

Woodbury County Zoning Commission Meeting Minutes

SPECIAL MEETING – TOWN HALL – SLOAN, IA

Date: August 31, 2026

Time: 7:00 PM

Location: Sloan Community Hall, 423 Evans Street, Sloan, IA 51055

MEETING VIDEO:

For specific content of this meeting, refer to the recorded video/audio on the Woodbury County Zoning Commission “Committee Page” on the Woodbury County website.

YouTube Direct Link: <https://www.youtube.com/watch?v=zE2JVJAYyOQ>

County Website Link: https://www.woodburycountyiowa.gov/committees/zoning_commission/

Attendees

Commissioners Present: Christine Zellmer Zant – Chair; Tom Bride – Vice Chair; Corey Meister; Steve Corey; Jeff Hanson (Remote/Phone)

Staff Present: Daniel Priestley – Zoning Coordinator; Ryan Erickson (camera/recording support)

Supervisor(s) Present: Daniel Bittinger (in person); Kent Carper (Remote)

Public Attendees (sign-in / present): Peggy Hanner, Richard Hanner, Kay Ping, Kathleen Stroup, Mary Herbst, Duane Herbst, Sue Wager, Sandy Silbernagel, Victoria Eliason, Allen Silbernagel, Dan Bittinger, Tambrey Groves, Gwen Brink, Roger Brink, Chad Brady, Mary Brady, Denise Jensen, Janet Yanack, James Yanack, Kara Stotz, Suzette Harrell, Jerri Moore, Chad Small, Kathy Skidmore, Rick Turkles, Don Lord, Angi Heck, Tony Heck, Jody House, Brittney Wilson, Ruth Groth, Amy Buck, Julie Grees, Diane Peterson, Harry Buck, Roy Skinner, Justin Mitchell, Ashley Wolfe, Mitchell Peterson, Deb Hatton, Linda Nordstrom, Larry Johnson, Mary Johnson, Scott Hostetler, Melissa Hostetler, Jeff Redmon, Kelly Mulvihill, Brenda Oestmann, Cole Christian, Bryan Kerr, Kelly Parscell (Keely Purscell), Emmy Scott (Margaret Scott), Randy Bartels, Denise Burkhart, James Loomis, Veronica Stewart, Jodi Nelson, Manape LaMere, Claudia Stensland, and additional members of the public who signed the attendance sheet.

Call to Order

The Woodbury County Zoning Commission special town-hall meeting was called to order at approximately 7:00 PM on August 31, 2026, at the Sloan Community Hall. Chair Chris Zellmer Zant opened the meeting, welcomed those in attendance, and reviewed standard Commission procedures. The meeting was audio-taped and minutes prepared. Attendees were asked to turn off cell phones or set them to vibrate and to complete the attendance sheet at the front table. Procedures for public comment (three-minute limit with a 30-second grace period, statement of name and address, respectful and non-repetitious comments) were explained. The Chair and Commission noted that this was a listening/input session focused on data-center permitting in the unincorporated areas of Woodbury County only.

Roll Call

Roll call was conducted. All five Commissioners were present: Christine Zellmer Zant, Tom Bride, Corey Meister, and Steve Corey in person; Jeff Hanson participated by telephone. A full Commission was present. Supervisor Daniel Bittinger was present in person; Supervisor Kent Carper participated remotely.

Public Comment on Matters Not on the Agenda

No public comments were offered on matters not listed on the agenda at the opening of the meeting.

Approval of Previous Meeting Minutes

The Commission reviewed the minutes from the previous regular meeting held July 27, 2026.

A motion was made by Corey Meister to approve the minutes of the July 27, 2026, meeting. The motion was seconded by Steve Corey. All in favor said “aye.” No opposition. The motion carried (5-0).

ITEM(S) OF BUSINESS – PUBLIC TOWN HALL MEETING TO SEEK INPUT FROM THE PUBLIC ABOUT THE PERMITTING PROCESS OF DATA CENTERS IN UNINCORPORATED WOODBURY COUNTY (ACTION / INFORMATION)

Zoning Coordinator Daniel Priestley provided extensive background. He explained that the Board of Supervisors had directed the Zoning Commission to study industrial data centers and develop a recommendation regarding data centers. A one-year moratorium on data-center applications in the unincorporated area had been instituted to allow orderly public input and analysis. The Commission’s role is to collect information and ultimately recommend ordinance amendments or other measures to the Board of Supervisors. Priestley emphasized that the town halls and any resulting regulations apply only to the unincorporated areas under county zoning jurisdiction; incorporated cities (including Salix) regulate their own zoning independently. He displayed and discussed the Woodbury County Comprehensive Plan 2040 Future Land Use Map, highlighting the agricultural character of most of the county and the designated industrial area south of Sergeant Bluff / along the I-29 corridor near the Missouri River. He stressed the importance of the comprehensive plan, the land-use summary table, conditional-use procedures, protection of public health/safety/welfare, and the need for robust public data. He invited written submissions by email (dpriestley@woodburycountyiowa.gov) or in person at any time during the process. Additional town halls were announced for Moville (September 21, 2026) and Salix (November 9, 2026), with possible further meetings as needed.

A letter/comments submitted by the Winnebago Tribe of Nebraska were received into the record by a motion from Corey Meister, a second from Steve Corey, and a unanimous voice vote (5-0).

The floor was then opened for public comment limited to three minutes per speaker (with a short grace period of 30 seconds). Speakers were asked to state their name (and address when possible) for the record. The following individuals spoke in the order listed below. When a person spoke more than once, each appearance is shown separately in sequence.

Public Comments – Speakers in Order of Appearance

1. Denise Jensen

- Identified herself as president of a local Sloan-area group.
- Expressed confusion regarding the respective roles of the County Zoning Commission (unincorporated areas) versus the City of Salix Zoning Commission.
- Stated she had reviewed county zoning ordinances (agriculture, limited industrial, residential, general industrial).
- Recommended that large data-center / factory / storage facilities be placed only in a heavy-industrial district rather than general industrial, citing proximity to major highways (old

Highway 75), moderate impact standards, and the need to keep such uses away from homes and retail.

- Called for a dedicated ordinance specific to data centers rather than vague amendments.
- Stressed the need for transparency; stated the process to date had not been transparent.
- Raised concerns about water usage, noise, light, vibration, and endangered species; insisted these issues must not be omitted from any ordinance.
- Urged that data-center developers be slowed down and held accountable; stated rural areas should not be pushed around.
- Indicated she would clean up her notes and submit them for the public record.

2. Eleanor Fetterman

- Called for a thorough investigation by the Sheriff's Department into the "weaponization" of data centers against constitutional rights.
- Requested Freedom of Information Act (FOIA) requests on multi-level NDAs and all communications between data-center interests, electric companies, mayors, and board members in Woodbury County and beyond.
- Described data centers as support systems for AI, cameras, facial-recognition technology, and surveillance; characterized the situation as exploitation rather than capitalism.
- Cited reported harm to cattle (claim of no live births near data centers) and quadrupled electric bills in other areas.
- Opposed changes from residential to business zoning that trap property owners and the use or threat of eminent domain.
- Personally recommended that data centers be banned.

3. Chad Small

- Spoke in support of responsible zoning that protects the rights of landowners and farmers.
- Stated that farmers and landowners should retain options for how they use their property (farming, wind, solar, data centers) as income opportunities.
- Advocated clear zoning rules addressing legitimate concerns such as noise, traffic, water, and setbacks.
- Described the Salix area as a suitable rural location with available land, infrastructure access, and distance from densely populated areas.
- Opposed creating rules that make development impossible simply because some people dislike the appearance or sound of a project.
- Called for responsible zoning that both protects the community and preserves landowner freedom of choice.

4. Janet Yanack

- Thanked supervisors, commissioners, and the public.
- Distinguished traditional smaller co-location data centers (CPU / fan-cooled) from mega/hyperscale data centers that power AI and ChatGPT and increasingly support surveillance.
- Noted hyperscale facilities use GPUs requiring liquid cooling; the least-expensive cooling method uses up to 5 million gallons of fresh water daily.
- Observed that closed-loop systems shift water demand to power plants and increase energy use.

- Cited impacts: massive land footprint, heat islands, audible and inaudible noise (health issues), 24-hour light pollution, air and water pollution, wildlife disturbance, and home devaluation.
- Stated hyperscale centers are typically built in clusters.
- Referenced union publications claiming higher wages at data centers; noted 75 % of Americans do not want hyperscale AI data centers nearby and only 19 % use AI regularly.
- Cited financial risks (Oracle bond downgrade; large off-balance-sheet lease/purchase commitments by major tech firms).
- Submitted an audible-sound / decibel chart, toxic-impact report, and air-quality document for the record (received by motion and unanimous vote 5-0; Motion; Meister – Second; Corey).

5. Ashley Wolfe

- Reported personal observations from residents living near the Council Bluffs Google data center: no positive comments.
- Cited construction and ongoing traffic problems, including unsafe tailgating that required a parent to escort a young driver to school.
- Described intense nighttime lighting (“like daylight”) that interferes with sleep.
- Noted wildlife displacement (some properties lost wildlife; others experienced influxes of displaced animals).
- Expressed personal concern about air quality / dust and sensitivity that can trigger asthma; stated many local residents share this concern.
- Preferred dark nights for sleep and outdoor air quality.

6. Keely Purscell (Member, Winnebago Tribal Council, Winnebago, Nebraska; landowner in Iowa)

- Spoke in support of those opposing the data center.
- Referenced the recent derecho in Gary, Indiana: residents remained without power while a data center retained power; opposed prioritizing a data center over residents (including elderly on oxygen or farmers relying on electricity for livestock).
- Requested that the Commission examine the Gary, Indiana situation.
- Noted the Winnebago Tribe had submitted formal comments; invoked the Winters Doctrine and federal law requiring a seat at the table for decisions affecting downstream tribal interests.
- Urged the Commission to say “no”; emphasized protection of farmland, cattle, and poultry.
- Cited a Stanton resident who reported cattle becoming aggressive and continuous noise after a data center was built nearby.
- Drew a historical parallel to the allotment era, in which outsiders claimed superior knowledge of land use; stated that money does not equal superior wisdom.
- Called for collaboration: “You’re not one of them, you’re one of us.”

7. Britney Wilson

- Background in business and social entrepreneurship.
- Stated that any business deal should include clear benefits for the local community; representatives should advocate for those benefits.
- Acknowledged AI growth but insisted projects must not pollute water (cited Cheyenne, Wyoming Meta data-center bacteria issue affecting elderly and immunocompromised).

- Called for enforceable noise limits, no tax cuts (companies can afford to pay), and protection of wildlife and recreational waters.
- Opposed increased utility costs for residents; argued local people must be the primary beneficiaries of any development.

8. Mitchell Peterson (Salix)

- Thanked the Commission for the public process (contrasted with the Salix process).
- Agreed the Salix site is problematic because of proximity to town and residences.
- If a project proceeds elsewhere in the county, strong setbacks and ordinances against massive expansions are essential (cited Council Bluffs Google expansion from ~1,000 acres to an additional 860 acres).
- Recommended home-value impact studies and transparent, front-loaded communication with the community.

9. Margaret Scott (Member, Winnebago Tribal Council)

- Invited the public and Commission to a hyperscale-data-center teach-in on September 9 at Winne Vegas (Sale-specific session 3–4 PM; public presentation 6 PM).
- Noted a hydrologist and ecologists would present scientific information on land and water impacts.

