Science for Georgia

Data Centers

Knowns and unknowns

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SCIENCE FOR GEORGIA®

- Science communication training for university students and young professionals
- Science outreach events for adults
- Advocating to ensure science has a seat at the table

Outline

- What are data centers?
- The known knowns
- The known unknowns
- The unknown unknowns

What are Data Centers?

Data Centers

What they make possible

- **Support small businesses**
- **Research breakthroughs**
- **Artificial Intelligence**
  - **Large Language Models i.e. Chat GPT**
  - **(Deep Fakes)**
- **How many connected devices in a home?**
  - **About 21 – phones, computers, gaming systems, thermostats, lightbulbs, toasters, fridges – we did this to ourselves**

Data Centers
Like nothing we've seen before

Compute Technology
- Algorithms & Computing

Storage Devices
- Hold all this data

Network Devices
- Connect Everything together

Cooling Systems
- HVAC + water chillers

Data Centers
Like nothing we've seen before

Fast Facts for Georgia

- Georgia is an attractive spot for data centers:
  - Cheap land, power, and water
  - Good broadband
  - Unlike the other hotspots of TX, AZ, and CA – we are considered water rich
- Data Center needs parallel our needs
  - When its hot out they also need more power and water
- Priced out
  - Premium centers placed in Georgia are too expensive for most local Georgia businesses to afford

Known Knowns

Lazy Engineers

Engineers are motivated by externalities
- Seek out the easiest and cheapest solution
- Gravitating to cheap land, energy, and water

Current data center approach:
Russian battle solution – throw bodies at the problem

Variable Market

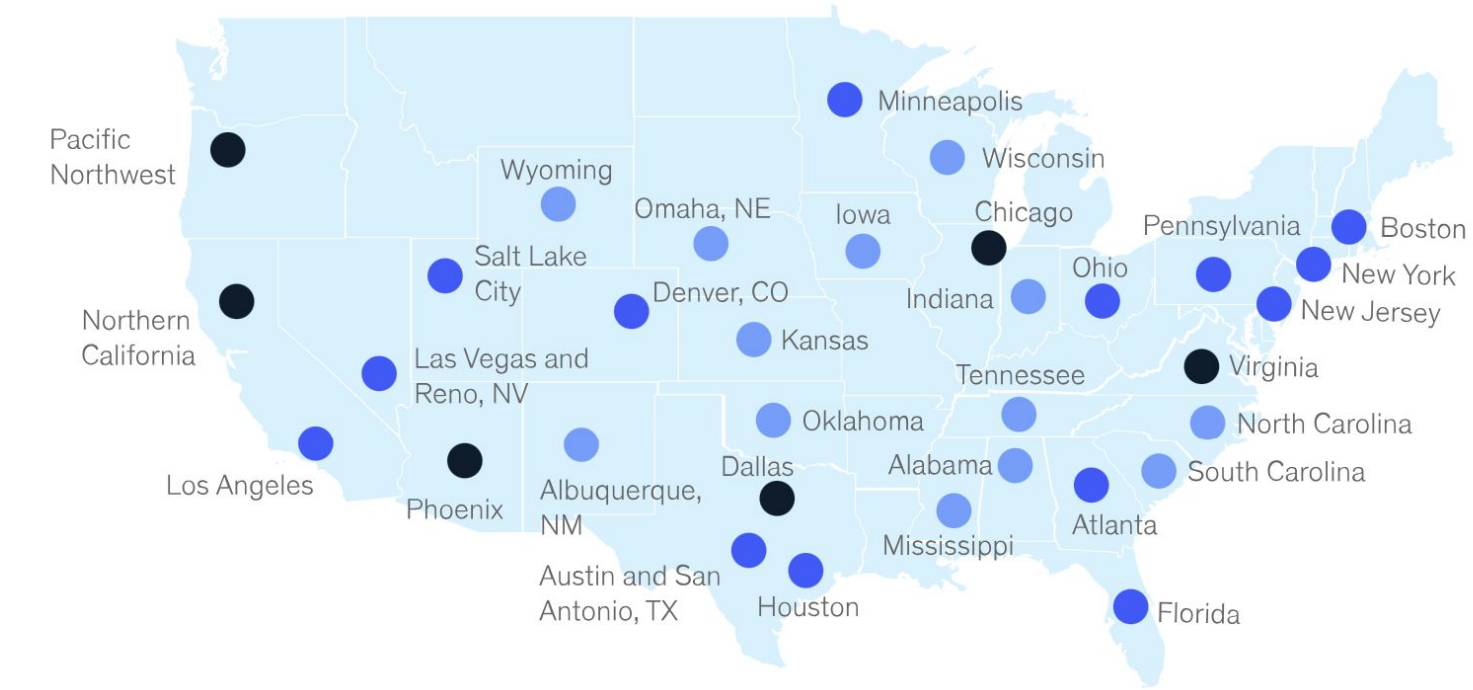
As power transmission becomes constrained in primary markets, leading players are moving to secondary and emerging markets.

