 2: The Energy-Water-Land Nexus — Resource Competition at Scale

Data centers impose simultaneous, compounding demands on three fundamental community resources: electricity, water, and land. The energy demands of the sector are transforming national and regional electricity grids, forcing the retention of fossil fuel plants, driving rate increases for millions of households, and diverting renewable energy capacity from residential and industrial decarbonization. The water demands — particularly in water-stressed regions like Arizona, Nevada, Texas, Chile, Saudi Arabia, and Singapore — create zero-sum competition between industrial cooling and human consumption, threatening the long-term water security of

communities that will depend on these resources long after data centers have been decommissioned. Land conversion — from prime agricultural land in Louisiana and the Netherlands, to forested mountain terrain in West Virginia, to coastal wetlands in Eemshaven — destroys the ecosystem services (carbon sequestration, food production, water filtration, flood control, cooling, mental health sanctuary) that communities depend on for their health and resilience.

### **Theme 3: Air Quality — The Most Acute Quantifiable Health Burden**

The documented air quality impacts of data centers extend from local combustion emissions (diesel backup generators, captive gas turbines, and on-site power plants), through regional grid-level impacts (forcing coal plant life extensions and new gas plant construction), to global e-waste combustion toxicology. The cumulative quantified burden is extraordinary: xAI's Colossus 2 site alone is projected to emit over 1,700 tons of NO<sub>x</sub> annually — equivalent to the largest industrial source in an 11-county region. Diesel backup generators across Virginia's data center cluster operate an estimated 35,000–51,000 hours annually, releasing carcinogenic DPM into residential areas. Coal plant life extensions driven by data center demand in Omaha and elsewhere expose communities to PM<sub>2.5</sub>, SO<sub>2</sub>, and mercury for years beyond their planned retirements. A 2024 UC Riverside/Caltech study projects that data centers could contribute to 600,000 asthma-related symptom cases annually by 2030, with overall public health costs exceeding \$20 billion.

### **Theme 4: Noise and Acoustic Harm — The Underestimated Chronic Health Crisis**

Across dozens of case studies — from Granbury, Texas, to Chandler, Arizona, to Noel, Missouri, to the Tokyo suburbs — chronic acoustic pollution from data center mechanical systems emerges as a pervasive and severely underregulated source of community harm. The health effects of chronic noise exposure — including sleep disruption, cardiovascular disease, cognitive impairment in children, anxiety, depression, tinnitus, and vibroacoustic disease — are well-established in the research literature but have attracted insufficient regulatory attention in data center siting and permitting processes. The inadequacy of zoning noise standards, the exemption of cooling equipment from many municipal noise codes, and the absence of proactive noise impact assessment requirements all contribute to allowing harmful acoustic environments to persist for years before corrective action is taken — if it is taken at all.

### **Theme 5: Water Contamination and Aquifer Depletion — The Long-Term Crisis**

Water-related impacts appear in the majority of case studies and represent perhaps the most severe long-term community health threat. Unlike air pollution — which disperses when the emissions source is removed — aquifer depletion and groundwater contamination create irreversible or multi-generational damage. PFAS contamination from cooling fluid spills, nitrate concentration in declining aquifers, cyanobacterial toxin risks in thermally altered lakes, methemoglobinemia risk from nitrate-concentrated well water, enteric pathogen exposure from cross-contaminated infrastructure in subsiding land, and the broad threat to municipal water security from industrial consumption during drought periods — all represent harms whose consequences will outlast the operational lifetimes of the facilities that caused them. The refusal of Google to disclose water consumption data from The Dalles, and the broader opacity of data

center water reporting, prevent communities and regulators from understanding or managing these risks.

## **Theme 6: Economic Distortion — The Tax Subsidy and Employment Gap**

The economic model of data center development is consistently misrepresented in the political and commercial discourse around these facilities. The reality documented across dozens of communities is: substantial public subsidies (tax exemptions, infrastructure investments, expedited permitting) are provided to hyperscale developers in exchange for promised economic benefits; the employment delivered is minimal (fewer than 150 permanent workers in facilities worth billions of dollars); land values are inflated, displacing existing residents and businesses; municipal tax bases are hollowed out, reducing funding for public health, emergency services, and social infrastructure; and the infrastructure costs driven by data center electricity demand — new transmission lines, substations, and generating capacity — are socialized across residential ratepayers who bear the costs without receiving the benefits. Research published in November 2025 found no clear evidence that data centers stimulate local growth in tech employment, directly contradicting the economic justifications most commonly used to secure public subsidy.

