Data Center Trends in Metro Atlanta and Considerations for Local Communities

Metropolitan North Georgia Water Planning District

Data Centers

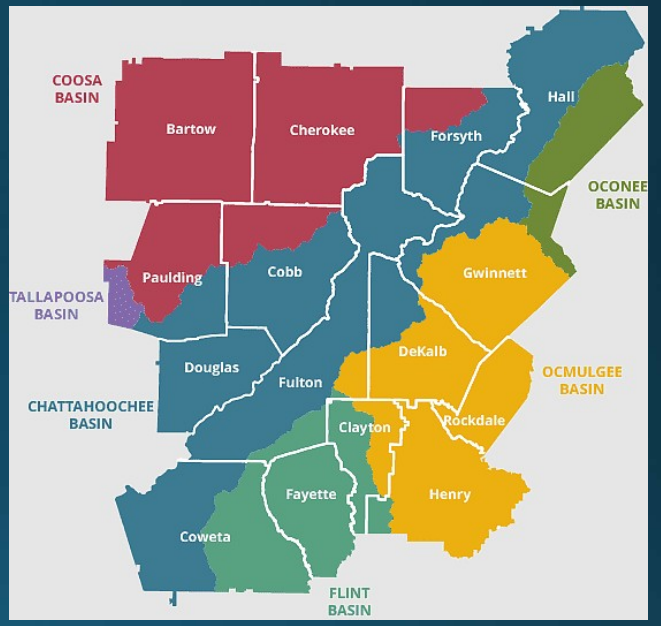
- A facility engaged in the storage, management, processing, or transmission of digital data
  - Houses computer or network equipment
  - Systems, servers, or appliances
  - Other associated components related to digital data operations

- Increase of “Colocations” and “Hyperscalers” facilities
  - Colocation: smaller facilities, usually company data storage in a rented space
  - Hyperscalers: think big players, facilities to meet the demands of cloud storage, streaming services, and AI

