CHAMPAIGN COUNTY BOARD
DATA CENTER ACTIVITIES TASK FORCE
County of Champaign, Urbana, Illinois
Monday, June 1, 2026 - 6:30 p.m.

Shields-Carter Meeting Room
Bennett Administrative Center
102 E. Main St., Urbana

Committee Members:

Aaron Esry – Vice Chair	Emily Rodriguez - Chair
Carly McCrory-McKay	Kevin Sage
Andrew Rehn	Deb Newell
Dirk Rice	Amy Young
Dennise Arres	

<u>Agenda Items</u>

I. **Call to Order**

II. **Roll Call**

III. **Approval of Agenda/Addendum**

IV. **Approval of Minutes**
   a. May 4, 2026

V. **Public Input**

VI. **Communications (discussion only)**

VII. **New Business (discussion only)**
   a. Presentation – Senior Manager of Programs Johanna Smith, Alliance for Water Efficiency
   b. Presentation – Dr. Ximing Cai and Research Assistant Hari Dave, Lincoln Institute Project, Civil & Environmental Engineering at University of Illinois
   c. Presentation – Executive Director Rick Manner, Champaign Urbana Sanitary District
   d. Memorandum on Water Use and Cooling, Director John Hall, Champaign County Planning and Zoning

VIII. **Other Business**
   a. Date of next meeting (discussion only)
      i. June 22, 2026 to focus on energy

IX. **Chair's Report**

X. **Next Steps (discussion only)**

XI. **Adjournment**

TO: **Data Center Task Force**

FROM: **John Hall, Zoning Administrator**

DATE: **May 19, 2026**

RE: **Proposed requirements for water use and cooling for a BIG DATA CENTER**

Champaign County
Department of
PLANNING & ZONING

Bennett Administrative Center
102 East Main Street
Urbana, Illinois 61801

(217) 384-3708
zoningdept@co.champaign.il.us
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BACKGROUND

Attachment A is a proposed standard condition for water use and cooling for a BIG DATA CENTER. The text with a single underline is what was proposed to ELUC on February 5, 2026, that ELUC deferred action on. The text with the double underline is new text that was not included in February.

Attachment A is based in large part on the City of Aurora requirements which are included as Attachments B and C.

Attachment D is a copy of the proposed water usage calculations for the CyrusOne 634 MW Data Center that was approved in Sangamon County, Illinois earlier this year. This is provided as an example of what can be expected in a special use permit application for a BIG DATA CENTER.

ATTACHMENTS

A Proposed Standard Condition for Water Use and Cooling

B City of Aurora requirement for Water Consumption and Quality Modeling Report

C City of Aurora requirement for Water Usage Standards

D Proposed Water Usage Calculations for CyrusOne C1 Sangamon 1 LLC 634 MW Data Center in Sangamon County, Illinois

Attachment A

N. Standard Condition for Water Use and Cooling

(1) The use of ground water and/or use of water from a PUBLIC WATER SUPPLY SYSTEM for cooling the processors, other equipment, and the buildings in the BIG DATA CENTER shall be limited to closed-loop cooling systems. No evaporative chillers shall be allowed.

(2) Maximum water usage effectiveness. Water usage effectiveness is the ratio of total potable building water consumption (in liters) to Information Technology equipment energy use (in kilowatt-hours). The maximum water usage effectiveness is 0.2.

(3) Any water well capable of withdrawing water at or above 70 gallons per minute (gpm) must comply with all requirements (including annual reporting requirements) of the Water Use Act of 1983 (525 ILCS 45).

(4) The SPECIAL USE Permit application shall include the following:

a. A description of the proposed cooling system for the processors, other equipment, and the buildings in the BIG DATA CENTER.

b. An estimate of the Total Direct Water Usage for cooling the processors, other equipment, the buildings, humidification, fire suppression, and occupant demand in the BIG DATA CENTER. The estimate shall identify the proposed source of water and include the amounts of ground water and/or water from a PUBLIC WATER SUPPLY SYSTEM to be used for cooling the processors, other equipment, the buildings, humidification, fire suppression, and occupant demand. The estimate shall include estimated average daily water demand (gallons per day); estimated peak daily water demand; estimated annual water consumption; and expected seasonal variability in water use.

c. A water withdrawal plan detailing proposed ground water withdrawals and use.

d. A written explanation by an Illinois Professional Engineer of how the use of ground water and/or the use of water from a PUBLIC WATER SUPPLY SYSTEM for cooling the processors, other equipment and the buildings in the BIG

DATA CENTER shall be minimized as much as possible.

e. An explanation of any chemical additives proposed to be added to the cooling water and how water used for cooling will be disposed of and how often it will be disposed of and how disposal of coolant water will be consistent with National Pollutant Discharge Elimination System (NPDES) standards and requirements. The source of any make-up water for the cooling system shall also be explained.

f. The BOARD may request copies of well records from the Illinois State Water Survey and may require an estimate by a qualified hydrogeologist of the likely impact on adjacent water wells.

