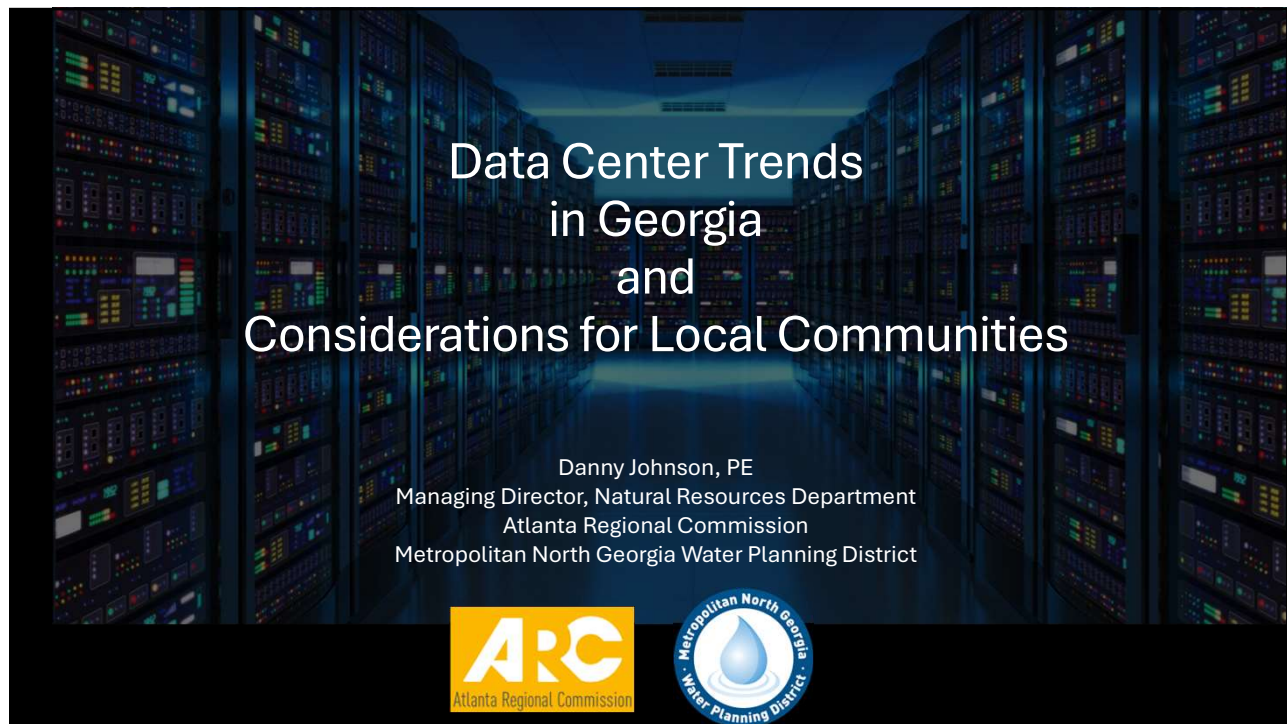




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Data Centers: Global, National, and Local Topic

Rapid Increase in Development Sites

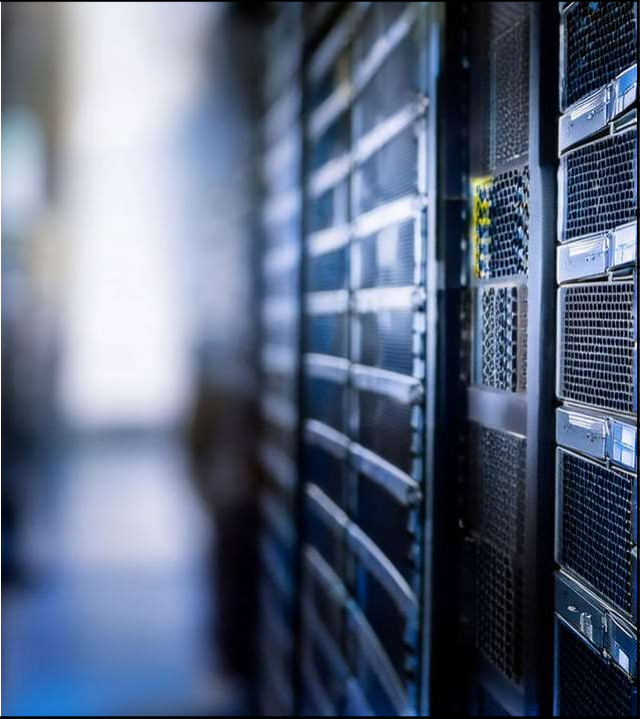
- Impacts on energy and potentially to water supplies
- Additional pressure on existing infrastructure