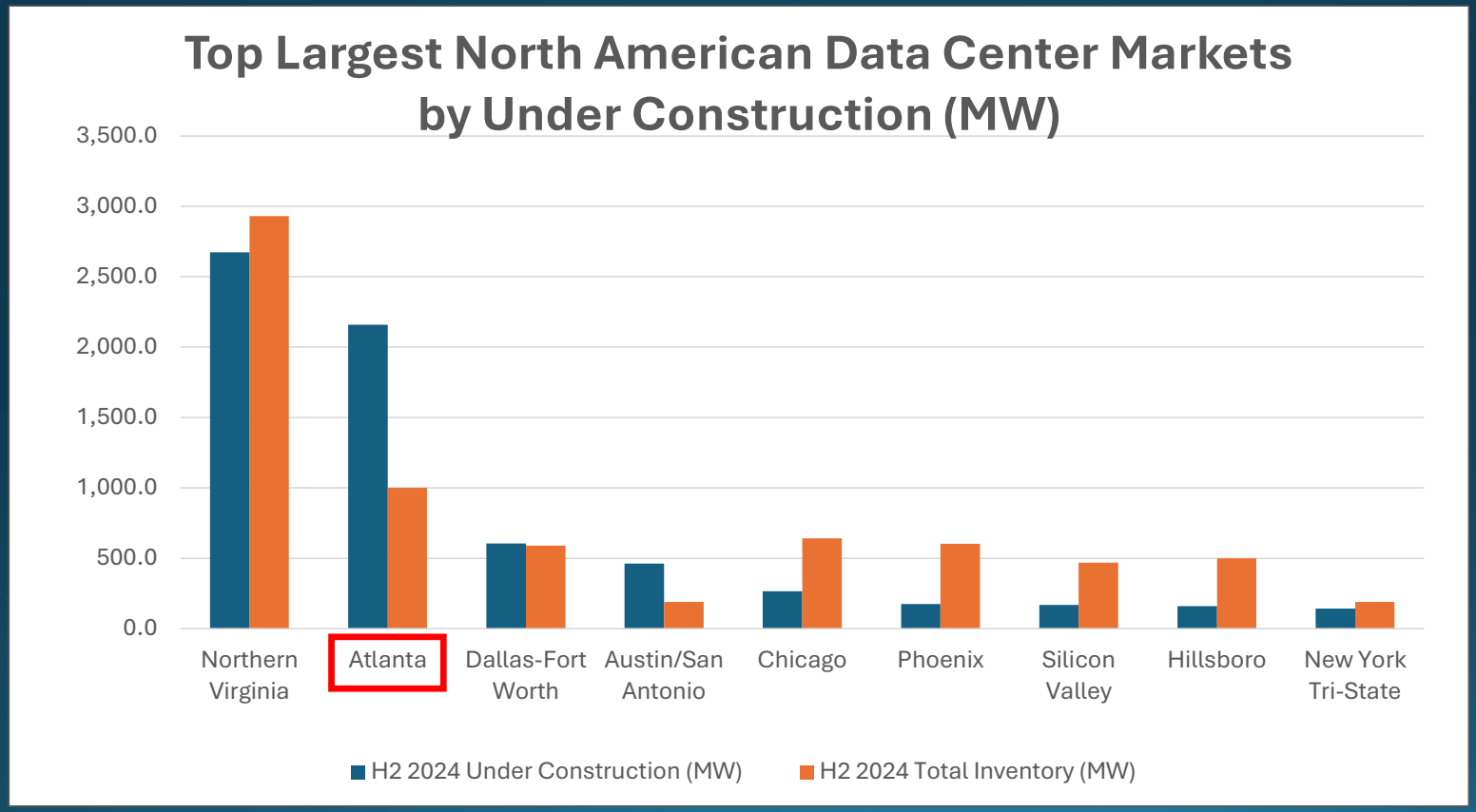
Data Center Growth in the Region

Data Centers Growth in Metro Atlanta

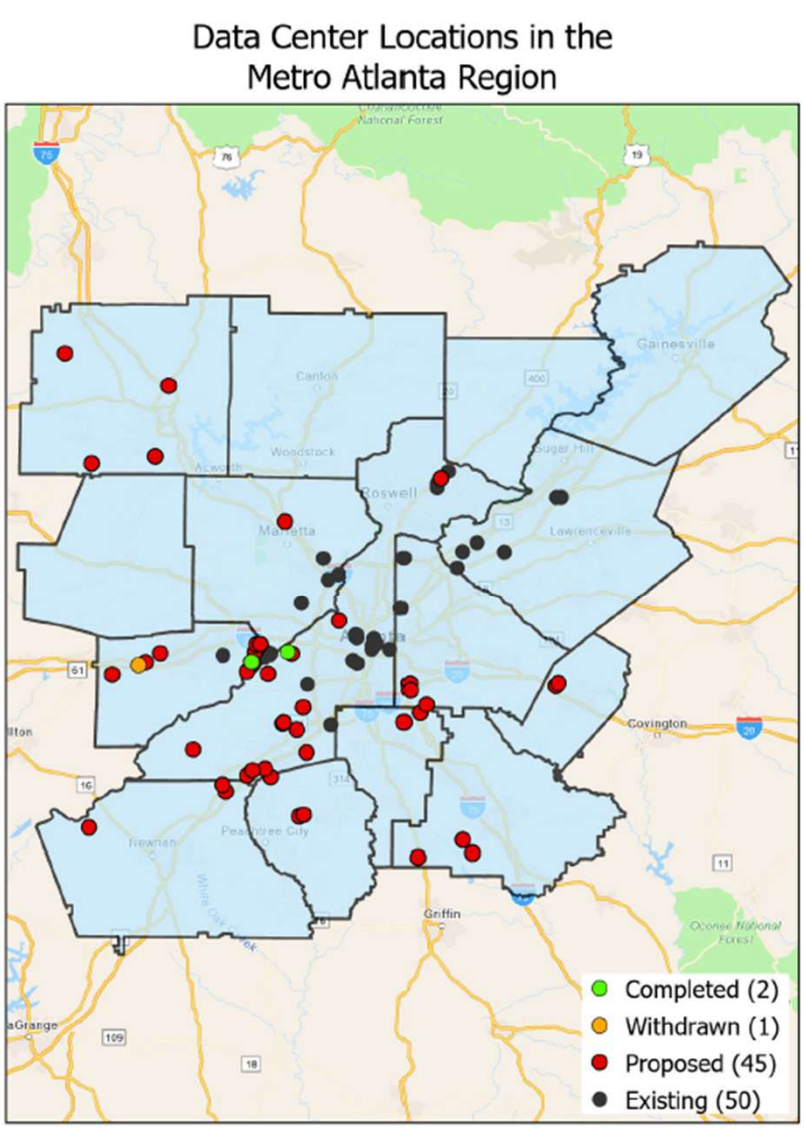
- Data centers are not a new concept, they have been around for decades
- “It is the **rate** at which they are being built and their **capacity** demands” that have increased”-AJC
- “Roughly 20 gigantic data center campuses are either in development or preparing for sizable expansions across Georgia, mostly near Atlanta”-AJC



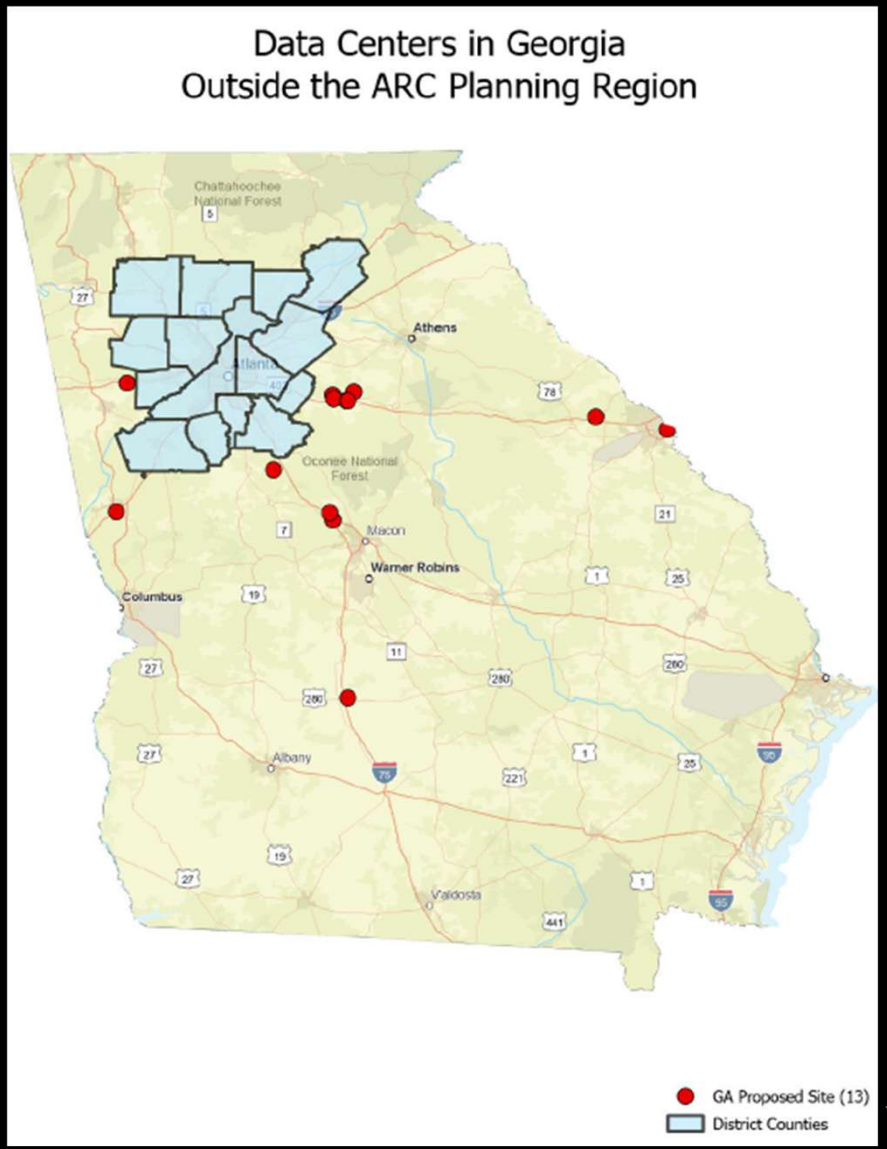
Atlanta has the 2nd most data center capacity under construction in the US (2,2159.3 MW).