(5) After the BIG DATA CENTER begins operation, an annual report on water usage shall be submitted to the Environment and Land Use Committee.

a. The report shall explain the amount of Total Direct Water Use for cooling the processors, other equipment, the buildings, humidification, fire suppression, and occupant demand by month and for the year.

b. The report shall include the average daily water demand (gallons per day); the peak daily water demand; the annual water consumption; and observed seasonal variability in water use.

c. The report shall include documentation that the water usage effectiveness is no more than 0.2.

d. The report shall also document any changes to the water for the closed-loop cooling system and document compliance of those changes with water-quality requirements.

e. Any reporting required for compliance with the Water Use Act of 1983 (525 ILCS 45).

within Office, Research, and Light Industrial, and industrial areas under the following conditions:

a. Applicants must submit, in addition to the application materials otherwise required by the Zoning Administrator, the following reports and studies as part of a conditional use request for a data center facility:

i. A baseline pre-development sound study with minimum and maximum dB (A) levels measured for a continuous weeklong period be submitted with the first petitions filed for the development.

ii. A Noise Modeling Study completed by a third-party acoustical engineer and submitted demonstrating compliance with the applicable standards to the underlying zoning district and this Section (25).

iii. A Water Consumption and Quality Modeling Report completed by a third-party engineer and submitted demonstrating compliance with Illinois Environmental Protection Agency requirements, the applicable standards to the underlying zoning district, and to this Section (25). The study should include the following: proposed water source identification, including but not limited to Municipal potable water supply, surface water withdrawals, reclaimed or recycled water, and any supplement or emergency water sources; estimated average daily water demand (gallons per day); estimated peak daily water demand; estimated annual water consumption; seasonal variability in water use; and projected Water Use Effectiveness as defined in this Section (25). This study must also describe water efficiency strategies, including but not limited to, cooling system type (e.g., closed-loop, hybrid, air-cooled, liquid cooling); water reuse and recycling systems; stormwater capture and reuse, where feasible; and leak detection, monitoring, and automated controls. When closed-loop or hybrid cooling systems are proposed, the Study shall specify the source of make-up water; blowdown volumes and frequency; chemical additives used in cooling water; temperature and quality characteristics of any discharged water; and the method and location of discharge (e.g., sanitary sewer, on-site treatment, reuse, or permitted surface discharge). The Study shall evaluate potential impacts to water quality, including risks of chemical contamination from cooling system additives, biocides, corrosion inhibitors, and other treatment chemicals; risk of accidental releases or leaks; spill prevention and response measures; and on-site storage and handling practices for water treatment chemicals. The Study shall include a Water Quality Protection Plan outlining secondary containment for chemical storage; monitoring protocols for discharge quality; and emergency response procedures for releases or system failures. The study shall specifically address measures to prevent thermal pollution; measures to prevent discharge of contaminants that may degrade receiving waters; and whether any wastewater pretreatment or cooling is required prior to discharge.

~~i.~~iv. Energy Consumption Modeling Report completed by a third-party engineer and submitted demonstrating compliance with the

iii. Illinois-specific data center energy code requirements adopted by rule, which may include more detailed criteria such as Mechanical Load Component (MLC) and Electrical Load Component (ELC) measures.

