



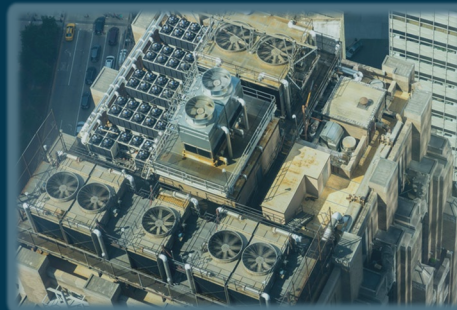
Joint Planning Board-Town Council Work Session on Data Centers

January 22, 2026



Data Center Presentation

- Data Centers
- Energy Consumption
- Water Consumption
- Environmental Impact
- Noise
- Land Use
- Economic Impact
- Traffic Generation
- Public Health & Safety
- Regulation Comparison



Data Centers

What is a data center?

A data center is a facility that provides computational services such as cloud computing, data storage, artificial intelligence (AI), cryptocurrency mining, and high-performance computing. These facilities support critical services, including email, streaming, online banking, social media, and medical records.

Types of Data Centers

Enterprise and Internal:

Are typically owned, operated, and located on-site by a single company. They may be as small as a server closet, or as large as a server room/building that provides services to internal users.

Example of this would be the internal server room located within Apex Town Hall that allows staff to host and share internal information throughout the organization to better serve the Town's departments and daily operations.

Types of Data Centers

Colocation (small, medium, large scale):

Colocation data centers operate much like a multi-tenant shopping center, where businesses lease space from a data center owner in the form of individual server racks or, in some cases, entire dedicated server rooms.

In some cases, companies leasing space from the data center operator may need to have physical access to their servers to maintain specific equipment or operations. Due to this, companies prefer to utilize and partner with colocation facilities within roughly 30–60 miles of their offices.

Types of Data Centers

Hyperscale:

Hyperscale Data Centers are large-scale facilities that provide behind-the-scenes digital services supporting much of the modern internet. Unlike other types of data centers, hyperscale facilities are typically built for and fully occupied by a single company that owns and operates the site to support its own large-scale cloud, or AI (Artificial Intelligence) services.

Common characteristics of hyperscale data centers include:

- Energy demand: ~100 MW or more
- Water demand: ~1 Million Gallons Per Daily (MGD) or more
- Number of servers: ~5,000 or more
- Redundancy Tiers: III or IV

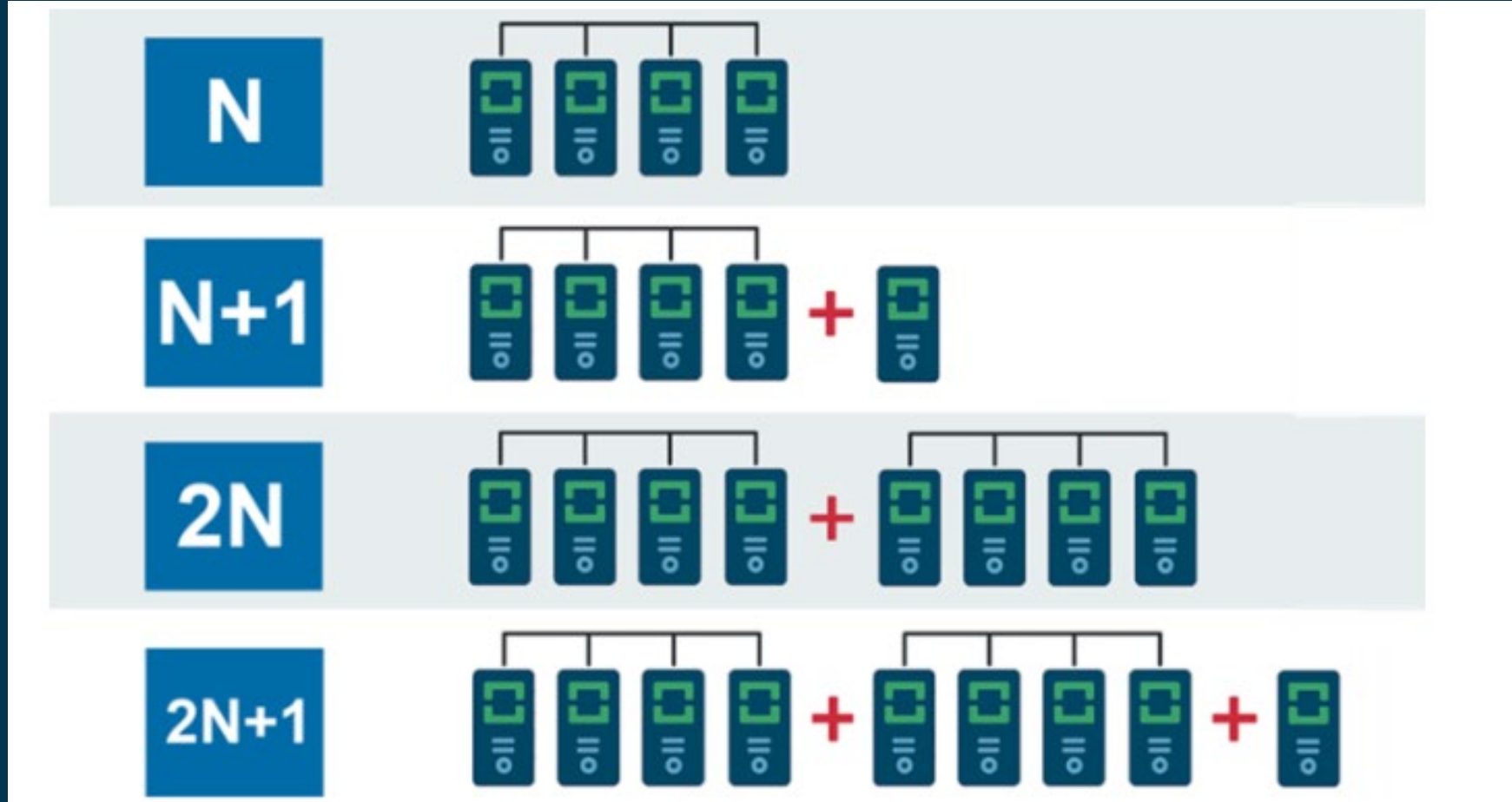
Data Centers

What are data center redundancies?

Level	Tier I	Tier II	Tier III	Tier IV
Redundancy	No	Partial; redundant components	N+1	2N or 2N+1
Redundant Distribution Paths (Energy, Cooling)	No	No	Yes, but only one path active at a time	Yes, all paths active simultaneously
Uptime Guarantee	99.671%	99.741%	99.982%	99.995%
Downtime per Year	28.8 hours	22 hours	1.6 hours	0.4 hours
Concurrently Maintainable	No; maintenance requires downtime	No; maintenance requires downtime	Yes, without taking data center offline	Yes, without taking data center offline
Cost	Moderate	High	Very High	Extremely High

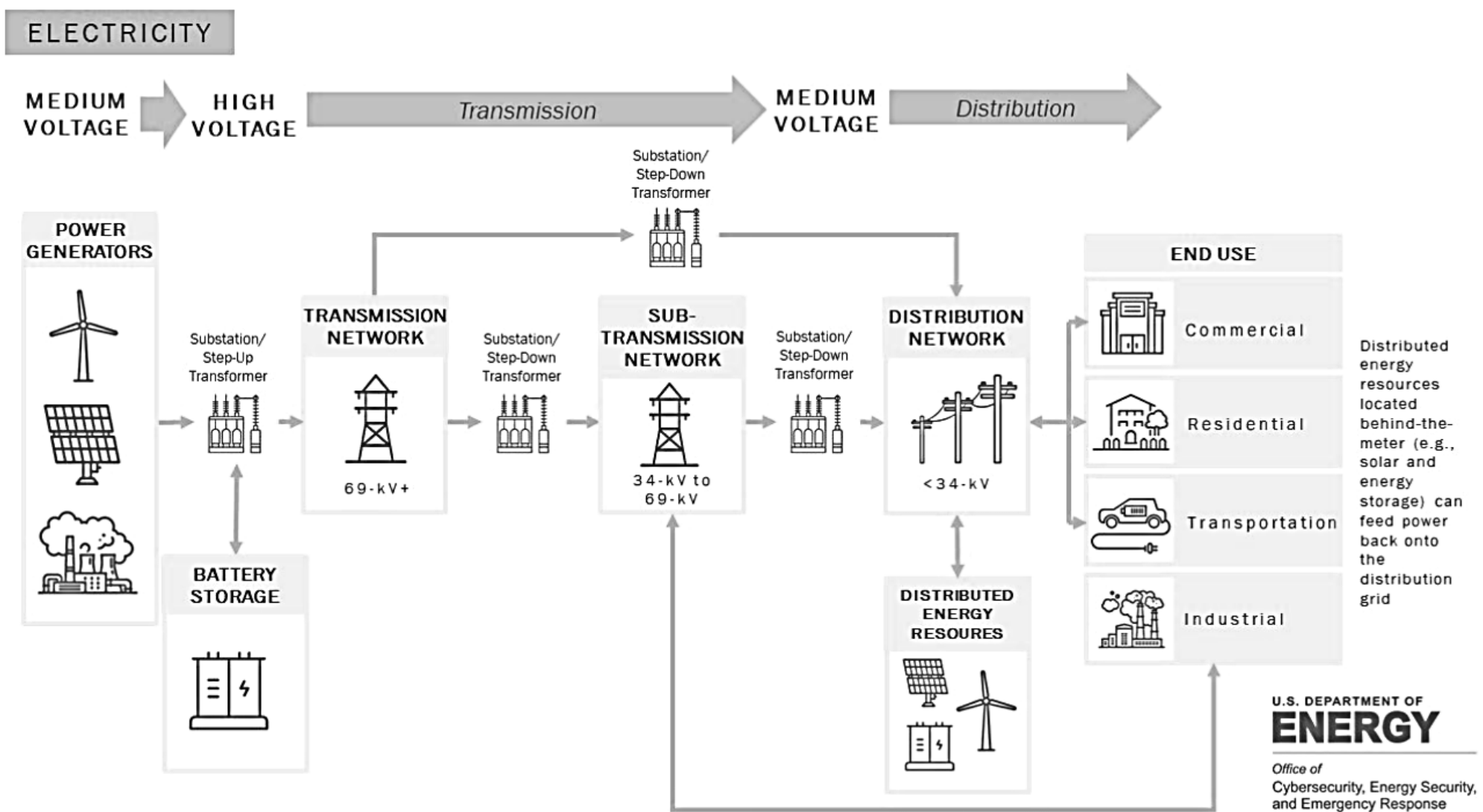
Data Centers

Visual example of redundancy tiers I-IV



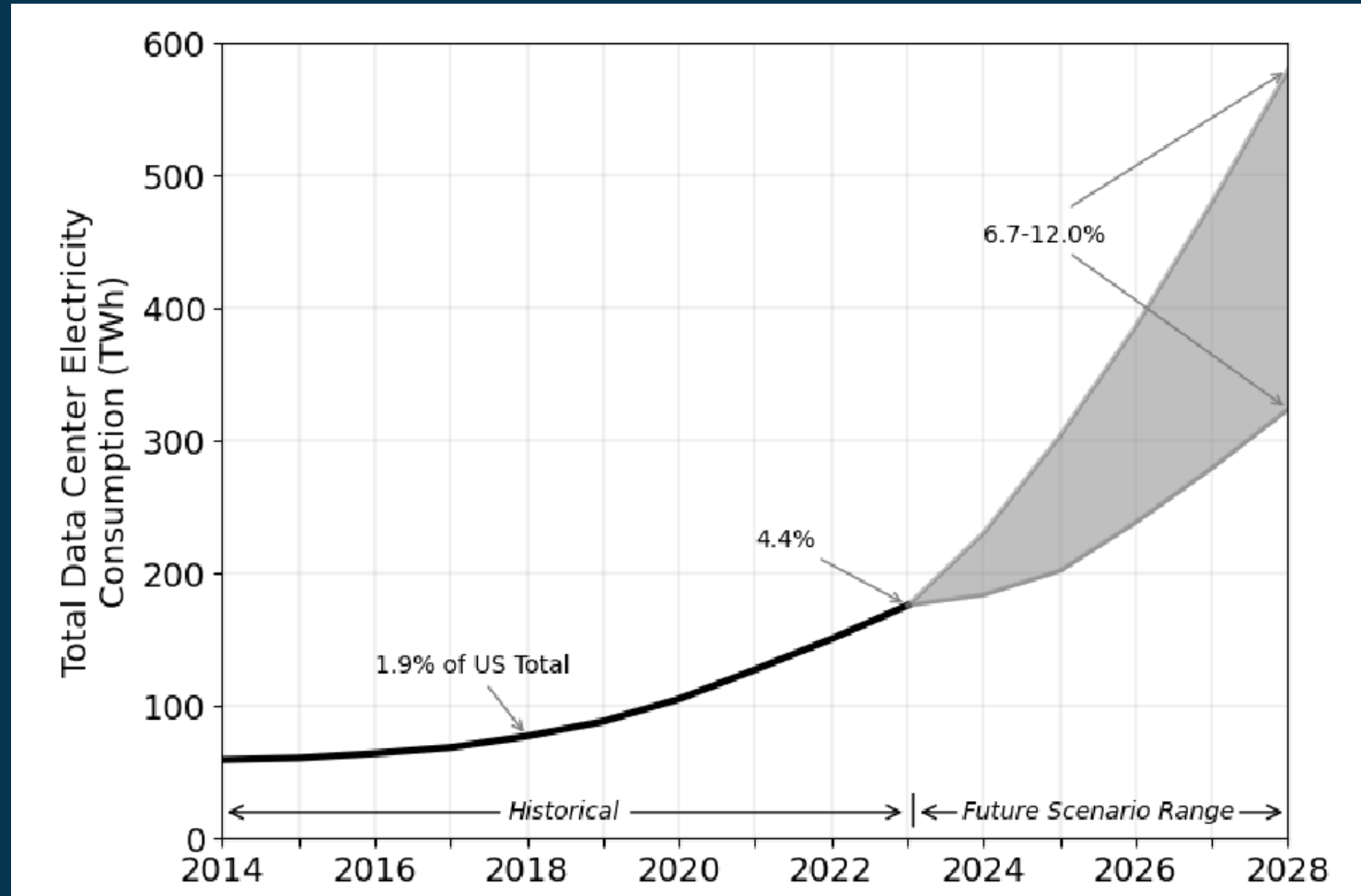
Source: <https://phoenixnap.com/>

Understanding the Grid



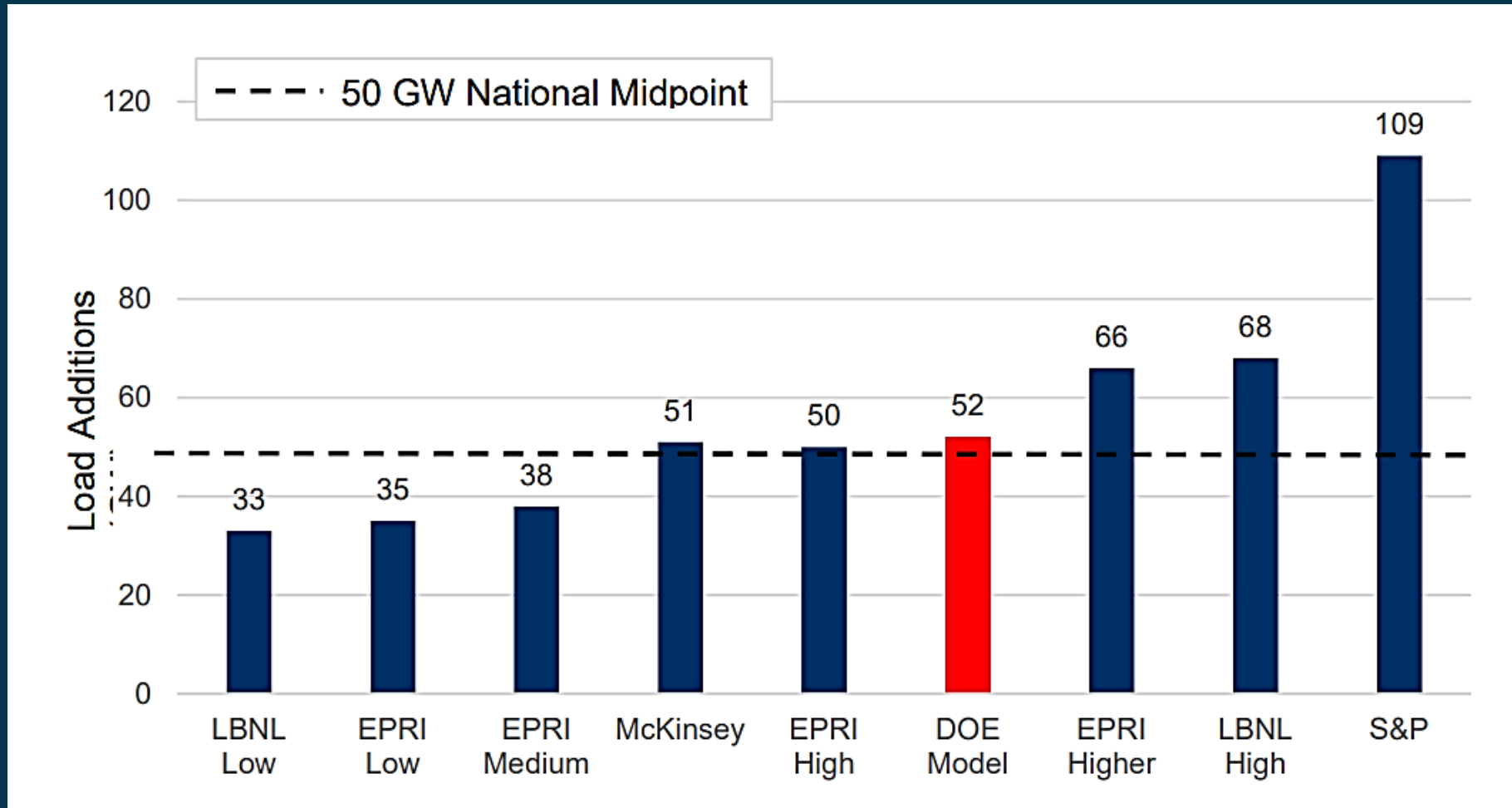
Energy Consumption

Total Data Center Electricity Consumption (TWh)



Source: Shehabi et al., 2024 United States Data Center Energy Usage Report, LBNL 2001637

Energy Consumption Additional Load Demand



Source: U.S. Department of Energy, Resource Adequacy Report – Evaluating the Reliability and Security of the U.S. Electric Grid, July 2025