10. Sandy Silbernagel

- Emphasized multi-generational responsibility to ancestors and future generations; family has century-farm and heritage-farm status.
- Opposed data centers that could force people from homes, cause ill health, or deplete water resources left by ancestors.
- Questioned the true ownership and motives of outside developers.
- Cited CF Industries' earlier \$1.3 billion investment promise that yielded only a handful of permanent jobs after construction.
- Stated she does not want her name associated with a decision that harms the land or community.

11. Claudia Stensland

- Raised the concept of water-quality standards and neighboring-jurisdiction impacts.
- Argued that the same principle applied to water-quality standards should also apply to data-center siting decisions that affect neighboring jurisdictions and downstream communities.

12. Lexa McKey

- Spoke regarding environmental and community impacts of large-scale data-center development.
- Emphasized the need for careful consideration of long-term effects on land, water, and local residents.

13. Denise Jensen (second time speaking)

- Reiterated the need for transparency and a clear, dedicated ordinance.
- Restated concerns about water, noise, light, vibration, and accountability of developers.
- Again urged that the process be slowed and that rural communities not be pushed aside.

14. Jody House

- Spoke on the need for strong protective measures if any data-center development is considered.
- Raised concerns about community impacts and the importance of local control.

15. Don Lord

- Questioned energy availability: noted that companies had previously been turned away or withdrawn because the county lacked sufficient power.
- Observed that the county is now being told sufficient energy exists for data centers and asked for transparency on that change.
- Requested clear, quantitative information on water use, power demand, and noise levels before any decision.

16. Keely Purscell (second time speaking)

- Re-emphasized the Winters Doctrine and the requirement for tribal consultation when decisions affect downstream interests.
- Restated opposition to prioritizing data-center power reliability over residential and agricultural needs.

17. Jean Mack

- Spoke regarding community impacts and the need for careful evaluation of data-center proposals.
- Expressed support for protecting local residents and resources.

18. Chad Small (second time speaking)

- Reiterated support for landowner property rights and the ability of farmers to choose how to use their land.
- Again called for clear, responsible zoning rules that address legitimate concerns while not prohibiting development outright.

19. Lynette Ross

- Spoke on environmental and quality-of-life concerns related to large-scale industrial data centers.
- Urged the Commission to prioritize the long-term well-being of residents and the agricultural character of the county.

20. Manape LaMere

- Drew historical parallels to colonization and the cotton gin's unintended expansion of slavery.
- Stated that every person present is party to treaties and that treaties are the supreme law of the land under the U.S. Constitution.
- Criticized social impacts of technology (phones at funerals and wakes) and warned of unknown long-term social effects of AI and data centers.
- Cited local water testing showing PFAS levels approximately 20,000 times the acceptable rate and linked closed-loop systems to PFAS contribution.
- Urged the Commission to complete thorough environmental homework on water, air, and noise and to stand firm rather than allow delay that favors corporations.

21. Nick Kerr (Bryan Kerr / related identification)

- Spoke regarding energy capacity, infrastructure, and the trajectory of industrial development in the county.
- Raised questions about prior industrial-to-nuclear discussions near the airport and how they relate to data-center energy needs.

22. Don Lord (second time speaking)

- Repeated the request for transparent, quantitative data on water consumption, power demand, and noise before any decision is made.
- Expressed that the public needs full information to make informed judgments.

23. Duane Herbst

- Spoke as a local resident concerned about impacts on farming operations, water resources, and community character.
- Supported careful, protective zoning standards.

24. Roger Brink

- Recalled that a solar project on approximately 25 acres near the current area of interest was denied two years earlier after public opposition (roughly 12–15 opponents).
- Observed the much larger turnout opposing data centers and expressed hope that the Commission would respond similarly.

25. Britney Wilson (second time speaking)

- Reiterated that any approved project must deliver clear, enforceable benefits to the local community.
- Restated opposition to tax incentives and to projects that externalize costs onto residents (utilities, environment, health).

26. Janet Yanack (second time speaking)

- Re-emphasized the distinction between traditional and hyperscale data centers and the scale of water, energy, and environmental impacts.
- Again referenced the submitted technical documents (decibel chart, toxic-impact, air-quality).

27. Denise Jensen (third time speaking)

- Sought clarification on county versus city jurisdiction after annexation.
- Re-stated the recommendation for heavy-industrial classification and a dedicated ordinance.
- Again called for full transparency and accountability.

28. Ashley Wolfe (second time speaking)

- Reiterated negative experiences reported by residents near existing data centers (traffic, light, wildlife, air quality).
- Encouraged the Commission and public to research and speak directly with people living near operating facilities.

29. Randy Bartels

- Spoke regarding local impacts and the need for protective standards.
- Expressed concern about long-term effects on the community and agricultural land.

30. Karen Stultz

- Spoke on quality-of-life, environmental, and community concerns related to data-center development.
- Supported careful evaluation and protective zoning measures.

31. Duane Herbst (second time speaking)

- Restated concerns about farming operations, water resources, and the agricultural character of the area.
- Supported strong protective standards in any ordinance.

32. Keely Purscell (third time speaking)

- Reiterated the neighboring-jurisdiction principle for water-quality standards and argued it should apply equally to data-center decisions.
- Again called for tribal consultation and protection of downstream interests.

33. Daniel Bittering (Supervisor, speaking from the floor)

- Responded to questions about prior business interest in the county over the last three to five years.
- Noted that some major companies had expressed interest but withdrew because energy providers indicated insufficient capacity.
- Acknowledged the public's desire for transparent information on water, power, and noise and indicated the need for better public data.
- Mandatory agreements to cover all costs should be considered.

34. Manape LaMere (second time speaking)

- Expanded on treaty obligations and the presence of multiple tribal nations with historic ties to the area (Winnebago, Ponca, Ioway, Omaha, Dakota).
- Re-emphasized environmental impacts (water, air, sound) and the social consequences of technology.
- Urged decisive action rather than prolonged debate that allows corporate interests to advance.

35. Denise Jensen (fourth time speaking)

- Returned to the jurisdiction question after annexation and the limits of county authority inside city limits.
- Reaffirmed the call for heavy-industrial zoning, a dedicated ordinance, transparency, and accountability.

36. Roger Brink (second time speaking)

- Reiterated the prior solar denial and the significance of the large public turnout against data centers.
- Expressed hope that the volume of opposition would influence the Commission's recommendation.

37. Veronica Stewart (Sloan resident since 2023)

- Moved to the area because she missed seeing the stars after living in a city for ten years; has not seen the stars in the last three years.
- Stated a long-held personal belief that the human race faces severe risk by approximately 2050.

- Said that approving a data center would expedite that trajectory and that whoever remains will be those who actually care for the land.
- Urged the public and Commission to start listening to those who have been quietly caring for the land for millennia.

38. Rick Brenden

- Asked the Board of Supervisors whether significant business interest seeking to add jobs had approached the county in the last three to five years.
- Sought clarification on energy capacity history and why power is now said to be available for data centers when earlier projects were constrained.
- Requested that the Board send clear public information on water use, power demand, and noise levels so residents can make informed decisions.

39. Manape LaMere (third time speaking)

- Returned to the themes of treaty obligations, environmental homework (water, air, sound), and the social impacts of technology.
- Warned that prolonged debate allows corporations to advance; urged the current generation to take a clear stand.
- Referenced the cotton-gin historical parallel again as a caution against unintended consequences of technological expansion.

Closing of Public Town-Hall Input

After confirming that all who wished to speak had been heard, a motion was made by Meister and seconded by Corey to close the public town-hall portion of the meeting. All in favor said “aye.” The motion carried. No further public comments were taken on the data-center item.

Staff Update

Zoning Coordinator Priestley provided the following update:

- The dialogue will continue. The next town-hall meeting is scheduled for Monday, September 21, 2026, at 7:00 PM at the Merville Community Center.
- A subsequent town hall is scheduled for Monday, November 9, 2026, at 7:00 PM at the Salix Community Center, 317 Tipton Street.
- Regular Zoning Commission meetings (4th Monday, 5:00 PM, Courthouse basement) will continue and will include data-center discussion/work-session items as appropriate.
- The Commission is a research/recommendation body; any eventual recommendation will proceed to the Board of Supervisors for formal public hearings.
- Electronic and written comments remain open throughout the process (dpriestley@woodburycountyiowa.gov).
- Priestley reiterated the jurisdictional boundary: county zoning authority ends at city limits; once land is validly annexed, the city controls zoning within its corporate boundaries.
- He reviewed the comprehensive-plan process, the Future Land Use Map, agricultural-preservation priorities (including corn-suitability rating), and the history of the solar ordinance that directed large-scale solar into industrial districts after strong public input.

Commissioner Introductions, Public Questions, and Clarifications

At the request of the public, the Commissioners introduced themselves:

- Corey Meister

- Steve Corey
- Tom Bride
- Chris (Christine) Zellmer Zant
- Jeff Hanson (phone)
- Daniel Priestley – Zoning Coordinator

Public questions addressed included: why a prior solar proposal on related land was denied and how that relates to data centers; the effect of annexation on county zoning authority; whether a data-center applicant would be required to demonstrate consistency with the comprehensive plan; energy-capacity history; and the difference between conditional-use permits and more specific ordinance standards. Staff and the Chair answered that the solar decision reflected strong agricultural-preservation input and the Future Land Use Map; once annexed, the city has exclusive zoning authority; the comprehensive plan is a broad policy guide; and the current process is designed to develop clearer, more specific standards if the Commission and Board ultimately decide to allow the use under defined conditions.

Adjournment

There being no further business, a motion was made by Meister and seconded by Corey to adjourn. All in favor said “aye.” The motion carried unanimously (5-0). The meeting adjourned at approximately 9:22 PM (meeting duration approximately 2 hours 22 minutes per the official recording).

Appendix / Attachments Received into the Record

- Winnebago Tribe of Nebraska formal comments/letter
- Documents submitted by Janet Yanack (decibel chart, toxic-impact report, air-quality document)

WINNEBAGO TRIBE OF NEBRASKA

P.O. Box 687 • 205 Bluff St. • Winnebago, Nebraska 68071 • PH: 402-878-2272

Visit us at: www.winnebago-tribe.com

Dan Priestley, Zoning Coordinator
Woodbury County Planning and Zoning
620 Douglas Street, Sixth Floor
Sioux City, IA 51101

August 28, 2026

Dear Woodbury County Zoning Commissioners:

The Winnebago Tribe of Nebraska requests that there be an absolute ban on future hyperscale data centers in the unincorporated land in Woodbury County. It took a 40-year fight to get our land returned in Iowa from the Army Corps of Engineers. Linn County in Iowa has adopted some of the nation's strictest data center zoning rules. We urge Woodbury County leaders to look to Linn County for lessons. Despite strict zoning rules, Linn County just like Woodbury, does not have a municipal water utility, which limits its ability to protect local water resources. Citizens of Linn County say the protections are not enough and say that their wells will dry up, as rivers can be tapped and wells drilled as long as they comply with the Iowa DNR. This could allow tapping into the Missouri River Aquifer that our tribal nation depends on for our drinking water. This is unacceptable.

