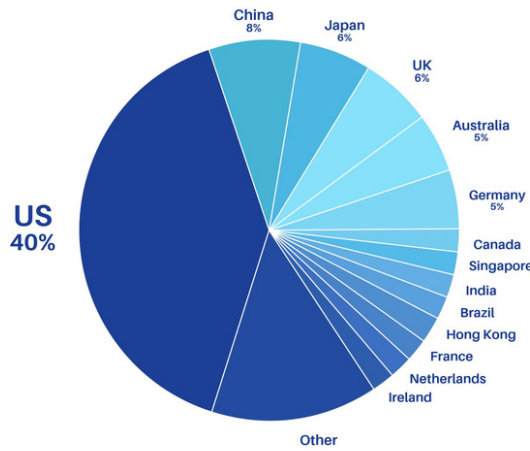**NPCA**
777 6th St NW STE 700, Washington,
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DATA CENTERS

What is a data center?

Data centers are large warehouses that store computers and data. They are generally owned by the largest and wealthiest corporations in the world like Amazon, Microsoft, and Google. Our digital lives and security are stored in these warehouses[1].

Hyperscale Data Center Operators
Data Center Locations By Country- December 2018

China 8%
Japan 6%
UK 6%
Australia 5%
Germany 5%
Canada
Singapore
India
Brazil
Hong Kong
France
Netherlands
Ireland
Other
US 40%

Main Concerns

Energy Needs:
Data Centers consume 2% of total in U.S energy consumption[2]

Water Usage:
Data centers use immense amounts of water and threaten surrounding water quality

Community Impact / Noise:
Communities are disrupted with high noise levels and hazardous noise pollution emitted by centers

The fight

Data centers are environmentally problematic in a variety of ways. Specifically, data centers consume as much energy as 25,000 households per year and millions of gallons of water a day[3]. They also disrupt communities with noise and health violations. Data centers can threaten national parks and drinking water quality.

The solution

Sustainable development in data centers can occur before or after the creation of the warehouse. Improving cooling methods and data server utilization can significantly improve negative impacts data centers have on the environment. This can reduce energy consumption, minimize excess water usage, and curb greenhouse gas emissions.

What can you do?

Educate yourself and others on the effects data centers have on the larger environment and nearby communities. Write to your local legislators demanding regulatory policies over data centers. Follow your local elections and be aware and conscious of decisions on data centers and data center regulations.

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NATIONAL PARKS CONSERVATION ASSOCIATION

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WATER CONCERNS 💧💧

WATER

Data centers use up to 3-5 million gallons of water a day. That is equivalent to what a city of 30,000 to 50,000 people uses in a year[1].

Why do data centers use so much water?
Water is used to remove heat released as computers process and store data to prevent them from failing. Oftentimes, there is a tradeoff: centers either consume less water and use more energy or consume more energy and use less water[2].

Why isn't this a widely known problem?
According to water management data for 122 companies operating data centers, only 16% disclosed information about plans to manage water-related risks. Communities are left unaware of the dangers of water run-off into local ecosystems and drinking water sources[3].

💧 Salinity

Salinity is the increase of salt in water sources. The salinity problem is partly due to development and stormwater issues. There is a **vicious cycle of data centers consuming water from rivers linked to watersheds and then releasing polluted water from cooling systems back to the river**, affecting the taste and the color of drinking water. The high salinity levels have also affected the ecosystem! Many fish crucial to maintaining a habitable environment are lost as salt-tolerant invasive species survive the change[4].

Run-off

Large-scale construction of data centers will increase sediment loss, making it more difficult for water to pass through surfaces. As a result, stormwater runs off into watersheds and disrupts the balance of local marine life. **Run-off can also damage public and private property, pollute water sources, threaten drinkable water, and kill fish and marine life[5].**

❤ Health Impact

The CDC has cited cooling towers as the main cause of legionnaires disease. **Legionnaires disease** is a type of pneumonia contracted by inhaling small droplets of water in the air containing Legionella bacteria. According to the CDC, approximately 10,000 U.S. citizens were infected with this disease in 2018. The bacteria grows in poorly maintained cooling towers. Data centers must conduct frequent inspections of their water storage facilities and decrease their reliance on cooling towers. To combat this issue, Data centers have used chlorine and bromine-based chemicals, however, exposure to these chemicals can cause psychosis and other neurological disorders[6].