3. Modular nuclear reactors, small modular reactors or any other nuclear-based energy are prohibited.

iv. Water Usage Standards. Data center facilities must maintain a Water Usage Effectiveness of no more than two tenths (0.2). As used in this Chapter, "Water Usage Effectiveness" or "WUE" is defined as the ratio of total potable building water consumption (liters) to Information Technology equipment (kilowatt-hour).

e. Screening. Except as expressly modified below, data center facilities must be designed to comply with the following requirements:

i. Roof-mounted mechanical equipment must be fully enclosed on all sides by a sound-attenuating screen or parapet equal in height

EXHIBIT

G

STRATEGIC MISSION CRITICAL

RECEIVED
FEB 26 2026
CHAMPAIGN CO. P & Z DEPARTMENT

January 20, 2026

Steven Hall LEHP, BS.
Sangamon County Department of Public Health
Assistant Director of Environmental Health
2833 South Grand Ave East
Springfield, Illinois 62703

RE: Sangamon County, IL – 108MW Data Center
Water Usage Calculations

Dear Mr. Hall,

The water requirements calculated for the above-mentioned project are provided below & include the total loads expected for the building water & fire suppression demands. The fire suppression demand is comprised of the highest sprinkler demand of the building, including hose stream, as well as the site fire hydrants. The building water load comprises of usage of plumbing fixtures as well as mechanical humidification requirements. The building will be constructed in multiple phases, including an initial shell phase & future build-out phases. The initial shell phase will consist of a single unisex restroom & janitor's closet, while additional planned plumbing fixtures & mechanical humidification will be installed in a future build-out.

The Total Peak Water Supply shows the worst-case flow rate accounting for the peak usage of all the plumbing fixtures within the building in addition to the mechanical humidifier sump basins being filled. The filling of the humidifiers considers conditions accounting for either the initial fill of the units or following the completion of a flush or dump cycle.

The Total Building Water Demand is the daily calculation comprising of the total gallons of water utilized per Full Time Employee (FTE) in addition to the water demands from the mechanical humidifier units. This is broken down between a worst-case peak day within the year and a typical day that can be expected throughout the year. The building demand per FTE assumes a 15 gallon per person per day usage of fixtures located within the building.

(1) 108 MW Building Demand - Water Consumption		
	Peak	**Average**
Peak Bldg FU's to GPM (Flush Valve) – Full Build	98	--
Add'l Total Mechanical – Humidification (GPM)	2	--
Total Peak Water Supply (GPM):	**100**	--
Full Time Employee (FTE) Load:	50	50
Building Demand Per FTE (GPD):	750	750
Mechanical Requirement (GPD):	2,126	404
Total Building Water Demand (GPD):	**2,876**	**1,154**
Annual Building Demand:		273,750
Annual Mechanical Demand:		147,402
Total Annual Demand (Gallons):		**421,152**

STRATEGIC
MISSION CRITICAL

Campus Total Demand (4) 108 MW Building Demand - Water Consumption		
	Peak	**Average**
Building Occupant Demand (GPD):	3,000	3,000
Mechanical Requirement (GPD):	8,504	1,616
Total Building Water Demand (GPD):	**11,504**	**4,616**
Annual Building Demand:		1,095,000
Annual Mechanical Demand:		589,608
Total Annual Demand (Gallons):		**1,684,608**

The water demands shown for the fire suppression systems below are comprised of separate requirements for both the internal building sprinklers as well as the fire hydrants on site to accommodate a fire event on the premise.

Fire Suppression Demand - Water Requirement	
Building Sprinkler Demand, including hose stream (GPM)	1,400
Duration of Supply (Minutes)	90
Total Sprinkler Requirement (Gallons)	126,000
Fire Hydrants (GPM)	2,000
Duration of Supply (Minutes)	240
Total Hydrant Requirement (Gallons)	480,000

Sincerely,

Gregory Wilhelm

Gregory Wilhelm, CPD

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COMMENTARY
10.1029/2025AV002140

Data Centers Water Footprint: The Need for More Transparency

Ana Pinheiro Privette[1], **Ana Barros**[1], **and Ximing Cai**[1]

[1]Center for Secure Water, University of Illinois Urbana Champaign, Urbana, IL, USA

Peer Review The peer review history for this article is available as a PDF in the Supporting Information.

Key Points:

- Data centers can use a lot of water, especially for cooling and power generation, which can put serious stress on local water supplies
- There's limited transparency around how much water data centers use, making it hard for communities and policymakers to plan
- Better integration of data center expansion with local and regional water management is required

Supporting Information:

Supporting Information may be found in the online version of this article.