Three tiers of US energy markets

Primary markets
Large existing demand of more than ~800 MW

Secondary markets
Relatively smaller demand but typically high growth

Emerging markets
Recent hyperscale activity because of cheap and sustainable or cleaner power, with negligible co-location presence



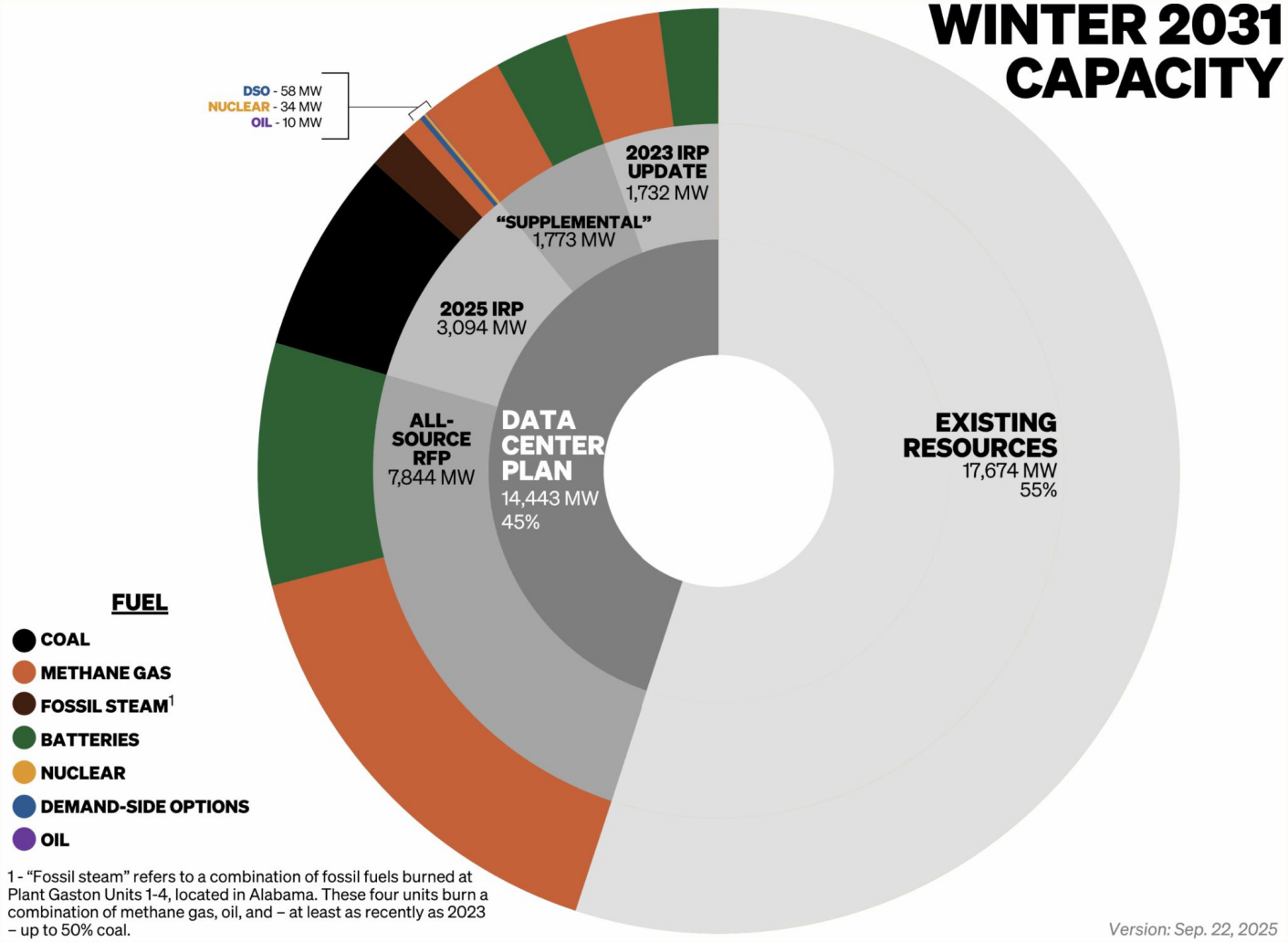
McKinsey & Company

We are planning for continuous growth

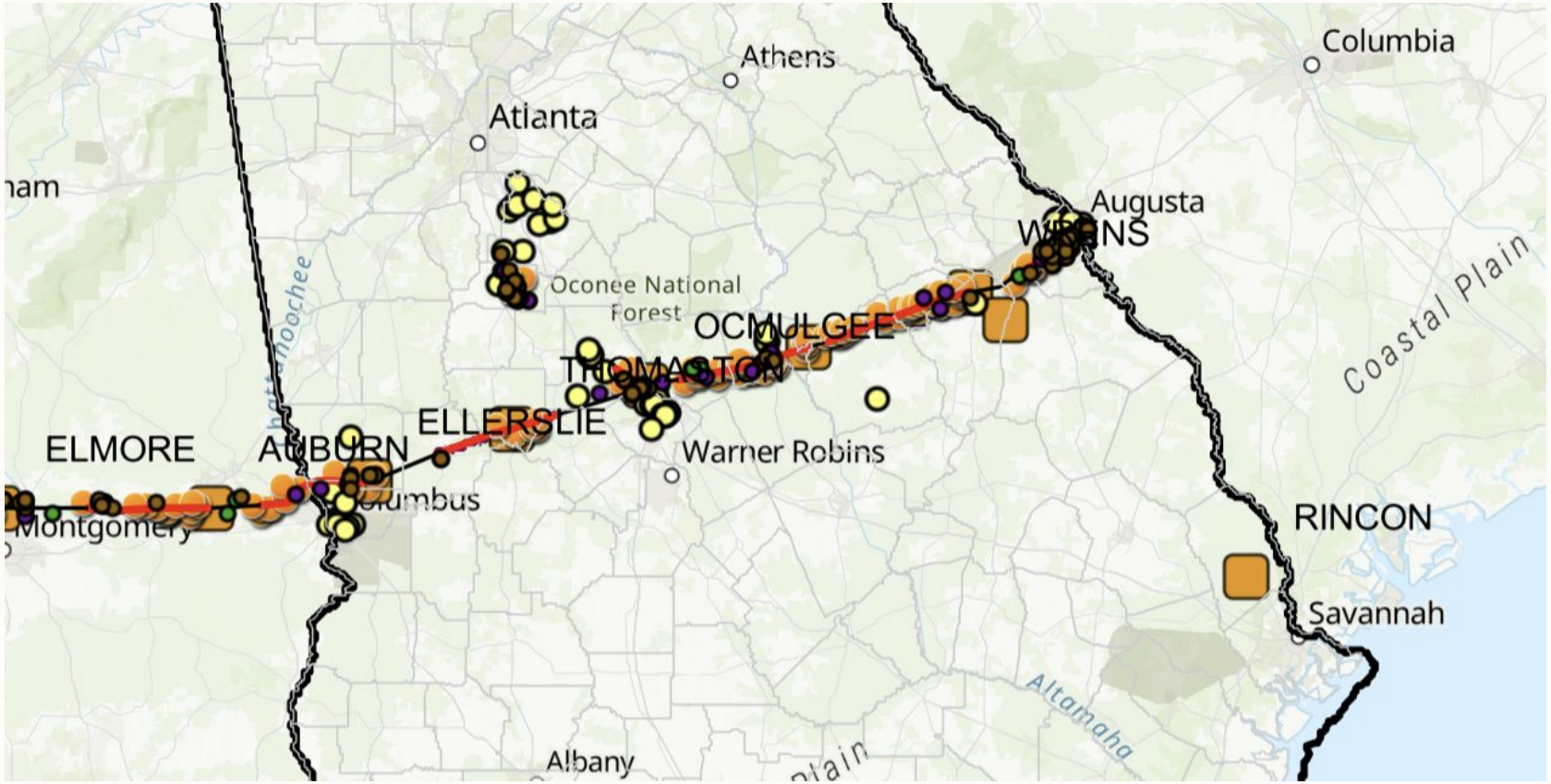
~Double our Power Generation by 2031

Approx 90% of planned additional capacity is for data centers.