Major Concerns about Resource Use

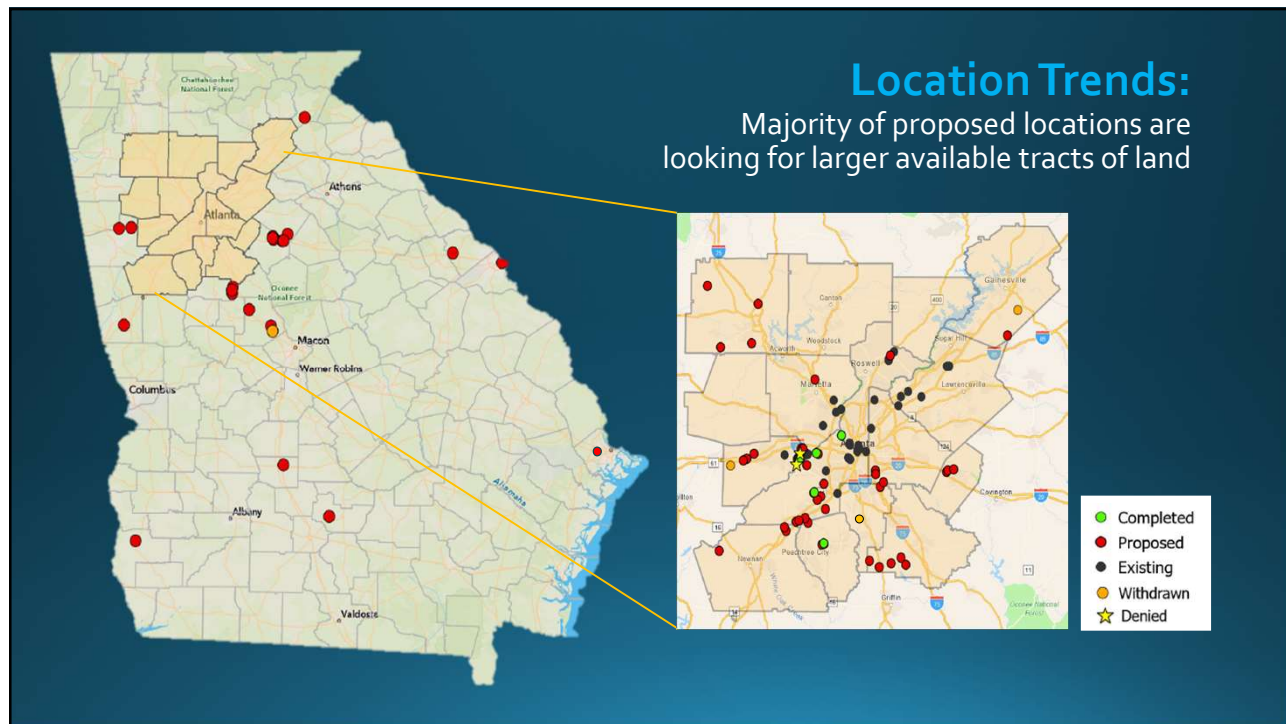
- Possible land, water, & air impacts
- Secondary concerns
 - Noise, appearance, temperature, & opportunity cost