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Citation:

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Writing – review & editing: Ana Pinheiro Privette

Abstract The exponential growth of artificial intelligence (AI) has driven the rapid global expansion of data centers, raising serious concerns about their environmental impact—particularly water use. While national and global water consumption by data centers may seem modest compared to other users, their localized impacts can be significant—especially in regions already facing water stress or drought. This commentary examines the multi-faceted water footprint of data centers, encompassing direct cooling, electricity generation, and supply chain water demands. It highlights major gaps in transparency around how much water data centers use, which undermine effective regulation, innovation, and community planning. To ensure the sustainable growth of digital infrastructure and the preservation of water resources, comprehensive monitoring and public disclosure of water use are essential. Equally important are resilient water infrastructure planning and stronger collaboration between industry and communities.

Plain Language Summary As artificial intelligence (AI) grows, so does the number of data centers—and they use a lot of water, especially for cooling. While their total water use in aggregate may seem small, in some communities it puts serious pressure on local water systems. The problem is, we do not have data about how much water these centers actually use. This makes it hard for towns and planners to prepare. To grow responsibly and better integrate with the local communities where they operate, tech companies need to be more open about water demand for existing and planned data centers and work closely with local communities to sustainably use shared resources.

1. Introduction

The rapid expansion of data centers—currently estimated at around 11,800 globally—is being driven primarily by the exponential growth in computational demand from artificial intelligence (AI) (Brightlio, 2025). This surge has amplified concerns about environmental sustainability, particularly around energy and water consumption.

Data centers, especially hyperscale facilities, are among the fastest-growing sources of electricity demand, with newer hyperscale facilities requiring 10–40x the power of data centers built prior to 2015 (Ferreira et al., 2026). That power produces substantial heat, which must be managed to prevent server failure. The most common cooling methods, such as cooling towers, rely heavily on freshwater withdrawals.

The water footprint of data centers can be divided into direct and indirect uses. Direct use (also known as Scope 1) is primarily linked to cooling servers. Depending on climate conditions and operational settings, data centers can evaporate 0.26–2.4 gallons (1–9 L) of water per kWh of server energy for cooling, depending on technology and climate (Li et al., 2025).

Indirect use includes the water used for electricity generation (Scope 2) and water embedded in the supply chain (Scope 3). The energy that powers data centers is often produced by thermoelectric or hydroelectric plants, both of which are highly water-intensive. On average, U.S. generation consumes ~2.0 gallons (7.6 L) of evaporated water per kWh (Torcellini et al., 2003). On the other hand, the production of data center hardware, especially semiconductors, requires additional water. While supply chain use is difficult to quantify due to limited transparency, studies show that an average chip facility today uses about 10 million gallons (~38 million liters) of ultra-pure water per day, primarily for cooling machinery and ensuring wafer sheet purity (Irwin-Hunt, 2023).

A study by the International Energy Agency (IEA) (IEA, 2025) estimates that, on average, about two-thirds of all water used by data centers is linked to electricity generation, while one-fourth is tied to cooling. Yet these average values obscure substantial variability. Data centers differ widely in their water footprints due to factors such as server density and configuration, cooling system design, the carbon and water intensity of the electricity supply, and local climatic conditions that affect cooling demand.

Available studies indicate that cooling-system choice is one of the primary drivers of variability in both energy and water impacts (Li et al., 2025). Regional electricity mixes further amplify these differences. Because the water use for power generation varies widely across the United States, otherwise identical data-center configurations can exhibit differences in total water footprint depending solely on where they are located and how much energy is required for cooling (Siddik et al., 2021). This resulting variability underscores the risk of relying on single average values or sector-wide benchmarks, which can significantly underestimate the true water footprint of data centers and obscure meaningful differences between facility types and locations (Shehabi et al., 2024).

The variations in powering energy sources extend to other environmental burdens, including Green House Gas (GHG) emissions. In 2018, U.S. data centers accounted for roughly 0.5% of total national greenhouse gas emissions, with about half of these emissions concentrated in the Northeast, Southeast, and Central regions. This regional concentration underscores a key point: where data centers are located significantly influences their environmental footprint, due to differences in grid carbon intensity, climate, and cooling demands (Siddik et al., 2021).