In the event that a ban is not approved, the Winnebago Tribe requests that only closed loop systems be eligible for permits under conditional-use permits for hyperscale data centers. There are currently four federally recognized tribes with lands in Iowa. They are the Omaha Tribe, Sac and Fox Tribe of the Mississippi, Ponca Tribe, and now, the Winnebago Tribe. Under the Winter's Doctrine, tribal nations have a sovereign right to all water required for our population now and into the future. The two Iowa Tribes must have a seat at the table for the permitting process.

Sincerely,



Coly Brown, Chairman
Winnebago Tribal Council



Janet Yanech

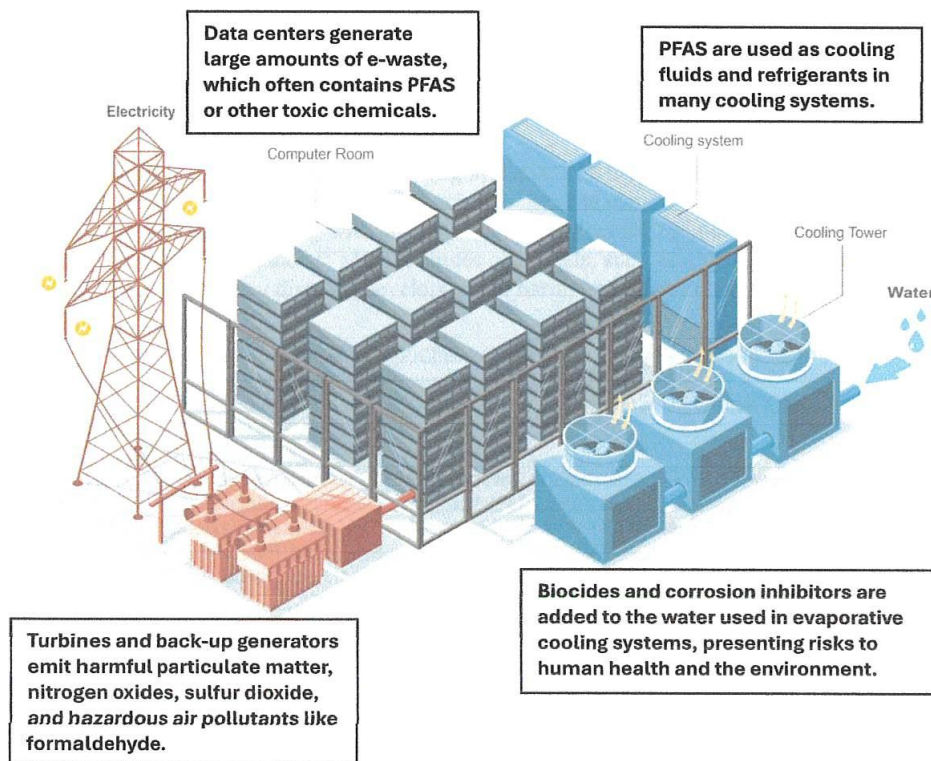


Janet Yarech

Data Centers' Hidden Toxic Impacts

Despite use of PFAS and other toxic chemicals, data centers disclose little about their releases and discharges

From the fuels that power their generators and turbines to the fluids and refrigerants that keep their servers from overheating, data centers are significant source of toxic chemicals and pollutants, including per- and polyfluoroalkyl substances (“PFAS”). Yet data centers rarely disclose the chemicals they use, and they are not required to publicly report their toxic releases, leaving surrounding communities unable to assess the risks to their health and environment. Many data centers also hide their operational details behind non-disclosure agreements, further impeding public access to information. This fact sheet summarizes several ways that data centers can use and release toxic chemicals and the harm that those substances pose to human health and the environment. The impacts of specific data centers depend on site-specific operations and conditions, however, and without greater transparency and reporting the communities surrounding data centers will remain exposed to unknown and unaddressed risks.



Underlying graphic courtesy of Hoosier Environmental Counsel, <https://www.hecweb.org/data-centers/>. Text boxes added by Earthjustice.

can like copper and zinc can also leach from the pipes used in evaporative cooling systems.¹² Even so-called “closed loop” systems still require periodic flushes and blowdowns to clear the system, releasing large volumes of contaminated wastewater to local waterways or treatment plants.¹³

Still other data centers rely on conventional air conditioning, with chilled air blown over servers to regulate their temperature. In addition to being energy intensive, air cooling systems often rely on PFAS as refrigerants.¹⁴ In the environment, these fluorinated gasses (“f-gasses”) can also degrade into TFA, worsening existing contamination.¹⁵ In addition to known leaks of f-gasses,¹⁶ these refrigerants can be also be emitted, without reporting, during data centers’ everyday operations.

Semiconductors and E-Waste

PFAS are widely used to manufacture the semiconductors used in data center servers, threatening the health of communities surrounding semiconductor production facilities.¹⁷ PFAS manufacturers like Chemours have announced plans to expand their existing facilities to meet rising demand related to semiconductor production and artificial intelligence.¹⁸

PFAS are also used in busbars that conduct electricity;¹⁹ communications cables;²⁰ and other equipment and infrastructure that is used in and disposed of by data centers. Because of the strains posed by round-the-clock data center operations and the pace at which electrical components are rendered obsolete, that equipment is frequently replaced and disposed of. One study found that the use of generative AI will generate an additional 1.2 to 5 million tons of e-waste between 2020 and 2030.²¹ Many data centers do not have any e-waste recycling systems,²² and federal regulations do not impose any requirements related to the disposal of PFAS,²³ increasing the likelihood of PFAS releases from data centers’ e-waste disposal.

¹² Ganesh Hegde, Ketos, *Closed Loop Cooling: Water Saver or Chemical Timebomb* (June 11, 2025), <https://ketos.co/closed-loop-cooling-water-saver-or-chemical-time-bomb>.

¹³ *Id.*

¹⁴ Matthew Gooding, Data Center Dynamics, *Altered Carbon: Could CO2 Cooling Replace F-gas-based Systems?* (Nov. 26, 2024), <https://www.datacenterdynamics.com/en/analysis/alter-carbon-could-co2-cooling-replace-f-gas-based-systems/>.

¹⁵ Ahmet Elbir, *Environmental Impacts of F-gases and Trifluoroacetic Acid: Potential Threats to Aquatic Ecosystems and Management Strategies*, 44 *Env’t Progress & Sustainable Energy* e70040 (2025), <https://aiche.onlinelibrary.wiley.com/doi/10.1002/ep.70040>; ATMOSphere, *The Rising Threat of HFOs and TFA to Health and the Environment*, at 11 (Oct. 2022), https://issuu.com/shecco/docs/2022_atmo_hfo_tfa_report; see also Eur. Chems. Agency, *Annex B to the Annex XV Restriction Report: Proposal for a Restriction on Per- and Polyfluoroalkyl Substances (PFASs)*, at 15 (Mar. 22, 2023), <https://echa.europa.eu/documents/10162/6f4a2076-7221-67a3-64f7-c67cc307f59c>.

¹⁶ Manuel G. Pascual, *Data Centers are Drying Up the Port of Marseille: ‘They Consume Enormous Amounts of Electricity,’* *El Pais*, Aug. 24, 2025, <https://english.elpais.com/technology/2025-08-24/data-centers-are-drying-up-the-port-of-marseille-they-consume-enormous-amounts-of-electricity.html>.

¹⁷ Tom Perkins, *Industry Acts to Head Off Regulation on PFAS Pollution from Semiconductors*, *The Guardian* (Aug. 2024), <https://www.theguardian.com/environment/article/2024/aug/24/pfas-toxic-waste-pollution-regulation-lobbying>.

¹⁸ Sara Samora, *Chemours Expands Teflon PFA Production in West Virginia*, *Manufacturing Dive* (Aug. 22, 2024), <https://www.manufacturingdive.com/news/chemours-plans-teflon-pfa-forever-chemicals-plant-expansion-west-virginia/724609/>; Miranda Willson, *‘Forever Chemicals’ Industry Aims to Capitalize on AI Boom*, *E&E News* (June 11, 2025), <https://www.eenews.net/articles/forever-chemicals-industry-aims-to-capitalize-on-ai-boom/>.

¹⁹ Daikin, *Materials for Data Center* (Sept. 2025), <https://www.daikinchemicals.com/magazine/materials-for-data-center.html>.

²⁰ *Id.*

²¹ Peng Wang et al., *E-Waste Challenges of Generative Artificial Intelligence*, 4 *Nature Computational Sci.* 818 (2024), <https://www.nature.com/articles/s43588-024-00712-6>.

²² Supermicro, *Data Centers & the Environment* (Dec. 2018), https://www.supermicro.com/wekeepitgreen/Data_Centers_and_the_Environment_Dec2018_Final.pdf.

²³ See, EPA, *Interim Guidance on the Destruction and Disposal of Perfluoroalkyl and Polyfluoroalkyl Substances and Materials Containing Perfluoroalkyl and Polyfluoroalkyl Substances— 2026 Version* at 8 (2026).

Power Generation

Data centers already consume nearly 5 percent of our nation's total electricity demand, a share that could more than triple by the end of the decade.²⁴ In addition to driving climate change and increasing electricity prices for consumers, this power generation often releases chemicals and pollutants that are associated with serious harms to public health and the environment.

Many data centers construct their own behind-the-meter power plants, located on site or in the vicinity of their operations. These power plants can contain dozens of gas-fired turbines, often constructed without necessary environmental permits.²⁵ Those turbines release fine particulate matter and nitrogen oxides, which can cause heart attacks, asthma, and premature deaths. One study found that authorized particulate matter emissions associated with a single data center could result in \$53–99 million in annual health costs.²⁶ Nationwide, more than 70 new gas-fired power plants are planned to support the build out of data centers, emitting up to 44,000 tons of nitrogen oxides and 32,000 tons of fine particulate matter each year.²⁷

Data centers also rely on on-site backup generators, often powered by diesel fuel or natural gas, which power the facility in the event of planned or unplanned power outages.²⁸ Between 2018 and 2024, generator capacity at data centers in the U.S. nearly tripled.²⁹ The International Agency for Research on Cancer classifies diesel exhaust as carcinogenic to humans, and diesel generators also release high levels of pollutants that are tied to reduced lung function, cardiovascular disease, and other serious harms.³⁰ A recent study estimated that emissions from back-up generators at Virginia data centers could trigger 14,000 asthma episodes and up to 19 deaths each year.³¹

For more information, contact Jonathan Kalmuss-Katz, Earthjustice (jkalmusskatz@earthjustice.org)

This document is intended for informational purposes only and does not constitute legal advice. The information contained herein is not a substitute for professional legal counsel. Please consult an attorney to discuss your legal needs. Additionally, this is a rapidly evolving legal and factual landscape, so the information here may not reflect the most updated version of the law or facts. This version was last updated on July 23, 2026.

²⁴ Christa Marsha, *Data Centers' Share of US Electricity seen Doubling by 2030*, Energy Wire (Feb. 26, 2026), <https://www.eenews.net/articles/data-centers-share-of-us-electricity-seen-doubling-by-2030/>.

²⁵ Press Release, *NAACP Sues xAI for Illegal Pollution from Data Center Power Plant* (Apr. 14, 2026), <https://earthjustice.org/press/2026/xai-sued-for-illegal-power-plant>.