New Development Type

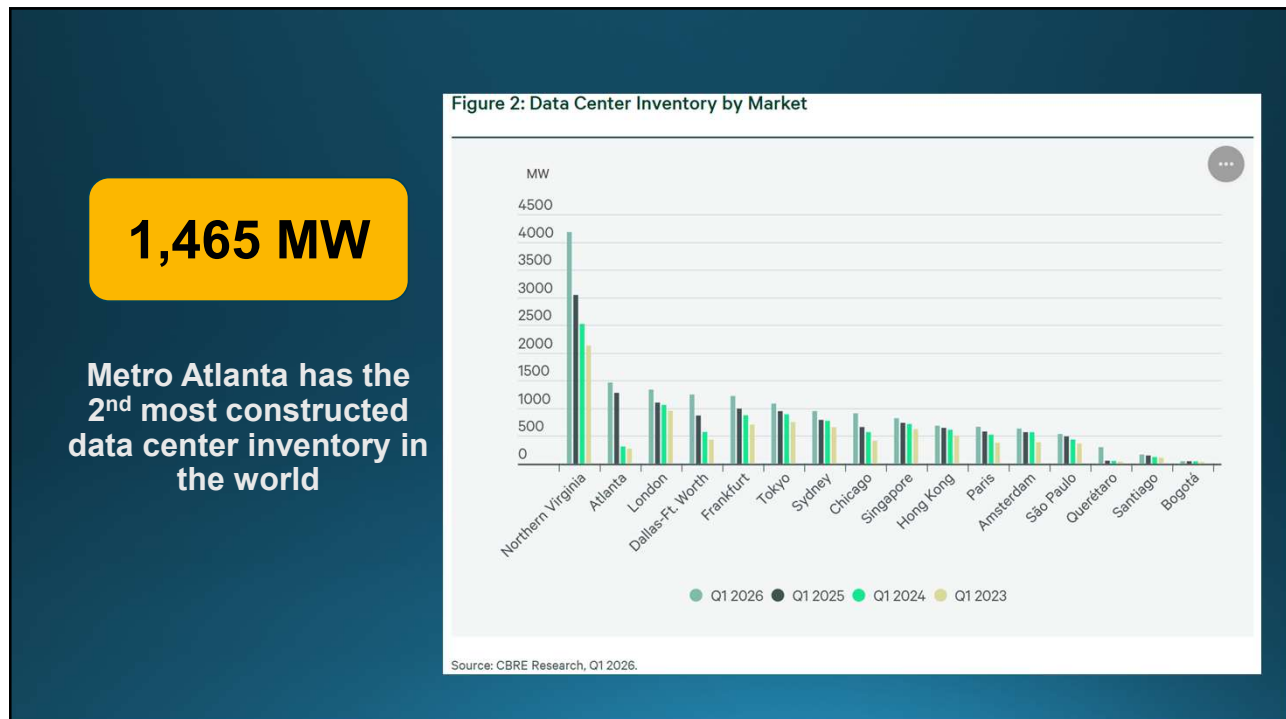
- Often not covered by existing local jurisdiction development recommendations & zoning practices



2



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4

Types of Data Center Cooling

- Air Cooling
- Liquid Cooling
- Immersion Cooling
- Evaporative Cooling
- Closed-loop Cooling
- Hybrid Cooling
- Free Cooling



Relevant Cooling Methods to Georgia

Evaporative water cooling:

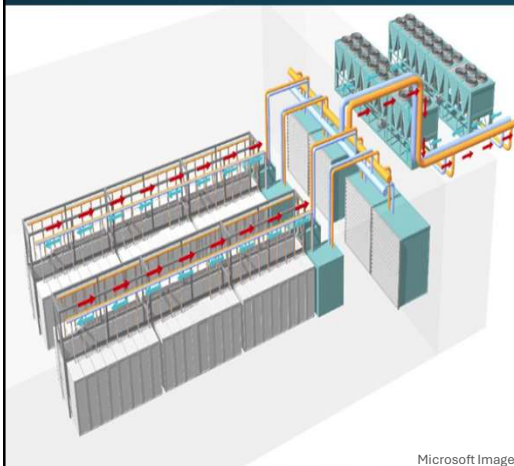
Uses natural water evaporation process to remove heat from the air
 Water intensive
 Can lose up to 80% of water to the atmosphere
 Reduces return water flow to rivers and reservoirs