Energy Consumption

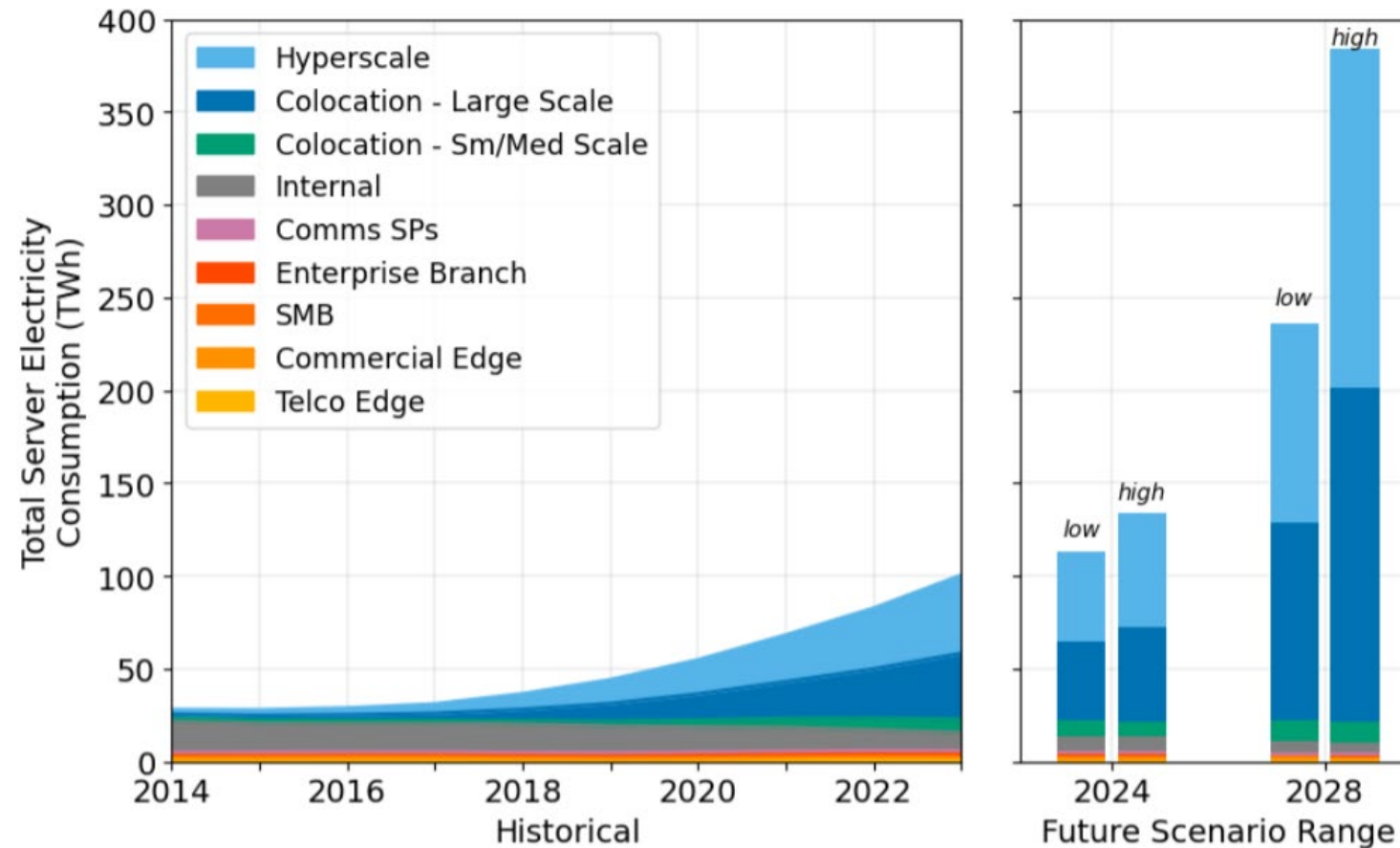
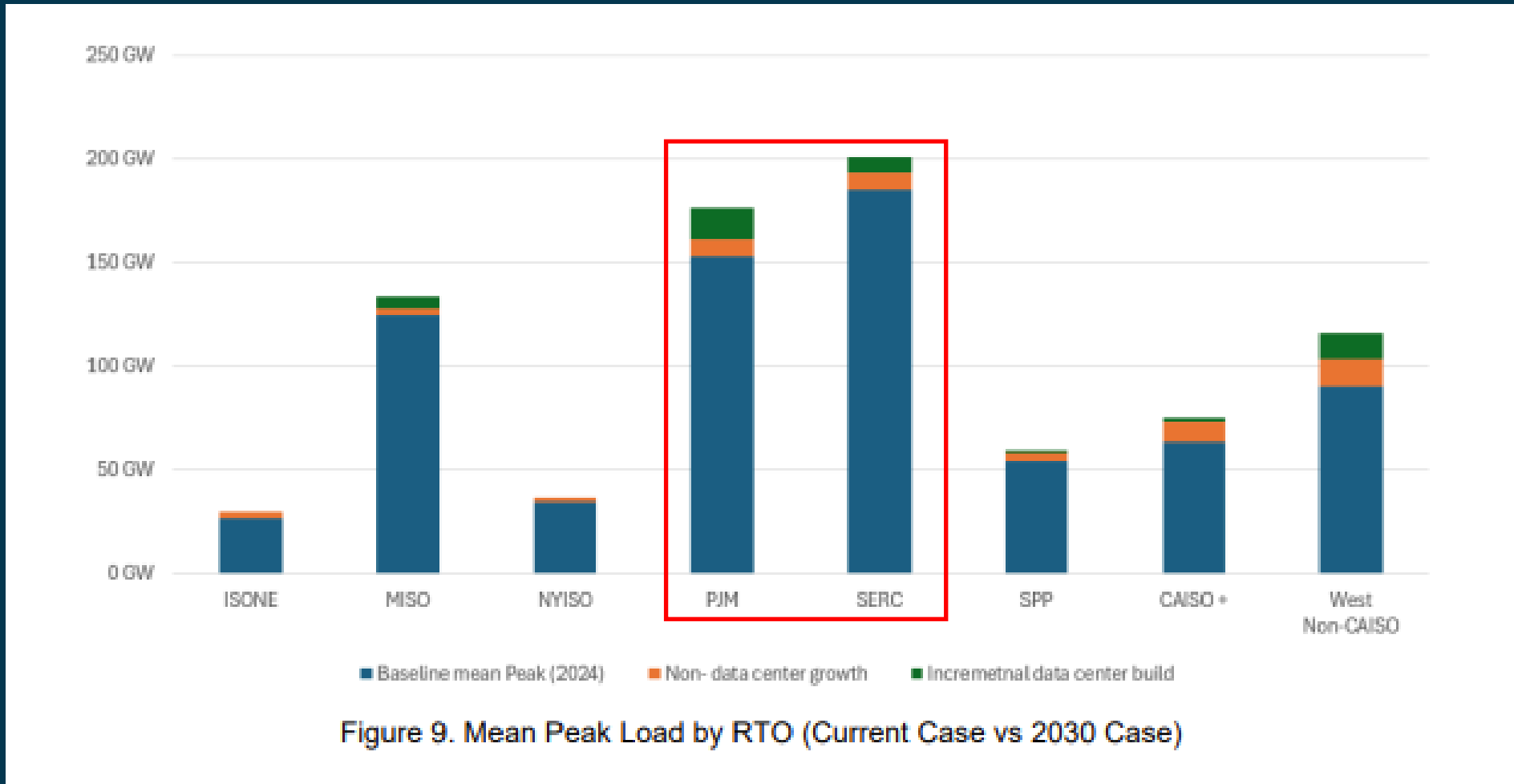


Figure 5.2. Server annual electricity use by space type.

Source: Shehabi, A. et al. (2024). United States Data Center Energy Usage Report. LBNL-2001637, Lawrence Berkeley National Laboratory.

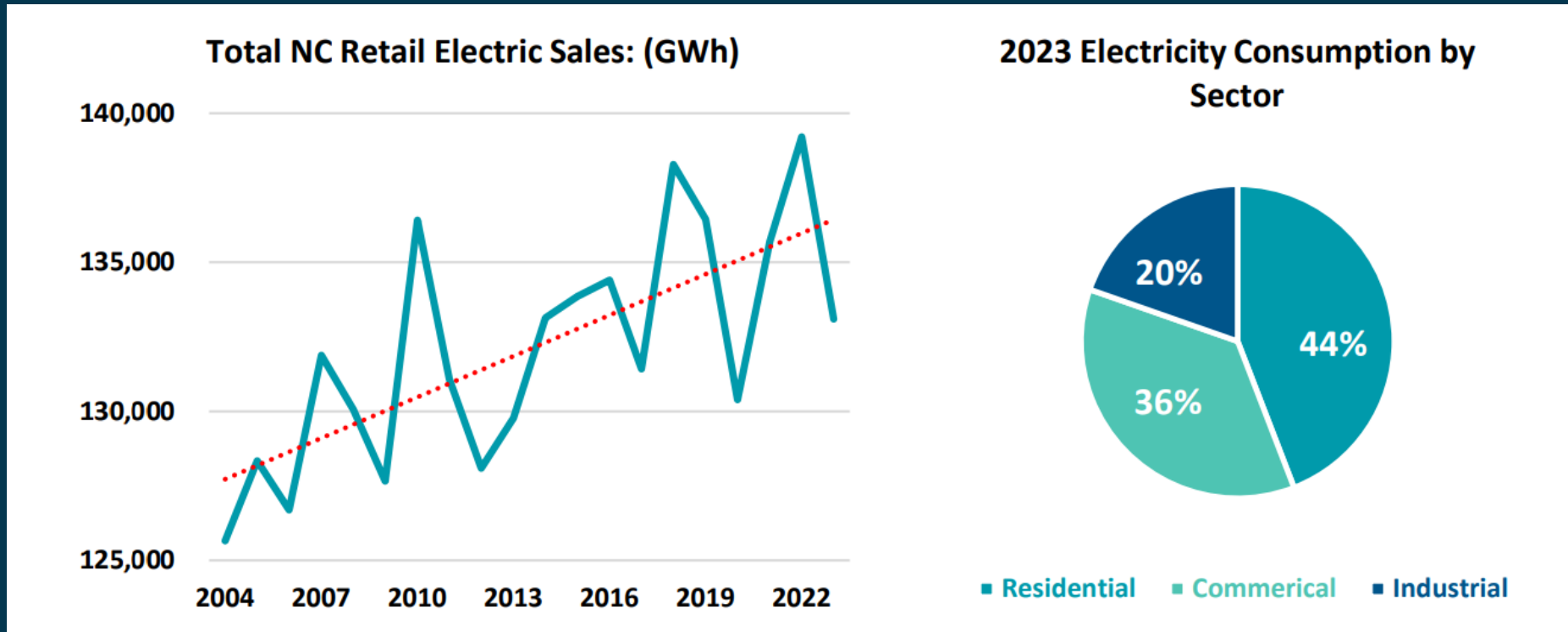
Energy Consumption

Anticipated mean peak load 2030



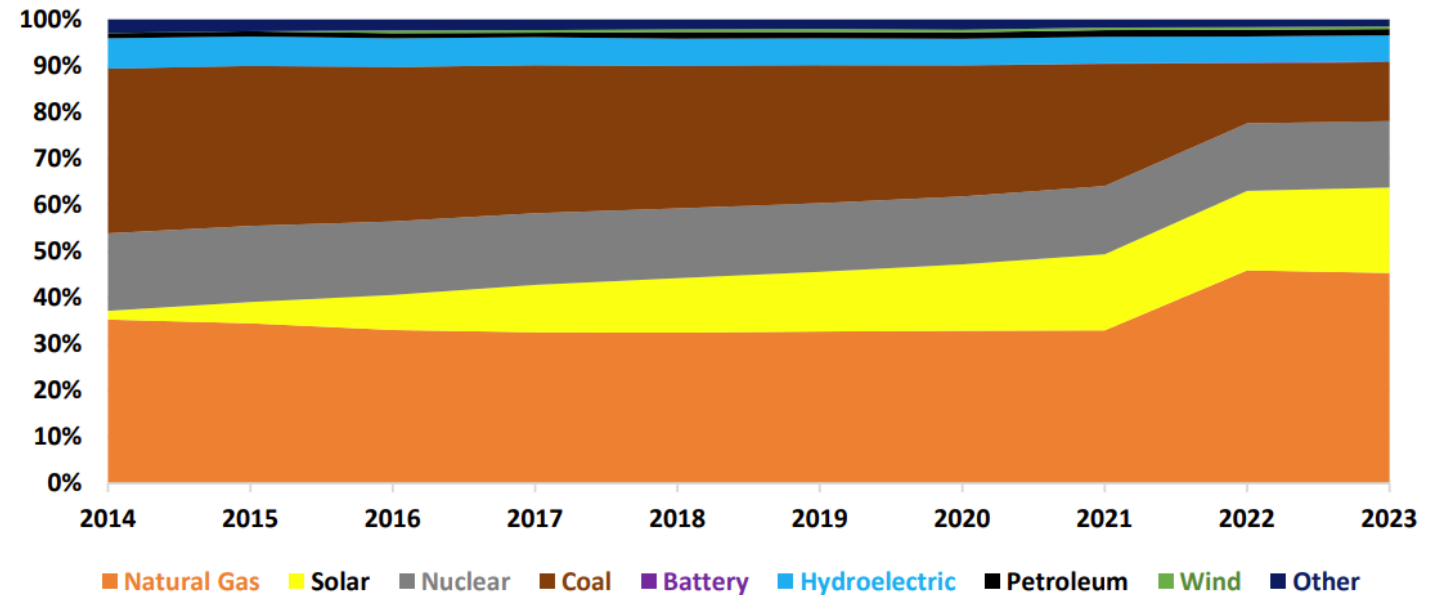
Source: U.S. Department of Energy, Resource Adequacy Report – Evaluating the Reliability and Security of the U.S. Electric Grid, July 2025

Energy Consumption

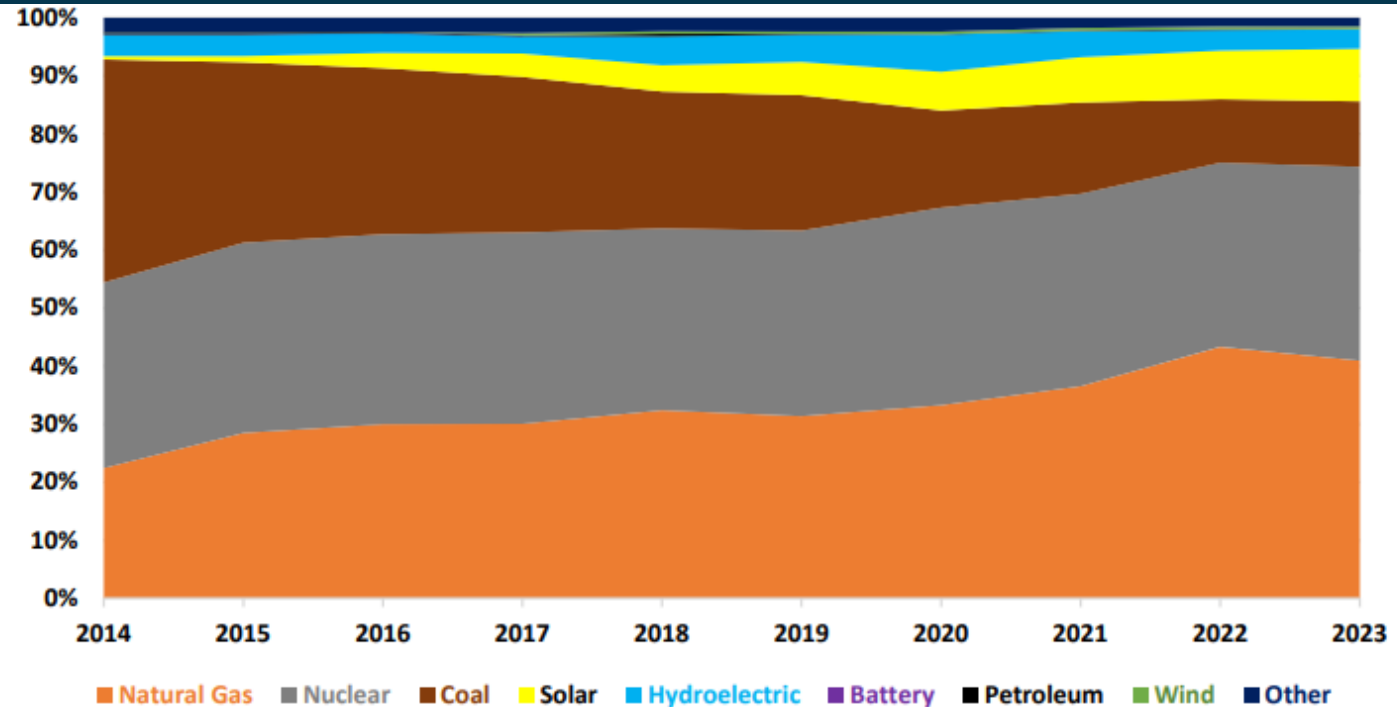


Source: NCDEQ. (2025). North Carolina Energy Security Plan: Final Report. State Energy Office.