²⁶ Michael Cork et al., EmPower Analytics Group LLC, *Air Quality, Health, and Economic Impacts of the Vantage Data Center Facility 2* (Feb. 27, 2026), <https://www.pecva.org/wp-content/uploads/Health-Impacts-Vantage-Data-Center-Report-2.pdf>.

²⁷ Env't Integrity Project, *The Power Behind AI: Wave of Dirty Gas Power Plants Planned for Data Centers* 3, 15 (July 1, 2026), https://environmentalintegrity.org/wp-content/uploads/2026/06/EIP_Report_ThePowerBehindAI_7.1.26.pdf.

²⁸ Damien Pitt, et al., VCU Institute for Sustainable Energy and Environment, *Localized Air Pollution Impacts from Data Centers in Northern Virginia* (2026), https://scholarscompass.vcu.edu/cgi/viewcontent.cgi?article=1003&context=isec_pubs/

²⁹ Better Data Center Project, *Diesel Generators at Data Centers Status, Impacts, and Protective Practices* 3 (Mar. 2026), <https://betterdatacenterproject.com/wp-content/uploads/2026/03/Diesel-Generators-at-Data-Centers-Status-Impacts-and-Protective-Practices.pdf>.

³⁰ *Id.*

³¹ Yuelin Han et al., *Health-Informed Computing: Estimating and Addressing the Public Health Impact of Data Centers* (June 8, 2026), <https://arxiv.org/pdf/2412.06288>.

Jan 16, 2026

Date: July 16, 2026
From: Steven Klafka, P.E., BCEE, Environmental Engineer
Subject: Evaluating Air Quality Impacts of Diesel Generators at Data Centers

INTRODUCTION

The purpose of this document is to help you understand and estimate air quality impacts due to back-up emergency diesel generators at AI data centers. This document can be used to prepare *public comments on proposed air pollution control permits for AI data centers*. It can also be included in your comments to state or local agencies.

AI data centers require large amounts of electrical energy. This energy is either generated on-site or obtained from the local electrical utility. In both cases, the AI data centers install backup power systems to assure the data center continues to operate during electrical or equipment outages or interruptions. Most often, back-up electrical power is obtained from on-site diesel emergency generators and fuel storage tanks in large arrays.

Diesel generators are significant sources of air pollution. It is assumed they will only operate for testing and in case of an emergency. For this reason, they are frequently approved by local and state regulatory agencies with *little-to-no emission controls and little-to-no assessment of their air quality impacts, especially beyond the fenceline of the property*.

Regulatory agencies may place limits on generator usage for non-emergency readiness testing. However, there are rarely limits on emergency usage, leaving an open door for unlimited use of equipment that was intended for infrequent operation. Typically, we think of "emergency" usage as a natural disaster caused by adverse weather. However, the term "emergency" can vary by state, and thus expand the hours when a backup generator will operate.

The enclosed evaluation describes diesel generator air pollutants, emission rates, control methods, factors influencing air pollutant dispersion, and potential air quality impacts. It *reviews regulatory approval requirements and offers recommendations for reducing impacts*.

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PROJECT DESIGN

Emission Sources

An AI data center receiving its electrical power from the local utility and transmission lines must guarantee its reliability with on-site backup power sources. Even those with on-site power may use back-up power sources for equipment outages and related issues. Keeping the AI data center running during an outage protects profits, maintains compliance with contractual agreements, and avoids disruption of services that rely on the AI data center.

More often than not, backup electricity is provided by diesel fueled backup generators. Diesel generators are common since they can start quickly when needed, have low initial and operating costs, and have been in use for many years. Since AI data centers require large amounts of electricity, they need large numbers of diesel generators and on-site fuel storage.

While factories typically might have several generators to provide perhaps 5 megawatts (MW) of backup, AI data centers require 50 to 200 generators providing as much as 500 MW. One typical 2 MW generator provides the electricity needs of 1,700 typical homes in the U.S.¹

The diesel generators are intended to be used as backup when there is an emergency loss of power. Planned usage for testing and maintenance may require 50 hours per year to assure the equipment is available when needed. In addition, in 2025, USEPA added that emergency diesel generators may be operated for up to 50 hours a year to participate in demand response in non-emergency situations.² This has increased the hours of planned, non-emergency general usage. During a period of extreme heat in 2026, the US energy secretary instructed grid operators to require data centers to use their backup power supplies if they need to ease the strain on the electrical system.³ PJM Interconnection received approval to rely on the back-up diesel generators located at data centers in more than a dozen states to supplement electricity demand.⁴

Usage for emergencies will vary with the reliability of the electrical supply and local server weather. An Uptime Institute survey of data centers found that “most operators had no or

¹ U.S. Energy Information Administration, Electricity consumption in U.S. homes varies by region and type of home, <https://www.eia.gov/energyexplained/use-of-energy/electricity-use-in-homes.php>, April 20, 2026.

² USEPA, Fact Sheet and Frequently Asked Questions, Use of Backup Generators to Maintain the Reliability of the Electric Grid, May 1, 2025.

³ New York Times, Energy Dept. Orders Data Centers to Tap Backup Power, As triple-digit temperatures engulf much of the United States, the Trump administration wants grid managers to require the use of backup power that often goes unused.

<https://www.nytimes.com/2026/07/02/business/energy-environment/electric-grid-data-centers-pjm.html?>

⁴ Maryland Matters, PJM gets green light to push data centers onto back-up power during heat wave, Order from Trump administration allows power plants to bypass pollution allowances, June 30, 2026

negligible outages in the past three years.”⁵ Before the widespread construction and operation of AI data centers, the U.S. Energy Information Administration reports that in 2022 the average electrical outage in the US was 5.6 hours per customer, while the maximum was approximately 19 hours in Florida.⁶

The frequency and length of power outages due to emergencies may change in the future. The frequency and length of diesel generator use due to demand response or to manage voltage/frequency disturbance events may increase at AI data centers in the future. The large increase in AI data centers in the U.S. has placed greater demands on electrical generator and distribution. Global warming is changing the climate so more frequent and severe storms may disrupt the reliable delivery of electricity.

To assist local and regulatory programs with estimating the potential or worst-case emissions from backup generators, USEPA recommends 500 hours of operation.⁷ This assumption is typically used by local and state regulatory agencies when approving new back-up diesel generators for AI data centers.

Emissions and air quality impacts occur whenever generators operate during non-emergency readiness testing or emergency use resulting from a utility power outage. It is more common for air permits to place fuel usage or operating hour limits on generator usage for non-emergency use. Limits on emergency usage are less common which can be problematic. Some states, such as Virginia, have established operating hour limitations (i.e. 500 hours) for any generator operation, including both non-emergency and emergency operation.⁸

Criteria Air Pollutants

Diesel fueled generators release the following air pollutant emissions:

- Nitrogen Oxide (NOx);
- Particulate Matter, primarily smaller than 10 microns (PM10);
- Particulate Matter, primarily smaller than 2.5 microns (PM2.5);
- Sulfur Dioxide (SO₂) formed from the sulfur in diesel fuel;
- Carbon Monoxide (CO) created by incomplete combustion;

⁵ Uptime Institute, Annual Outage Analysis 2025, <https://uptimeinstitute.com/resources/research-and-reports/annual-outage-analysis-2025>

⁶ U.S. Energy Information Administration, annual average total of electrical power interruptions, <https://www.eia.gov/todayinenergy/detail.php?id=61303>

⁷ U.S. EPA, Calculating Potential to Emit (PTE) for Emergency Generators, September 6, 1995. <https://www.epa.gov/title-v-operating-permits/calculating-potential-emit-pte-emergency-generators>

⁸ Virginia Department of Environmental Quality, Clarification#2025-01, Emergency Generator Air Permit Guidelines, January 17, 2025. <https://www.deq.virginia.gov/news-info/shortcuts/permits/air/Issued-air-permits-for-data-centers>

- Lead (Pb) released from the Pb in the fuel; and,
- Volatile Organic Compounds (VOC) created by incomplete combustion.

The Washington Department of Ecology (WDOE) has evaluated the air quality impacts of numerous AI data centers equipped with backup emergency diesel generators. WDOE explains the potential air quality impacts of diesel generators as follows:⁹

Diesel exhaust is a toxic air pollutant, containing fine particles that can cause health problems for people who are exposed frequently and at high enough levels. These tiny particles are too small to be filtered out of the air by the nose and upper respiratory system. The particles go deep into the lungs, where they can cause damage and chemical changes.

Nitrogen dioxide (NO₂) is another toxic air pollutant that can cause breathing problems even when you're exposed for a short time, from 30 minutes to 24 hours. Nitrogen dioxide can make breathing harder for people who already have lung problems, such as asthma. It also adds to acid rain and smog.

When it adopted its Clean Air Nonroad Diesel Rule in 2004, prior to the recent growth in data centers, USEPA described the health benefits of controlling NO_x and PM emissions as follows:¹⁰

“Reducing NO_x and PM emissions from nonroad diesel engines by more than 90 percent will provide a wide range of public health benefits. Controlling these emissions will, by 2030, prevent every year about: 12,000 premature deaths, 8,900 hospitalizations, one million work days lost, 15,000 heart attacks, 6,000 children’s asthma-related emergency room visits, 280,000 cases of respiratory problems in children, 200,000 cases of asthma symptoms in children, and 5.8 million days of restricted adult activity due to respiratory symptoms.”

The criteria pollutants have National Ambient Air Quality Standards or NAAQS.¹¹ These include NO₂, PM₁₀, PM_{2.5}, SO₂, CO and Pb. There is a NAAQS for ozone (O₃) which is formed in the atmosphere from NO_x and VOC.

The USEPA and state agencies operate air quality monitors to measure concentrations of criteria air pollutants to verify compliance with the NAAQS.¹² These monitors typically obtain

⁹ WDOE, Diesel pollution from data centers, <https://ecology.wa.gov/air-climate/air-quality/data-centers>

¹⁰ USEPA, Regulatory Announcement, Clean Air Nonroad Diesel Rule, May 2004.

<https://nepis.epa.gov/Exe/ZyPDF.cgi/P10001RN.PDF?Dockey=P10001RN.pdf>

¹¹ USEPA, NAAQS Table, <https://www.epa.gov/criteria-air-pollutants/naaqs-table>, April 20, 2026.

¹² USEPA, Managing Air Quality - Ambient Air Monitoring, <https://www.epa.gov/air-quality-management-process/managing-air-quality-ambient-air-monitoring>

representative regional background concentrations rather than impacts of any specific industrial facility.

During the issuance of an air pollution permit for utility and industrial emission sources, USEPA, state agencies or permit applicants may conduct dispersion modeling to estimated downwind concentrations of criteria air pollutants to verify compliance with the NAAQS. However, a modeling analysis for diesel generators at data centers is rarely conducted, even when the installations at AI data centers are in the tens to hundreds of MWs in size.

Even if a regulatory agency uses dispersion modeling to keep air pollutant concentrations below the NAAQS, they are still approving an increase in emissions and exposure. With regard with fine particles or PM_{2.5}, the American Lung Association does not consider any new exposure to be safe.¹³

“There is no safe threshold to breathe in fine particles. A recent review of all available scientific evidence to date clearly shows that particle pollution is associated with increased mortality from all causes, cardiovascular disease, respiratory disease and lung cancer.”

The residents of disproportionately impacted neighborhoods may already be exposed to high levels of air pollution from industries and roadways. New AI data centers and their diesel generators will only exacerbate existing poor air quality conditions.