The choice of cooling technology often involves a trade-off between on-site water use and energy consumption. Reducing a facility's local water footprint typically requires higher energy input, which in turn increases the indirect, off-site water and carbon footprint associated with regional electricity generation—unless the facility relies on low-water-intensity renewable power. This interdependence makes it essential to track both water and energy metrics concurrently to accurately evaluate optimal strategies, while also considering the facility's carbon footprint to understand its broader environmental impact. This energy–water trade-off is poorly captured in regional planning frameworks because facility-level data on cooling equipment, seasonal water use, and watershed-scale interactions are sparse or unavailable (Ferreira et al., 2026). Over the past decade, pressure has grown for companies—including data center operators—to disclose their environmental impacts. To date, most attention has centered on greenhouse gas emissions and carbon footprints, leading tech companies to set ambitious net-zero targets, reduce energy consumption, and increase reliance on renewable power. By contrast, water use has received far less scrutiny, with limited regulatory incentives or industry focus.

2. The Need for More Water Use Transparency

Despite their essential role in powering the digital economy and AI—and their growing recognition as critical infrastructure—data centers remain among the least transparent industrial users of water. Most companies disclose only partial or aggregate water use figures, with limited facility-level disclosure, and sometimes omit water data entirely from sustainability reports. Even basic industry metrics, such as Water Usage Effectiveness (WUE), a measure of the water use efficiency for data centers, are tracked by fewer than one-third of operators, leaving significant blind spots (WEF, 2024). For the little data disclosed, the absence of standardized reporting data makes it difficult to accurately assess or compare water impacts across facilities. Moreover, reported figures rarely differentiate between direct and indirect water use. This distinction is critical: direct use exerts immediate stress on local water resources, whereas indirect use, such as water embedded in electricity generation, is dispersed across wider geographies.

Transparency challenges do not stem from industry practices alone. Local governments, utilities, and development authorities often sign nondisclosure agreements or structure incentive packages with minimal public reporting, believing that confidentiality protects their competitiveness in attracting and retaining investment. These constraints extend to water utilities as well: local providers frequently block or heavily redact water-use data, citing trade-secret protections or security concerns (Berry & Heaven, 2021). Together, these public- and private-sector barriers significantly limit the availability of reliable information, making it difficult for communities, planners, and regulators to assess real water and energy impacts (EPA, 2024).

Granular, facility-level data on water use is scarce, and few data center operators provide this level of transparency. Nonetheless, available aggregated information indicates that data centers rank among the top 10 water-consuming industrial or commercial sectors in the United States (Ahmad, 2024). With the U.S. data center market projected to grow at a compound annual growth rate (CAGR) of 23% through 2030 (Upwind, 2024), concerns are mounting regarding the potential environmental impacts of this rapid expansion, particularly on local water resources and stressed watersheds.

Gaps in water use data create significant research challenges, as scientists and analysts struggle to quantify the true water footprint of data centers or model their environmental impacts accurately. Without reliable, site-specific information, it becomes difficult to identify water saving opportunities, design sustainable cooling technologies, and/or update regional water management policies. Moreover, the lack of transparency can hinder innovation, as companies and researchers may be unable to benchmark performance, test new water-saving solutions, or scale best practices across facilities. Ultimately, incomplete data not only limits understanding but also slows progress toward planning new data centers and sustainable and resilient operations of existing centers.

Greater transparency in water use will not only improve resource management for technology companies but can also inform choices about AI consumption. It could enable smarter planning by guiding the strategic allocation of AI workloads, taking advantage of spatial and temporal flexibilities to distribute environmental impacts more equitably. For example, relocating AI training and deployment to regions with more abundant water resources can help balance the overall water footprint (Ren, 2023), reducing the risk of placing a disproportionate burden on areas already grappling with scarcity and drought.

3. Looking at the Existing Numbers on Water Use

Our understanding of the sector's water footprint is pieced together from a fragmented and incomplete evidence base. While comprehensive data sets remain scarce, scattered studies offer a partial view of data center water use. Data centers account for the overwhelming majority of water consumed by major tech companies. In 2023, Meta used 813 million gallons of water globally, of which 95% (776 million gallons) was consumed by its data centers. Google's footprint is even larger: in 2023, the company reported using 6.4 billion gallons of water worldwide, with 95% (6.1 billion gallons) attributed to its data centers (McCauley & Scanlan, 2025).

Although these numbers are large, they remain modest compared to water use in sectors such as agriculture and energy production. For example, in the United States, where more than 5,400 data centers are in operation (Brightlio, 2025) their combined footprint is estimated to account for only about 0.3% of the total public water supply for the contiguous U.S. (Ren & Luers, 2025); while agriculture accounts for roughly 70% of all freshwater withdrawals in the country, making it by far the largest water-consuming sector (USGS, 2023). The primary concern, however, lies in the local-level impacts that data centers can impose on water resources and infrastructure.