Installed Capacity by Fuel Type

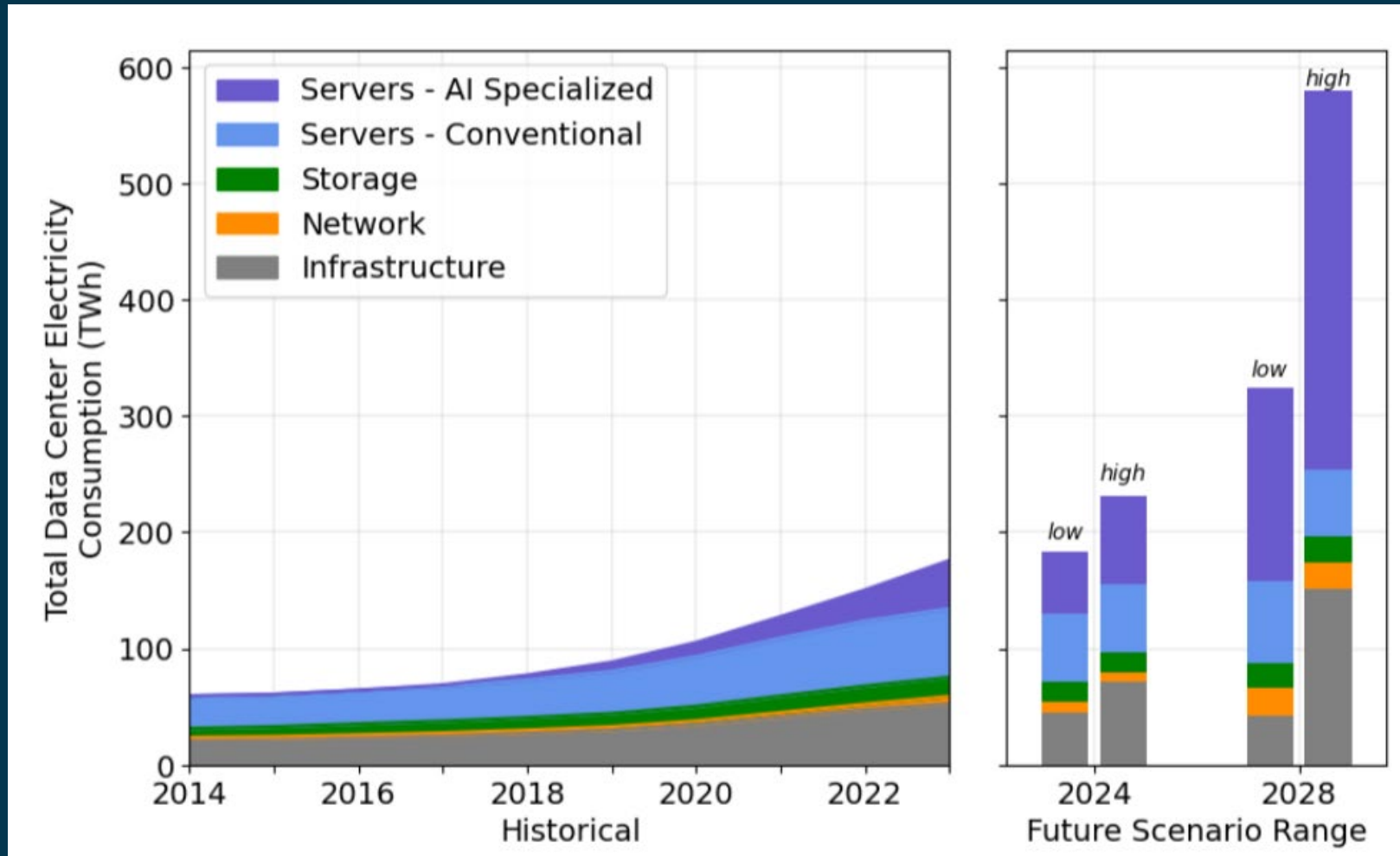


Generation by Fuel Type



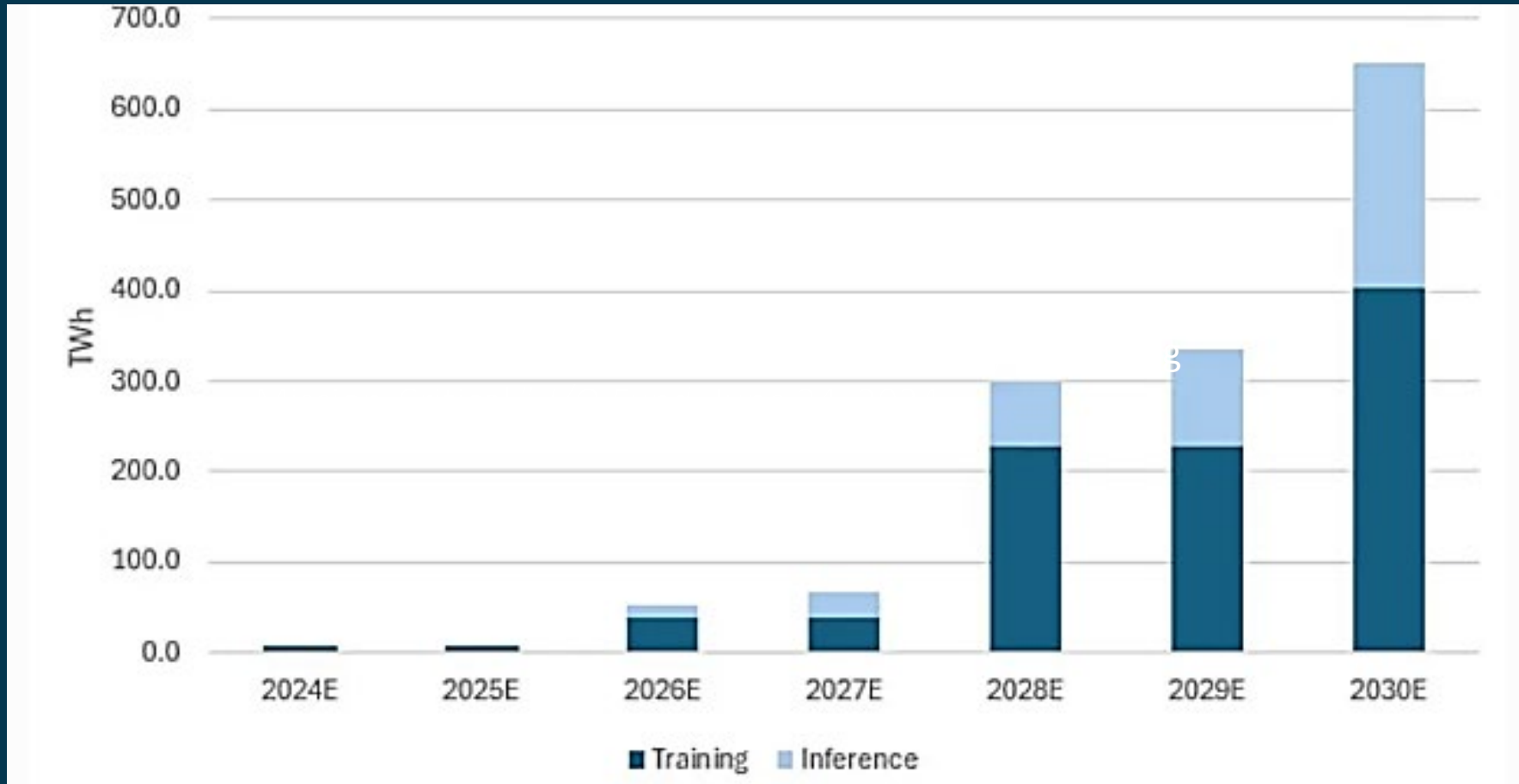
Source: NCDEQ. (2025). North Carolina Energy Security Plan: Final Report. State Energy Office.

Impact of Artificial Intelligence



Source: Shehabi, A. et al. (2024). United States Data Center Energy Usage Report. LBNL-2001637, Lawrence Berkeley National Laboratory.

Impact of Artificial Intelligence



Source: Beth Kindig, "AI Power Consumption: Rapidly Becoming Mission-Critical," *I/O Fund*, June 24, 2024

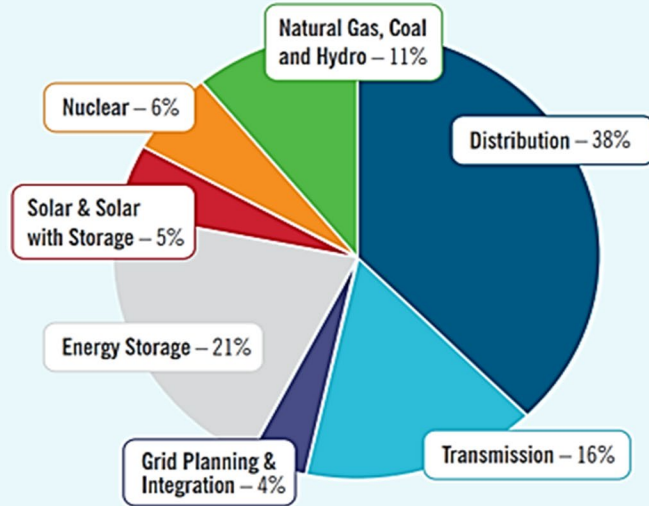
Energy Consumption

Future Generation (Near Apex)

- 356 MW of standalone Battery Energy Storage Systems (BESS) in New Hill
- 100 MW of Solar in Longleaf
- 900 MW of Nuclear at Shearon Harris

2027-2028 Multiyear Rate Plan Investments

As part of this rate request, Duke Energy has proposed \$8.3 billion in new investments represented in the chart below.*



Distribution – \$3.2 billion across 436 projects

Transmission – \$1.3 billion across 603 projects

Grid Planning & Integration – \$302 million across 96 projects

Energy Storage – \$1.7 billion across 13 projects

Solar & Solar with Storage – \$391 million across 5 projects

Nuclear – \$502 million across 48 projects

Natural Gas, Coal and Hydro – \$934 million across 198 projects

*Represents North Carolina retail portion of system investments.

Proposed Rate Change by Customer Class

Customer Class DEC	% Increase Jan. 1, 2027	% increase Jan. 1, 2028	Customer class DEP	% increase Jan 1, 2027	% increase Jan. 1, 2028
Overall	10.9%	4.1%	Overall	10.9%	4.1%
Residential	13.5%	4.5%	Residential	13.9%	4.3%
General service	7.3%	4.0%	SGS	9.8%	4.8%
Industrial	9.0%	3.7%	MGS	6.4%	4.3%
OPT (Business TOU)	8.3%	3.6%	LGS	5.4%	3.6%

Source: Duke Energy, 2025 NC Rate Case Fact Sheet.

Energy Consumption

Large Load Users

Duke Energy is exploring ways to work with large electricity users, such as data centers, manufacturing facilities, and any other use exceeding 50 MW of power.

In SC, Duke reached a settlement with the Sierra Club and other interested parties to petition the state's utility commission to require additional items as part of their review and approval of new energy request.

This may include:

1. Minimum contract period and contract demand for billing purposes;
2. Collateral requirements;
3. Exit policies and restrictions on customer capacity reduction;
4. Treatment of generation, transmission, and administrative costs;
5. Interconnection costs, including opportunities to support grid-enhancing technologies to manage interconnection costs;
6. Optional tariff provisions for flexible interconnections; and
7. Optional tariff provisions for management of clean behind-the-meter resources and optional clean transition tariffs to enable direct selection of new clean energy resources.

Energy Consumption

Policy Considerations & Potential Mitigation Measures

- Evaluating if an Electrical Load Study detailing the project's anticipated diversified load and peak demand for both summer and winter seasons would help the Town understand any potential impact to the local grid.
- Encouraging data centers to set a Power Usage Effectiveness (PUE) ratio goal to maximize efficiency (perhaps a goal of 1.25 or lower) and to provide the Town with annual report on the data center's PUE.
- Evaluating alternative on-site generation or energy storage.

Water Consumption

The primary water use for a data center comes from cooling computing equipment. The amount of water necessary will be dependent on factors such as:

- Size of the system (number of units, racks, etc.)
- Cooling method - liquid (evaporative) vs air cooling (less water)

A hyperscale data center may require ~1–5+ MGD (365 million gallons – 1.83 billion gallons annually).

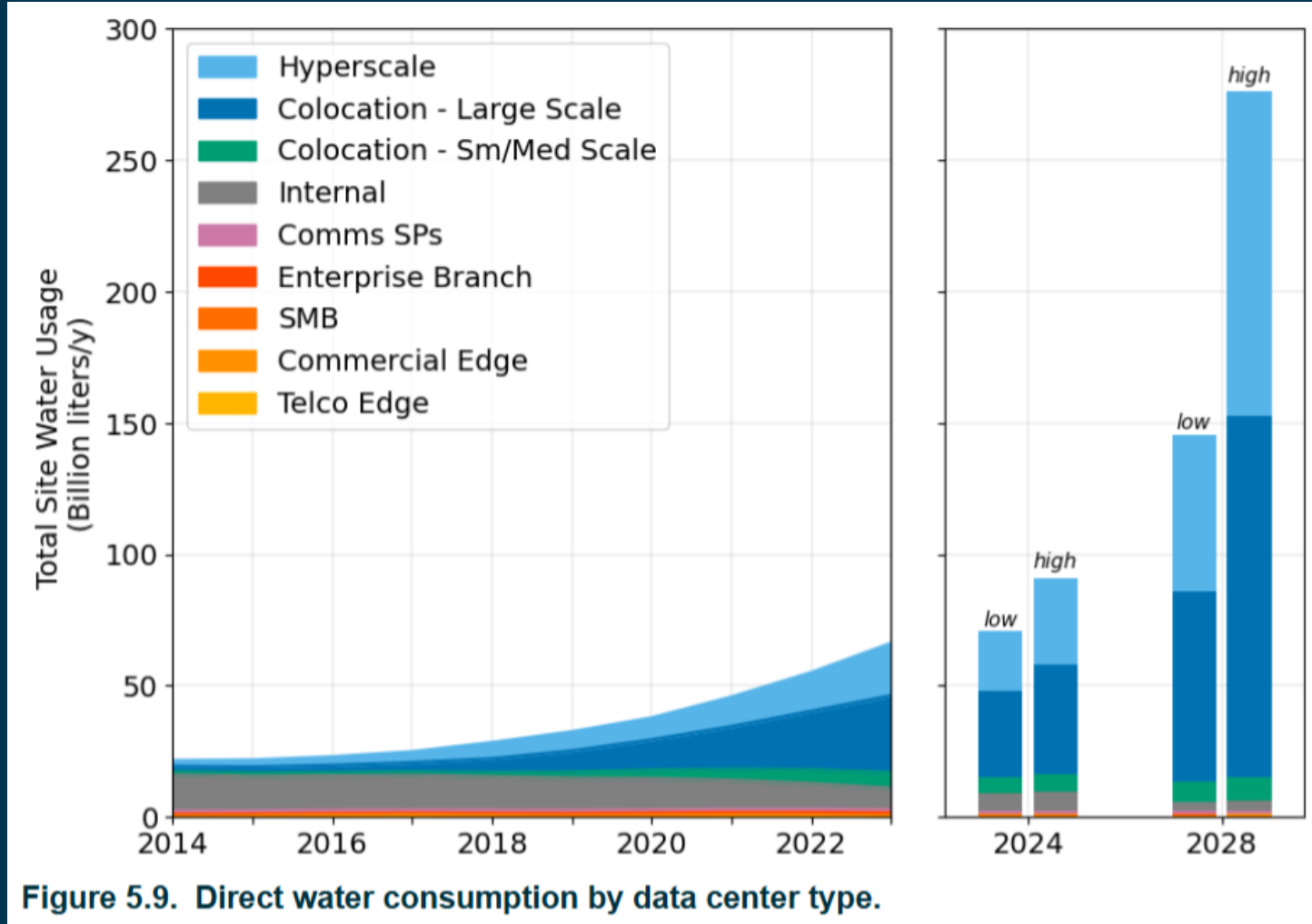
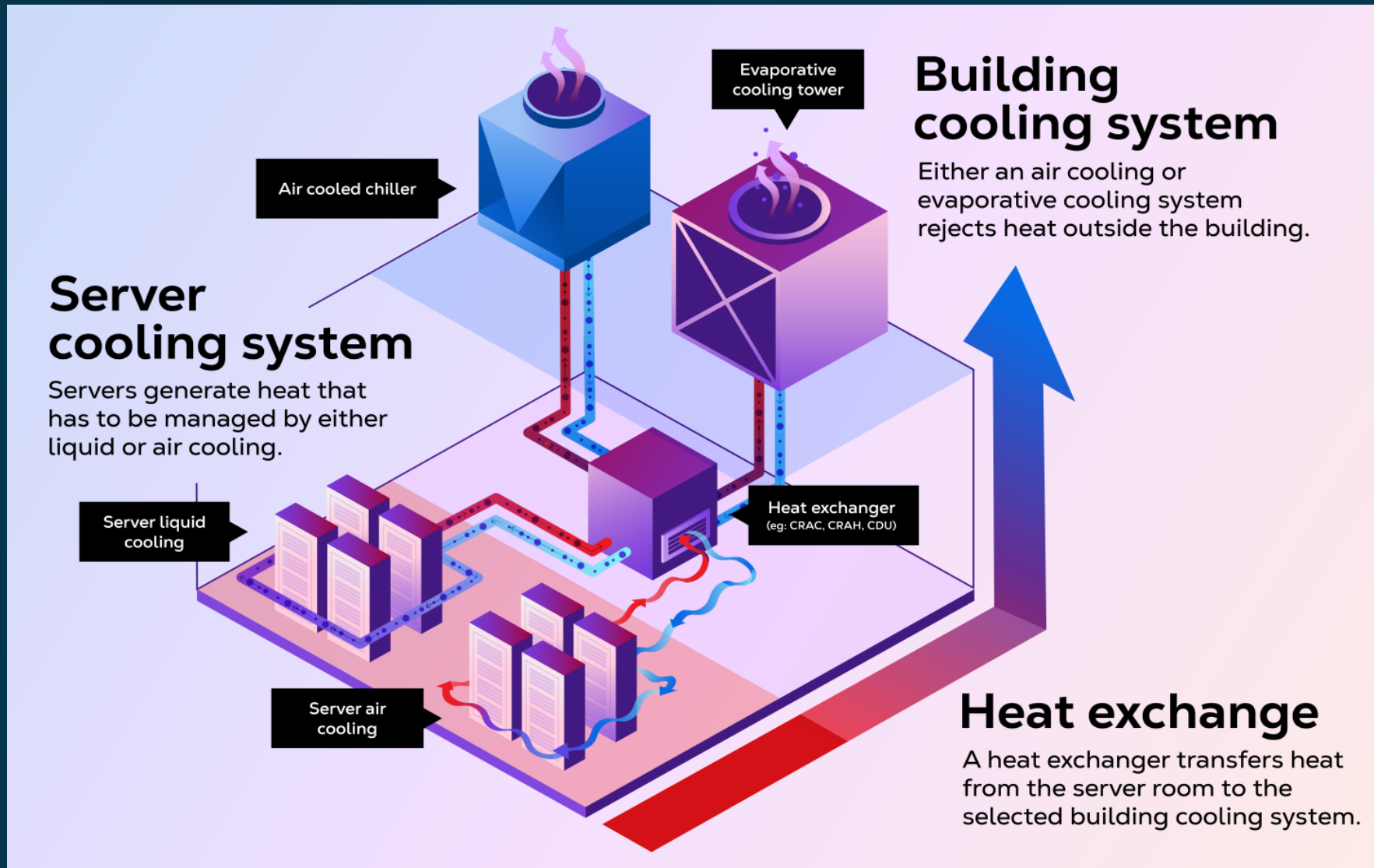


Figure 5.9. Direct water consumption by data center type.

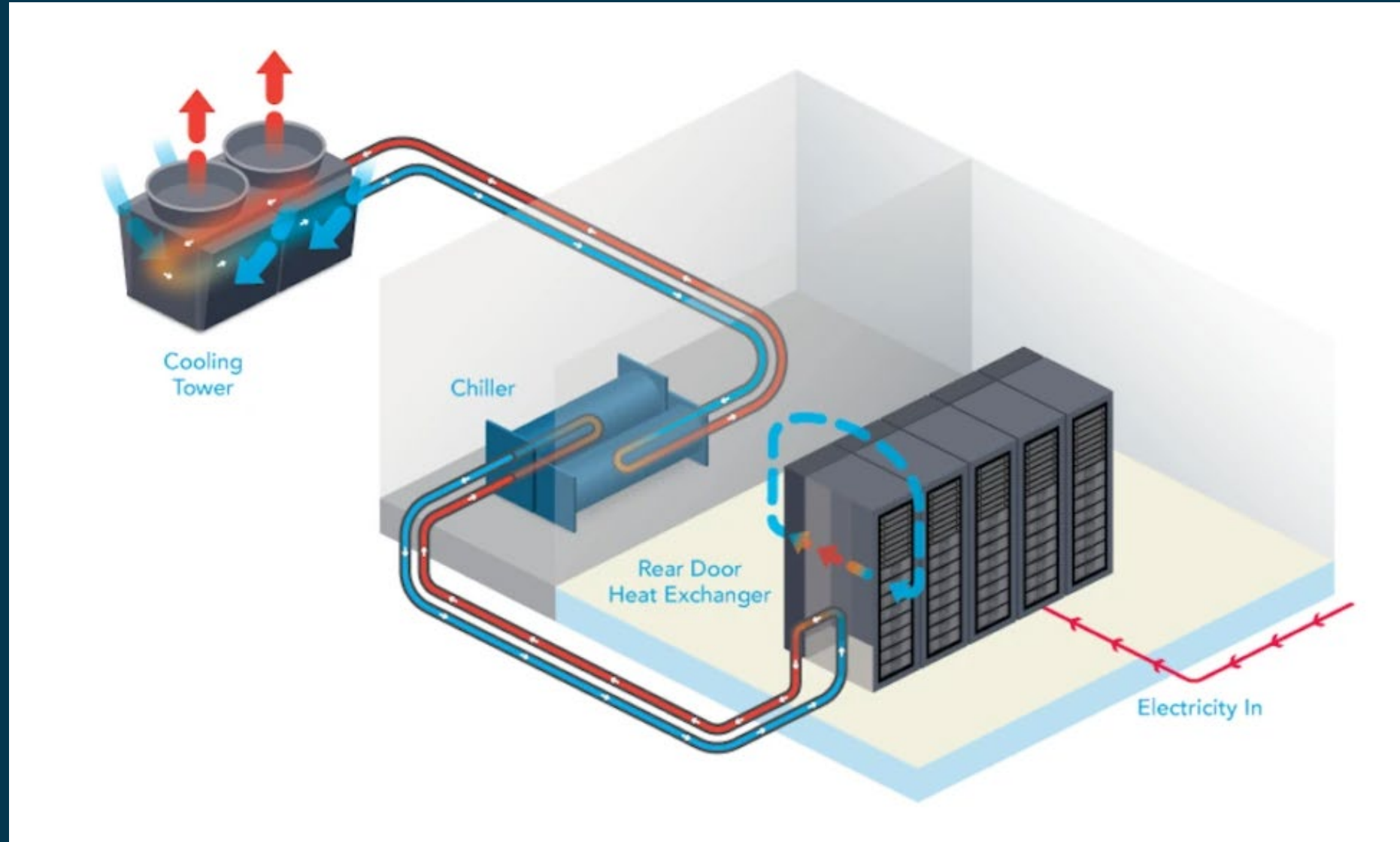
Shehabi, A. et al. (2024). United States Data Center Energy Usage Report. LBNL-2001637, Lawrence Berkeley National Laboratory.