Location Trends: Majority of proposed locations are in the more southern parts of Metro Atlanta



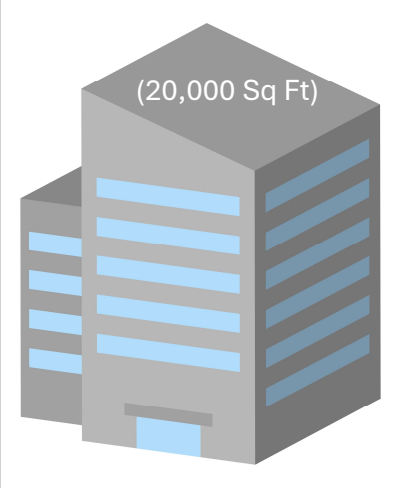
Sites Across Georgia



Energy and Data Centers

1 Megawatt (MW) = one million watts of power, and is enough to supply 650 homes

5 MEGAWATTS CAN POWER EITHER



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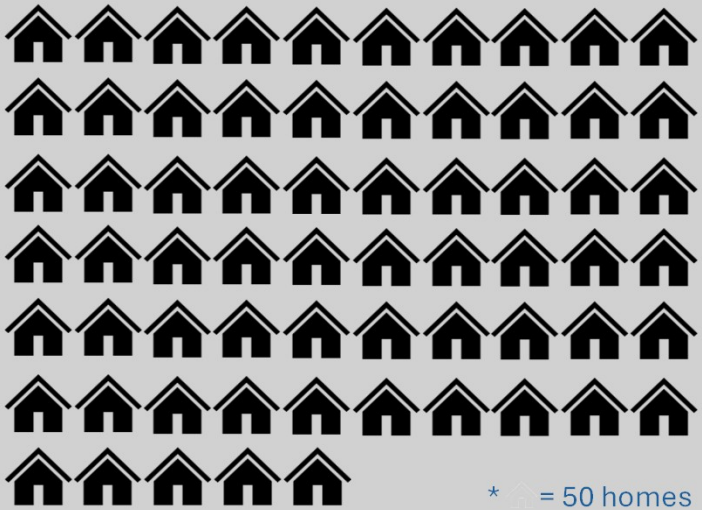
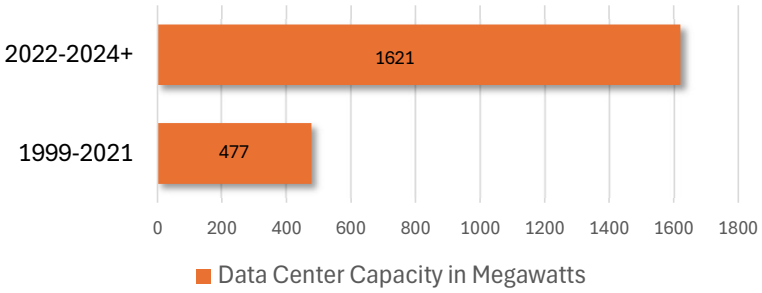
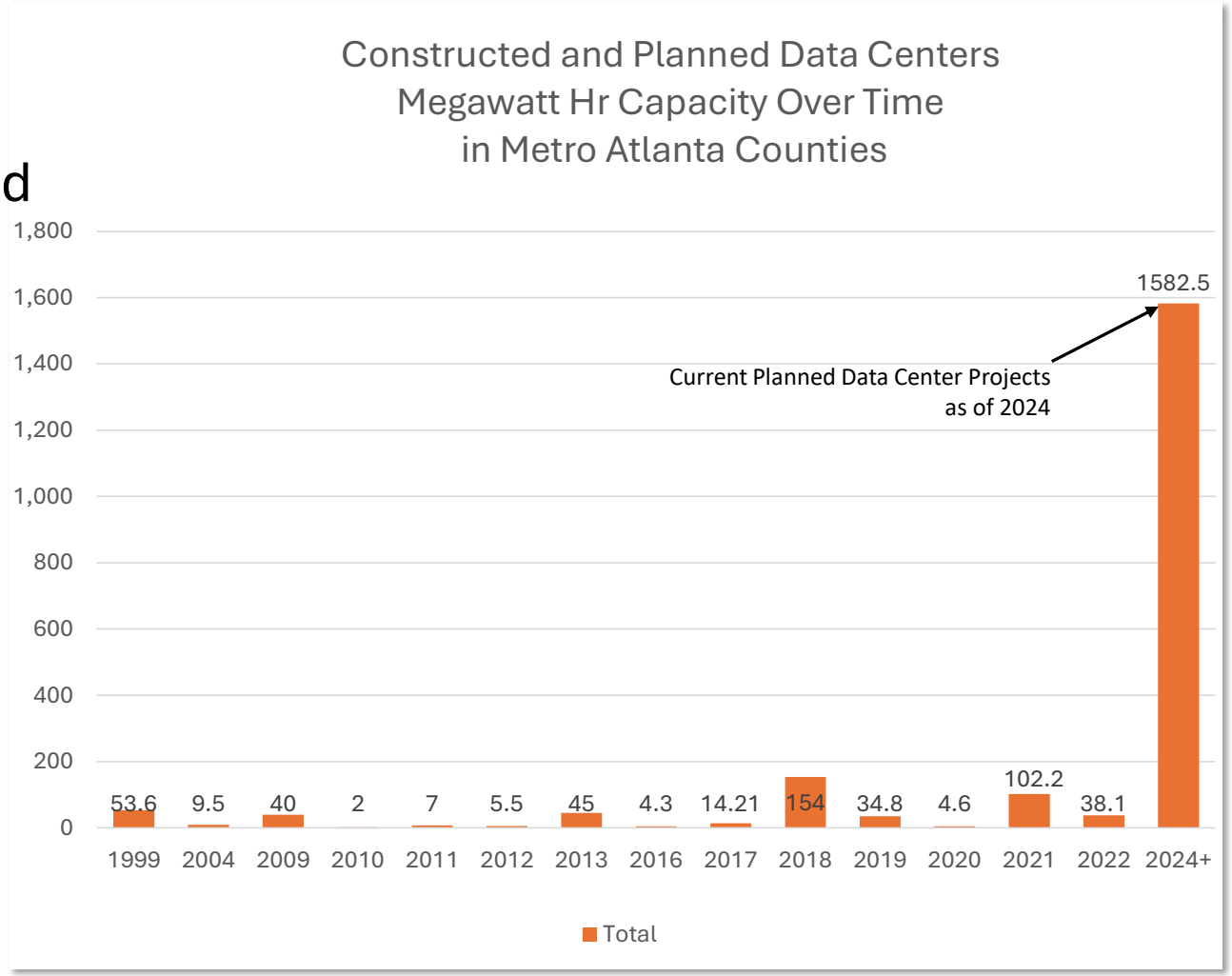