'Closed-loop' cooling:

A water-glycol mix continuously circulates in a sealed circuit to absorb heat
 Uses significantly less water, but requires more energy
 More expensive to install and operate

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Stewarding our limited resources with Non-Evaporative Cooling technologies



Microsoft Image

Closed-loop cooling recommended over Evaporative *Stewarding our limited resources*

- A water-glycol mix or other refrigerant mixture circulated in a closed loop system
- Minimum amount of water needed to flush/refill system as needed periodically
- Provides resilience to facility during moments of drought and emergency outages
- Reduced impact to regional water supplies

Though it uses less water, the capacity required may still be similar to other commercial/industrial water users in a community.

Tradeoffs

- Larger capital investment
- Physical footprint
- Higher energy demands

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How much water are data centers requesting?



Depends on

Size	Scale	Type of Facility	Energy Demands	Type of Cooling
	Building or campus?	Data storage vs AI/Processing		Air vs Liquid Evaporative vs Closed-Loop

Water demand requests in Metro Atlanta

Evaporative

Varies, but as much as 9 million gallons per day* has been requested

Closed-Loop

Typical range
5,000 to 50,000 gallons per day

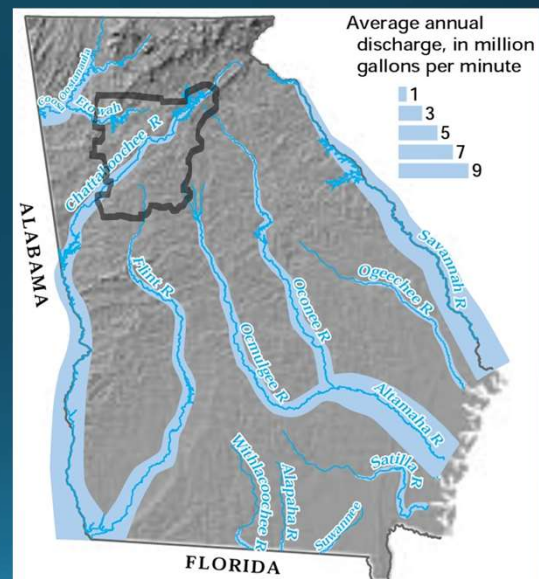
*Later changed to closed-loop cooling

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Why Cooling Methods Matter in Metro Atlanta?

- One of the smallest available surface water supplies of any major metro area
- Drought-prone
- Stewarding water resources for metro and downstream users
- Leaders in water conservation – by necessity



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Considerations for Local Communities



**Local Economic
Impacts**



Job Creation



**Land Use Present
and Future**



**Additional
Infrastructure
Needs**



**Environmental
Health Impacts**



**Drought
Management**



**Emergency
Outages**



Critical Issues

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How could a data center benefit your community?

Significant tax revenue growth



- Property taxes
- Business taxes
- Sales taxes

Epicenter for further commercial and economic growth



- Indirect economic boost via income tax revenue and consumer spending
- Fund public services
 - Infrastructure projects and community development

Financial Planning



Direct revenues toward community priorities, such as:

- Education
- Housing funds
- Fire and safety investments
- Community development
- Infrastructure upgrades

Workforce Development



- Data center could provide or support work force training programs for the community
- Create high-paying construction jobs
- Skilled technical roles

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Site Readiness



Physical Infrastructure

- What does it look like?
- Does construction/operations of project shift other development plans?
- Re-evaluate Comprehensive Plan
- Setting precedent for future proposals
- Adaptive Infrastructure or "Stranded Asset"?