Cooling Systems



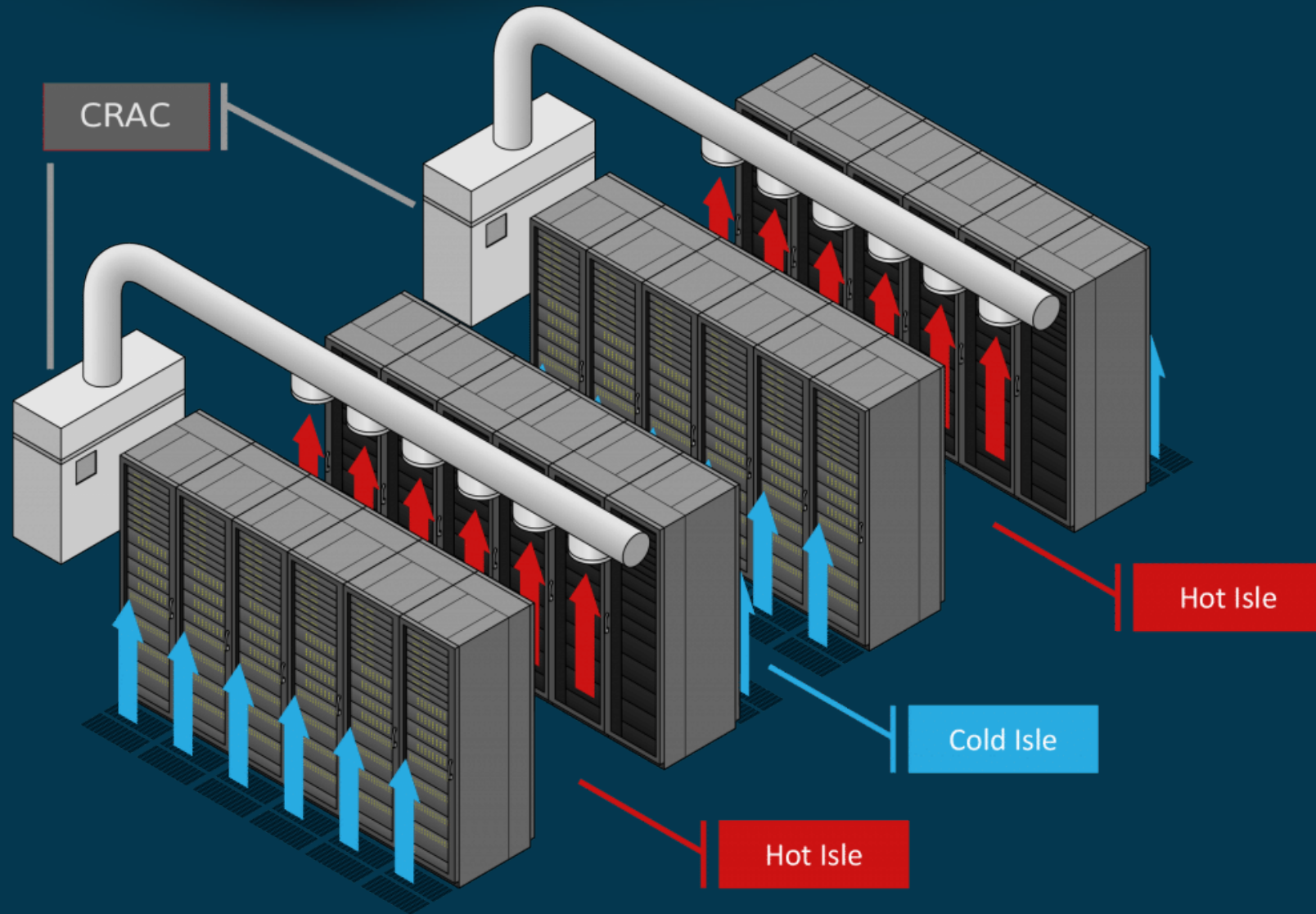
Source: equinix.com

Closed-Loop Liquid to air cooling



Source: Upsite.com

Air Cooling



Source: nlyte.com

Comparing Water Use by Use Type

1,500,000 Gallons of water per day applied to each of the following uses.

Use	Design Flow Rate	Equivalency	Notes/Context
Multi-Family Residential/Apartments	250 GPD/unit	~6,000 units	Comparable to several large apartment complexes
Single-family residential	300 GPD/unit	~5,000 homes	Roughly a small town's worth of housing
Hospital	300 gal/bed	~5,000 beds	Equivalent to multiple large regional hospitals
Grace Christian School	~18,000 GPD	~83 comparable schools	Local reference point
Felton Grove High School	~35,250 GPD	~43 comparable schools	Local reference point
Light Industrial: Apex Light Industrial Phase 2	~69,130 GPD	~22 comparable buildings	Local reference point
Auto Manufacturing	~39,000 gallons per unit*	~38 vehicles per day	A single plant may create up to 100,000 to 400,000 vehicles per year
Bioscience Facility	~67, 000 GPD	~22 comparable facilities	Median of regional reference points

Water Consumption

Policy Considerations & Potential Mitigation Measures

- Encouraging or requiring the use of reclaimed water for equipment cooling applications.
- Limiting potable water use for non-cooling site needs, emergencies, or reclaimed water system maintenance periods.
- Encouraging or requiring the use of geothermal closed loop for cooling.
- Discouraging or prohibiting the use of groundwater for cooling.
- Considering adoption of a potable water surcharge to discourage domestic water use, support water conservation and infrastructure costs. Encouraging onsite storage of reclaimed water to serve the use for a 24-hour period minimum.

Water Consumption

Policy Considerations & Potential Mitigation Measures cont.

- Requiring a water and sewer study detailing anticipated demand, necessary infrastructure and plant updates, and long-term operating impacts to the utility system.
- Encouraging data centers to set a Water Usage Effectiveness (WUE) ratio goal to maximize efficiency (perhaps a goal of 0.5 or lower) and to provide the Town with annual report on the data center's WUE.
- Applying monitoring and reporting requirements that follow the Towns Sewer Use Ordinance and pretreat wastewater if needed to meet local limits.
- Allowing a combination of air and liquid cooling methods to optimize efficiency and reduce waste.

Environmental Impacts

Data centers may impact the environment from daily operation (lighting, greenhouse gases, etc.) or from potential equipment failure that leads to leaks of hazardous material onsite, or fires and explosions.

Known Points of Concern:

- Light Pollution
- Air Quality & Greenhouse Gases
- Water Quality and Supply
- Ground and Air Contamination

Environmental Impacts: Light Pollution

Data centers may store highly sensitive information regarding financial, medical, or in some instances national security-related information. As a result, data centers take security very seriously and tend to provide enough lighting to adequately monitor and ensure safety on the site.

Any lighting concerns not fully mitigated by the UDO's exterior lighting standards will need to be addressed through suggested zoning conditions at the time of rezoning to mitigate potential impacts on neighboring property owners and local wildlife. Such conditions may include additional standards for fixture height, additional shielding, and greater setbacks from the property lines.

Environmental Impacts: Air Quality

Direct Impact: Emissions from onsite generators can release greenhouse gases and other air pollutants, that contribute to climate change and can degrade local air quality. Additional mitigation measures may be necessary to reduce or control the emissions from onsite power generation.

Indirect Impact: Some fossil fuel power plants may have their life spans extended beyond their original retirement date to help meet the demand for electricity until newer plants are brought into service. When this occurs, it creates the potential for an increase in greenhouse gases and other air pollutants that may have negative impacts on communities near these power plants and thus results in indirect environmental impact from excess energy demand.

Diesel Emissions

The Environmental Protection Agency (EPA) states that exposure to diesel exhaust like that from diesel backup generators has been linked to serious health effects, including asthma and other respiratory illnesses, and can aggravate existing heart and lung conditions, particularly among children and older adults. These impacts can lead to higher rates of emergency room visits, hospitalizations, missed work and school days, and premature death.

Environmental Impact: Water Quality and Quantity

Direct Impact: Data centers that withdraw large volumes of potable water from shared reservoirs may create direct impacts, such as stress on wildlife, degradation of habitat, and reduced water availability for surrounding communities.

Indirect Impact: Power generation facilities require large amounts of water to cool, and as demand for energy grows, the need for more energy to meet that demand will indirectly require an increase in water use.

Jordan Lake Water Supply Allocations

Allocation-holder	Allocation (% of Water Supply Pool)*
Cary/Morrisville & Apex	46.2
Chatham County –North District	13
Durham	16.5
Hillsborough	1
Holly Springs	2
Orange County	1.5
OWASA	5
Pittsboro	6
Total distributed allocation:	91.2 (out of 100)
Remaining allocation:	8.8
*Every 1% equals 1 million gallons of water per day (MGD). 100% = 100 million gallons of water per day (MGD).	

Source: NC Department of Environmental Quality – Jordan Lake Water Supply Allocation, Current Allocations

Environmental Impact: Ground Contamination

- Data centers that store coolants, diesel, battery backups, or biocides for cooling tower treatment must comply with state and federal requirements for safe storage and use of potentially hazardous materials.
- Equipment failure could result in leaks or spills of potentially hazardous materials, posing a risk to the local environment.

Environmental Impact: Air Contamination

A hyperscale data center typically requires multiple cooling towers to dissipate heat generated by large-scale computing operations. Depending on facility size, redundancy requirements, and cooling design, a hyperscale data center may utilize anywhere from fewer than ten to several dozen cooling towers at full build-out.

Improper maintenance of building water systems may contribute to the growth and spread of potentially harmful bacteria such as *Legionella*. The most common illnesses associated with *Legionella* exposure are Legionellosis and Legionnaires' disease.

In rare cases, research has shown that due to the aerosolization associated with cooling towers, the spread of *Legionella* may occur outside of the immediate area of the site, and under certain conditions, aerosolized mist may up to travel several miles from the source.

To prevent the growth and spread of *Legionella*, the CDC has developed an assessment and operational toolkit; adherence to these resources may help minimize the risk of releasing potentially harmful bacteria into the environment.

Environmental Impact

Policy Considerations & Potential Mitigation Measures

- Applying existing UDO Section 8.6 *Exterior Lighting* and considering additional zoning conditions to address lighting concerns such as color temperature, brightness, fixture height, and light trespass.
- Considering the use of Tier IV or Tier IV equivalent backup generators to reduce the adverse impact on air quality.
- Considering the use of natural gas generators for emergency backup.
- Considering the use of spill containment berms, walls, and impermeable barriers to prevent off-site and ground contamination.

Environmental Impact

Policy Considerations & Potential Mitigation Measures cont.

- Considering closed-loop cooling alternatives, such as geothermal systems (e.g., Pit Thermal Energy Storage) or reclaimed water, to reduce impacts on local aquifers and shared reservoirs.
- Considering the use a closed-loop cooling system that does not create a mist that carry the legionella bacteria into the environment, and that can demonstrate compliance with CDC and American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) Guideline 12 2023 *Managing the Risk of Legionellosis Associated with Building Water Systems* standards.

Note: Additional environmental considerations regarding environmental assessments, testing, and monitoring were shared by residents on 1/14/2026; staff will need additional time to conduct research prior to presenting on these items.

Noise

Data centers use large backup generators and have HVAC systems that often include cooling chillers, which are louder than standard HVAC units. Together, this equipment can produce continuous high- and low-frequency noise that may impact nearby properties.

The most common way that sound is measure by **Decibels (dB)**, which measures sound intensity on a logarithmic scale, where every 10 dB increase represents sound that is perceived as roughly twice as loud.

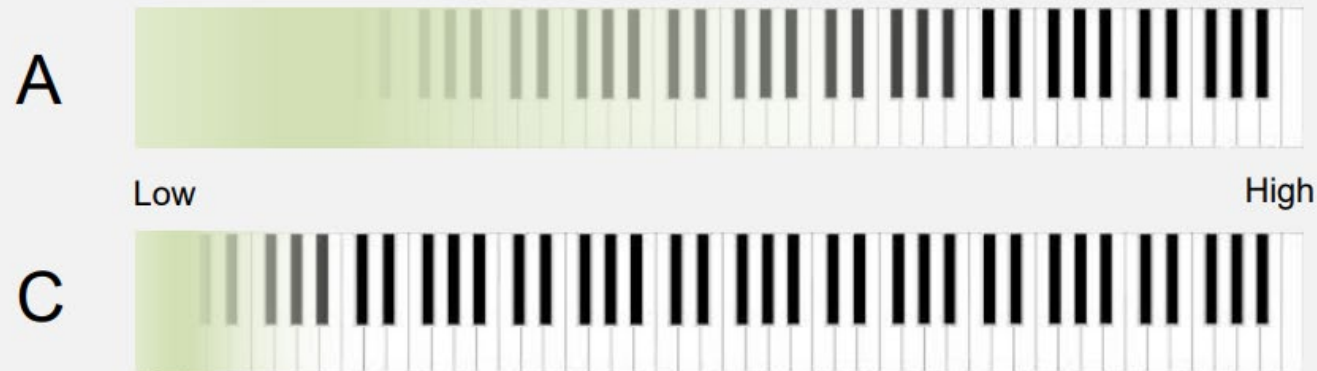
Decibels are measured by comparing a sound's pressure level to a standard reference level, with A-weighting (dBA) reflecting human hearing sensitivity and C-weighting (dBC) capturing lower-frequency sounds.

Other analysis such as Octave-band measure decibel levels across additional frequencies (Hz) beyond the A or C weighted scales.

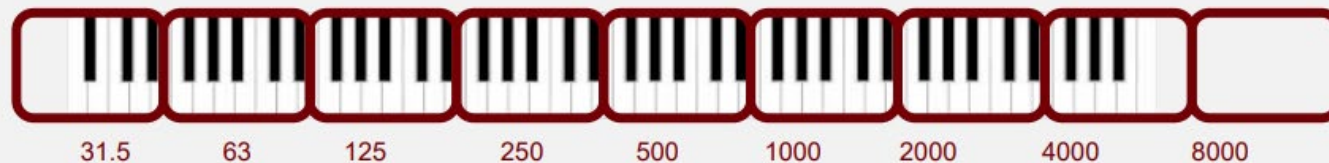
Noise

Measurement Levels – Being updated

Distinction between A/C Weighted Scale



Octave-band sound levels, continuous



Noise Source	Approx. Decibel Level (dB)	Potential Effect / Perception
Jet take-off (80ft)	150	Risk of severe physical injury; possible eardrum rupture at close range
Aircraft carrier deck	140	Extremely painful; immediate risk of hearing damage
Military jet take-off with afterburner (50 ft)	130	Painful; immediate hearing damage likely
Thunderclap; chain saw; oxygen torch	120	Threshold of pain for many individuals; hearing damage possible with short exposure
Jet flyover (1,000 ft); live rock music; horn noise – train (100 ft)	110	Very loud; hearing damage likely with short exposure
Gas lawn mower (3ft)	100	Hearing damage possible in as little as 15 minutes; ~8x perceived loudness of 70 dB
Diesel Truck (50ft) General Freight Train (100ft) Lawn mower (100ft)	90	Hearing damage possible with prolonged (8-hour) exposure; ~4x as loud as 70 dB
Garbage disposal (3ft); dishwasher; factory noise;	80	Hearing damage possible with long-term exposure; ~2x as loud as 70 dB
Passenger car at 65 mph; freeway traffic; vacuum cleaner (10ft); radio or TV	70	Upper range may be annoying to some individuals
Conversation in restaurant or office; background music; AC unit (100 ft); heavy traffic (300ft)	60	Generally comfortable; normal conversation level
Quiet suburb; conversation at home	50	Quiet; minimal disturbance
Library; bird calls; urban ambient sound floor	40	Very quiet
Quiet rural area	30	Extremely quiet
Whisper; rustling leaves	20	Barely audible
Breathing	10	Near the threshold of hearing

Noise

AIR-COOLED CHILLERS

Data centers commonly rely on air-cooled chillers that are installed either at ground level or on the roof. Air-cooled chillers are a notable source of exterior noise due to the operation of large fans and compressors used to expel heat from the facility. These components can add significant noise to the site.



Source: Aircomfort.com

Noise

COOLING TOWERS

Cooling towers function by receiving heated water from the facility's liquid chillers and dispersing heat into the atmosphere. The cooled water is then recirculated back into the system. This process involves multiple mechanical components operating simultaneously, which can generate noise. Data centers typically employ one to several dozen cooling towers, often located on rooftops.



Source: bextel.com



Source: bextel.com

Noise

BACKUP GENERATORS

Data centers are designed to operate continuously, with minimal tolerance for service interruptions. To maintain operations during power outages, facilities are equipped with diesel-powered backup generators. Although generator use is typically infrequent and limited to emergency events or testing conditions, their operation can result in substantial short-term noise impacts on adjacent properties.



Source: storagereview.com



Source: kaloengineering.com

Noise

AIR HANDLING UNITS

Air handling units serve two primary functions within a data center: (1) providing adequate ventilation to remove heat and airborne contaminants, and (2) maintaining acceptable operating temperatures within server halls. These units are typically located on the rooftop. The quantity of air handling units may be significantly higher than that of typical office and industrial uses. When operating simultaneously, air handling units can generate combined noise levels above the typically accepted decibel level near residential uses.



Source: technical.ly

Example of site layout and location of generators and cooling equipment.



Source: Nathan Howard/Bloomberg via Getty Images

Example of site layout and location of generators and cooling equipment.



Source: Piedmont Environmental Council, Hugh Kenny

Example of site layout, including the location of generators and cooling equipment and their proximity to residential uses.



Source: Piedmont Environmental Council, Hugh Kenny

Example of site layout, including the location of generators and cooling equipment and their proximity to residential uses.



Source: Piedmont Environmental Council, Hugh Kenny

Noise

Policy Considerations & Potential Mitigation Measures

- Providing measurable and enforceable use standards and/or zoning conditions that address both high-frequency and low-frequency noise.
- Prioritizing the utilization of pre-construction and post-construction noise studies prepared by a qualified, third-party acoustical professional to evaluate compliance with adopted standards.
- Prioritizing maximum allowable noise levels at property lines (for example, 55 dBA and 50 dBC, or limits established as defined number of decibels above existing ambient conditions) with additional mitigation evaluated if standards cannot be maintained.

Noise

Policy Considerations & Potential Mitigation Measures cont.

- Exploring best practices for when the use of backup generators is appropriate (e.g., emergency operation and maintenance activities).
- Encouraging generator testing and maintenance to defined daytime hours (e.g., 10:00 a.m. to 4:00 p.m.) to minimize community impacts.
- Encouraging minimum separation distances between sound-generating equipment and property lines and encouraging placement of such equipment behind principal structures to provide additional shielding.
- Encouraging the use of parapet walls to screen all rooftop equipment. UDO Sec. 5.2.4.B.2 allows parapet walls to extend no more than 5 feet above the allowable height of the building, so the actual building height may need to be reduced in order to accommodate the needed parapet wall height.