1 Small Data Center

3250 Homes

Over the last 24 months, new planned data center projects exceed the total energy demand over the previous 20 years combined

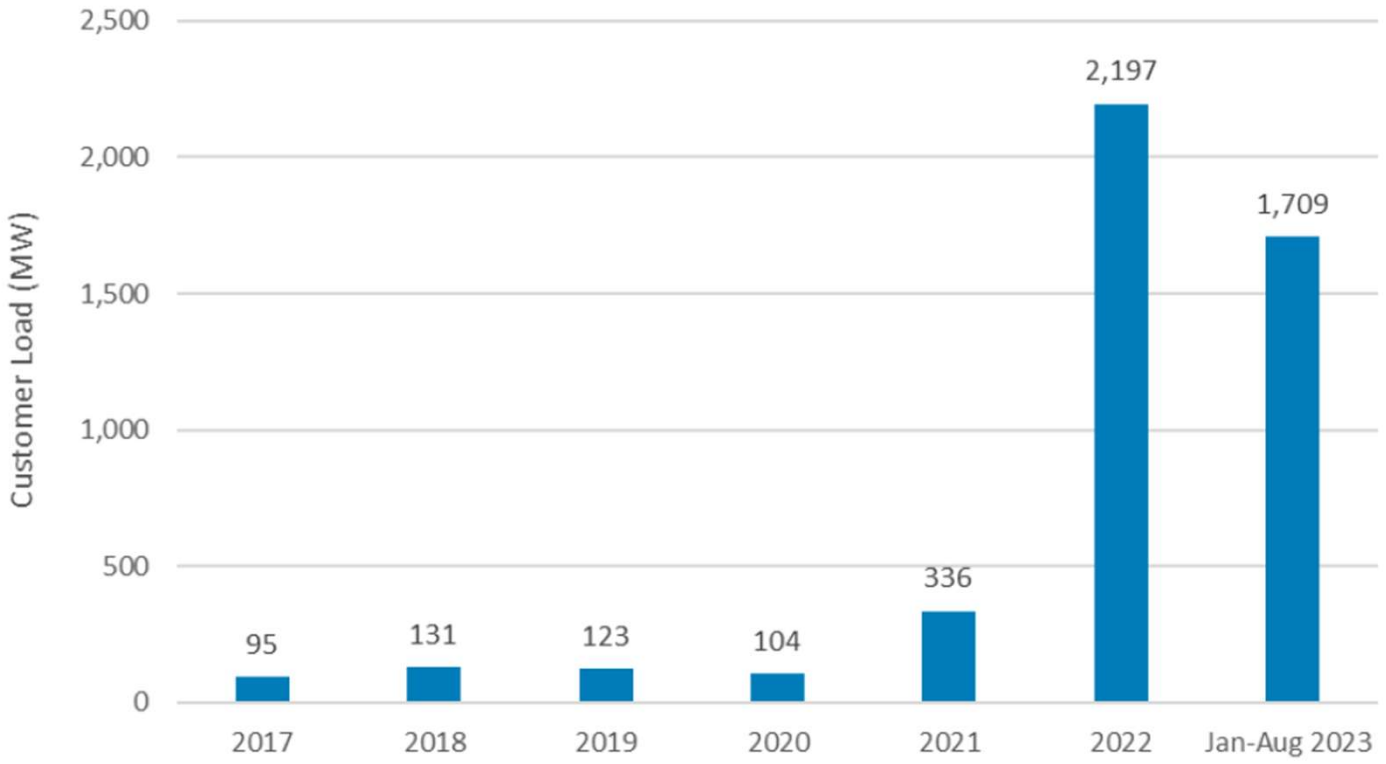




Source : ARC Analysis. Based on publicly available data. Does not include facilities where data is unavailable. Years presented are based on data collected.