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ENERGY

Why are we worried?

Data centers use A LOT of energy. In 2020 it is estimated that data centers are responsible for 1-2% of worldwide annual energy consumption. That may not seem like a lot, but that equates to over 6 million U.S. households. The data center industry is growing exponentially with 18 million servers worldwide and 7 million added within just the past 14 years[1].

Energy consumption is a **huge element of the negative environmental and economic effects of data centers.** By encouraging builders and current data centers to focus on targeting these areas, they will automatically become more sustainable.
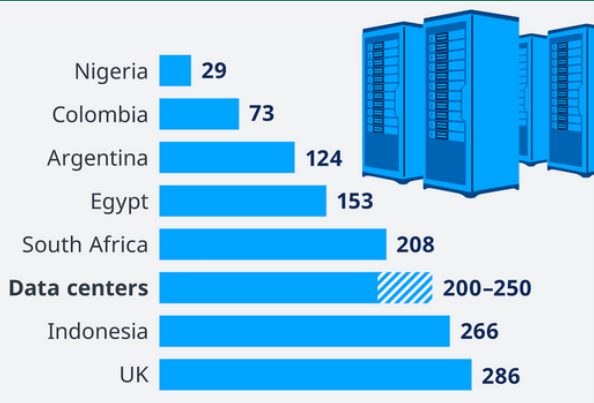
FAST FACT

Just ONE data center uses as much energy as 25,000 households and may consume 100-200x as much energy as a standard office space[2].

The "Trilemma"

Data center consumption is complicated... you either consume more energy and less water or more water and less energy. Using less energy is producing less noise but still using more water. There's a trade off[3]!

Data Centers use more electricity than entire countries

Country / Category	TWh
Nigeria	29
Colombia	73
Argentina	124
Egypt	153
South Africa	208
Data centers	200–250
Indonesia	266
UK	286

Domestic electricity consumption of selected countries vs. data centers in 2020 in TWh[4]

Energy Needs

The use of energy in data centers is only one-half of the story. We have to consider where energy is coming from and the environmental and developmental impacts the sourcing has on the community. Even with renewable energy, excluding transmission lines, there are huge land costs associated with the energy needed to power typical data centers. Even with claims of renewable energy use, most data centers take directly from the power grid. A shift to renewable energy would require large land purchases. After data centers are developed, millions of acres of green space must be turned into solar or wind farms to power data centers. Data centers will either overload local power grids or encroach on green space to create their own power farms.

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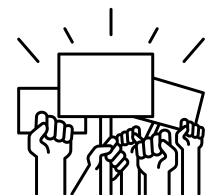
COMMUNITY IMPACT AND NOISE

NOISE POLLUTION

Noise in a data center can range from 80 - 96 decibels near server areas. For employees, this is the same as listening to a power mower for an entire work week.[1]

Why are data centers so noisy?
There are many noise makers in data centers, however the biggest is HVAC systems that average a noise level of 70 decibels.[2] However, average noise levels around server areas have reached 92 decibels, causing a risk of hearing damage.

Why is data center noise a problem?
High noise levels constitute employee health concerns, as decible levels violate OSHA regulations. Communities label noise pollution as "**acoustic attacks**," as a constant hum becomes psychological, harming the overall health of the community.

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Legality

Data center noise pollution is unregulated. Community contests over the "right" to quiet have little evidence to reference with noise pollution falling just below noise intolerance levels of local ordinances. For residential areas, ordinances limit noise to a decibel level during the daytime that data centers exceed. Loopholes, such as exempting air conditioning units from the limit, allow data centers to emit noise pollution. Technically, data centers violate no laws.

Health Impact

Noise within a data center can range from 80 - 96 decibels near server areas. Violations of safety codes appear when comparing these decibels to OSHA regulations. When data centers exceed noise levels of 80 decibels, OSHA warns of risking "Noise-Induced Hearing Loss."[3] Thus, noise levels in data centers are not suitable for work environments.

Time to reach 100% noise dose	Exposure level per NIOSH REL	Exposure level per OSHA PEL
8 hours	85 dBA	90 dBA
4 hours	88 dBA	95 dBA
2 hours	91 dBA	100 dBA
1 hour	94 dBA	105 dBA
30 minutes	97 dBA	110 dBA
15 minutes	100 dBA	115 dBA

OSHA Occupational noise exposure regulations[4]

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