Its mostly fossil fuels

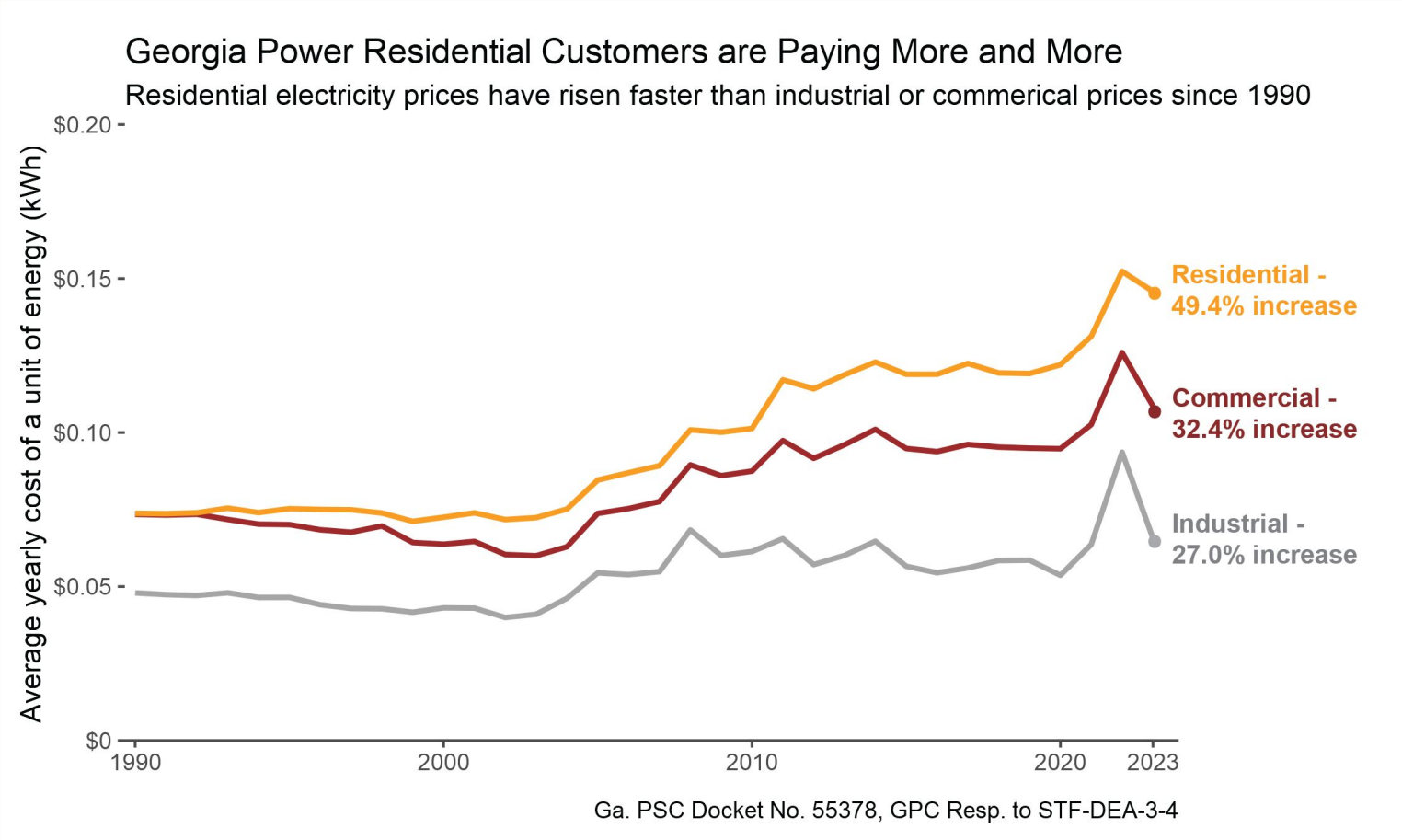


And also a new gas pipeline



Rate increases

- $43 / month bill increase
- GA Power said that “very little, if any, of that $43 is for investments to serve data centers”
- Billions upon Billions of expenses have not gone into customer bills yet.



Environmental Impacts

- Immediate Vicinity:
  - Noise & Light Pollution
  - Water runoff if not properly graded
- When the power goes out:
  - Air pollution depending on their backup generator type (diesel generators = lots of air quality impacts)
- Locality:
  - Strain on water resources
  - Loss of tree cover and possible impact on property value due to new power transmission lines
- Big Picture
  - Power consumption in Georgia – mainly via polluting sources and water intensive

So what's this I hear about cooling?

- Closed Loop Cooling – targeted cooling - blows cool air directly onto servers and not over the entire data center. Saves energy.
- Recirculation vs Evaporative –
  - Instead of the water being used once and then evaporated off – it is recirculated over and over
  - This saves about 50% of water consumption
  - Data Center Water Usage: A Comprehensive Guide - Dgtl Infra