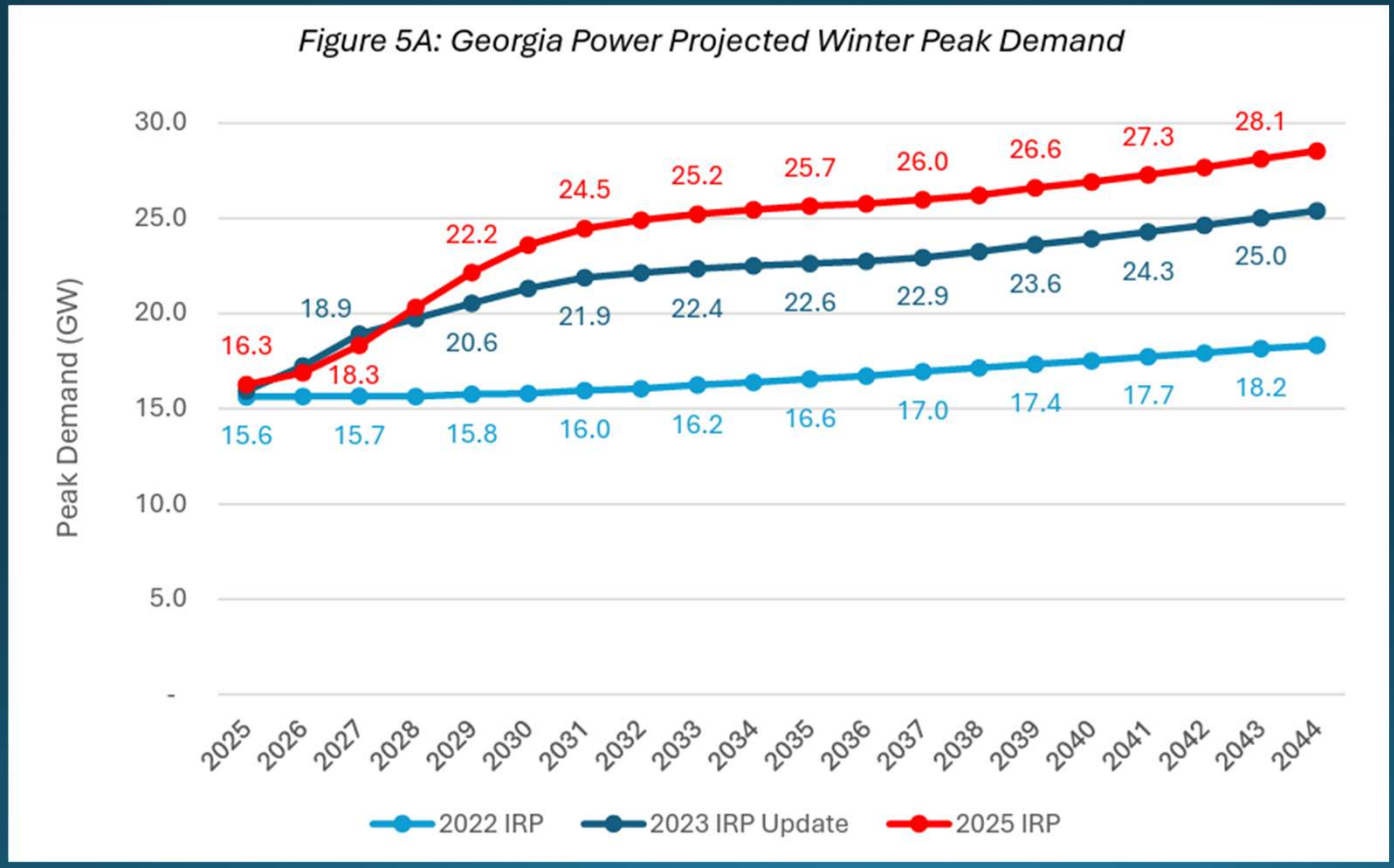
Beginning in 2022, there has been a significant increase in energy demand by new large load customers