Hazardous Air Pollutants

Particulate matter and VOC emissions will be composed of numerous inorganic and organic chemicals. These are considered hazardous air pollutants or HAP, sometimes called toxic air pollutants or TAP. Similar to any fuel combustion, the HAP emissions from diesel generators include inorganic trace metals which are contained in the diesel fuel, and organic products of incomplete combustion like benzene, formaldehyde and polyaromatic hydrocarbons.

Many local or state agencies have adopted regulations to control HAP or TAP emissions. These include air quality standards for specific chemicals or emission control requirements.

USEPA has adopted national emission standards to reduce HAP emissions from diesel generators.¹⁴ These standards include National Emission Standard for Hazardous Air Pollutants (NESHAP) and New Source Performance Standards (NSPS). Those generators used for emergency backup are subject to the NSPS Tier 2 emission standards. These do not require the

¹³ American Lung Association, Particle Pollution, April 19, 2026, <https://www.lung.org/clean-air/outdoors/what-makes-air-unhealthy/particle-pollution#risk>

¹⁴ USEPA, Regulations for Emissions from Heavy Equipment with Compression-Ignition (Diesel) Engines, <https://www.epa.gov/regulations-emissions-vehicles-and-engines/regulations-emissions-heavy-equipment-compression>, April 20, 2026.

use of add-on control equipment, so the generators are uncontrolled. Diesel generators used full-time are subject to the NSPS Tier 4 emission standards which do require add-on control equipment. Diesel generators that run in conditions besides true emergency conditions, such as demand response, or voltage/frequency disturbance events, would presumably be required to meet the less stringent Tier 2 emission standards which do not require the use of add-on control equipment.

DATA CENTER DESIGN AND AIR QUALITY IMPACTS

Energy Generation Method

For back-up power, AI data centers are likely to use diesel generators as they are readily available and allow on-site fuel storage.

Diesel Generator Emission Tier

Diesel generators are considered stationary engines by USEPA. For new engines or generators built after 1996, USEPA established emission limitations and control requirements under the national NSPS regulations. There are currently four tiers depending on the date of construction:

- Tier 1 – 1996-2002
- Tier 2 – 2003-2005
- Tier 3 – 2006-2010
- Tier 4 – 2011- Present

For larger generators, > 560 kW, built today, Tier 2 limits apply to emergency generators and Tier 4 limits apply to continuously operated generators. Table 1 compares the Tier 2 and Tier 4 emission limits.¹⁵

Tier 2 limitations rely on generator engine design to meet the federal emission limits. These generators have uncontrolled emissions. If the manufacturer certifies the generator to comply with USEPA Tier 2 requirements, then typically no post construction testing of emissions is required. While not common, the permit agency may require a data center to conduct compliance stack tests on their diesel generators to verify compliance with the federal NSPS emission limitations. These tests require less than one hour of combined sampling at various operating loads.¹⁶

¹⁵ USEPA, EPA Emission Standards for Nonroad Engines and Vehicles, <https://www.epa.gov/emission-standards-reference-guide/epa-emission-standards-nonroad-engines-and-vehicles>

¹⁶ USEPA, Engine Testing Regulations, <https://www.epa.gov/vehicle-and-fuel-emissions-testing/engine-testing-regulations>

Tier 4 limitations rely on the use of add-on control equipment which reduce emissions by 90% or more. These add-on emission controls include:

- Selective Catalytic Reduction (SCR) control systems to reduce NOx emissions;
- Oxidation catalyst control systems to reduce CO and VOC emissions; and,
- Diesel particulate filters (DPF) to reduce PM emissions.

Similar SCR and oxidation catalyst control systems are also used to control emissions from larger coal, oil and natural gas-fired power plants.

Table 1 – Current Tier 2 and Tier 4 Diesel Generator Limitations

Air Pollutant	Size & Type	NMHC	NMHC+NOx	NOx	PM	CO
	(kW)	(g/kW-hr)	(g/kW-hr)	(g/kW-hr)	(g/kW-hr)	(g/kW-hr)
Tier 2	> 560 - All	-	6.4	-	0.2	3.5
Tier 4	> 560 Generators	0.19	-	0.67	0.03	
	> 560 All Others	0.19	-	3.5	0.04	3.5

Note: NMHC = Nonmethane Hydrocarbons

Generator Emissions

Table 2 summarizes the hourly and annual emissions from a typical diesel generator with a generating capacity of 2,750 kW. It complies with USEPA Tier 2 emission limitations so has no add-on emission control equipment. Annual emissions are shown based on varying operating schedules from 50 to 8,760 hours per year. While 50 hours per year may be sufficient for testing and maintenance, more operation is needed to accommodate demand response, manage voltage/frequency events, or during the loss of electricity from the utility. The highest annual emissions in Table 2 reflect generator usage for 8,760 hours per year, or continuous operation. This scenario could occur if off-site utility electricity were no longer available.

The emission estimates in Table 2 are based on operation at 100% capacity. For long-term operation, a generator could reduce generator output to 70% of capacity, with similar reductions in fuel usage and emissions.

Table 2 - Emissions from a Typical Diesel Generator with 2,750 kW Capacity

Air Pollutant	Hourly (lbs per hour)	50 hrs/yr (tons per year)	100 hrs/yr (tons per year)	500 hrs/yr (tons per year)	8,760 hrs/yr (tons per year)
NOx	53.5	1.34	2.68	13.38	234.33
CO	10.3	0.26	0.52	2.58	45.11
VOC	0.9	0.02	0.04	0.22	3.90

PM	0.8	0.02	0.04	0.21	3.64
SO2	0.08	0.002	0.004	0.02	0.4

Data Center Total Project Emissions

The total emissions from two example AI data centers equipped with multiple backup diesel generators are summarized in Tables 3 and 4. Table 3 shows an AI data center with combined capacity of 87 MW of diesel generators. Table 4 shows an AI data center with combined capacity of 500 MW of diesel generators.

It is assumed that the diesel generators at both AI data centers comply with USEPA Tier 2 emission limitations so have no add-on emission control equipment. Annual emissions are shown based on varying operating schedules from 50 to 8,760 hours per year. As previously noted, 50 hours per year may be sufficient for testing and maintenance, but more operation is needed to accommodate demand response, manage voltage/frequency events, or use during the loss of electricity from the utility. The highest annual emissions reflect generator usage for 8,760 hours per year, or continuous operation. This scenario could occur if off-site utility electricity were no longer available.

On an hourly basis, approved emissions are very large so an AI data center can have significant short-term air quality impacts.

On an annual basis, approved emissions are typically kept low and below thresholds at which more stringent permit requirements would apply.

Annual usage of the generators and their emissions can be kept low by a fuel consumption and/or operating hours limit in the air pollution permit issued by the state or local agency. While annual usage may be limited to simplify permit approval requirements, the AI data center will still have high short-term emissions:

Table 3 – Total Emissions from a Data Center with 87 MW Capacity Diesel Generators

Air Pollutant	Hourly (lbs per hour)	50 hrs/yr (tons per year)	100 hrs/yr (tons per year)	500 hrs/yr (tons per year)	8,760 hrs/yr (tons per year)
NOx	1,692.5	42.3	84.6	423.1	7,413.3
CO	325.9	8.1	16.3	81.5	1,427.2
VOC	28.2	0.7	1.4	7.0	123.3
PM	26.3	0.7	1.3	6.6	115.0
SO2	2.5	0.1	0.1	0.6	11.1

Table 4 - Total Emissions from an AI Data Center with 500 MW Capacity Diesel Generators

Air Pollutant	Hourly (lbs per hour)	50 hrs/yr (tons per year)	100 hrs/yr (tons per year)	500 hrs/yr (tons per year)	8,760 hrs/yr (tons per year)
NOx	9,727.3	243.2	486.4	2,431.8	42,605.5
CO	1,872.7	46.8	93.6	468.2	8,202.5
VOC	161.8	4.0	8.1	40.5	708.8
PM	150.9	3.8	7.5	37.7	661.0
SO2	14.5	0.4	0.7	3.6	63.7

Stack Heights

Historically, diesel generators typically do not have tall stacks to disperse their emissions since they are used infrequently and their impacts during use are rarely evaluated.

With the advent of AI data centers simultaneously using many diesel generators, the potential for significant overlapping air quality impacts has increased. Like any large source, tall stacks help disperse the emissions and maintain impacts below air quality standards.

Short stacks are likely to be used if issuance of an air permit by the local or state agency requires no air quality modeling analysis to assess the downwind impact. In this case, a short stack might be 35 feet, while tall stack may be 100 feet.

Later in this report, examples of air permit issuance projects are provided. These show the height of stacks which have been used for diesel generators. The Lavender Fields Holdings project in Michigan City IN consists of 132 diesel generators. Each of these generators was equipped with a stack that was 20 feet tall. The Vantage Data Centers Management project in Port Washington, WI consists of 45 diesel generators. Each of these generators was equipped with a stack that was 35 feet tall. The Washington Department of Ecology has issued air permits to numerous data centers. In 2022, it approved the MWH Data Center in Qunicy, WA. It was equipped with 96 diesel generators with stack heights ranging from 30 to 72 feet in height.¹⁷

A more extreme example is the Texas Commission on Environmental Quality proposed approval of the Fermi America Project Matador project in Carson County, Texas in 2026. Rather than use back-up diesel generators, this facility would provide its own on-site power generation using gas turbines. To assure compliance with air quality standards, 80 of the facility gas turbines would each be equipped with stacks that were 198 feet tall.¹⁸

¹⁷ Washington Department of Ecology, Data centers regulated or reviewed by Ecology (listed by city), <https://ecology.wa.gov/air-climate/air-quality/data-centers>

¹⁸ Perales, Allmon & Ice, P.C., Request for Contested Case Hearing regarding Application by Fermi Equipment

When wind blows over a building or structure it causes aerodynamic downwash which pulls the stack emission plume towards the ground causing higher concentrations. A generator located next to a building and equipped with no stack or a short stack is more likely to experience downwash. A rule of thumb is that stacks need to be 2.5 times the nearest building or structure height to avoid influence from winds blowing over the building. This stack height is referred by USEPA to as “Good Engineering Practice” or GEP stack height.¹⁹

If no dispersion modeling analysis is conducted for proposed data center diesel generators it would be reasonable to ask that all stacks meet the GEP criteria to assure adequate dispersion of the emissions.

Buildings and Structures

When a dispersion modeling analysis is conducted, it will consider the dimensions of data center buildings and structures and thus identify high impacts associated with aerodynamic downwash. If no analysis is conducted, the high impacts associated with downwash will not be identified.

Property boundary and fences

When shorter or no stacks are used for diesel generators, air pollutant concentrations are typically highest close to the AI data center and decrease further away. Under prior USEPA policy, the facility property was considered “ambient air” which must comply with the NAAQS. The facility could only be excluded if there is a fence installed along the entire perimeter to preclude public access. In 2019, USEPA updated its interpretation and allowed other measures like regular patrols, cameras, and perhaps signage.²⁰ In any case, it’s important the data center has a fence or suitable measure to keep the public off their property.

This USEPA policy on a fenced property boundary applies to the major source PSD air permits. At a minor source, local or state agency policy determines where ambient air begins and air quality standards will apply.