Environmental & Public Health Impacts

- Stormwater runoff and water quality
- Community awareness, consideration and communication
- Coordination with fire/emergency services
- Heat island



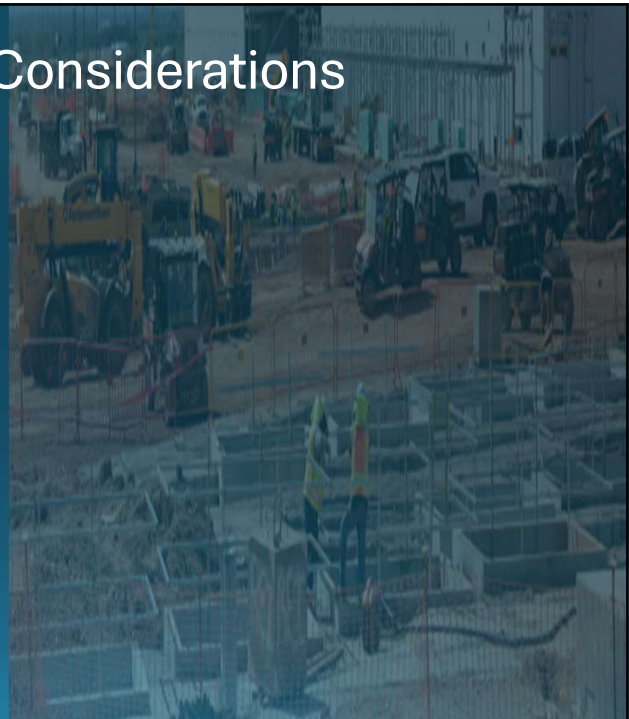
Water Service Considerations

- Immediate demand and future capacity needs
- Additional infrastructure needs
- Coordinate and understand wastewater requirements from developers
- Know developer's system reliability and expectations early in discussions
- Critical infrastructure

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Development Ordinance Considerations

- Building set-backs
- Lighting directed away from adjoining property
- Landscaping - mature versus young planting requirements for buffers
- Noise thresholds and generator testing frequencies
- Specialized fire fighting training/cooperation needs
- Alternative power generation applications



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Addressing Community Concerns



Noise Impacts

Possible sources of concern:

- Generators
 - Testing and running
- Cooling systems
- Site construction
- Energy “hum”
- Sub-level decibels impacting wildlife and communities



Land Development

Possible sources of concern:

- Tree removal
- Stormwater runoff
- Traffic
- Property values
- Heat Islands



Community Awareness & Communication

Important to engage with community to address:

- Daily-life impacts
- Public outreach sessions
- Study/Mitigation efforts
- Zoning code amendments

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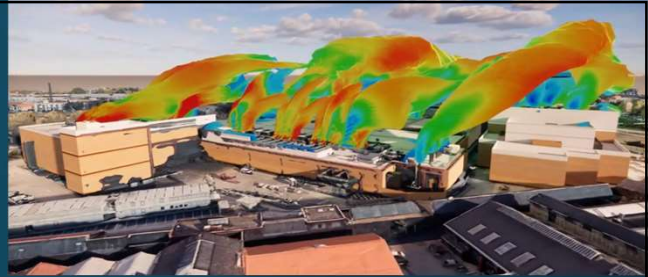
Air Quality

- Possible degradation during construction and in operations
 - Construction dust
 - Diesel generators (back up energy supply)
- Exposure to fine particulate matter, even at a low level, can pose substantial health risks and threaten local wildlife and minimize plant growth and yield – F. Dominici, professor of biostatistics, Harvard's School of Public Health