Because most available data are reported in aggregate form and as average usage (JLARC, 2024), it can characterize broad resource requirements but provides limited insight into the actual impacts these facilities impose at the local scale. Evidence from Prince William County, Virginia illustrates this point. Reported data for 25 operating data centers (as of late 2021) show that the average daily water consumption per building is approximately 18,000 gallons, while the maximum reaches nearly 88,000 gallons per day (County of Fairfax, 2024). Relying on a single average WUE (e.g., from industry-provided national data) for planning purposes hides the fact that two facilities with the same IT load may impose dramatically different pressures on surrounding water resources and neighboring communities. For planners and decision makers, the distinction is critical: local impacts depend not on generalized averages but on the specific design, operation, climate, and water availability, the energy context of each facility, as well as water management governance.

4. The Impacts of Data Centers at the Local Scale

These gaps in data are not just a research problem—they have real consequences for communities. At the local scale, in the communities that house these data centers, the impacts can be pronounced, and lack of data can hinder efforts to build resilience in the local and regional water systems. Without accurate account and projections of water use, local governments and water managers cannot effectively plan for this added demand. The growth of facilities in vulnerable areas risks compounding water stress, potentially undermining local supplies and the resilience of existing infrastructure. Without integrating water availability and demand into data center siting and economic development decisions, states and local governments risk locking regions into an unsustainable and inefficient water-use trajectory that threatens drinking water supplies (Volzer, 2025).

Over 97% of the water consumed by major data center operators is drawn from municipal drinking water systems—many of which are already operating near or at capacity (Bluefield Research, 2025). This strain is particularly acute in small and mid-sized cities, where many existing and planned data centers are located, and where water supply infrastructure is often more vulnerable than in larger urban areas.

In 2023, Google's data center in Council Bluffs, Iowa consumed roughly 980 million gallons of water (Nguyen, 2025). That year, Google ranked as the city's number one customer for Council Bluff Water Works, the utility responsible for supplying water to households and industries (CBWW, 2023). This single facility accounted for about 21% of the city's total water use, the equivalent of adding more than 4,700 residents—based on an average per-capita water consumption of 208 gallons per day—to a city with a population of just 62,790 (WPR, 2025).

Similar pressures are emerging in other U.S. communities. In The Dalles, Oregon, data center water use nearly tripled in 5 years, reaching 355 million gallons in 2021—about 29% of the city's total water demand (Lei et al., 2005). Likewise, in Mesa, Arizona, water allocation agreements for large new data center campuses have raised concerns about competition with residential and agricultural users in an already water-scarce region. For instance, a proposed data center was projected to use up to 1.75 million gallons of water per day once fully operational, which is approximately two-thirds of the city's daily water supply (Polom, 2021).

While attention often focuses on big tech hyperscalers like Amazon Web Services (AWS), Google, Microsoft, and Meta, a rising cohort of third-party data center developers and operators is reshaping the industry, playing an increasingly critical role in driving new water demand (Bluefield Research, 2025). The expansion of these facilities, combined with site selection criteria, means that new data centers are increasingly being located in regions facing water scarcity. Since 2022, nearly two-thirds of new U.S. data centers have been built in high water-stress areas such as California, Arizona, and Texas (Skidmore, 2025).

The lack of transparency can lead to speculation and fuel distrust and conflict, particularly in regions already managing drought or competing demands across agriculture, industry, and households. Communities are increasingly starting to push back on data center sitting in their backyards. A Google facility in South Carolina faced sustained opposition over its proposed groundwater use, prompting a negotiated shift to surface water alternatives (Solon, 2021). In Memphis, a newly built AI data center (xAI) raised alarm among residents over daily withdrawals from aging public water infrastructure (Ahmad, 2024; Chow, 2024). In Minnesota and other water-scarce areas, environmental groups are demanding reuse, recycling, and compensation for potable water use (CWA, 2025).

5. Toward Sustainable Growth of Digital Infrastructure

To address these concerns, leading tech companies are beginning to deploy various advanced strategies that explore low- or no-water colling systems, and optimization of hardware and software. These strategies aim to reduce freshwater demand, conserve resources, and lower environmental impacts. In addition, significant investments are being made to assist local water utilities in upgrading their infrastructure to handle rising demand, implementing on-site treatment systems for water reuse and regulatory compliance, and integrating advanced technologies to boost efficiency and strengthen the resilience of water systems.