Land Use (Zoning, Site Design, Aesthetic Standards)

Data center zoning varies by jurisdiction: some require overlay districts with specific performance standards, others limit data centers to industrial zones, while some allow them in both commercial and industrial districts.

In recent years concerns related to noise, architectural designs, and specific use standards have resulted in other municipalities amending their zoning ordinance standards to attempt to mitigate these impacts via:

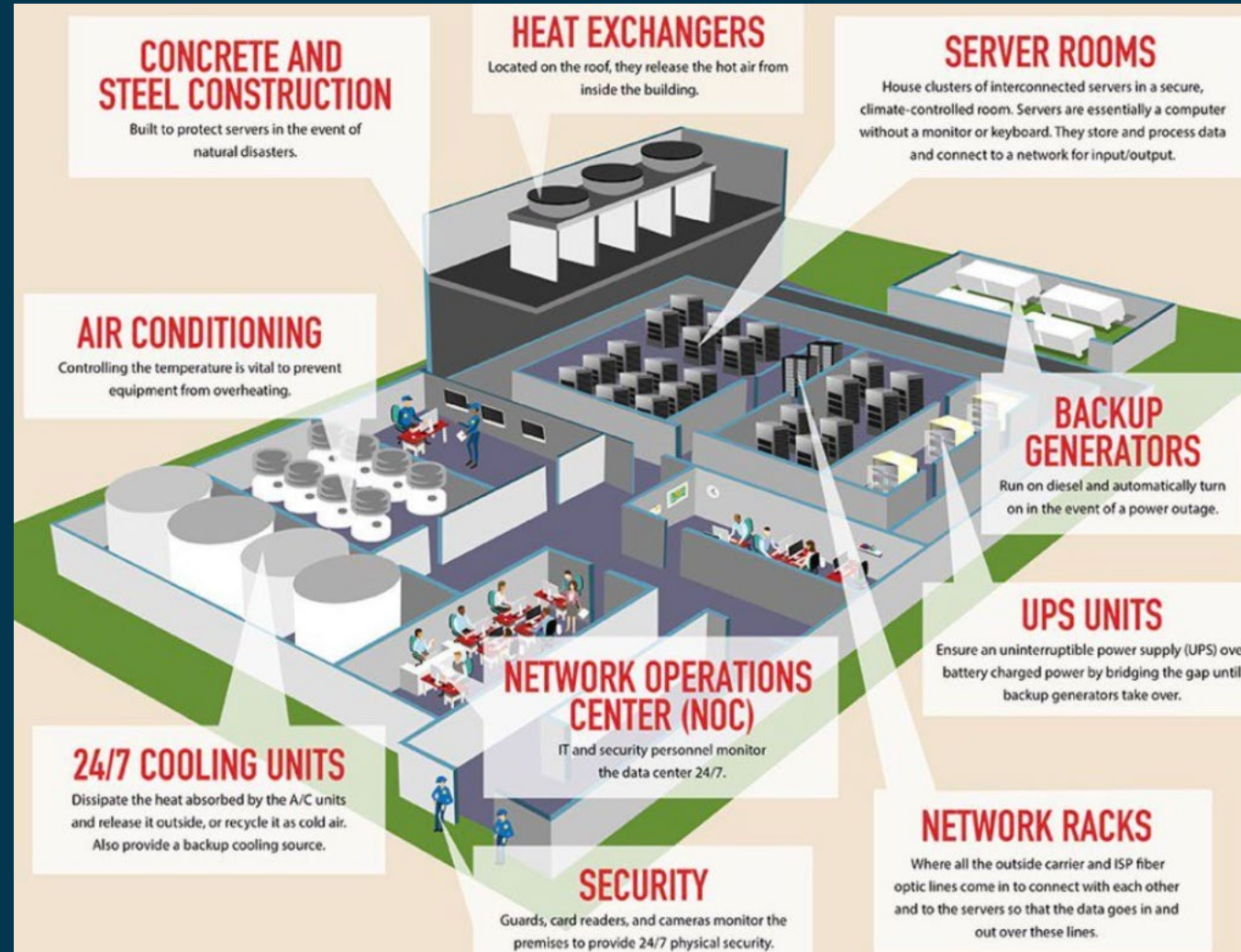
- Larger setbacks (100' - 1,000')
- Wider buffers (50' - 200')
- Additional screening for electrical and mechanical equipment.
- Increased separation requirements for noise producing equipment from property lines.

Additionally, large colocation and hyperscale data centers may require on-site electric substations to meet power demands.

- Substation placement and visibility can impact surrounding communities due to safety concerns, noise, and visual effects.

Land Use

Example of site layout and design of a data center.



Source: greenarchworld.com

Land Use

Example of site layout and design of a data center.



Land Use

Example of the importance of site distance from residential uses.



Source: Gerville/Istock. Loudoun Meadows, Aldie, VA.

Land Use

Example of electric substation constructed to support data centers.



Source: pecva.org

Land Use

Example of electric substation constructed to support data centers and roof-mounted mechanical equipment.



Source: [energynow.com](https://www.energynow.com); Nathan Howard/Bloomberg

Design Standards

Data center designs can vary widely, and without strong architectural standards, developments may result in 60'-100' tall plain warehouse structures that can quickly age, diminish local character, and become visual eyesores.



Source: DPR.COM Meta's Henrico County Data Center

Design Standards

Example building designs of a data center.



Source: dgtlinfra.com Amazon (AWS) Data Center Location in Northern Virginia

Decommissioning & Reuse of Hyperscale Data Center Sites

- **Future reuse depends on decommissioning:** Retaining high-hazard infrastructure (fuel systems, batteries, substations) can limit redevelopment options, increase permitting complexity, and trigger higher building and fire code requirements.
- **Full removal increases flexibility:** Complete decommissioning supports adaptive reuse and aligns with a broader range of employment, commercial, or industrial land uses.
- **Change of occupancy matters:** Under the NC Building Code, new uses require evaluation of remaining infrastructure; retained hazardous systems may force higher-hazard occupancy classifications.

Decommissioning & Reuse of Hyperscale Data Center Sites cont.

- **Code implications:** Higher-hazard classifications can require enhanced fire protection, separation, egress, and life-safety systems under the NC Building and Fire Codes.
- **Hazardous materials process:** Reuse requires inventory, reporting, closure planning, removal, inspection, and approval by fire and environmental authorities.
- **Utility infrastructure considerations:** Private substations may be removed or retained; continued use requires full compliance with NC codes and updated electrical documentation.
- **Best practice:** Require a **decommissioning and reuse plan** at the time of approval to ensure long-term site adaptability and community protection.

Land Use

Policy Considerations & Potential Mitigation Measures cont.

- Following best practices for data center application review, including conditional zoning and developer agreements.
- Finalizing amendments to the Unified Development Ordinance (UDO) to create the data center use, definition, and related supplemental standards.
- Applying existing UDO Article 9 *Design Standards* and considering additional zoning conditions to address architectural concerns such as building massing, fenestration, facade articulation, and materials.
- Encouraging maximum height standards or minimum setback distances for data center structures to limit visual impact.

Land Use

Policy Considerations & Potential Mitigation Measures cont.

- Limiting hyperscale data center development to zoning districts intended for industrial use.
- Evaluating minimum site area thresholds (e.g., 100 acres or more) to ensure adequate separation from surrounding land uses and infrastructure.
- Prioritizing enhanced setbacks and wide buffers (e.g., 200' – 1,000') that prioritize the preservation of existing mature vegetation and the use of berms where little or no vegetation exists.
- Encouraging the applicant to provide a decommissioning and reuse plan to address long-term site viability and potential future redevelopment.

Land Use

Policy Considerations & Potential Mitigation Measures cont.

- Encouraging internal placement of equipment and screening of rooftop or ground-mounted equipment when internal placement is not practicable.
- Prioritizing minimum separation distances between potential hazard areas (such as fuel storage tanks and battery energy storage systems) and sensitive land uses, including schools, daycare facilities, hospitals, and similar uses.
- Encouraging early installation of perimeter buffers and screening in initial phase to mitigate visual impacts during construction and operation

Capacity and Regulatory Requirements

Water Treatment: Cary/Apex Water Treatment Facility

- Total Facility Capacity: 56 MGD
- Apex Capacity: 12.88 MGD (23% Ownership)
- Apex Avg. Daily Flow (2025): 5.05 MGD (39%)
- Apex Max Day Demand (2025): 6.9 MGD

Raw Water Intake: Jordan Lake

- Apex Capacity: 10.6 MGD (23% Allocation)
- Apex Avg. Raw Demand (2025): 5.83 MGD

Capacity and Regulatory Requirements (cont.)

Water Storage: Elevated Storage

- Hunter Street Tank: 0.5 MG
- Mason Street Tank: 1.0 MG
- Tingen Road Tank: 1.5 MG
- Available Storage: 3.0 MG
- Pleasant Park Tank: 1.5 MG (Under Construction)
- Planned Storage (2026): 4.5 MG



Capacity and Regulatory Requirements (cont.)

Water Storage: Regulatory Requirements

- **MINIMUM:** ½ Average Daily Flow
- 2025 Avg. Daily Flow: 5.05 MGD
- Required Elevated Storage: 2.52 MGD
- Current Available Storage: 3 MGD
- Planned Available Storage (2026): 4.5 MGD

Water Storage: Purpose

- Water Pressure
- Emergency Supply (water main break, pump failure, etc.)
- Fire Flow/Demand
- Peak Flow Demands

*Apex also holds 23% of clear-well storage at CAWTP excluded from above

Capacity and Regulatory Requirements (cont.)

Wastewater Treatment: Apex Water Reclamation Facility

- Total Facility Capacity: 3.6 MGD
 - Functional Capacity: 2.8 MGD
- Apex Avg. Daily Flow (2025): 1.1 MGD (39.3% Functional)



Capacity and Regulatory Requirements (cont.)

Western Wake Regional Water Reclamation Facility (WWRWRF)

- Total Facility Capacity: 18 MGD
- Apex Capacity: 6.12 MGD (34% Ownership)
- Apex Avg. Daily Flow (2025): 5.05 MGD (82.5%)



Capacity and Regulatory Requirements (cont.)

Wastewater Treatment: Pretreatment Requirements

- Apex Sewer Use Ordinance (Div. 4.5, Sec. 19-92) sets parameters on characteristics of wastewater prior to entering the public system.
 - Cary Sewer Use Ordinance applies additionally on projects flowing to Western Wake Regional Water Reclamation Facility
- Industrial Use Permit (IUP) required for projects with discharge characteristics not meeting the required ordinance
 - IUP are site specific and designed based on the materials found in discharge
 - Required pre-treatment onsite, at the cost of the discharger
 - Sampling Requirements to verify pretreatment requirements are met

Capacity and Regulatory Requirements (cont.)

Constituent	Collection & Treatment Concern	Effect
TDS (salt)	- Water quality (pass-through) - Interference	- Effluent toxicity - Elevated effluent TSS
Biocides & fungicides (QAC and organics)	Interference	- Elevated effluent NH₃-N - Effluent toxicity
Corrosion inhibitors – Metals, orthophosphate, organics	- Interference - Water quality - Biosolids	- Elevated effluent NH₃-N - Land application restrictions - Effluent toxicity
Metals – Mo, Cr, Al, Cu, Zn	- Biosolids - Nitrification inhibition - Water quality	- Land application restrictions - Effluent toxicity
Antiscalants	None	None

Source: Cheslek, H. Black and Veatch

Water System Impacts

- Instantaneous, inconsistent peak water demand
- Infrastructure needs for peak demand
 - Initial Capital Costs (Developer/Owner)
 - Distribution Improvements and Expansion (Pipe)
 - Treatment Capacity and Expansion
 - Elevated Storage Needs
 - Long-Term Operation and Maintenance (Town)
 - Water Quality and Age Impacts during off-peak (flushing, water loss)
- On-Site Storage
 - Provide on-site stability during peak demand
 - Reduced conveyance costs for the Town
 - Reduced treatment costs due to offset demand

Reclaimed Water

- Treated wastewater being used for purposes other than drinking; not discharged to a body of water
- Operated like a domestic water system, commonly distributed through purple pipes
- Currently no reclaimed distribution network at either Apex WRF or Western Wake Regional WRF.
- Water Source Capacity Protection (Jordan Lake)
- Increased treatment capacity due to offset
- Reduces available water supply to downstream partners

Economic Impact – Employment Generation

- Few workers typically employed for day-to-day operations, with research showing floor area-to-employee ratios as high as 5,000 square feet per employee.
- A 250,000-square-foot data center may require only about 50 full-time employees to operate once constructed.
- Significant temporary construction employment is associated with data center development, particularly during site preparation, building construction, and infrastructure installation.
- Permanent jobs, while limited in number, are generally well-paying, with technology professionals averaging \$108,100 annually, network support technicians \$76,060, and data center roles ranging from \$42,000–\$149,000.
- These wages exceed U.S. median household incomes (which in 2024 were \$44,870 for female nonfamily households and \$58,000 for male nonfamily households) highlighting the high-wage nature of data center employment.

Economic Impact – Tax Revenue

Real and Personal Property

- Data centers are subject to ad valorem property taxes for real and personal property
 - Real (buildings and land)
 - Business property (equipment)
- Assessments are conducted by County tax office
 - Real property per schedule
 - Business property annually during listing cycles
- Data provided by Wake County –
 - Real property values per square foot stable 2016-2024
 - Business property values per square foot volatile 2016-2024

Economic Impact – Tax Revenue

Illustrative Example (Wake County Data)

- Using 2024 Assessed Values:
 - Average Data Center has \$38,000,000 of real value
 - Average Data Center has \$115,000,000 of business personal property (subject to depreciation)

Type	Per \$100	Apex Property Tax (Estimate)
Real Value	\$380,000	\$135,280
Business Personal Property	\$1,150,000	\$409,400
	Total	\$544,680

Economic Impact – Tax Revenue Depreciation

- Data center depreciation is more volatile than traditional real property due to the high concentration of equipment
- Equipment depreciates at a significantly faster rate than real estate assets
- While rebuilds and upgrades may restore value, there is limited historical data to reliably project or guarantee long-term outcomes

- An example from Wake County Tax Administration shows data processing equipment depreciated by approximately **95% within five years**

Business Personal Property (BPP) of \$115,000,000			
Year	Depreciation	BPP Per \$100	Property Tax Estimate
Installed	-	\$1,150,000	\$409,400
1	20%	\$920,000	\$327,520
2	39%	\$701,500	\$249,734
3	59%	\$471,500	\$167,854
4	80%	\$230,000	\$81,880
5	95%	\$115,000	\$20,470

Economic Impact – Tax Revenue

Sales and Use Taxes

- Qualifying data centers are exempt from sales tax on electricity and certain support equipment (7% and 7.25%, respectively).
- Other tax exemption/incentives for eligible data centers exist under North Carolina law, but are not available in Wake County.
- Apex receives 3.29% of Wake County sales tax collections.

Traffic Generation

Policy Considerations & Potential Mitigation Measures

- Requiring coordination between Town staff, NCDOT (if involving NCDOT maintained roadways), the applicant, and the applicant's traffic engineer to determine the scope of any trip generation letter or full TIA.
- Considering mitigation measures identified in a TIA or traffic letter, such as turn lanes, signal modifications, or other operational improvements, to maintain roadway safety and capacity.
- Encouraging coordination between Town staff, the applicant, and the applicant's traffic engineer to determine the scope of any trip generation letter or full TIA.
- Considering mitigation measures identified in a TIA or traffic letter, such as turn lanes, signal modifications, or other operational improvements, to maintain roadway safety and capacity.

Traffic Generation

Policy Considerations & Potential Mitigation Measures cont.

- Evaluating traffic impacts using Land Use Code (LUC 160) in the ITE Trip Generation Manual (11th Edition), which defines a data center as a free-standing warehouse-type facility primarily used for off-site storage of computer systems, applications, and secure data. Some facilities may include maintenance areas and small office spaces and may be occupied by single or multiple tenants.
- Recognizing that LUC 160 reports an average daily trip generation rate of 0.99 trips per 1,000 square feet, while acknowledging that sample sizes are small and additional data may be needed to refine anticipated trip generation.
- Coordinating with NCDOT's Congestion Management group, as recommended, to evaluate trip generation methodology on a case-by-case basis.

Hazards

Hazards associated with Data Centers may include:

- Chemical Hazards
 - Data centers may have large volumes of coolants, refrigerants, and biocides (for water treatment).
- Fire & Explosion Hazards
 - Data centers may have large volumes of stored fuel onsite to power backup generators.
 - Volume of stored fuel will depend redundancy requirements, energy demand, and number of generators.

Scenario:

A hyperscale data center with 96 diesel generators may have ~500,000 gals or more of diesel fuel onsite (each generator may carry ~6,000 gals each $6,000 \times 96 = 576,000$ gals).

Hazards

Fire & Explosion Hazards cont.

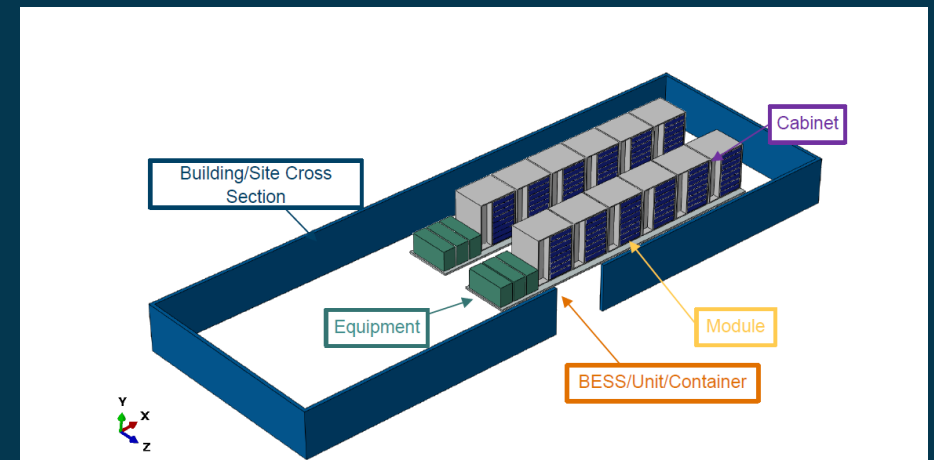
Battery Energy Storage Systems (BESS)

What is a BESS?

- Stores excess energy on-site from renewable sources or grid various battery chemistries: lithium-ion, lead-acid, sodium-ion, solid-state, etc.
- Discharges energy during peak demand, service interruptions, or sells back to the grid.
- Typically consists of modular container units housing 200–1,000+ batteries per container.
- Can include multiple containers for larger capacity needs.
- Supports various battery chemistries: lithium-ion, lead-acid, sodium-ion, solid-state, etc.



Source: Americas.rwe.com



Source: Landscape of Battery Energy Storage System
Hazards & Mitigation Strategies (NFPA FPRF, 2023).

Key Hazards of BESS

Thermal Runaway

- Overheating of battery cells can trigger self-sustaining chemical reactions.
- Risk of fire or explosion increases rapidly.

Toxic and Flammable Gas Emissions

- Fires may release hydrogen, carbon monoxide, CO₂, methane, hydrogen fluoride, VOCs.
- Health hazards and emergency response complications.

Stranded Energy

- Residual electrical energy can persist after damage or discharge.
- Risk of shock, arc flash, arc blast, or delayed re-ignition.