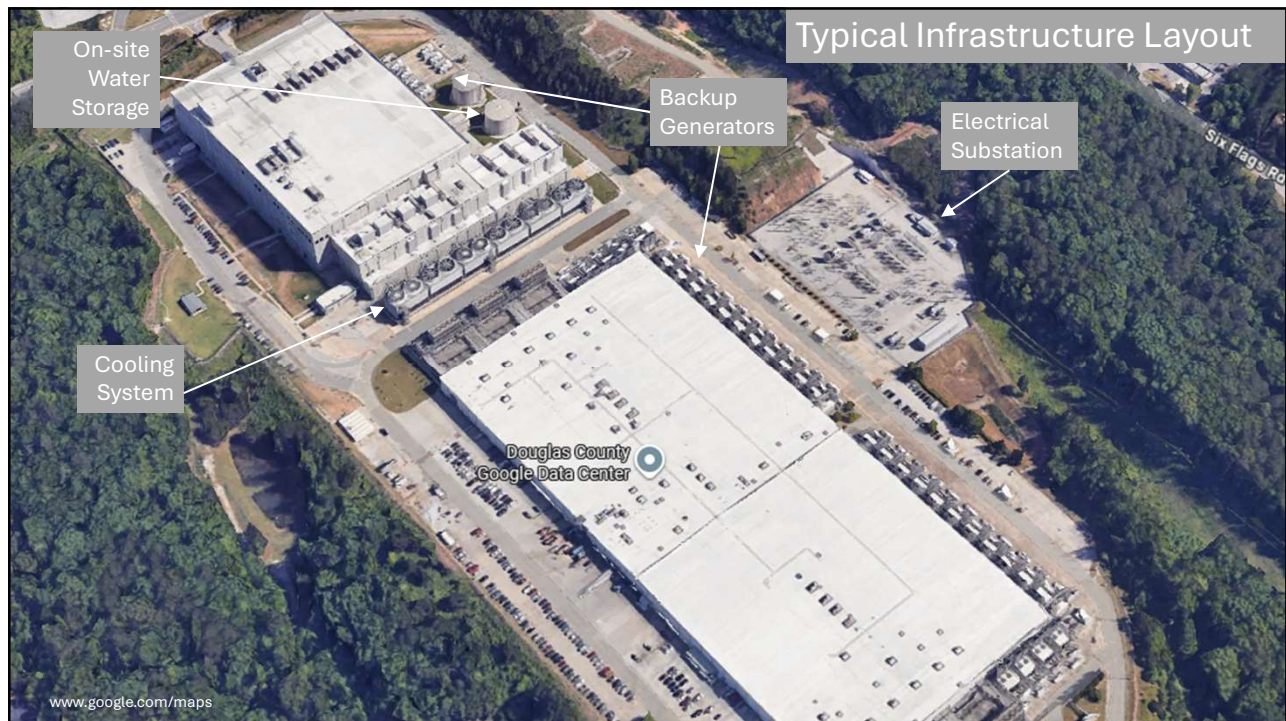
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Heat Island Effect



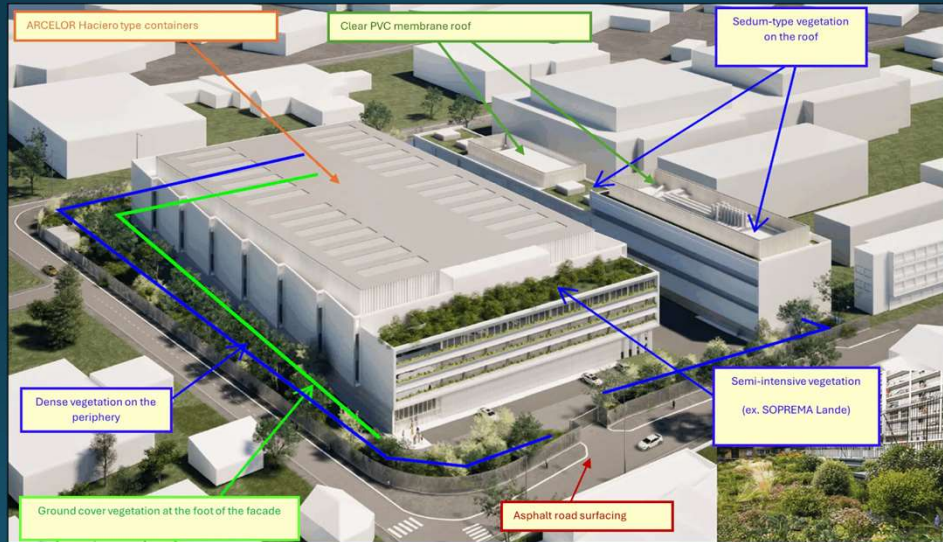
- Emerging international research comparing AI Hyperscalers to older data centers
- On-site heat release via energy-intensive processes
 - Increasing computation demands
 - Powering cooling systems
- Recent study found an local increase of 3.6 F (Marinoni et al, 2026)
 - Extreme cases up to 16.4 F
 - Heat impacts being felt upwards of 6 miles from site
- Dense urban environment acts as a **heat trap**, limiting dispersion and favoring recirculation on neighboring facades and air intakes