LOCAL CONDITIONS

When evaluating the air quality impacts of an AI data center, unique local conditions should be considered. These include the following:

Holdco, LLC for Proposed Air Quality Permit Nos. 181009, PSDTX1670, and GHGPSDTX254, Submitted to Texas Commission on Environmental Quality, January 20, 2026.

¹⁹ USEPA, Guideline on Air Quality Models; Enhancements to the AERMOD Dispersion Modeling System, 95056 Federal Register / Vol. 89, No. 230 / Friday, November 29, 2024 / Rules and Regulations, 7.2.2.1 Good Engineering Practice Stack Height.

²⁰ USEPA, Revised Policy on Exclusions from “Ambient Air”, December 2, 2019.
https://www.epa.gov/sites/default/files/2019-12/documents/ambient_air2019.pdf

Urban vs Rural

- Urban areas have more people who are likely to be exposed than a rural site with fewer neighbors.
- Urban areas have more existing air pollution sources including industries and mobile vehicle traffic which increase existing emissions. These existing industrial sources should be identified and included in modeling analysis with the diesel generators at an AI data center.
- Urban areas have higher background air pollutant concentrations.
- A dispersion modeling analysis should account for the location being either urban or rural, existing off-site emission sources, and appropriate background concentrations.

Topography

The highest pollutant concentrations are located in the center of a stack plume so:

- Diesel generators at an AI data center located in a relatively flat area will allow stack pollutants to disperse before they reach the ground.
- Diesel generators at an AI data center located in a valley or surrounding by hills will result in higher concentrations since the plume will impact land closer to the plume center. This is the situation where dispersion modeling is especially useful to understand how topography increases the anticipated air quality impacts.
- Any dispersion modeling analysis should account for local terrain.

Meteorology

- Any dispersion modeling analysis should use meteorology that is representative of the project location.
- Weather measurements are typically obtained from a local airport.
- A wind rose created from the hourly measurements will show predominant wind speeds and directions where data center emissions will blow.

Non-attainment Areas or Other High Background Air Quality Areas

- The procedures used for a dispersion modeling analysis and its purpose to demonstrate compliance with air quality standards are typically the same no matter the location. However, a data center which will impact neighborhoods that have been identified as already having significant air quality issues or significant existing health impacts should raise caution.
- The complexity of a normal dispersion modeling analysis can be increased to provide more information about the project impacts in specific neighborhoods.

- Inhalation exposure provided by the modeling analysis can be combined with other routes of exposure like food and water to provide a more complete understanding of the *combined pollution burden on nearby residents*.
- The estimated exposure can be used to support the need for add-on emission controls and post-construction monitoring of emissions and impacts.

AIR QUALITY PERMIT REQUIREMENTS

As the number of diesel generators installed and emissions increase, emission thresholds are likely to be exceeded so that a permit is required prior to construction.

Major Sources

The type of air pollution construction permit and its requirements vary depending on the total allowable or potential emissions from a proposed data center. The potential emissions include *any legally enforceable restriction on emissions, operating hours or fuel usage*.

If total potential emissions from any single criteria air pollutant exceeds 250 tons per year (tpy), then the project is classified as “major” and requires a Prevention of Significant Deterioration or PSD construction permit. While the local or state agency may have authority to issue a PSD permit, it must follow USEPA and state policies and regulations.²¹ One would expect major source data center requirements to be the same no matter the location within the U.S. However, it is not unusual to find slightly different interpretations by each local or state program. These differences may include the cost threshold at which add-on control options are no longer considered feasible, procedures to determine background air quality, or the number of off-site sources to be considered in the dispersion modeling analysis.

Significant PSD requirements include:

- Use of Best Available Control Technology to control emissions.
- An air quality impact modeling analysis to verify compliance with the NAAQS.
- An analysis of impacts on nearby Class I areas such as national parks.
- An opportunity for public comments on the draft permit.

The example data center shown in Table 4 limited to 500 hours per year of operation has maximum emissions of NOx and CO which are well above 250 tpy. Without any enforceable restrictions, the diesel generators at this AI data center would be subject to the PSD permit requirements.

²¹ USEPA, Prevention of Significant Deterioration Basic Information, <https://www.epa.gov/nsr/prevention-significant-deterioration-basic-information>

The diesel generators at an AI data center required to obtain a major source PSD construction air permit would have a more stringent and protective level of analysis and emissions control such as:

- The BACT requirement would most likely demand the use of Tier 4 emission controls for the diesel generators. This add-on air pollution control equipment would reduce emissions by more than 90%. It includes Selective Catalytic Reduction (SCR) control systems to reduce NOx emissions, oxidation catalyst control systems to reduce CO and VOC emissions, and diesel particulate filters (DPF) to reduce PM emissions. Any technically feasible emission control method must be evaluated. For example, a data center in New Jersey also equipped its natural gas-fired reciprocating engine generators with wet scrubbers and biofilters.²²
- The air quality impact analysis would evaluate the high hourly emissions from the diesel generators, and include off-site existing sources of emissions in the surrounding area. The USEPA approved dispersion model AERMOD provides accurate estimates of air quality impacts within 50 km of project site, so could evaluate impacts of all off-site industrial sources within this radius.

Synthetic Minor Sources

To avoid the delay and additional regulatory requirements of a PSD permit, most AI data centers using diesel generators would accept limitations on emissions, fuel consumption and operating hours to reduce potential annual emissions below 250 tpy. The example data center presented in Table 3 did accept an annual operating restriction of 50 hours per year for testing and maintenance. The actual emissions based on this 50-hour permit condition reduced NOx emissions to less than 250 tpy. In this case, a minor source construction permit, not a PSD permit, would be required.

Instead of limiting operating hours, a data center could also voluntarily install Tier 4 add-on emission control equipment. This approach would reduce annual emissions by approximately 90%. A data center which used this approach in 2025 was the Microsoft Mount Pleasant Data Center in Mount Pleasant, Wisconsin.²³

Minor source construction permit requirements for a new or modified AI data center vary by local or state agency. It would not be uncommon for a local or state agency to require no emission controls and no air quality impact analysis for data center diesel generators. By

²² Air Permit Application, DataOne USA, LLC, Vineland, NJ, December 16, 2025.

²³ WDNR, Air Pollution Control Construction Permit #24-MIN-238, Microsoft Mount Pleasant Data Centers, January 10, 2025.

avoiding the need for the major source PSD permit, a data center would be allowed to have very high uncontrolled hourly emissions with no analysis of its air quality impacts.

Diesel generators classified as either a major source or a minor source can both have high hourly emissions and high short-term impacts. By limiting its annual emissions, the minor source has avoided an evaluation of those impacts. Even if a project is a minor source, the applicant for a minor source permit or the agency issuing the permit should still conduct a modeling analysis to determine the air quality impacts.

Staged Projects

Often an AI data center will be built in stages in response to greater demand for its services. Additional diesel generators may be added to the facility after initial construction has been completed.

A data center which has already been issued a major source permit has emissions of any pollutant above 250 tpy. Subsequent expansions by adding new diesel generators are subject to major source permit requirements if expansion emissions exceed the PSD significant emission rates (SER). These SER are much lower than 250 tpy. For PM_{2.5} and NO_x, the thresholds are 10 tpy and 40 tpy, respectively. Limits on operating hours and fuel usage may be established for the new diesel generators to keep their emissions below the SER.

A data center issued a minor source permit as a synthetic minor source would have emissions of any pollutant below 250 tpy. At a later date, it could expand by adding diesel generators with emissions up to, but not exceeding, another 250 tpy, and avoid major source permit requirements for modifications.

Air permit requirements are less stringent for minor versus major sources. There is incentive to stage a project to keep total emissions below the major source emission thresholds. For this reason, expansion of an existing data center should be evaluated for potential circumvention of the major source PSD rules by purposely staging a larger project into small projects with lower emissions. The smaller projects may each have emissions below the thresholds at which major source permit would be required, while the larger project when smaller projects are combined would exceed the threshold.

In 2009, USEPA published rules describing *“the principles of project aggregation that we would apply when determining whether a source had unreasonably segregated a single project into multiple projects, thereby circumventing the NSR permitting requirements.”*²⁴ Later in 2018,

²⁴ Prevention of Significant Deterioration (PSD) and Nonattainment New Source Review (NSR): Aggregation and Project Netting (74 FR 2376; January 15, 2009).

USEPA confirmed these rules.²⁵ Any expansion of an existing data center should be evaluated to determine if emissions from the new project should be combined with prior projects at the same facility.

Permit Thresholds for Non-attainment Areas

The PSD construction air permit requirements apply to air pollutants for the which the project location complies with the NAAQS. This is a considered an attainment area. Areas which do not comply with the NAAQS, typically urban areas, are considered non-attainment areas for that air pollutant. For these non-attainment area pollutants there are lower annual emission thresholds such as 25 or 50 tpy at which unique non-attainment areas requirements. These requirements may include emission offsets or use of add-on control equipment. To avoid these non-attainment area requirements, an AI data center may limit fuel usage or operating hours to keep annual emissions of that specific air pollutant below the non-attainment area threshold.

Title V Operation Permit Thresholds

Once a new AI data center has been constructed, it will receive an operation permit under federal Title V or 40 CFR Part 70 regulations. The major source operation permit threshold is 100 tpy. To avoid unique major source requirements such as compliance inspections, semi-annual monitoring reports, and more frequent agency inspections, a new AI data center may limit fuel usage or operating hours to keep annual emissions of any air pollutant below the Title V major source threshold.

LOCAL AND STATE REQUIREMENTS FOR DIESEL GENERATORS AT DATA CENTERS

The federal PSD regulations provide a consistent set of air pollution permit requirements when the emissions from multiple diesel generators at an AI data center are large enough to be considered a major source. However, for diesel generators at AI data centers which limit annual emissions to be classified as a minor source, there are a wide range of policies and rules that have been adopted by local and state regulatory agencies for issuance of air pollution permits to owners or operators of data centers.

The minimum requirements for diesel generators are those established by USEPA. These include the Tier 2 and Tier 4 emission limits, and associated recordkeeping for generator maintenance and operating hours.

²⁵ Prevention of Significant Deterioration (PSD) and Nonattainment New Source Review (NNSR): Aggregation; Reconsideration, Last updated on February 20, 2026, <https://www.epa.gov/nsr/prevention-significant-deterioration-psd-and-nonattainment-new-source-review-nnsr-aggregation>

Here is a short overview of additional diesel generator requirements enforced by local and state regulatory agencies:

Wisconsin Department of Natural Resources (WDNR)

The WDNR has not adopted any new air pollution policies and regulations to reflect the surge in the construction of data centers in Wisconsin. The agency uses its existing policies and rules when evaluating diesel generators at data centers. This approach is the same as for an industrial facility installing one or two backup generators, so has not been updated to reflect the numerous generators installed at data centers.

Emergency diesel generators must comply with the USEPA Tier 2 emission standards, so no add-on control equipment is necessary. There is nothing in the WDNR guidance to cover potentially increased frequency and length of diesel generator use in such large quantities to manage voltage/frequency disturbance events.