Particulate & Environmental Hazards

- Combustion produces soot, fine particulates, and potentially toxic byproducts.
- Can contaminate air, soil, and nearby environment.

Planning & Safety Implications

- Hazards affect fire suppression, emergency response, and post-incident remediation.
- Requires: proper system design, operational controls, site location consideration, and coordination with fire/emergency services.

Fire Response Capabilities

- Town of Apex Fire Department (current and future)
- Cary, Apex, Morrisville (CAM) partnership
- Mutual-aid Agreements
- Hazmat response contract

Data Centers – Related to Fire Protection

- Research was conducted related to fires and other emergencies at data centers.
- Data centers are typically in fire resistive buildings with automatic fire detection and suppression systems.
- The majority of the internal components are computers/servers. They also have battery back-up power systems, which can create challenges if a fire occurs.
- There are an estimated 12,000 data centers in the world, 5,500 in the US. Between 2014-2023, 22 fires were reported world-wide, less than 1% of them having a fire.

FIRE: Policy Considerations & Mitigation Measures

- Early & Frequent Engagement
- Independent Fire Protection Review
- Water Supply & Runoff Containment
- Department Training & Guidance

Police: Emergency Access and Operational Independence

Given the sensitive or restricted nature of many data centers, the police department must ensure that officers can access the facility in emergencies without unnecessary delays or dependence on on-site staff.

This includes:

- Pre-establishing secure access procedures for both emergency and after-hours responses.
- Ensuring APD has direct access to relevant areas of the property during time-sensitive events such as alarms, medical emergencies, or security breaches.
- Clarifying expectations with the facility operator regarding gate access, credentialing, and key control.
- Any delays in gaining entry hinder the Department's ability to protect life and property.

Police: Community Concerns and Increased Calls for Service

Even when operations run smoothly, data centers can generate community complaints related to:

- Noise (HVAC systems, backup generators)
- Light pollution
- Traffic
- Contractor activity
- Environmental concerns
- Perceived public safety risks

The majority of these complaints—regardless of whether they are police matters—are typically routed to APD as the initial point of contact. This will likely increase call volume and necessitate ongoing coordination with other Town departments for appropriate follow-up and resolution.

Police: Traffic and Construction Impacts

The construction phase of a data center can significantly impact local roadways due to heavy equipment, frequent deliveries, and a large contractor workforce. Post-construction, traffic patterns may remain elevated depending on staffing levels and ongoing maintenance activity.

Impacts may include:

- Increased collisions or near-miss incidents due to large vehicle movements.
- Road obstruction complaints.
- The need for periodic traffic control or special patrol assignments.
- Longer-term roadway wear or congestion.
- APD may also need to coordinate with NCDOT, Town Engineering, and facility leadership to mitigate traffic impacts and ensure safe ingress and egress.

Police: Specialized Response Considerations

Data centers often house large quantities of electrical equipment, lithium-ion batteries, cooling systems, and backup generation infrastructure. In emergency situations—particularly fire, hazardous material releases, or electrical failures—response may require specialized equipment or training.

Public safety considerations include:

- The need for detailed pre-incident planning with APD and Fire.
- Potential need for additional PPE or tools for safe ingress.
- Coordination with the Fire Department on rescue procedures, evacuation routes, suppression methods, and incident command.
- Understanding of any high-voltage, chemical, or battery-related hazards that may affect law enforcement operations.

Police: Alarm Response and False Alarms

Data centers typically utilize extensive alarm and monitoring systems. Historically, facilities of this nature can generate high volumes of alarms—security breaches, access control notifications, and sensor alerts—some of which default to police response.

Key considerations:

- Increased demand on APD for alarm verification response.
- Possible need for specialized training on interpreting alarm categories.
- Developing clear expectations with facility management to reduce unnecessary dispatches.

Police: After-hours Activity and Contractor Presence

These sites frequently operate 24/7 and may involve after-hours vendor access for maintenance, upgrades, or emergency repairs.

APD often becomes the first responder for:

- Suspicious persons calls.
- Verification of contractor authorization.
- Securing the premises during system outages.
- This adds to routine patrol workload.

Police: Conclusion

While these challenges are manageable with proper planning and resource support, they represent meaningful impacts to police operations that should be considered when evaluating any data center project.

Regulation Comparison

Planning Staff reviewed the development standards from several communities that permit data centers.

- Charlotte, NC
- Maiden, NC
- Loudon County, VA (updates to standards are underway)
- Fairfax County, VA
- Frederick County, VA
- Prince William County, VA
- Edgecombe County, NC (standards adopted November 2025)

Regulation Comparison

In general, the use is permitted in Industrial zoning districts, with some communities allowing the use in other zoning district types subject to certain conditions being met.

Most communities have requirements related to the following:

- Additional setbacks from roads and/or residential uses
- Additional buffers from roads and/or residential uses
- Standards for the location and/or screening of ground- and roof-mounted mechanical equipment
- Building design standards
- Time limits on generator testing
- Location and screening of onsite electric substations, storage tanks, etc.
- Requirements for noise studies (pre- and post-construction)

UDO Amendment Process Summary

- UDO Sec. 2.3.2 states that "an amendment to the text of this Ordinance may be proposed by the Town Council, the Planning Board, the Board of Adjustment, the Planning Director, or pursuant to Sec. 2.2.1 *Authority to File Applications*". Sec. 2.2.1 states applications may be submitted "by the landowner, lessee or person holding an option or contract to purchase or lease land, or an authorized agent of the landowner".
- UDO Amendment applications are accepted on the 1st business day of the month.
- Staff provides comments to the applicant on the proposed revisions, and the applicant resubmits revisions for staff review. This continues until the application is ready to be scheduled for public hearing.
- The Planning Board hears the proposed amendment as a New Business item and makes a recommendation to the Town Council.
- The Town Council holds a public hearing and makes the final decision to approve or deny the proposed amendments.



Planning and
Development
Services

DATA CENTER COORDINATION: RECOMMENDATIONS AND NEXT STEPS

Planning and Development Services

March 2026

Purpose

This report summarizes the research conducted by Wake County into regulations and placement of large or hyperscale data centers and provides recommendations for local community consideration. It also documents the next steps that will be taken to provide more guidance for local communities.

Role: Wake County's role is to coordinate and convene stakeholders to share information and guidance, as appropriate. Stakeholders include municipalities, public utilities, Duke Energy, economic development, the Wake Water Partnership, the Central Pines Regional Council of Governments (CPRC), and the NC Department of Environmental Quality.

Multiple entities are contributing to the knowledge base and best practices on the issue of AI and the related growing demand for hyperscale data centers. Wake County is working alongside and in coordination with CPRC as they research best practices in order to support local governments. Apex staff are generous with their time as they process the annexation and rezoning request for the New Hill data center. Lastly, the Board of Commissioners has representation on the North Carolina AI Leadership Council, whose mission is "to guide the responsible and effective use of Artificial Intelligence in state government".

Background: Nationally, the demand for and location of hyperscale data centers is evolving and expanding driven by a demand to support artificial intelligence applications in business operations and consumer services. In general data centers are located where five factors converge:

- 1) Internet capacity (fiber)
- 2) Demand for service (population)
- 3) Available space (land)
- 4) Electrical capacity
- 5) Cooling capacity (water/air)

Data centers are likely attracted to Wake County based on the first two factors, fiber and population. The other factors, land, electricity, water, are likely challenges or restricting factors based on costs and competition from user potential uses.

In 2025, the Town of Apex received an application requesting annexation and rezoning of a 190-acre site for a hyperscale data center. Several other municipalities have also received inquiries. Data centers are not new to our community. There are five located in Wake County (examples: SAS, NetAPP, BB&T, Global), but these data centers are generally smaller and serve to support another larger use.

Definition: Following the lead of Duke Energy, this report shall focus on data centers that propose to consume more than 100 Megawatts (MW) daily in electrical power (see recommendation 1). Municipalities may choose to apply recommendations from this report in other instances. For context, the current daily output of the Shearon Harris Nuclear Plant is 928 MW and the data center request in Apex would consume around 250 MW daily.

Initial Considerations

Hyperscale data centers are different than many other warehouse or industrial uses because of the enormous demand for electricity for power and water for cooling. Based on this, it is recommended that communities work with potential developers to understand how electrical and cooling needs could/will be addressed very early in the process.

1) Electricity Assessment: Overall, Duke Energy noted that they will adjust, as needed, to meet future energy demands, but the cost for expansion cannot just be passed on to existing and future rate payers. Duke Energy routinely charges potential commercial users an upfront fee to develop an assessment of the infrastructure needed to serve a site. Duke Energy recently formalized its policy for applicants needing 100 or more MW. The policy requires applicants to pay a \$100,000 non-refundable fee to cover research and analysis and to make financial commitments to the long-term usage and payment for the energy load requested. This policy applies to all of Duke Energy's service area, including applicable ElectriCities¹.

2) Municipal Water and Waste-Water Assessment: Although the municipalities in Wake County have different levels of future municipal water and waste-water capacity, all the communities have goals to maximize the usefulness to the community of this future capacity. Future capacity in the Wake County area is difficult and costly to attain and once allocated it is likely to be even more expensive and difficult to replace. A use, such as hyperscale data center, that requires 1 to 5 million gallons of water per day for one time use would significantly impact the community's future options. The data center industry has, and is continuing to evolve, various on-site methods to reduce daily municipal water usage. These methods, however, usually add chemicals to increase efficiency and protect internal loops, and these chemicals may impact waste-water treatment. Data centers have also used municipal reuse water and captured rainwater to reduce the use of municipal water. All systems lose water to evaporation. The efficiency of cooling methods will be affected by Wake County's average temperature.

¹ ElectiCities is a membership organization that provides power supply to communities.

Data centers also use different amounts and types of water during maintenance and replenishment windows. To encourage dialogue between the municipality and the applicant, it makes sense for municipalities to set a threshold amount of annual water usage that will trigger specific questions and criteria.

Site Considerations

Continuing the theme that hyperscale data centers are different than other uses based on size and the impact of on-site operations, Wake County's research identified the following specific areas of concern and provides recommendations on local ordinance changes to best prepare for potential applications.

1) Applicable Zoning: Wake County's research found that Wake County municipalities do not have a consistent definition, assigned zoning district, or specific standards for large data centers. Some municipalities noted the language in existing zoning districts could be interpreted to allow data centers. Wake County's research found that the rezoning process could serve as a pathway for facilitating the best dialogue between the proposed development and the community. As noted, the larger community dialogue in the proposed Apex development was started by a request to annex and rezone the property.

2) Placement and Use of Back Up Generators and Battery Energy Storage Systems (BESS): Data centers generally require redundant back-up systems to maintain operations if electric grid power is unavailable. Though solar, battery or other low noise solutions can be encouraged to assist or augment with back-up power needs, based on power requirements, most centers have diesel or natural gas generators. Although these generators are like the generators used in other commercial and industrial locations, the difference is the number of generators required and the frequency of generator use. To address concerns with generator noise and emissions, it is recommended that municipalities work with developers to carefully locate these on site. There are examples where generators have been placed within specifically designed locations surrounded by the data center building and far removed from any property lines. Communities have also requested / required information on the number of hours generators will be used and hours for testing.

3) *Noise / Low Frequency Sounds:* Adjacent landowners in some areas around the country have noted concerns with noise and vibrations generated by servers within the site. These sounds are often sensed as much as they are heard.

4) *Setbacks and Screening:* Data centers are 24-7 operations with security needs. This often translates to a requirement for lighting in many areas of the site during all hours of dusk and darkness.

5) *Reuse and Decommissioning:* Like other technology heavy uses, data centers, especially the equipment within the center, have an expected life cycle. Reuse provisions require that aspects of the site and building design are planned to accommodate future uses and technological advancement. Decommissioning provisions define the state the site must be in if the use is discontinued. Both provisions are often supported by formal commitments, agreements and/or financial commitments.

Community Considerations

Wake County's research identified the following specific areas of concern and provides recommendations on community wide impacts to best prepare for proposed data centers.

1) *Limited Tax Revenues:* Wake County's experience (see Further Notes 2) with existing smaller scale data centers suggests that the taxable value of the center will decrease relatively quickly. This is because a large percentage of the site's value is equipment, i.e. servers, server connections, server stands, that depreciate quickly based on expected useful life and tax policies. Based on this, it is recommended that municipalities estimate conservatively on projected revenues that will be generated via tax revenues.

2) *Limited Job Creation:* National statistics suggest that data centers create fewer permanent jobs per square foot, per dollar invested, per kilowatt hour uses, and per gallon of water used than many other large-scale developments. Based on this it is recommended that municipalities estimate conservatively on projected revenues that will be generated from future income taxes.

3) *Advanced Understanding of Community Needs:* Wake County's research indicates that data center developers value clear expectations and pathways to site construction

and operation. Because data centers are not expected to greatly expand the jobs and tax base that communities typically rely on to multiply the benefits of commercial investment, it is important for the community to have a specific discussion on how it will balance community impacts with overall community benefits. The electricity assessment, the municipal water and sewer assessment, and the site development requirements outlined in the recommendations will provide context for this consideration. Nationally, communities have identified specific project investments that could be funded as part of larger project cost / benefit consideration and approval process. Some of these investments have been closely tied to potential data center impacts such as funding for plant improvements to expand municipal water or grey water capacity while others are tied to larger community needs or issues like the funding for other community facilities like fire stations, parks, or transportation improvements. The data center developer would need to agree to all funding agreements and the cost would need to be proportional to impacts.

Recommendations and Next Steps

Recommendation 1: As a first step of the process, require that property owners and / or potential developers attest that they have contacted Duke Energy and are aware of the electricity assessment policy.

Next Step 1: Wake County and its partners will build on the recommended basic check list to further flesh out process steps and model documentation for the community, developer, Duke Energy dialogue. Although Duke Energy has formalized their process for users requesting more 100 MW, the question still has “chicken and egg” aspects about it as the community wants to know the ability and timing of Duke Energy to serve a proposed development and Duke Energy wants to know the community’s position on permitting the development overall. The model documentation and, as possible, clear check points, will be tied into further development of community tools as noted in recommendations 2, 3, and 4.

Recommendation 2: Adjust municipal water connection policies to require a special assessment process for uses that propose to use over 500,000 gallons of municipal water or municipal gray water daily. The goal of the special assessment would be to set

early and up-front expectations on water and sewer demands, understand on-site methods that could or would be used to reduce water usage, understand the potential fluctuations in water usage based on temperature, system maintenance or other system operations, assess investments that would need to be made to meet demand, and identify long term commitments and agreements needed to protect the water and sewer agency.

Next Step 2: Wake County will work with water agency partners (Raleigh, Cary, Holly Springs, Fuquay-Varina) and others to determine the best ways to modify the commercial water service application process to require further documentation and assessment for large water uses. Like Duke Energy policy, it is very possible that this process will entail upfront fees to cover detailed studies. A recent review of water capacity across Wake County, noted that a use requiring 1 to 5 million gallons per day would require significant site-specific and regional investments and would likely trigger system-wide capacity concerns as well. Based on this, it is possible that the area would prohibit uses that directly cool with municipal water and require usage of municipal gray water or other on-site solutions.

Recommendation 3: Consider a separate unified development ordinance category specifically for uses that require more than 100 Megawatts of power. This use would be permitted only in specific zoning districts or overlay.

Next Step 3: Wake County and its partners will develop model language for a unified development ordinance (UDO) category that covers a use that will require more than 100 MW of power. This language will explore the best ways to fit into various municipal regulations and may not be one size fits all. The goal of this language will be to define that data centers are allowed if they meet all minimum requirements, but that a rezoning process will be required to designate a specific site. This site-specific process will allow adequate dialogue between the developer and the community regarding community impacts and investment. If the partners determine that model language cannot be developed quickly enough, the group shall develop model language for a temporary moratorium on uses requiring more than 100 Megawatts of power that will stay in place only until full UDO changes are adopted.

Recommendation 4: Review ordinance requirements to verify that adequate provisions are in place to allow the community to work with the developer to find the best solutions to ensure that adjacent properties are shielded from generator noise and other impacts. Potential issues not covered by the noise ordinance may need to be discussed as part of the rezoning process.

Next Step 4: Wake County and its partners will develop model language for unified development ordinance (UDO) changes related to placement and use of back-up generators and battery energy storage systems (BESS), noise / low frequency sounds, setbacks and screening, reuse and decommissioning, and other site-specific issues as identified.

Recommendation 5: As part of facilities assessment, particularly water and sewer facilities, and public outreach, municipalities should understand community needs and identify potential investment opportunities. These opportunities should be prioritized based on impact and categorized based on location. As appropriate, as part of the rezoning approval process, the municipality should consider these investments as part of developer approved conditions or part of a developer approved community benefit agreement.

Next Step 5: As an extension of ongoing municipal facility and community needs assessments, Wake County and its partners will identify and prioritize projects like fire stations, parks or transportation improvements that could be funded to offset specific community impacts. This work will include a review of recommendations for best practices in developer approved conditions and developer approved community benefit agreements. This work will be right-sized with the understanding that hyperscale data center applications may be limited in Wake County by high land costs and competition for water, sewer and electrical capacity.

Further Notes

1) Work Coordinated with Central Pines Regional Council of Governments (CPRC): All Wake County work on data centers will continue to be coordinated with CPRC. CPRC is currently coordinating similar discussions, gathering research about best practices and has produced a report. [CPRC report](#)

2) *Data Center Depreciation Table Example:* The following table is provided by Wake County's Tax Administration Office showing an example depreciation schedule for servers and equipment within a data center.

Data Processing Equipment Depreciation Schedule (U-5)			
	Installed Cost New	Percent Good	Taxable Value
Year 1	\$20,000	80%	\$16,000
Year 2	\$20,000	61%	\$12,200
Year 3	\$20,000	41%	\$8,200
Year 4	\$20,000	20%	\$4,000
Year 5	\$20,000	5%	\$1,000
Year 6	\$20,000	5%	\$1,000
Year 7	\$20,000	5%	\$1,000

Data Centers

Findings, Recommendations, and Next Steps

Terry Nolan

March 23, 2026



@wakegov    

wake.gov

Background

- Wake County hosts regular meetings with municipal planning directors and stakeholders.
- Municipalities expressed interest in the county organizing regional discussions.
- Focus is on hyperscale data centers requesting 100+ Mega Watts (MW) of power.

Goals

Establish a unified set of tools, resources and documentation to help guide decision-making

- Coordinate planning efforts across jurisdictions to address shared challenges and opportunities.
- Develop a unified framework for evaluating and managing the impacts of data centers on infrastructure, environment, land use, and community well-being.

What we learned

- Most municipalities in Wake County have fielded inquiries for a data center.
- Wake County Tax Administration notes value of data centers includes significant business personal property that rapidly depreciates. Value is uncertain because assets are listed annually and include large additions or removals.
- Many resources available and model ordinances are being developed to help communities.

Wake County Report Structure

- **Initial Considerations**
 - Power and Water
- **Site Considerations**
 - Unified Development Ordinance Use
 - Backup power
 - Noise and low frequency sound
 - Setbacks and screening
 - Reuse and decommissioning
- **Community Considerations**
 - Limited tax revenues and job creation
 - Advanced understanding of community needs

Recommendation 1: Power

Ensure developers are aware of Duke Energy's assessment policy for uses needing over 100 Megawatts.

- Upfront costs for review and analytics.
- Power request may require new infrastructure and time to construct.
- Assessment is the basis for discussion on future costs and commitments.

Next Steps

- Work with Duke Energy to determine how this process can best be aligned with the rezoning and site development process.