For example, Microsoft is also rolling out closed-loop water recycling systems that continuously circulate the same water between servers and chillers, eliminating the need for freshwater top-ups. Starting in 2026, new facilities in Arizona and Wisconsin will deploy this technology, each saving an estimated 125 million liters of water per year (Crimmins, 2025). Similarly, Amazon Web Services (AWS) is expanding its use of recycled wastewater for cooling. By 2030, AWS plans to operate 120 data centers with reclaimed water—up from about 20 today—potentially saving more than 530 million gallons of drinking water annually across the U.S. (Swinhoe, 2025). In Umatilla, Oregon, AWS collaborated with local farmers and community leaders to recycle data center cooling water for agricultural irrigation (Amazon, 2025). AWS has also funded water supply modernization and flood-risk reduction projects in Spain's Aragon region, using AI to improve agricultural water efficiency (Amazon-EU, 2025). Another initiative includes Essential Utilities' US$26 million investment in Pennsylvania to build an 18-million-gallon-per-day treatment plant to supply both a data center and its onsite power facility (Essential Utilities, 2025).

These efforts are driven not only by sustainability goals but also by the growing operational risks tied to water availability, permitting delays, and potential community opposition. As water stress and regulatory scrutiny intensify, leading data center operators are moving from being passive water consumers to becoming proactive resource managers and are increasingly collaborating with local communities to enhance the resilience of the water infrastructure systems in which they operate. According to Bluefield Research (Bluefiled Rsearch, 2025). "*Utilities benefit from infrastructure improvements*, *while hyperscale companies can quantify* "*avoided water loss*" *as part of their sustainability metrics*. *These win-win collaborations offer scalable paths to align community water needs with corporate growth strategies*."

Sustainable growth of digital infrastructure depends on close collaboration and a shared vision among data center operators, local utilities, natural resource managers, and communities. It requires integrating data center water demand into broader water management frameworks alongside other major users—such as agriculture, municipalities, and industry—to ensure equitable and resilient resource allocation. Achieving this requires far greater transparency around planned facilities, operational practices, and their water footprints. Clearer insights into how much water new data centers will consume, when peak demand will occur, and how operations may shift as AI workloads expand are essential. Stronger regulation and oversight, coupled with meaningful community engagement and access to accurate, site-specific water data, will equip policymakers, planners, and local stakeholders with the information needed to assess risks and design effective mitigation strategies.

6. Summary and Recommendations

Water use by data centers is an increasingly urgent and complex sustainability challenge, particularly as AI-driven demand accelerates the expansion of digital infrastructure. While data centers currently account for a relatively small share of national and global water consumption, their local-level impacts can be substantial—especially in regions already facing water stress, aging infrastructure, and growing drought threats. Many centers rely heavily on municipal drinking water for cooling, placing additional pressure on communities with limited resources.

However, understanding and managing these impacts is made more difficult by a widespread lack of transparency. Most operators do not disclose detailed water use data, and utility records are often incomplete or restricted. This opacity prevents policymakers, water managers, and researchers from accurately assessing risks, planning for future demand, and building resilience into the existing water systems. At the same time, gaps in reporting and standardized metrics hinder innovation and limit the ability to compare performance across facilities or share best practices.

To ensure the sustainable growth of digital infrastructure and protect local water systems, a coordinated approach is needed. This includes standardizing water use reporting at the facility level, incentivizing adoption of low- or no-water cooling technologies and integrating water availability assessment into data center site selection. Stronger collaboration between operators and local utilities can support infrastructure investment, while mandatory water risk assessments for new facilities can guide long-term planning.

Finally, economic-development transparency reforms—such as requiring disclosure of water, energy, and infrastructure commitments in incentive agreements—can help ensure that public benefits, risks, and trade-offs are visible to communities. Public transparency, meaningful community engagement, and sustained research funding for water-efficient hardware and AI workload management are also essential. These steps are vital to ensure that the rapid expansion of AI and cloud services does not compromise water security at the local and regional level or weaken the long term resilience of this critical infrastructure.

Conflict of Interest

The authors declare no conflicts of interest relevant to this study.

Data Availability Statement

Data were not used, nor created for this research.

Acknowledgments
None.

References

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