There is little or no dispersion modeling to verify compliance with the NAAQS or HAP standards. Emergency generators are considered intermittent sources following USEPA modeling policy, so there is no modeling of compliance for the 1-hour NAAQS for NO₂. A state-only policy concludes that direct PM_{2.5} emissions cannot cause an exceedance of the NAAQS so no modeling is conducted to verify compliance with the 24-hour and annual average NAAQS for PM_{2.5}. Under the state HAP rules, HAP emissions from the combustion of diesel fuel are exempt from HAP air quality standards.²⁶

Virginia Department of Environmental Quality (VDEQ)

VDEQ has a dedicated data center web site explaining air permit approval procedures.²⁷ It recently proposed to update its air permit requirements for data centers equipped with diesel generators.²⁸ While these generators are typically designed to meet USEPA Tier 2 requirements with no add-on emission controls, VDEQ has proposed to require that all generators for applications received after July 1, 2026 be equipped with the USEPA Tier 4 controls including selective catalytic reduction (SCR) systems or equivalent for NO_x emission control, a diesel oxidation catalyst system or equivalent for carbon monoxide control, and a diesel particulate filter (DPF) or equivalent for PM emission control.

Oregon Department of Environmental Quality (ODEQ)

²⁶ These state-only policies are likely inadequate to protect public health and may not be legally defensible.

²⁷ VDEQ, Issued Air Permits for Data Centers, <https://www.deq.virginia.gov/news-info/shortcuts/permits/air/issued-air-permits-for-data-centers>

²⁸ VDEQ, Memorandum - APG-576* - Diesel Engine-Generator Set Procedure for Writing New and Modified Permits, December 29, 2025. <https://www.deq.virginia.gov/home/showpublisheddocument/33241/639059863912930000>

ODEQ has a dedicated data center web site explaining air permit approval procedures.²⁹ ODEQ expects data centers using diesel generators that are proposed to meet the federal Tier 2 emission standards to conduct facility-specific dispersion modeling for short-term NAAQS compliance and the Clean Air Oregon Level 3 risk assessment process for HAP.

More recently, ODEQ has created a Tier 4 Streamlined Data Center Permit. When Tier 2 generators are equipped with technology that controls DPM, NOx and VOC and thus meet Tier 4 emission standards, they are not required to conduct facility-specific dispersion modeling.

Washington Department of Ecology (WDOE)

WDOE has a dedicated data center web site explaining air permit approval procedures and provides copies of prior air permits and air quality impact analyses.³⁰ When required, a data center must conduct a dispersion modeling analysis and prepare a health impact assessment of their toxic air pollution for diesel exhaust and nitrogen dioxide. WDOE has published air permit and health impact assessments prepared for 22 data center projects. State only requirements for a new AI data center limit the combined cancer risk from toxic air pollutants to less than 10 in one million.³¹

EXAMPLE DATA CENTER PROJECTS

Lavender Fields Holdings LLC, Michigan City IN^{32, 33}

This data center was issued IDEM Permit No. T091-49561-00195 and applied for a modification to double the number of generators. It will be equipped with one hundred and thirty-two diesel-fired critical emergency generators with combined generating capacity exceeding 400 MW. Generators are designed to comply with USEPA Tier 2 emission limitations so their emissions will be uncontrolled. NOx and CO emissions were synthetically limited in the application to 245 tpy to keep them below major source threshold of 250 tpy, and thus avoid the major source PSD requirements including BACT and ambient air modeling. Potential emissions from other air pollutants assume 500 hours per year of operation. An increased frequency and length of diesel generator use to manage voltage/frequency disturbance events was not modeled. IDEM

²⁹ ODEQ, Tier 4 Streamlined Data Center Permit, <https://www.oregon.gov/deq/air/aqpermits/pages/data-center-permit.aspx>

³⁰ WDOE, Diesel pollution from data centers, <https://ecology.wa.gov/air-climate/air-quality/data-centers>

³¹ WDOE, Health Impact Assessment Recommendation Document for CyrusOne Data Center Quincy, Washington, April 2019. <https://ecology.wa.gov/getattachment/6abc4aa7-6b4b-434b-a76b-a35f5089f8aa/20190425CyrusOneTier2HiARec.pdf>

³² Indiana Department of Environmental Management, Lavender Fields Holdings LLC, Permit No. T091-49561-00195, New Source Construction and Part 70 Operating Permit, Addendum to the Technical Support Document (ATSD) for a New Source Construction and Part 70 Operating Permit, Technical Support Document (TSD) for a New Source Construction and Part 70 Operating Permit.

³³ Olsson, Air Construction Permit Application for Lavender Fields Holdings LLC, June 15, 2026.

estimated emissions of organic HAP but not inorganic HAP. Since the PSD requirements did not apply, no dispersion modeling analysis was conducted to verify compliance with the NAAQS or HAP air quality standards. In response to public comments, IDEM notes it has no authority to require specific technology (such as Tier 4 add-on control equipment), or down-wind fence-line ambient monitoring. A public meeting held December 9, 2025. The draft permit was submitted to USEPA for review on March 4, 2026. A final permit has not been issued.

Vantage Data Centers Management Company, LLC, Port Washington, WI³⁴

This Vantage WI-1 Data Center project will be issued WDNR Construction Permit No. 25-MIN-094. It is equipped with forty-five (45) diesel-fired emergency generators with combined generating capacity of 87 MW. The generators were designed to comply with USEPA Tier 2 emission limitations so the emissions are uncontrolled. An annual fuel usage limitation was established to limit potential annual emissions. Potential NOx emissions were 49 tpy and less than the major source threshold of 250 tpy. The hourly total emission rate of NOx is 200 times the annual average emission rate. The WDNR did conduct dispersion modeling for the annual average NAAQS for NO2 using the annual average emission rate and determined compliance. This approach is typical for intermittent sources approved in Wisconsin. No further dispersion modeling was conducted due to WDNR policies which: 1) eliminate modeling for compliance with the 1-hour NAAQS for NO2 for intermittent sources, 2) assume no direct PM2.5 emissions can cause an exceedance of the NAAQS, and 3) combustion of diesel fuel is exempt from state HAP air quality standards. Public meeting was held on April 14, 2026.

It's worth noting that the Vantage project in Wisconsin was required to conduct no dispersion modeling analysis and use no add-on emission control equipment. However, for its smaller project in Washington State, Vantage was required to evaluate its impacts and use add-on controls. The Vantage Data Center – WA-13 Expansion Project in Quincy, WA was required to conduct a health assessment in 2022. The health assessment evaluated air quality impacts due to emissions of NOx and HAP. Cancer risks were assessed for carcinogenic TAP and compliance with state acceptable source impact levels were determined for other non-carcinogenic HAP. WDOE eventually required the diesel generators at this site to comply with the federal Tier 4 emission control requirements including the installation of add-on particulate and nitrogen oxide controls consisting of catalyzed diesel particulate filters and selective catalytic reduction to further reduce emissions.

³⁴ WDNR, Preliminary Determination for the Construction Permit for the Proposed Construction of a Data Center and Analysis and Preliminary Determination for the Operation Permit for a Data Center for Vantage WI-1 to be Located at N43430735 W 87861494, Port Washington, Ozaukee County, Wisconsin, Construction Permit No.: 25-MIN-094, Operation Permit No.: 24618528A-F01, Facility ID No.: 24618528, February 26, 2026.

Sierra Club and Midwest Environmental Advocates arranged for a dispersion modeling analysis to be conducted for the Vantage project in Wisconsin. The modeling results were submitted to the WDNR during the public comment period on the draft permit. This analysis shows that if the generators operated continuously for the entire year the following impacts would occur: 1) the 1-hour average NAAQS for NO₂ would be exceeded, 2) the annual average NAAQS for PM_{2.5} would be exceeded, and 3) the combined off-site inhalation cancer risk would exceed one in one million.³⁵

Figure 1 presents the NO₂ modeling results for the Vantage WI-1 Data Center submitted to the WDNR for consideration. These are based on all proposed diesel generators operating continuously throughout the year. The maximum 1-hour average NO₂ concentration was predicted to be 2,542 µg/m³, well above the NAAQS of 188 µg/m³. Violations of the NAAQS are predicted to be exceeded out to a distance of 16 km or 10 miles.

This is an example of a data center located in flat terrain. Had it been located in a valley, the impacts would have increased significantly.

Since there is no limitation on the operating hours of the generators during emergencies, these results are technically possible. An example of emergency use would be the management of voltage/frequency disturbances.

³⁵ Evaluation of Air Quality Impacts of Vantage WI-1 Data Center, Memorandum from S. Klafka, P.E., BCEE, Wingra Engineering to E. Ward, Director, Sierra Club, Wisconsin Chapter and M. Gelf, Legal Fellow, Midwest Environmental Advocates, April 13, 2006.

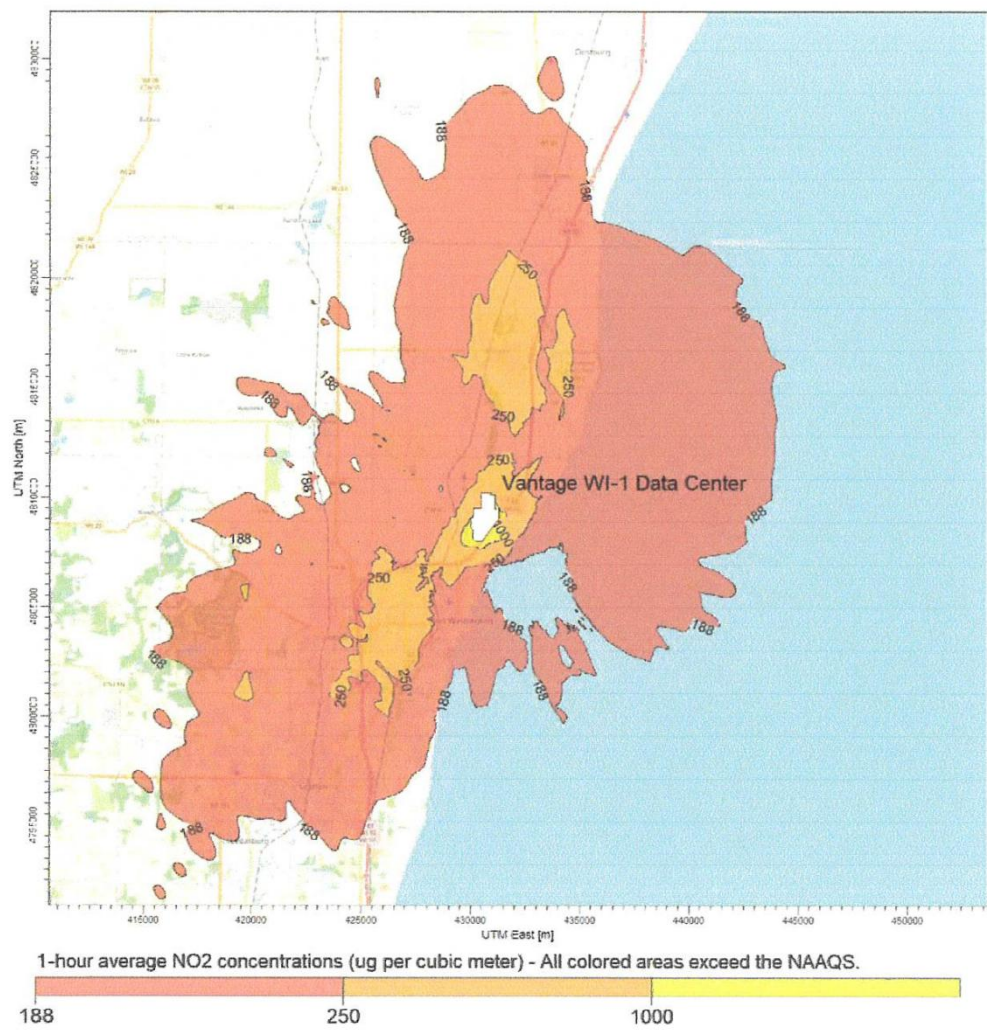


Figure 1 – Vantage WI-1 Data Center Predicted 1-hour Average NO₂ Concentrations

DATA CENTER AIR PERMIT EVALUATION PROCEDURES

When evaluating a new or existing data center equipped with a large number of diesel generators for backup power, here is a list of issues to consider and design alternatives for reducing the project air quality impacts:

Emission Estimates

- If not already provided in the permit application, the reviewing agency should provide emission estimates of all criteria air pollutants and HAP.
- USEPA emission factors for large stationary diesel and all stationary dual-fuel engines are typically used to estimate emissions of criteria air pollutants and organic HAP.³⁶ This section does not provide factors for inorganic HAP but these are available from USEPA for the combustion of distillate fuel oil.³⁷
- Estimates should include peak hourly emissions, approved annual emissions based on any proposed limitations on fuel consumption or operating hours, and maximum annual emissions assuming full-time operation for the entire year.