Recommendation 2: Water

Work with agencies to develop a water and sewer assessment policy for uses needing over 500,000 gallons per day (equivalent to ~3,000 homes).

- Model intent of Duke Energy process
- Determine threshold for “hyperscale”

Next Steps

- Work with agencies to determine thresholds, process steps, and technical tools to be used. Draft model language. Create a basis for future cost and commitment discussion.

Recommendation 3: Land Use

Work with municipalities to develop unified development ordinance (UDO) land use type for uses that require more than 100 Megawatts.

- Most municipalities don't have a specific land use category currently
- Create new category
- Require community dialogue before approval (rezoning)

Next Steps

- Work with municipalities to determine the best definitions and other elements to incorporate into the local UDO. Draft model language.

Example for illustration only

- Definition = uses 100MW power or more
- Allowed zoning districts = Industrial
- Water assessment required, if applicable
- Development standards
 - Set a large minimum lot size for the use (ex. 200 acres)
 - Set basic performance standards: setbacks, screening, lighting, parking, etc.

Sites that meet these criteria (in Wake County) will need to be annexed into a municipality and rezoned.

Recommendation 4: Use Standards

Work with municipalities to verify UDO requirements on setback, buffers, noise and lighting and update as needed.

- Ensure that ordinances cover potential specialized concerns
- Start with available guidance

Next Steps

- Work with municipalities and Regional Pines Council of Governments to determine the best definitions and other elements to incorporate into the local UDO. Draft model language.

Recommendation 5: Community Needs

Work with municipalities to identify and prioritize larger facility needs.

- Data centers do not provide traditional jobs or consistent tax base associated with commercial development.
- Identify ways community can balance expected impacts with community benefits.

Next Steps

- Work with municipalities to identify and prioritize community needs. Detail best practices for developer/ community rezoning commitments and community benefit agreements.



WAKE.GOV



Date: May 4, 2026

To: Mayor Williams
Mayor Pro Tempore Caballero
Council Member Burris
Council Member Cook
Council Member Kopac
Council Member Rist

Through: Diana Schreiber, City Clerk

From: Council Member Baker

Subject: Ordinance Imposing a Temporary Moratorium on Development Approvals for Data Centers, Cryptocurrency mining, and Related High-Impact Data Processing Facilities within the City of Durham

Executive Summary

This Ordinance is being proposed by Council Member Nate Baker to impose a Temporary Moratorium, pursuant to N.C.G.S. § 160D-107, on development approvals for data centers, cryptocurrency mining operations, data processing facilities, and other related high impact uses within the City of Durham.

The draft ordinance was posted on the City's website, and the public hearing was noticed in accordance with N.C.G.S. 160D-601.

Motions

To hold a public hearing to consider the following motion:

To adopt an ordinance imposing a temporary sixty-day moratorium on development approvals for data centers, cryptocurrency mining operations, and any use associated with data center processing facilities within the City of Durham pursuant to N.C.G.S. 160D-107.

Background

Durham City Council is responsible for promoting the health, safety, and general welfare of the City's residents. The City Council has observed a recent increase in inquiries and potential applications for data centers and cryptocurrency mining operations (collectively "high impact facilities") in nearby counties and acknowledges that existing data center

facilities could be expanded within the City of Durham. These types of high-impact facilities present unique challenges not adequately addressed by Durham's current Unified Development Ordinance (UDO) and not addressed at all in the Durham City Code provisions that deal with the extension of water and sewer utilities. The potential impacts of data centers and other related high-impact uses include, but are not limited to:

- Extremely high energy consumption and strain on existing utility infrastructure.
- Utility rate increases to residents to fund these private commercial uses.
- Significant noise generation from cooling systems and backup generators affecting adjacent residential areas and general quality of life.
- Substantial water usage for cooling purposes.
- Potential environmental impacts, including air, water and soil pollution, hazardous material storage, and electronic waste disposal.
- Remediation and other obligations for abandoned infrastructure and assets should construction of such facilities not come to full fruition or be put to their intended use.
- Land use compatibility and opportunity cost concerns in districts with residential uses.

The City of Durham joins several other local governments from across North Carolina that have observed the above-listed challenges posed by the development of data centers and other high-impact facilities. In the last six months, temporary moratoria halting development approvals for data centers and similar uses have been adopted by Chatham County, Town of Apex, City of Kings Mountain, Gates County, Town of Canton, Town of Boone, Town of Wendell, and the City of Brevard. It has been widely reported that additional local governments throughout the state are currently evaluating the need for a moratorium to be better prepared to respond to development applications for data centers and high-impact uses.

Issues

The City's existing regulations were not developed with these specific types of high-impact uses in mind, and the City of Durham needs time to develop appropriate, comprehensive standards to ensure that any future development and expansion of such facilities is consistent with the City's long-term land use plan and protects the public's health and interests. The table of permitted uses in the current zoning ordinance does not define "data centers," "data processing facilities," "cryptocurrency mining operations," and any other uses associated with data processing facilities. Additionally, the Durham Code of Ordinances does not consider the impact of the aforementioned uses on existing City infrastructure and how the impact will affect utility extensions. Some data centers are already located in Durham, but the impact of their continued development and expansion is not yet regulated. A temporary moratorium on accepting and processing new applications for such facilities is a reasonable and necessary measure to allow City staff and the Planning and Development Department sufficient time to study the issues, engage with stakeholders, draft appropriate amendments to the Unified Development

Ordinance, consider appropriate provisions for the future LDC, to allow the City to adopt any needed amendments to the Durham Code of Ordinances to address utility extension for these high impact uses.

Alternatives

- A. ***Modify and Approve the Proposed Ordinance.*** City Council may elect to modify the proposed ordinance prior to approval.
- B. ***Not approve the Proposed Ordinance.*** City Council may elect to not approve or pass the ordinance imposing a temporary moratorium on data centers.

Financial Impact

Beyond costs associated with the publication of the legal advertisement to notice the requisite public hearing, there are no other financial impacts associated with this item.

Equal Business Opportunity Summary

This is an ordinance. It was not reviewed by the Finance Department for compliance with the Ordinance to Promote Equal Business Opportunities in City Contracting.

Attachments:

Attachment A: Draft Ordinance- Data Center Temporary Moratorium

Attachment B: Public Notice- Data Center Temporary Moratorium

AN ORDINANCE IMPOSING A TEMPORARY MORATORIUM ON DEVELOPMENT APPROVALS FOR DATA CENTERS, CRYPTOCURRENCY MINING OPERATIONS, AND ANY USE ASSOCIATED WITH DATA CENTER PROCESSING FACILITIES WITHIN THE CITY OF DURHAM PURSUANT TO N.C.G.S. §160D-107

WHEREAS, pursuant to N.C. Gen. Stat. § 160D-107 local governments may adopt an ordinance authorizing a temporary moratorium on any development approvals required by law; and

WHEREAS, pursuant to Durham Unified Development Ordinance (UDO) sec. 3.19.6, in order for a governing body to impose a temporary moratorium on development approvals, the governing body must first adopt a resolution which includes appropriate supportive findings for the moratorium and calls for a public hearing;

WHEREAS, the Durham City Council passed a resolution on May 4, 2026, with the required supportive findings and calling for a public hearing;

WHEREAS, the UDO does not specifically define “cryptocurrency mining,” “data center,” “data processing facility,” and other associated uses as a specific use; and

WHEREAS, the Durham Code of Ordinances does not consider the impact of the aforementioned uses on existing City infrastructure and how the impact will affect utility extensions; and

WHEREAS, the Durham City Council at its May 4, 2026 regular meeting held a legislative hearing regarding this moratorium in accordance with N.C. Gen. Stat. § 160D-601; and

WHEREAS, the Durham City Council believes such a moratorium will protect the public interest and welfare of the residents of the City of Durham until such regulations regarding the aforementioned uses are adopted, and until the City can assess the potential impact of such uses on utility extensions made pursuant to the Durham City Code.

NOW, THEREFORE, BE IT ORDAINED BY THE CITY COUNCIL OF THE CITY OF DURHAM:

Section 1. A temporary moratorium is hereby imposed commencing on May 4, 2026 and expiring no later than July 3, 2026, or on approval of new zoning regulations regarding data centers, data processing facilities, cryptocurrency mining, and any other uses associated with data processing facilities not yet defined by the Durham Unified Development Ordinance. The moratorium specifically includes the corporate limits of the City of Durham as well as any future City of Durham planning area as depicted on the City of Durham Land Use Map. For the purposes of this moratorium, a “data center” or “data processing facility” refers to a building, a dedicated space within a building, or group of buildings housing computer systems and associated components, such as telecommunication and data processing systems, to be used for remote storage, processing, or distribution of large amounts of data. Examples of such data include, but are not

limited to, computationally intensive applications such as cryptocurrency mining, artificial intelligence (A.I.) computing, weather modeling, genome sequencing, application hosting, cloud storage, video and technical streaming services, etc. Such facilities may include air handlers, power generators, water cooling and storage facilities, utility substations, and other infrastructure to support operations.

This moratorium shall not apply to data processing equipment or server rooms that are clearly incidental and subordinate to a permitted principal use and are intended solely to support on-site operations of such principal use, provided such equipment or server rooms comply with all other applicable provisions of the Durham Unified Development Ordinance. Such principal use may include, but is not limited to, hospitals, medical facilities, financial institutions, offices, educational institutions, or similar uses, as long as such data processing activities are not offered as a primary service to off-site users. Projects classified as exempt in accordance with N.C. Gen. Stat. 160D-107(c) are also excluded from this moratorium as a matter of law.

Section 2. In compliance with the requirements of N.C. Gen. Stat. 160D-107 the City of Durham makes the following statements:

(1) Data centers, data processing facilities, cryptocurrency mining operations, and any other uses associated with data processing facilities require considerable amounts of electricity, land, and water, and their operation can result in exceedingly high greenhouse gas emissions, harmful decibel levels that exceed safe hearing limits and cause chronic sleep disturbances, the creation of heat islands, widespread pollutant exposure from back-up diesel generators, e-waste, and other local impacts to residents and communities living near the facilities. The Durham Planning and Development Department is in the process of developing zoning standards and mitigation methods for these intensive land use types which may cause detrimental harm to the natural environment and the quality of life of City residents. The City seeks time to develop such standards. The City has looked at alternative solutions to a moratorium but found none. The City has determined that to simply allow this intensive land use to be permitted without regard to location, height, size, density, population, industry, residence or other purpose would be counter to the stated goals of the City of Durham Comprehensive Plan and hinder implementation of the City of Durham Code of Ordinances and the adopted Unified Development Ordinance.

(2) The UDO table of permitted uses does not currently include “data centers” nor does the ordinance provide a definition of this use or similar uses. The City seeks to update the UDO definition section and table of uses to specifically define “data center,” “data processing facility,” and “cryptocurrency mining operation” as a specified land uses. The City further seeks to review the City Code of Ordinances to address the potential impact on infrastructure and utility extension. Therefore, the City seeks to place a moratorium on the use of property within the City of Durham planning jurisdiction for data centers, data processing facilities, cryptocurrency mining, and any other uses associated with data processing facilities for a period of sixty (60) days or until such time that specific land use standards for these uses can be developed. All development approvals for data centers,

data processing facilities, cryptocurrency mining operations, and any uses associated with data processing facilities are subject to the moratorium.

(3) The moratorium shall begin May 4, 2026 and shall end on July 3, 2026, or upon adoption of a Zoning Ordinance Text amendment addressing the land uses of data centers, data processing facilities, cryptocurrency mining, and associated uses and any necessary amendments to the Durham Code of Ordinances to address utility extension, whichever comes first. This sixty (60) day moratorium is necessary to allow sufficient time for the Durham Planning and Development staff to study these uses and their impacts, to consider zoning standards and mitigation methods and to prepare an amendment to the UDO to address data centers, data processing facilities, cryptocurrency mining, and other uses associated with data processing facilities, as well as to allow the City to adopt any needed amendments to the Durham Code of Ordinances to address utility extension for these high impact uses prior to the expiration of the moratorium.

(4) Durham Planning and Development Staff will study the impacts of data centers, data processing facilities, cryptocurrency mining, and any other uses associated with data processing facilities on communities within the first thirty (30) days of the moratorium. Concurrently, the Planning and Development Staff will investigate how other communities in North Carolina and across the United States have addressed these impacts through zoning regulations. Planning and Development staff will develop the land use regulations required to mitigate negative impacts associated with land uses described as data centers, data processing facilities, cryptocurrency mining operations, and any other uses associated with data processing facilities. Subsequently, in the final thirty (30) days, a series of text amendments to the Unified Development Ordinance and any necessary amendments to the Durham Code of Ordinances to address utility extension will be proposed which will follow the legislative process for adoption. The research, policy development, and legislative processes necessitate an adequate moratorium limit of sixty (60) days.

Section 3. If any section, subsection, sentence, phrase, or part of this ordinance is declared invalid or unconstitutional by a court of competent jurisdiction, such invalidity shall not affect the validity of the remaining portions of this ordinance. The City Council hereby declares that it would have passed this ordinance, and each section, subsection, sentence, clause, or phrase thereof irrespective of the fact that any one or more sections, subsections, sentences, clauses, or phrases be declared invalid.

Section 4. All ordinances or parts of ordinances in conflict herewith are hereby repealed to the extent of such conflict.

Section 5. This ordinance is effective upon adoption.

Adopted this the 4th day of May, 2026.

**NOTICE OF PUBLIC HEARING
CITY OF DURHAM**

Notice is hereby given that the Durham City Council will hold a public hearing on **May 4, 2026**, at a meeting starting at 7 p.m. to consider the adoption of a proposed moratorium on the acceptance and processing of applications for new or expanded data centers within the City of Durham. The meeting will be held in person in the City Council Chambers, 1st Floor, 101 City Hall Plaza and online using the Zoom virtual meeting platform. The purpose of the proposed moratorium is to allow the City to evaluate the impacts of data center facilities on utility capacity, environmental resources, energy consumption, and local zoning, and to prepare appropriate land-use regulations. The proposed ordinance would temporarily prohibit the construction, development, or permitting of data centers, cryptocurrency mining operations and any use associated with data center processing facilities for a period of 24 months. Changes to the proposed action may be made following the public hearing.

All interested persons are invited to attend the public hearing and provide comment. Written comments may be submitted prior to the meeting by emailing the Durham City Council at shay.castro@durhamnc.gov or by contacting the City Clerk's Office at 919-560-4166 during business hours (Mon-Fri, 8 a.m. to 5 p.m.) in advance of the meeting. A copy of the proposed ordinance is available for review on the City website at <https://www.durhamnc.gov/AgendaCenter/City-Council-4>.

The proposed ordinance follows this notice of public hearing.

AN ORDINANCE IMPOSING A TEMPORARY MORATORIUM ON DEVELOPMENT
APPROVALS FOR DATA CENTERS, CRYPTOCURRENCY MINING OPERATIONS, AND
ANY USE ASSOCIATED WITH DATA CENTER PROCESSING FACILITIES WITHIN THE CITY
OF DURHAM PURSUANT TO N.C.G.S. §160d-107.

WHEREAS, pursuant to N.C. Gen. Stat. § 160D-107, local governments may adopt an ordinance authorizing a temporary moratorium on any development approvals required by law; and

WHEREAS, the City of Durham Unified Development Ordinance does not define cryptocurrency mining, data center, and other uses associated with data centers as specific uses; and

WHEREAS, the Durham City Council at its May 4, 2026 regular meeting held a legislative hearing regarding this moratorium in accordance with N.C. Gen. Stat. § 160D-601; and

WHEREAS, the Durham City Council believes such a moratorium will protect the public interest and welfare of the residents of the City of Durham until such regulations regarding the aforementioned uses are adopted.

NOW, THEREFORE, BE IT ORDAINED BY THE CITY COUNCIL OF THE CITY OF DURHAM:

Section 1. A temporary moratorium is hereby imposed commencing on May 4, 2026 and expiring no later than May 4, 2028, or on approval of new zoning regulations regarding data centers, data processing facilities, cryptocurrency mining, and any other uses associated with data processing facilities not yet defined by the Durham Unified Development Ordinance. The moratorium specifically includes the corporate limits of the City of Durham as well as any future City of Durham planning area as depicted on the City of Durham Land Use Map. For the purposes of this moratorium, a "data center" or "data processing facility" refers to a building, a dedicated space within a building, or group of buildings housing computer systems and associated components, such as telecommunication and data processing systems, to be used for remote storage, processing, or distribution of large amounts of data. Examples of such data include, but are not limited to, computationally intensive applications such as cryptocurrency mining, artificial intelligence (A.I.) computing, weather modeling, genome sequencing, application hosting, cloud storage, video and technical streaming services, etc. Such facilities may include air handlers, power generators, water cooling and storage facilities, utility substations, and other infrastructure to support operations.

This moratorium shall not apply to data processing equipment or server rooms that are clearly incidental and subordinate to a permitted principal use and are intended solely to support on-site operations of such principal use, provided such equipment or server rooms comply with all other applicable provisions of the Durham Unified Development Ordinance. Such principal use may include, but is not limited to, hospitals, medical facilities, financial institutions, offices, educational institutions, or similar uses, as long as such data processing activities are not offered as a primary

service to off-site users. Projects classified as exempt in accordance with N.C. Gen. Stat. 160D-107(c) are also excluded from this moratorium as a matter of law.

Section 2. In compliance with the requirements of N.C. Gen. Stat. 160D-107 the City of Durham makes the following statements:

(1) Data centers, data processing facilities, cryptocurrency mining operations, and uses associated with data processing facilities require considerable amounts of electricity and water usage, which can result in greenhouse gas emissions, as well as additional pollution, e-waste, noise, and other local impacts to residents and communities living near the facilities. The Durham Planning and Development Department is in the process of developing zoning standards and mitigation methods for these intensive land use types which may cause detrimental harm to the natural environment and the quality of life of City residents. The City seeks time to develop such standards. The City has looked at alternative solutions to a moratorium but found none. The City has determined that to simply allow this intensive land use to be permitted without regard to location, height, size, density, population, industry, residence or other purpose would be counter to the stated goals of the City of Durham Comprehensive Plan and hinder implementation of the City of Durham Code of Ordinances and the adopted Unified Development Ordinance.

(2) The Unified Development Ordinance table of permitted uses does not currently include "data centers" nor does the ordinance provide a definition of this use or similar uses. The City seeks to update the Unified Development Ordinance definition section and table of uses to specifically define "data center," "data processing facility," and "cryptocurrency mining operation" as specified land uses. Therefore, the City seeks to place a moratorium on the use of property within the City of Durham planning jurisdiction for data centers, data processing facilities, cryptocurrency mining, and any other uses associated with data processing facilities for a period of twenty-four (24) months or until such time that specific land use standards for these uses can be developed. All development approvals for data centers, data processing facilities, cryptocurrency mining operations, and any uses associated with data processing facilities are subject to the moratorium.

(3) The moratorium shall begin May 4, 2026 and shall end on May 4, 2028, or upon adoption of a Zoning Ordinance Text amendment addressing the land uses of data centers, data processing facilities, cryptocurrency mining, and associated uses, whichever comes first. This twenty-four (24) month moratorium is necessary to allow sufficient time for the Durham Planning and Development staff to study these uses and their impacts, to consider zoning standards and mitigation methods, and to prepare an amendment to the Unified Development Ordinance to address data centers, data processing facilities, cryptocurrency mining, and other uses associated with data processing facilities prior to the expiration of the moratorium.