Figure 2: New Large Load Customers Selecting Georgia Power by Year



Source: Georgia Power, 2023 IRP Update

Forecasted energy demands were recently revised upward for winter peak demand

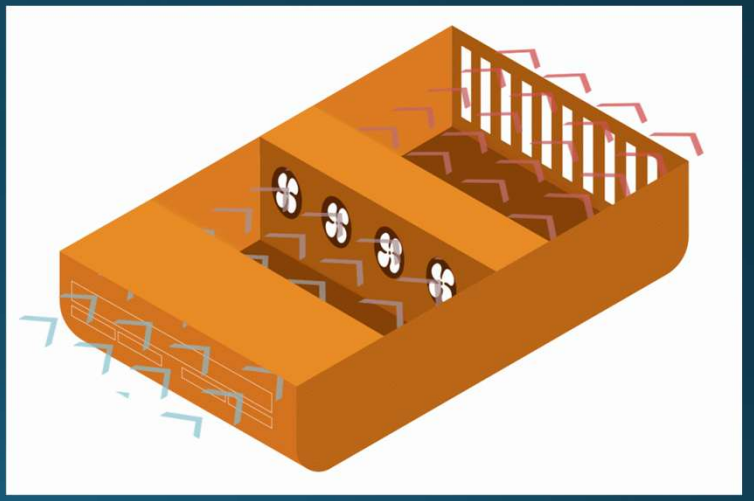


Source: Georgia Power, 2025 IRP

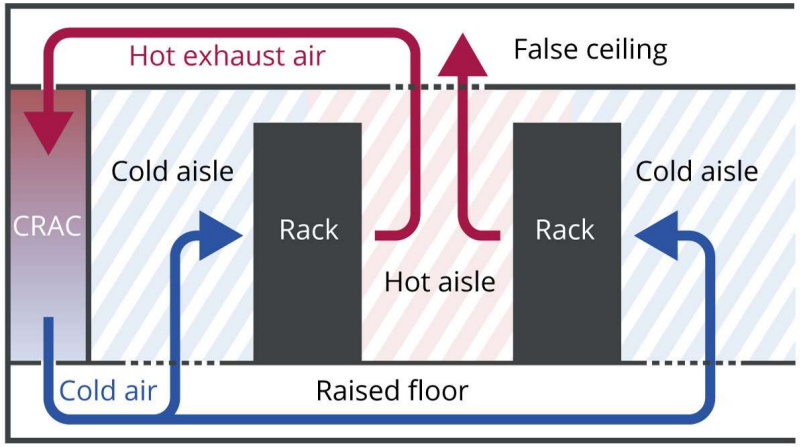
Cooling and Water Use in Data Centers

Cooling Technologies

- Operation temperature is imperative to the stability of system performance
- Heat removal by the cooling system is one of the most prominent challenges in the maintenance of data centers
  - "**Fatal heat**"- damages the performance of components of the data center
- "An indispensable part of a data center is the cooling system" and "accounts for around **30% of the power consumption** of the data center"
- Two main classifications of cooling systems
  - Air-cooling and liquid-cooling



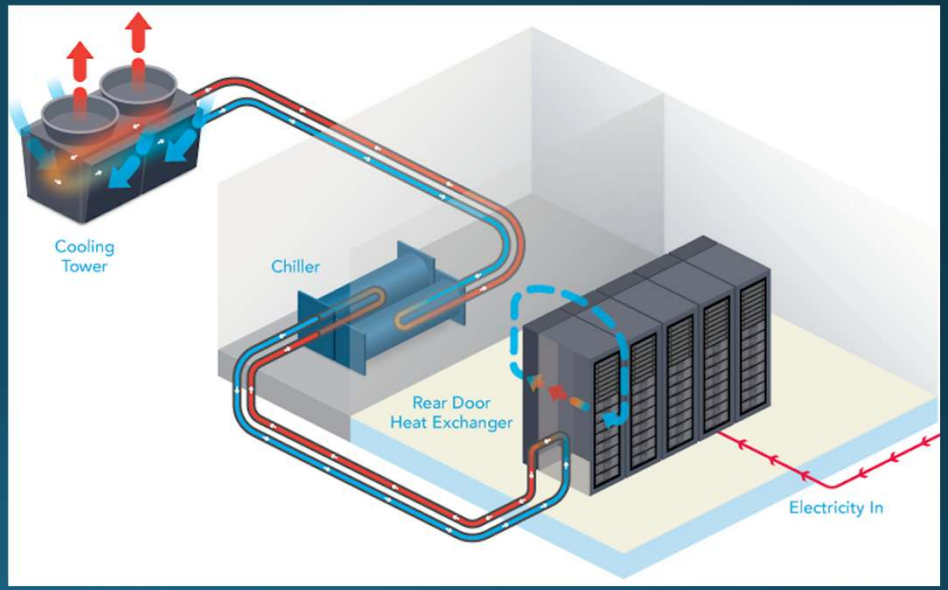
Air-Cooling System



- Air-cooling was the most widely used; suitable for lower-density computing
- Thermal loads within capabilities of efficiency of air-based heat dissipation
- In-efficient in larger centers due to low density and heat dissipation capacity in the air

Water Consumption Depends on Cooling Method

- Liquid Cooling - Ideal for high-density and high-performance computing
  - More efficient heat transfer through cool plates
- More efficient heat removal
  - Allows for closer component packing
  - Greater computing capacity within the same footprint
- Closed loop cooling preferred over Evaporative – *Stewarding our limited resources*



How much water are data centers requesting?

Depends on:

Size	**Scale** Building or campus?	**Type of Facility** Colocation vs Hyperscaler	**Energy Demands**	**Type of Cooling** Air vs Liquid Evaporative vs Closed Loop

Water Demands and Types of Cooling

Evaporative	**Closed Loop Cooling**
As much as 9 million gallons per day	Typical range less than 100,000 gallons per day

Considerations for Local Communities

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

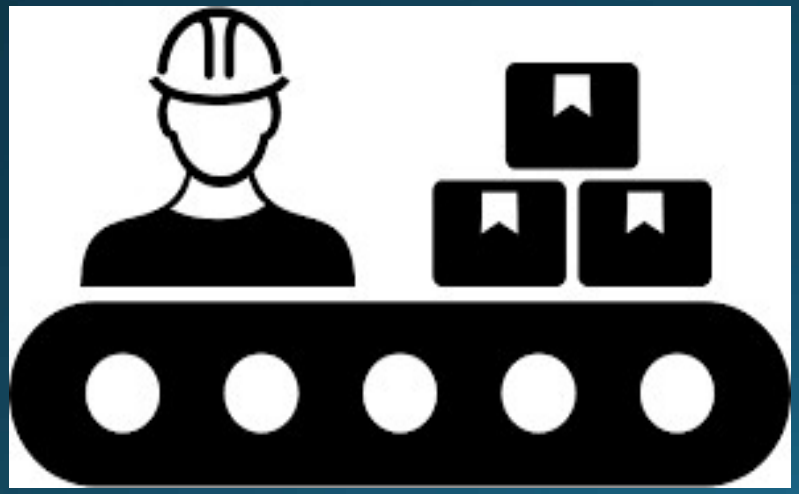

“The promise of revenue expansion and diversification will require strategic planning to ensure community needs are addressed in concert with achieving long-term economic prosperity for the County.”
-Prince William County 2023 Data Center Industry Tax Revenue Report
Photo Credit: World Bank

How could a data center benefit your community?