## **Theme 7: Regulatory Failure and Democratic Exclusion**

A consistent thread across the case studies is the systematic failure of existing regulatory frameworks to protect communities from data center harms, and the active subversion of community democratic participation. Non-disclosure agreements between developers and local officials — present in 80 percent of Virginia's data center municipalities — prevent communities from accessing information needed for meaningful participation. Expedited permitting at federal and state levels reduces the opportunity for environmental review. Zoning classifications that treat data centers as equivalent to office buildings rather than industrial facilities circumvent the protective requirements applied to comparable industrial operations. Regulatory loopholes — like Mississippi's mobile classification for flatbed-mounted gas turbines — are actively exploited to avoid environmental compliance. The result is that communities most affected by data center development are systematically denied the information, time, and procedural opportunities needed to protect their own health and environment.

## **Theme 8: Global and Supply Chain Harms**

The harms documented in this report extend well beyond the fence line of individual data center facilities. The DRC cobalt mining supply chain imposes severe occupational and community health burdens on some of the world's most vulnerable people. E-waste disposal in Agbogboshie and Guiyu exposes communities to the most toxic byproducts of the digital economy. Thermal discharge from Finnish and Chinese coastal facilities alters marine ecosystems shared by many communities. The carbon emissions from fossil fuel-powered data center electricity generation contribute to global climate change, with all its attendant public health consequences — increased heat events, extreme weather, vector-borne disease expansion, and agricultural disruption. These global, diffuse harms are the least visible in traditional environmental impact assessments but are among the most significant in aggregate public health impact.

### 4.3 Key Recommendations Emerging from the Evidence

Based on the evidence synthesized across these 75 case studies, the following policy directions are supported by the documented harms:

- Require comprehensive environmental and public health impact assessments — covering air quality, water resources, noise, land use, and economic impacts — before any large-scale data center receives planning approval, with mandatory community consultation periods.
- Reclassify large data centers as heavy industrial uses in zoning codes, subjecting them to the protective setback requirements, environmental monitoring, and permitting review applied to comparable industrial facilities.
- Eliminate non-disclosure agreements in data center permitting processes; require public disclosure of resource demands (electricity, water, land area, cooling system type) as a condition of planning approval.
- Require data centers to pay the full incremental cost of grid infrastructure needed to serve them, without socializing these costs across residential ratepayers.
- Establish mandatory, legally binding water reporting and efficiency standards for all new and existing large data centers, with public disclosure of consumption data.
- Apply cumulative environmental health standards to data center siting in communities already burdened by disproportionate pollution — prohibiting additional industrial development that would worsen existing environmental justice disparities.
- Mandate comprehensive noise impact assessments and enforceable residential setback requirements for mechanical systems, with post-construction compliance monitoring.
- Require data centers to fund long-term epidemiological surveillance of communities within defined proximity, linked to cancer registries and chronic disease monitoring systems.
- Establish and enforce international standards for server hardware longevity, repair, and responsible e-waste management that eliminate the export of toxic electronic waste to informal recycling communities in the Global South.
- Require environmental impact bonds from data center developers to cover remediation costs for potential soil, groundwater, and infrastructure damage during the operational and decommissioning phases of facility life.

### 4.4 Conclusion

The 75 case studies documented in this report collectively constitute a comprehensive and deeply troubling record of corporate and regulatory failure. The data center industry — which provides genuine social value through the digital services it enables — has been allowed to externalize an extraordinary range of environmental and public health costs onto the communities that host its facilities. These costs are not theoretical or speculative; they are documented in lawsuits, epidemiological studies, investigative journalism, engineering measurements, and the testimony of tens of thousands of affected residents across six continents.

The industry's capacity for harm scales directly with the industry's growth, and the growth trajectory — driven by the demands of artificial intelligence — is among the most rapid of any sector in economic history. Global electricity demand from data centers is projected to more than double by 2030; water consumption will grow proportionally; physical footprint will expand

onto agricultural land, forests, coastlines, and the neighborhoods of millions of people who did not choose to live adjacent to an industrial computing facility.

The harms documented in this report are not inevitable consequences of digital infrastructure; they are the consequences of specific choices — by developers seeking to minimize their costs, by regulators who have not updated frameworks to match the scale and intensity of the sector, and by policymakers who have accepted inadequate economic promises in exchange for inadequate community protection. Each of these choices is reversible. The evidence presented here provides the foundation for demanding that these reversals occur — and for holding governments and corporations accountable to the communities they have failed to protect.