(4) Durham Planning and Development Staff will study the impacts of data centers, data processing facilities, cryptocurrency mining, and any other uses associated with data

processing facilities on communities within the first year of the moratorium. Concurrently, the Planning and Development Staff will investigate how other communities in North Carolina and across the United States have addressed these impacts through zoning regulations. Planning and Development staff will develop the land use regulations required to mitigate negative impacts associated with land uses described as data centers, data processing facilities, cryptocurrency mining operations, and any other uses associated with data processing facilities. In the second year of the moratorium, a series of text amendments to the Zoning Ordinance will be proposed which will follow the legislative process for adoption. Public input will be sought during each part of the process. To allow adequate time for research, policy development, and legislation, a twenty-four-month moratorium is necessary.

Section 3. If any section, subsection, sentence, phrase, or part of this ordinance is declared invalid or unconstitutional by a court of competent jurisdiction, such invalidity shall not affect the validity of the remaining portions of this ordinance. The City Council hereby declares that it would have passed this ordinance, and each section, subsection, sentence, clause, or phrase thereof irrespective of the fact that any one or more sections, subsections, sentences, clauses, or phrases be declared invalid.

Section 4. All ordinances or parts of ordinances in conflict herewith are hereby repealed to the extent of such conflict.

Section 5. This ordinance is effective upon adoption.

Adopted this the 4th day of May, 2026.

**ORANGE COUNTY
BOARD OF COMMISSIONERS
ACTION AGENDA ITEM ABSTRACT
Meeting Date: March 17, 2026**

**Action Agenda
Item No. 6-c**

SUBJECT: Discussion of Moratorium on “Data Centers” as a Land Use

DEPARTMENT: County Attorney’s Office &
Planning and Inspections

ATTACHMENT(S):

- 1) Overview of Potential Impacts from Large-Scale Data Centers
- 2) Presentation

INFORMATION CONTACT:

John Roberts, County Attorney, 919-245-2318
Cy Stober, Planning Director, 919-245-2575

PURPOSE: To receive an overview of the impacts of data centers and discuss a possible 1-year moratorium on new data centers as a permitted land use.

BACKGROUND: At the March 5, 2026, Board Business meeting, Commissioner Marilyn Carter petitioned to ask staff to prepare a presentation for the Board’s March 17, 2026, Business meeting addressing the following:

- 1) The potential impacts of large-scale data center development in Orange County, including electricity demand, water usage, land use compatibility, environmental considerations, and potential impacts on residents’ utility costs, and water quality.
- 2) Policy options available to the County, including, but not limited to, a temporary moratorium on data center development, revising the Orange County Land Use Plan and UDO, and the legal process required to implement each option.
- 3) Recommendation(s) for Board action.

Commissioner Jamezetta Bedford asked that noise and environmental justice also be included.

The County Attorney and Planning Director have prepared a presentation, with sources cited for reference, regarding the potential impacts from “large-scale data centers”. The County Attorney also assessed two policy options available to the Board in declaring a moratorium on this land use, less than or greater than 60 days. There are differing public notice criteria for the two moratorium options.

A pending amendment to the Unified Development Ordinance (UDO) to regulate data centers as a permitted land use may also be directed to staff, at the Board’s pleasure. It is not possible to amend the UDO’s text within 60 days due to the administrative requirements of Orange County’s UDO.

FINANCIAL IMPACT: There is no financial impact associated with this item.

ALIGNMENT WITH STRATEGIC PLAN: This item supports:

- **GOAL 1: ENVIRONMENTAL PROTECTION AND CLIMATE ACTION**

OBJECTIVE 6. Protect water supply/watersheds.

OBJECTIVE 7. Conserve and protect high priority open space, including Natural Heritage sites, nature preserves, watershed riparian buffers, and prime/threatened farmland.

OBJECTIVE 8. Include environmental stewardship objectives in the Comprehensive Land Use Plan.

- **GOAL 2: HEALTHY COMMUNITY**

OBJECTIVE 7. Invest in services and programs that improve the health and quality of life of the community (e.g., recreation and public open spaces, arts, etc.)

RECOMMENDATION(S): The Manager recommends that the Board consider the following options and direct staff to take actions accordingly:

- 1) Direct staff to prepare materials for and give public notice of a legislative public hearing at the April 21, 2026 Board Business meeting to declare a moratorium on “large-scale data centers” for one (1) year; and
- 2) Initiate an amendment to the Orange County UDO to define and regulate “large-scale” data centers, inclusive of Artificial Intelligence Data Centers, Cryptocurrency Mining Facilities, Data Centers, Data Processing Facilities, and similar uses.

General Definition of a Data Center

A large group of networked computer servers typically used by organizations for the remote storage, processing, or distribution of large amounts of data. *Source – Dictionary.com*

Environmental Impact of Data Centers

- Data centers require large cooling systems to function, and these systems emit a steady hum that can disturb nearby residents. To address this, local governments are setting noise limits, often 65 decibels at the property line and 55 decibels in quieter or residential areas. How these limits are met is up to the data center designer, but common approaches include sound-absorbing or sound-blocking structures, berms or increased setbacks. *Source – National Association of Counties*
- Communities living in close proximity (i.e., one mile) to EPA-regulated data centers have higher air pollution burdens compared to the national median (i.e., 50th percentile of air pollution). *Source – Environmental Data and Governance Initiative*
- In particular, communities of color within one mile of EPA-regulated data centers face worse air pollution than other communities near data centers and the typical (median) community in the country. These trends are relatively consistent, but not as pronounced when considering state-specific averages. *Source – Environmental Data and Governance Initiative*
- Low-income communities within one mile of EPA-regulated data centers do not have a statistically significant association with air pollution at the national level, but they do tend to face higher levels of nitrogen dioxide and diesel particulate matter (PM) than other parts of the states where they are located. *Source – Environmental Data and Governance Initiative*

Land Use Compatibility

- Not currently listed as a specific use in the UDO.
- Staff must examine what land use categories are compatible with Data Centers.
 - Including Artificial Intelligence Data Centers, Data Centers, Data Processing Facilities, Cryptocurrency Mining Facilities.
- Due to the high utility needs of Data Centers there are very few areas of the County that would be practical for such a use and a substantial impact is not expected in rural areas of Orange County.

Electrical Usage Impact of Data Centers

- Large data centers can span hundreds of acres and can have unique power and water infrastructure needs. Data centers can require large amounts of power similar to a medium-sized city, accounting for nearly 4.4 percent of U.S. annual electricity in 2023. In

response to transformations in technologies including AI, hyperscale development across the country and new domestic manufacturing, the total national energy demand is estimated to increase 20 percent by 2030.² This level of power demand can trigger the need for additional generation sources and new grid infrastructure. *Source – National Association of Counties*

- Nationally, evidence suggests that large facilities' drains on electrical grid infrastructure leads to higher costs for residents.

Water Usage Impact of Data Centers

- Large data centers can consume up to 5 million gallons *per day*, equivalent to the water use of a town populated by 10,000 to 50,000 people. *Source -- Data Centers and Water Consumption By Miguel Yañez-Barnuevo*
- Novel technologies like direct-to-chip cooling and immersion cooling can reduce water and energy usage by data centers. *Source -- Data Centers and Water Consumption By Miguel Yañez-Barnuevo*
- Nationally, evidence suggests that large facilities' drains on water utility infrastructure leads to higher costs for residents.

Policy Options Available to the County and Process

Temporary Moratorium – Two options for moratoria, less than or greater than 60 days. Less than 60 days requires a legislative public hearing with more than 7 days advance public notice and may be imposed by BOCC majority vote/resolution. Greater than 60 days requires a legislative public hearing with notice of the hearing given once a week for two successive calendar weeks. The notice must be published the first time not less than 10 days nor more than 25 days before the date scheduled for the hearing and must be adopted by ordinance. Either option requires specific findings by the BOCC.

Revising the UDO – During a moratorium the actual amendment to the UDO would go through the usual process for a text amendment, i.e., staff drafting and review, planning board hearing, review, and recommendation, BOCC hearing and decision. Amending the UDO with regard to data centers would be subject to downzoning restrictions such that Data centers could not simply be prohibited. For any use specifically eliminated, another use must be added. For example, "Data Center" over 20,000 square feet prohibited while "Data Center Local" under 20,000 square feet allowed each with specific descriptions.

Recommendations for BOCC Action

Manager recommends the BOCC – Direct staff to bring back to the BOCC a public hearing on a one-year moratorium on data center development for the purpose of developing appropriate UDO safeguards related to Artificial Intelligence Data Centers, Cryptocurrency Mining Facilities, Data Centers, Data Processing Facilities, and similar uses.



Item 6-c:
Discussion of Moratorium on “Data
Centers” as a Land Use

General Definition of a Data Center

A large group of networked computer servers typically used by organizations for the remote storage, processing, or distribution of large amounts of data.

Air Quality Impact of Data Centers

- Communities living in close proximity (i.e., one mile) to EPA-regulated data centers have higher air pollution burdens compared to the national median
- Communities of color within one mile of EPA-regulated data centers face worse air pollution than other communities near data centers and the typical (median) community in the country
- Low-income communities within one mile of EPA-regulated data centers tend to face higher levels of nitrogen dioxide and diesel particulate matter than other parts of the states where they are located.

Water Use Impact of Data Centers

- Large data centers can consume up to 5 million gallons *per day*, equivalent to the water use of a town populated by up to 50,000 people.
- Novel technologies like direct-to-chip cooling and immersion cooling can reduce water and energy usage by data centers.

Electrical Use Impact of Data Centers

- Data centers can require large amounts of power similar to a medium-sized city, accounting for nearly 4.4 percent of U.S. annual electricity in 2023.
- The total national energy demand is estimated to increase 20 percent by 2030.
- Evidence suggests that large facilities' drains on water utility infrastructure leads to higher costs for residents.

Noise Impact of Data Centers

- Data centers require large cooling systems to function, and these systems emit a steady hum that can disturb nearby residents.
 - Local governments are setting noise limits, often 65 decibels at the property line and 55 decibels in quieter or residential areas.

Local Land Use Compatibility of Data Centers

- Not currently defined or regulated by UDO
- Due to high utility needs – namely water and power – there are very few areas in the county that can hypothetically support a data center
- Staff must examine what land use categories might be compatible with Data Centers
 - Work must include Artificial Intelligence Data Centers, Data Centers, Data Processing Facilities, Cryptocurrency Mining Facilities
 - Distinction between “large-scale” and “local” data centers is likely needed

Moratorium Options

- Temporary Moratorium
 - < 60 Days
 - Public hearing may be held with one public notice 7+ days prior to the hearing
 - 60+
 - Public hearing may be held with one public notice per week for two successive weeks prior to the hearing
 - First notice must be posted 25 – 10 days prior to hearing

Manager Recommendations

- Direct staff to prepare materials for and notice a legislative public hearing at the April 21 BOCC meeting to declare a moratorium on “large-scale data centers” for one (1) year; and
- Initiate an amendment to the Orange County UDO to define and regulate both “large-scale” data centers, inclusive of Artificial Intelligence Data Centers, Cryptocurrency Mining Facilities, Data Centers, Data Processing Facilities, and similar uses.

**ORANGE COUNTY
BOARD OF COMMISSIONERS
ACTION AGENDA ITEM ABSTRACT
Meeting Date: April 21, 2026**

**Action Agenda
Item No. 5-a**

SUBJECT: One-Year Moratorium Ordinance on “Data Centers” as a Land Use

DEPARTMENT: County Attorney’s Office &
Planning and Inspections

ATTACHMENT(S):

- 1) Ordinance Imposing a Temporary Moratorium
- 2) Presentation

INFORMATION CONTACT:

John Roberts, County Attorney, 919-245-2318
Perdita Holtz, Deputy Planning Director, 919-245-2578

PURPOSE: To hold a public hearing and receive comment on a proposed ordinance to impose a one-year moratorium on large-scale data centers as a land use, inclusive of Artificial Intelligence Data Centers, Cryptocurrency Mining Facilities, Data Centers, Data Processing Facilities, and similar uses.

BACKGROUND: At its March 5, 2026, Business meeting, the BOCC voted unanimously to direct staff to prepare a presentation addressing the following:

- 1) The potential impacts of large-scale data center development in Orange County, including electricity demand, water usage, land use compatibility, environmental considerations, and potential impacts on residents’ utility costs, and water quality.
- 2) Policy options available to the County, including, but not limited to, a temporary moratorium on data center development, revising the Orange County Land Use Plan and UDO, and the legal process required to implement each option.
- 3) Recommendation(s) for Board action.

The staff provided the presentation at the March 17, 2026, Business meeting. The Board voted unanimously to hold a public hearing at its April 21, 2026, Business meeting to allow for the opportunity to declare a one-year moratorium on large-scale data centers as a land use, inclusive of Artificial Intelligence Data Centers, Cryptocurrency Mining Facilities, Data Centers, Data Processing Facilities, and similar uses. The Board also voted unanimously to direct staff to develop amendments to the County’s Unified Development Ordinance (UDO) to define and regulate both “large-scale” data centers, inclusive of Artificial Intelligence Data Centers, Cryptocurrency Mining Facilities, Data Centers, Data Processing Facilities, and similar uses during this moratorium.

Pursuant to North Carolina General Statute (NCGS) 160D-107, “local governments may adopt temporary moratoria on any development approval required by law, [and] the duration of any moratorium shall be reasonable in light of the specific conditions that warrant imposition of the

moratorium and may not exceed the period of time necessary to correct, modify, or resolve such conditions.”

FINANCIAL IMPACT: There is no financial impact associated with this item.

ALIGNMENT WITH STRATEGIC PLAN: This item supports:

- **GOAL 1: ENVIRONMENTAL PROTECTION AND CLIMATE ACTION**

OBJECTIVE 6. Protect water supply/watersheds.

OBJECTIVE 7. Conserve and protect high priority open space, including Natural Heritage sites, nature preserves, watershed riparian buffers, and prime/threatened farmland.

OBJECTIVE 8. Include environmental stewardship objectives in the Comprehensive Land Use Plan.

- **GOAL 2: HEALTHY COMMUNITY**

OBJECTIVE 7. Invest in services and programs that improve the health and quality of life of the community (e.g., recreation and public open spaces, arts, etc.)

RECOMMENDATION(S): The Manager recommends that the Board:

- 1) Conduct the public hearing and receive public comment;
- 2) Close the public hearing; and
- 3) Vote to Approve the Ordinance to Apply a One-Year Moratorium on Data Centers as a Land Use in Orange County.

AN ORDINANCE IMPOSING A TEMPORARY MORATORIUM ON DEVELOPMENT APPROVALS FOR LARGE SCALE DATA CENTERS AND RELATED HIGH-IMPACT FACILITIES IN ORANGE COUNTY.

WHEREAS, the Orange County Board of Commissioners (the "Board") is responsible for promoting the health, safety, and general welfare of the County's residents; and

WHEREAS, North Carolina General Statute § 160D-107 authorizes local governments to adopt temporary moratoria on development approvals under certain conditions; and

WHEREAS, the Board has observed a recent increase in inquiries and potential applications for high-impact facilities, specifically large scale data centers and similar operations, within the unincorporated areas of the County; and

WHEREAS, these types of facilities present unique challenges and potential impacts not adequately addressed by the County's current Unified Development Ordinance (UDO) or zoning regulations, including but not limited to:

- Extremely high electricity consumption and strain on existing utility infrastructure;
- Significant noise generation from cooling systems and backup generators, affecting adjacent residential areas and general quality of life;
- Substantial water usage for cooling purposes;
- Potential environmental impacts, including hazardous materials and electronic waste disposal; and
- Land use compatibility concerns, including in rural or agriculturally zoned districts; and

WHEREAS, the County's existing regulations were not developed with these specific types of high-impact uses in mind, and the County needs time to develop appropriate, comprehensive standards to ensure that any future development of such facilities is consistent with the County's long-term land use plan and protects the public interest; and

WHEREAS, the Board has considered alternative courses of action, such as relying on existing general use permits or on-the-spot zoning amendments, but determined these were inadequate because they lack the specific performance standards (e.g., noise limits, utility capacity requirements, setbacks) needed to mitigate the unique impacts of data centers effectively; and

WHEREAS, a temporary moratorium on accepting and processing new applications for such facilities is a reasonable and necessary measure to allow County staff and the Planning Board sufficient time to study the issues, engage with stakeholders, and draft appropriate amendments to the UDO;

NOW, THEREFORE, BE IT ORDAINED by the Orange County Board of Commissioners:

Section 1. Moratorium Imposed

A temporary moratorium is hereby imposed for a period of one (1) year from the effective date of this Ordinance. During this period, the County shall not accept, process, or approve any applications for the following development approvals:

- Special Use Permits;
- Conditional Zoning Permits;
- Zoning Map Amendments (rezoning requests);
- Building Permits (except for interior renovations that do not expand capacity or impact

exterior appearance/noise);

- Any other development approval required by law;

for the establishment, construction, erection, alteration, or expansion of any data center, cryptocurrency mining facility, other high-impact data processing facility or other uses including but not limited to Artificial Intelligence Data Centers, Cryptocurrency Mining Facilities, Data Centers, Data Processing Facilities, and similar uses.

Section 2. Scope and Exemptions

This moratorium shall apply to all unincorporated areas of Orange County. Exemptions include:

- Any development that has received a valid development approval in accordance with G.S. 160D-107(c) prior to the effective date of this ordinance.
- Single and two-family residential dwellings.

Section 3. Plan of Action and Schedule

During the effective period of this moratorium, the Orange County Board of Commissioners and County Staff shall take the following actions:

- Step 1: Study the potential impacts (energy, water, noise, land use) of data centers and similar facilities.
- Step 2: Draft specific land use ordinance amendments and performance standards to regulate these facilities, including appropriate zoning districts, setback requirements, noise limitations, and utility capacity conditions.
- Step 3: Planning Board review of the draft amendments.
- Step 4: The Board of Commissioners will hold the necessary public hearings to consider and potentially adopt the final ordinance amendments.

Section 4. Duration and Termination

This Ordinance shall be in full force and effect from April 21, 2026 until April 21, 2027, unless earlier terminated, extended, or modified by the Board of Commissioners in accordance with North Carolina law. The stated duration is reasonably necessary to address the identified problems.

Section 5. Severability

If any section or part of this ordinance is declared invalid or unconstitutional by a court of competent jurisdiction, such invalidity shall not affect the validity of the remaining sections or parts.

Adopted this the 21st day of April, 2026.



Item 5a:

Public Hearing to consider a Moratorium on
“Data Centers” as a Land Use

General Definition of a Data Center

A large group of networked computer servers typically used by organizations for the remote storage, processing, or distribution of large amounts of data.

Air Quality Impact of Data Centers

- Evidence shows communities living in close proximity (i.e., one mile) to EPA-regulated data centers have higher air pollution burdens
- Evidence shows low-income communities and communities of color within one mile of EPA-regulated data centers face worse air pollution than other communities near data centers
- Recent evidence suggests data center operations cause “heat island” effects in surrounding areas

Electrical, Noise, and Water Impact

- Data centers require large cooling systems to function, which emit a steady hum
- Evidence shows data centers can require large amounts of power similar to a medium-sized city
- Evidence shows large data centers can consume up to 5 million gallons per day

Local Land Use Compatibility of Data Centers

- Not currently defined or regulated by the Orange County UDO
- Staff must examine what land use categories might be compatible with Data Centers and recommend appropriate standards
- For these reasons a moratorium on Data Center development in Orange County is recommended

Manager Recommendations

The Manager recommends that the Board take the following actions:

- 1) Conduct the public hearing and receive public comment;
- 2) Close the public hearing; and
- 3) Vote to Approve the Ordinance to Apply a One-Year Moratorium on Data Centers as a Land Use in Orange County.