- Significant tax revenue growth
  - Property taxes from real estate and infrastructure investments
  - Business taxes from operations or equipment
  - Sales taxes on equipment purchases
  - Increased revenue could serve to reduce or eliminate property taxes for residents
- Epicenter for further commercial and economic growth
  - Indirect economic boost through increased income tax revenue and consumer spending
    - Fund public services, infrastructure projects, and community development
- Workforce development
  - Data center could provide or support work force training programs for the community
  - Create high-paying construction jobs
  - Skilled technical roles

Job Creation for Data Centers Lags Similar Sized Developments

Between 200 and 1,000 jobs on site for a typical headquarters, manufacturing, or shared service operations



By comparison, between 5 and 30 jobs at a typical data center (cleaning, security, IT)

CBRE

It is Important to Understand the Economic Influences on the Local Economy

- Scale of tax revenue for community
- Proximity of data storage to metro businesses
- Data-center-related jobs have increased by 20% nationwide to 3.5 million from 2.9 million between 2017 and 2021, far exceeding the 2% rise in overall U.S. employment. – CBRE

Table 2. Economic Impacts of a Typical Large Data center to Local Communities

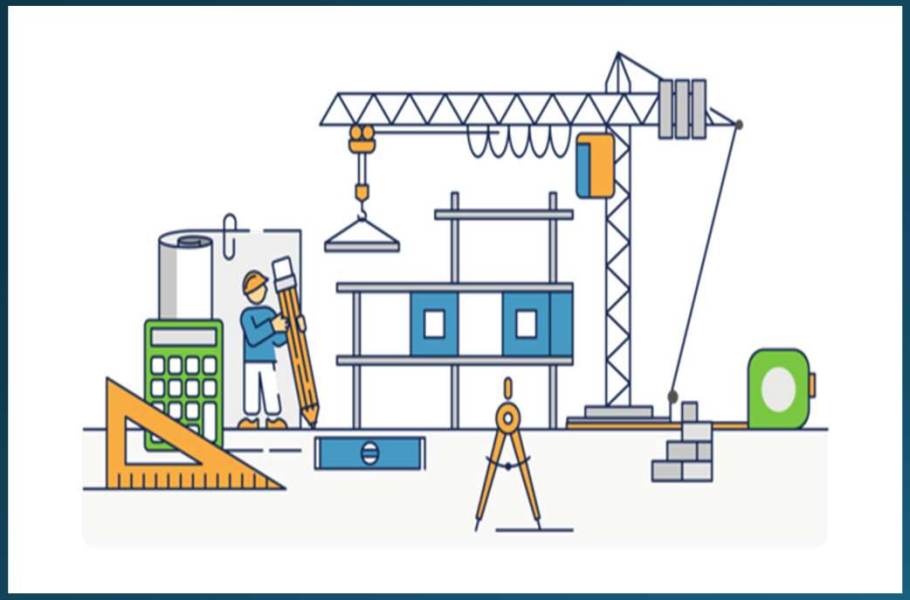
CONSTRUCTION PHASE 18-24 MONTHS	OPERATION PHASE ANNUALLY
1,688 Local Jobs	157 Local Jobs
$77.7 million wages	$7.8 million wages
$243.5 million local economic activities	$32.5 million local andeconomic activities
$9.9 million state & local taxes	$1.1 million state & local taxes

US Chamber of Commerce

Consider Land use Today and in the Future

- Physical infrastructure
  - How much does it cost?
    - Cost optimization: balancing initial investment versus operations costs
  - What does it look like?
    - Scalability: ability to expand and accommodate changing demands
    - Redundancy
    - Efficiency standards
- Will the construction of data centers shift other development plans?
  - Need to reevaluate comprehensive planning for transportation improvements and community development
- Adaptive infrastructure
  - Adaptive design to allow flexibility as technology advancements
  - “Stranded assets”
    - No longer meets the design capacity
    - No longer economically viable due to technology or business needs.

Development Ordinance Considerations



- Lighting directed away from adjoining property
- Landscaping - mature versus young planting requirements for buffers
- Specialized fire fighting training/cooperation needs

Incorporate Best Management Practices to Mitigate Environmental and Env. Health Impacts

Stormwater Runoff and Water Quality

- Area development should prevent increases to:
  - Downstream flooding
  - Streambank channel erosion
  - Water quality and habitat degradation
- Consider green roofs
- Providing increased open space requirements
- Requiring native tree and plant vegetation

Air Quality

- EPA requires tiered regulatory system for backup generators
- Tier IV Generator Requirements
  - Fabricated 2012-Current
  - More environmentally friendly, minimize harmful emissions
  - Reduce the emissions of NOx and particulate matter
  - Require clean diesel particulate filters

Wastewater Considerations

- Emphasize the importance of return flows in the wastewater process to the water supply and watershed
  - Reducing consumptive loss
  - Maximizing system return
- Treatment standards should meet those specified under the industrial wastewater permit requirements
  - Treatment of “Biocides”
    - Chemicals to control microbial growth and ensure water quality, public health, and environmental protection
- Ensure that wastewater discharge rate is modeled in a way that local treatment facilities and sewer systems are able to manage increased volumes and temperature fluctuations

Address Water Resource Needs Early and Require Closed Loop Cooling

- 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 local utility of its capacity to meet peak-day demands for data center projects, in addition to other current and projected future peak-day demands.
- ARC recommends that the utility/local government 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.
- Though closed loop uses less water, the capacity required is still larger than most other water needs in a community.

