A 100 MW+ AI campus can create **real, continuous noise pollution**, but it comes from a very specific set of systems—not the servers themselves. The noise is mostly industrial in nature and can matter a lot for nearby communities, especially in rural or suburban areas where these campuses are often built.

Cv'80dB at the source, the noise from a data center is generally audible for 207"vq"407"o kpu away. The sound carries exceptionally far because of the constant low-frequency "hum" generated by cooling systems, air handlers, and backup generators, which does not easily degrade.

🔊 Where the noise actually comes from

1. Cooling systems (the biggest source)

Modern AI data centers dump enormous amounts of heat, so cooling is constant and aggressive.

Dry cooling farms (very loud)

If the site uses air-cooled heat rejection (common in “no-water” designs):

- Thousands of large axial fans
- Constant high-speed airflow
- Big heat exchanger arrays outdoors

These can create continuous broadband noise similar to:

- Highway traffic
- Industrial HVAC plants
- Aircraft-style fan hum at close range

At 100 MW scale, this becomes a **permanent outdoor industrial sound field**.

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2. Cooling towers (if used instead of dry cooling)

If the campus uses evaporative cooling towers:

- Large fans at the top of towers
- Falling water inside the structure
- Air movement through fill media

Noise characteristics:

- Lower frequency “roar”
- Continuous background hum
- Occasional splashing/flow variation sounds

Cooling towers are often quieter than dry coolers, but still noticeable at scale.

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3. Backup generators

AI campuses rely heavily on diesel or gas generators for outages and testing.

Noise sources:

- Engine combustion
- Exhaust stacks
- Load testing events (very loud, intermittent)

During testing:

- Entire generator yards can sound like construction zones or industrial plants

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4. Electrical equipment (transformers, substations)

Large campuses require on-site substations.

These produce:

- Constant low-frequency “hum” (50/60 Hz)
- Magnetic vibration noise
- Occasional switching sounds

Usually not loud individually, but noticeable when scaled across many units.

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5. Construction noise (temporary but intense)

Before operation, a 100 MW+ build includes:

- Pile driving

- Excavation
- Crane operations
- Road building
- Substation installation

This phase can last months to years and often generates the **most severe noise complaints**.

📏 How loud are we talking?

Typical ranges near a large AI campus:

Source	Approx. Noise Level
Dry coolers (near field)	70–85 dB
Cooling towers	60–75 dB
Generators (testing)	80–100+ dB
Substations	40–60 dB (steady hum)

For context:

- 60 dB = normal conversation
- 80 dB = heavy traffic
- 100 dB = loud factory or chainsaw range

🌎 Why AI campuses amplify noise concerns

1. Continuous operation

Unlike many industrial sites:

- AI workloads run 24/7
- Cooling never stops

So the noise is **constant, not intermittent**.

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2. High-density cooling demand

AI racks (especially from systems like NVIDIA GPU clusters) can exceed:

- 80–150 kW per rack

That means:

- More heat
- More cooling
- More fans running simultaneously

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3. Location mismatch problem

These campuses are often built in:

- Rural or semi-rural areas
- Agricultural zones
- Emerging tech corridors (e.g., parts of Georgia or Texas)

Residents in these areas may not expect:

- Industrial-scale fan noise
- 24/7 humming
- Generator test cycles

🧠 Human impact

Noise pollution from large campuses can lead to:

- **Sleep disturbance (night-time low-frequency hum)**
- **Stress and annoyance**
- **Reduced property desirability**
- Community opposition to expansion

Low-frequency industrial noise is particularly hard to block with walls or vegetation.

🧯 How companies try to reduce noise

1. Acoustic enclosures

- Surrounding generators and chillers with sound-dampening structures

2. Fan optimization

- Larger, slower-spinning fans (lower noise per airflow)
- Variable-speed controls

3. Site buffering

- Large setbacks from residential areas
- Earth berms and tree buffers

4. Equipment layout design

- Positioning noisy systems away from property boundaries

5. Hybrid cooling systems

- Reducing reliance on constant high-speed dry cooling

Companies like Microsoft and Google increasingly design campuses with acoustic impact in mind as part of permitting requirements.

⚖️ Tradeoff reality

Noise is tightly linked to efficiency choices:

Goal	Noise Impact
Dry cooling (no water)	High noise
Evaporative cooling	Moderate noise
Liquid cooling (direct-to-chip)	Lower noise inside facility, but still external heat rejection noise
Maximum efficiency	Often higher acoustic footprint

📜 Bottom line

A 100 MW+ AI campus can absolutely create **industrial-scale noise pollution**, mainly from:

- Cooling systems (dominant source)
- Backup generators
- Electrical substations
- Construction activity

It is typically:

- Continuous (not just daytime)
- Low-frequency (hard to block)
- Comparable to light industrial zones or small power plants

And as AI campuses grow, **noise is becoming a major permitting and community acceptance issue**, alongside water and electricity use.