Dispersion Modeling

- If not already provided in the permit application, a dispersion modeling analysis should be conducted by the reviewing agency to verify compliance and identify possible exceedances of the NAAQS and air quality standards for HAP emissions.
- The modeling analysis should use local meteorology, topography, fenced property boundaries, and consider the downwash effects of data center buildings and structures.
- While maximum concentrations are typically provided for comparison with air quality standards, the concentrations which occur in overburdened neighborhoods should be provided with the results. Figures displaying concentration contours or isopleths should be provided to show the extent of likely air quality impacts.
- For a modeling analysis, the maximum predicted air pollutant concentrations due to emissions from the data center are typically added to background concentrations representative of the location, and the total is then compared with the NAAQS. If there are existing air pollution sources in the area, the background concentration will be high and closer to the NAAQS. It is important that a representative and high background concentration be selected.

³⁶ USEPA, AP-42: Compilation of Air Emissions Factors from Stationary Sources, 3.4 Large Stationary Diesel And All Stationary Dual-fuel Engines, April 2025. https://www.epa.gov/system/files/documents/2025-04/c03s04_april2025.pdf, April 20, 2026.

³⁷ USEPA, AP-42: Compilation of Air Emissions Factors from Stationary Sources, 1.3 Fuel Oil Combustion, May 2010, https://www.epa.gov/sites/default/files/2020-09/documents/1.3_fuel_oil_combustion.pdf, April 20, 2026.

- The modeling analysis may include only the diesel generators at an AI data center if it is located in a rural area and there are no other industrial sources. However, the AERMOD dispersion model approved by USEPA can provide reliable concentration estimates for an area within 50 km or 31 miles from the data center. If there are other industrial sources within this distance, they should be included with the data center to determine the combined impact and compliance with the NAAQS.
- If no dispersion modeling analysis will be conducted for a project, request that the stack heights be no lower than GEP to assure adequate dispersion of air pollutant emissions.
- If no dispersion modeling analysis will be conducted for a project, request that diesel generators be equipped with add-on emission control equipment which comply with USEPA Tier 4 emission limitations.

Compliance Demonstration and Testing

- Any limitations on total operating hours or fuel usage should be verified with permit recordkeeping requirements that are publicly available. These limits on hours and fuel usage are typically established so the project is classified as a synthetic minor source for air permit requirements.
- Records of the actual operation of each diesel generator should be included in the permit recordkeeping to help investigate future complaints or air quality problems.
- A limitation on operating hours for emergencies including voltage/frequency disturbances should be established. Otherwise, the emission estimates and modeling analysis should be based on full-time operation, 8,760 hours per year.
- Request that stack testing be conducted after construction to verify compliance with air permit and USEPA emission limitations.

Ambient Monitoring

- A dispersion modeling analysis should identify the locations of maximum off-site impact on a figure of the project area.
- *Ambient monitors should be located at the point of maximum off-site air quality impacts to verify compliance with the NAAQS.*
- While USEPA and state agencies operate monitoring networks, these are primarily designed to measure regional background concentrations not the impacts of specific industrial air pollution sources like data centers.
- *The types of monitors already in use by the USEPA and state agencies are ideal since they have established design, maintenance and certification procedures. However, their large costs limit adoption.*
- Typically, each air pollutant requires its own type of monitor or sampling method.

- The air pollutants anticipated to have the greatest impacts relative to their NAAQS would be NO₂ and PM_{2.5}. These would be the first choice for ambient monitoring.
- Low-cost air quality monitors and sensors are supported by USEPA and are now in widespread use by individuals and government agencies.³⁸
- Thousands of low-cost sensors sold by PurpleAir are in wide use, and continuous report PM_{2.5} measurements to the internet for public access.³⁹
- The NAACP policy recommendations for data centers in Maryland include ambient monitoring: “Implement community-led monitoring (low-cost air sensors for GHGs and co-pollutants)”⁴⁰
- To supplement USEPA and state agency regional monitors, communities have installed low-cost monitoring networks. Denver has established a low-cost monitoring network for 17 air pollutants which continuous measurements uploaded to the internet.⁴¹ Madison, Wisconsin operates 45 sensors for PM_{2.5}.⁴²
- Request that the air permit for a data center require development of a monitoring plan for the installation of low-cost monitors and sensors to provide continuous measurements at the point of maximum impact, and at numerous sensitive locations around diesel generators at the AI data center to accommodate changes in wind directions and include more impacted neighborhoods.

Distance and Vegetation Buffers

- Air quality impacts decrease with distance so the larger the buffer area between the diesel generators at an AI data center and sensitive receptors (i.e. residential areas, schools, daycare centers, etc.), the better.
- Vegetation and landscaping berms may reduce large fugitive dust emissions from roadways and construction, and also reduce noise levels.
- The NAACP recommendations for data centers suggests that:⁴³ “Best practice recommends minimum setbacks for sensitive receptors (schools, daycares, churches, senior facilities) of ≥1,000 meters (≈0.6 miles) without vegetative buffers, or ≥750 meters with dense, engineered vegetative buffers designed for particulate interception.”

³⁸ USEPA, Air Sensor Toolbox, <https://www.epa.gov/air-sensor-toolbox>

³⁹ <https://www2.purpleair.com/>

⁴⁰ NAACP, The Peoples Report, p.28, A Gap Analysis of Data Center Infrastructure in Prince George’s County, Maryland.

⁴¹ City of Denver, Love My Air, <https://denver.lovemyair.com/>

⁴² City of Madison, Air Quality Monitoring for Our City, <https://www.cityofmadison.com/sustainability/climate/air-quality>

⁴³ NAACP, The Peoples Report, p.30, A Gap Analysis of Data Center Infrastructure in Prince George’s County, Maryland.

Alternative Project Design⁴⁴

- Reduce or eliminate diesel generators usage by installing battery energy storage.
- Reduce diesel generator usage by eliminating operation for momentary grid disturbances, bridging power, demand response, planned outages, or primary power.
- Reduce diesel generator usage by improving electrical grid reliability with electrical storage, or upgrades to the aging distribution network.
- Reduce diesel generator usage by designing power controls to ride through momentary grid disturbances rather than immediately switching to backup power.
- Reduce diesel generator usage and required capacity by using more efficient data center design with load shifting or delaying workloads.
- Tier 4 add-on control equipment is readily available as a voluntary measure to reduce air quality impacts.

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Task Force assessment of impacts of AI-driven data centers in Prince George's County, Maryland identifying information gaps related to environmental justice and civil rights, air quality, energy justice, and water infrastructure. Provides recommendations that are equity, justice, and health focused.

Center for Study of Science, Technology and Policy, The Diesel Generator Dilemma: Reliable Power, Unwanted Emissions.

Reviews diesel generator usage in India noting they contribute 7%–18% of the total air pollution in non-attainment cities. Provides a history of improvements including new emission standards, installation of add-on controls, and use of dual-fuel generators, emission and testing standards, and recommendations for future improvements including maintenance requirements and changing to other energy alternatives like solar panels, batteries and hydrogen fuel cells.

Tong, Z. and Zhang, K.M., The near-source impacts of diesel backup generators in urban environments, Atmospheric Environment 109 (2015) 262-271.

A dispersion modeling analysis was conducted to evaluate particulate matter concentrations downwind of a diesel generator in urban street canyons. Tall buildings cause recirculation of

⁴⁴ Better Data Center Project: Diesel Generators at Data Centers: Status, Impacts, and Protective Practices, March 2026. <https://betterdatacenterproject.com/resources/diesel-generator-report>, April 20, 2026.

emissions and high PM concentrations. Suggests the location of generators considers air flow around buildings and away from fresh air building intakes.

Better Data Center Project: [Diesel Generators at Data Centers: Status, Impacts, and Protective Practices](#), March 2026.

Reviews the ubiquitous presence of diesel generators at data centers, the air, noise, spill and climate impacts, and best practices to reduce harm.

[Northern Virginia data center air pollution rivals power plant emissions, VCU research finds](#)
<https://news.vcu.edu/article/northern-virginia-data-center-air-pollution-rivals-power-plant-emissions>; https://scholarscompass.vcu.edu/isee_pubs/3/

Examines the actual and future emissions backup generators at data centers in Northern Virginia, compares them to other sources, correlates them with demographic characteristics *such as race, income, and education*.

Inside Climate News, Virginia Regulators Weigh Expanded Use of Data Center’s Polluting Generators

<https://insideclimatenews.org/news/15122025/virginia-regulators-weigh-expanded-use-of-data-centers-polluting-generators/>, December 15, 2025

The state’s Department of Environmental Quality would expand permissible uses during emergencies to include “planned outages” by grid operators, presumably for power line upgrades. *Environmentalists say that with expanded use of diesel generators comes more harmful air pollutants and more greenhouse gases.*

Data Centers’ Use of Diesel Generators for Backup Power Is Commonplace—and Problematic
<https://insideclimatenews.org/news/12112025/data-center-diesel-generators-noise-pollution/>

“Energy analysts and environmentalists say diesel generators are expensive, noisy, highly polluting and exempt from Clean Air Act regulations in times of energy “emergencies.”

AI’s deadly air pollution toll

<https://news.ucr.edu/articles/2024/12/09/ais-deadly-air-pollution-toll>

This article summarizes a recent UC Riverside paper, *The Unpaid Toll: Quantifying and Addressing the Public Health Impact of Data Centers*, UC Riverside, R1T, Caltech, October 2025. *This paper introduces a principled methodology to model lifecycle pollutant emissions for data centers and computing tasks, quantifying the public health impacts. Researchers found that:*

“Computer processing demands for artificial intelligence, or AI, are spurring increasing levels of deadly air pollution from power plants and backup diesel generators that continuously supply electricity to the fast-growing number of computer processing centers.”

and,

“For example, pollution from backup generators at data centers in Northern Virginia drifts into Maryland, West Virginia, Pennsylvania, New York, New Jersey, Delaware, and the District of Columbia, creating regional public health costs of some \$190 million to \$260 million a year. If these backup generators emit at their maximum permitted level, the annual cost will become 10-fold and reach \$1.9 billion to \$2.6 billion.”