Prepare to Address Community Concerns

Noise Impacts

- Generators, cooling systems, potential years of site construction and energy drawn from the power grid produce data center noise pollution
- Understand the impacts and consider noise ordinances
- Zoning ordinance requirements
  - Cooling technologies and backup generators contained within an enclosed building (Fairfax, VA)
  - City of Atlanta Noise Control Ordinance
    - Blowers, Engines, Machinery, etc
    - Proximity restrictions
    - Identify structures to deaden noise
    - Day and time limitations

Community Awareness & Communication

- Recommended practice
- Study/Mitigation efforts
- Public outreach
- Zoning code amendment to define the location and operation of data centers (Chandler, AZ)

Be Prepared to Address these Critical Issues:

- Transmission Lines may be Required
  - Consideration and evaluation of availability and distance of existing substations and transmission lines to serve proposed data centers.
    - Will easements/condemnation be required on private property?
    - Avoid possible need for clearing and construction
    - Compare data center energy demands against existing infrastructure
      - Identify potential upgrades and/or reliability concerns
- Anticipate the need for additional infrastructure (e.g., larger water lines, storage tanks, possible water supply and treatment expansions)
- Drought Management
  - Consider updates needed to Drought Management Plan to account for prioritized water management requirements from data centers.
- Emergency Outages
  - Consider design elements and redundancy needs for maintaining critical water supplies to new developments
  - Discussing system reliability and expectations with the owner early in the process

Consider Requiring Solar – But Recognize that Solar is Unlikely To Meet Full Power Demands

1 MW of power
=
5 acres of solar panels

100 MW of power
=
542 acres of solar panels

Green Infrastructure and Data Center Operations


Photo credit: Encor Advisors

- Zero Net Emissions
  - Net zero Scope 1 and 2 emissions
    - Scope 1: Emissions directly under organizations ownership or control
    - Scope 2: Emissions caused indirectly by company (i.e purchasing energy)
- Hot Aisle Containment
  - Barrier that guides hot air exhaust back to the cooling unit
  - Prevents mixing with cool air
- Increasing Uptime
  - Minimize system downtime
- Microgrids
  - Reliable: Continuous supply even in outages
  - Sustainable: Integration of solar and wind power
  - Reduce costs: Optimized energy consumption leading to lower costs

District's Current Role

Developing informational materials and resource toolkits for our local government leaders

Provide education and seek feedback from ARC's and the District's Governing Board

Provide comments through the Development of Regional Impact (DRI) process

- Acknowledge proposed water and sewer demands
- Recognize peak day demands may differ
- Reflect on importance of water stewardship and coordination with water utility
- Other considerations for communities

Through these efforts, the District seek to reinforce the following…

- Work closely with economic developers
- Be at the table at the start of initial development conversations
- Understand how data centers would fit into comprehensive planning

- Understand trade-offs to your community
  - Immediate demand vs Future capacity
  - Sustainable practices
  - Community benefits and perceptions
  - Resiliency strategy goals and reductions

Current Local Government Efforts Across the Region

Current Moratoriums

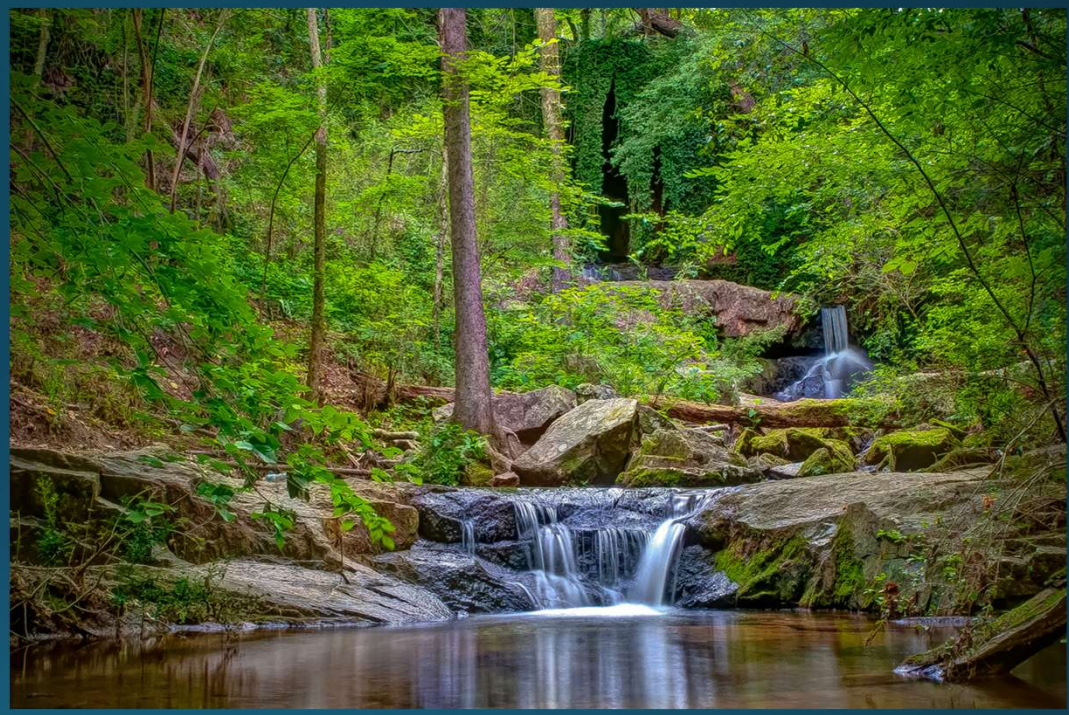
- Douglas County (90 Days)
- Coweta County
- DeKalb County (100 Days)

Ordinances

- Draft ordinance development
  - Coweta County
  - Douglas County
- Zoning Rules
  - City of Atlanta (Beltline buffer and East Atlanta Village and Little 5 Points
  - Forsyth County

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

Scan the QR Code
to visit the MNGWPD website



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