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Site Design Can Reduce Effects



Eolios

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Solar and Green Roof Installation?

On-site solar unlikely to meet full power demands but can provide benefits

Roof designs with solar or green roofs not preferable for most sites

1 MW of power
=
5 acres of solar panels



100 MW of power
=
540 acres of solar panels

Associated risk concerns:

Could cause damage to expensive technology investment at the facility

Potential to disrupt operations

Green roofs require additional water during dry periods

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Community Benefit Agreements

Helps to address public concerns

- Identifies key community concerns
- Provide greater benefits to communities impacted by data center construction and operations

Several key features

- Transparency
- Community investments
- Sustainability for communities

Brookings

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Typical Comment Provided by ARC during DRI Process

The water resources of the metro Atlanta region are critically important to the region's economic vitality and quality of life.

The region lies in the headwaters of six major river basins, where natural surface water sources are small relative to other major metropolitan areas and in need of a high level of protection.

The firm yield of water supply sources available to individual jurisdictions also varies, and some jurisdictions have larger available supplies than others.

ARC recommends a careful examination by the Water Provider of its capacity to meet peak-day demands for this project, in addition to other current and projected future peak-day demands.

ARC also recommends that the Water Provider require the installation of advanced "waterless" cooling technologies or "near waterless" technology to reduce the burden on the drinking water supplies and increase the resiliency for both the project and the potable water system.

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Georgia Tech

Energy Policy and Innovation Center (EPICenter)

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Initiative

GEORGIA DATA CENTER ORDINANCE HUB

Yang You

<https://epicenter.energy.gatech.edu/data-center/>

Data Center Zoning and Ordinances in Georgia

County and municipality names shown on the map have adopted dedicated data center ordinances or general zoning provisions that permit data centers, including within industrial or business park districts. Jurisdictions with only general zoning provisions are marked with an asterisk (*).

Shaded areas indicate that the county or at least one city within the county has adopted relevant data center ordinance or zoning language. Additional jurisdictions may have adopted relevant language that is not reflected on the map.

Data Center Development in Georgia

Some locations on this map may represent multiple data center projects at different stages of development (e.g., operational, under construction, and/or planned). Because these projects can occur at the same or very close geographic coordinates, their markers may overlap and appear as a single point.

County-Level Data Center Presence & Development Phase

- Operational
- Under construction
- Planned

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The Big Picture

Developers
Engage with water providers early in project planning discussions.

Water Providers
Consider impacts and establish parameters for water use

Local Leaders
Support policies for balanced, resilient growth.

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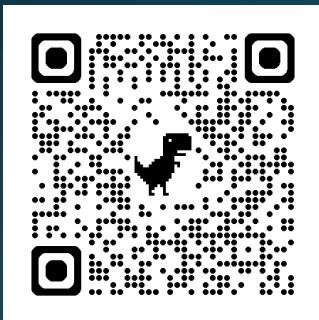


**Understand trade-offs
for balanced and resilient growth
and informed decision making**

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Scan the QR Code
for additional resources



The resilience of our region—both today
and tomorrow—**depends on all of us.**



For Technical Assistance & additional information contact

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ARC/Metropolitan North Georgia Water Planning District

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