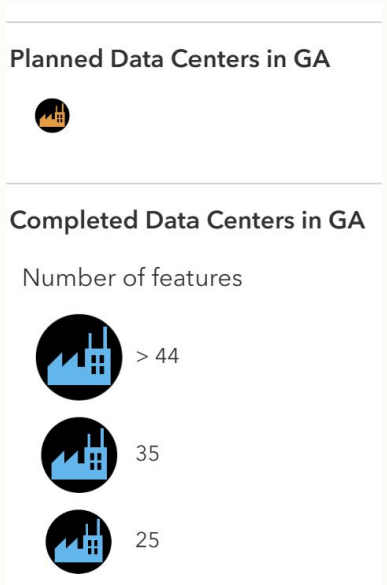
Known Unknowns

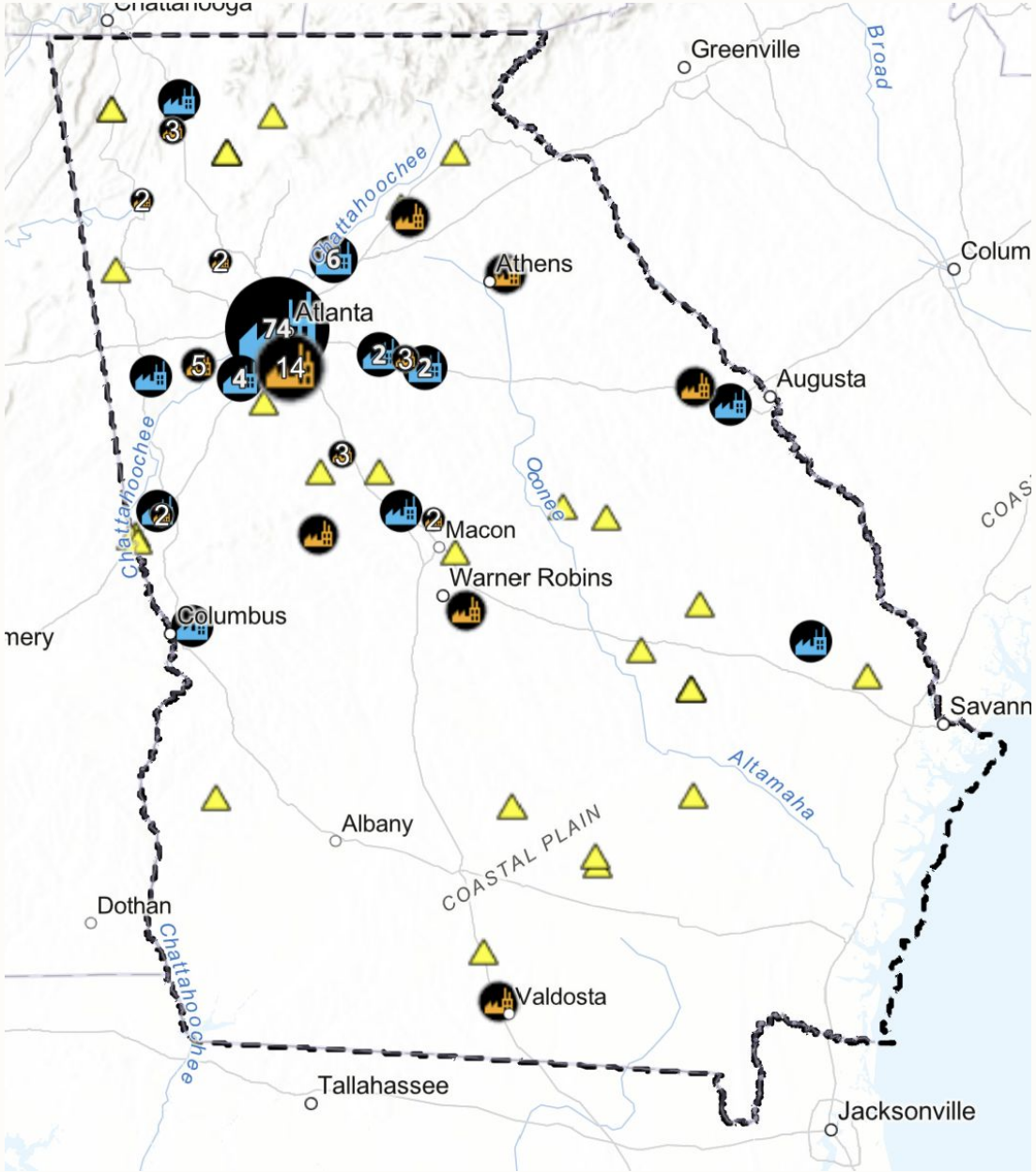
We don’t know for certain

- How many
- Location
- Amount of power and water usage
  - Albeit – it is already alarmingly large!
- Power provider
- Tax revenue
- Job creation
  - Must distinguish between temporary and permanent.
- Additional infrastructure demands

Data Centers

Where are they?
https://bit.ly/DataCenterGA





Data Centers in Georgia
By the Numbers

	Current Data Centers	Planned Data Centers	Crypto Mines	Total	Equivalent
Total Number	**97**	**42**	**35**		
Square Footage	**44 Million**	**116 Million**	**7 Million**	**168 Million Sq Feet**	**~3,856 acres**
Total Power Capacity	**6,500 MW**	**14,800 MW**	**1,100 MW**	**22,000 MW**	**~ 9.9 Million Homes There are ~4.6 M housing units in GA**
Total Water Usage (Low Est) (G / Yr)	**13 Billion**	**30 Billion**	**n/a**	**43 Billion Gallons per Year**	**1.8 Million people Savannah Metro 431K Augusta Metro 636K Atlanta Metro 6 M**

Two Hits on Water

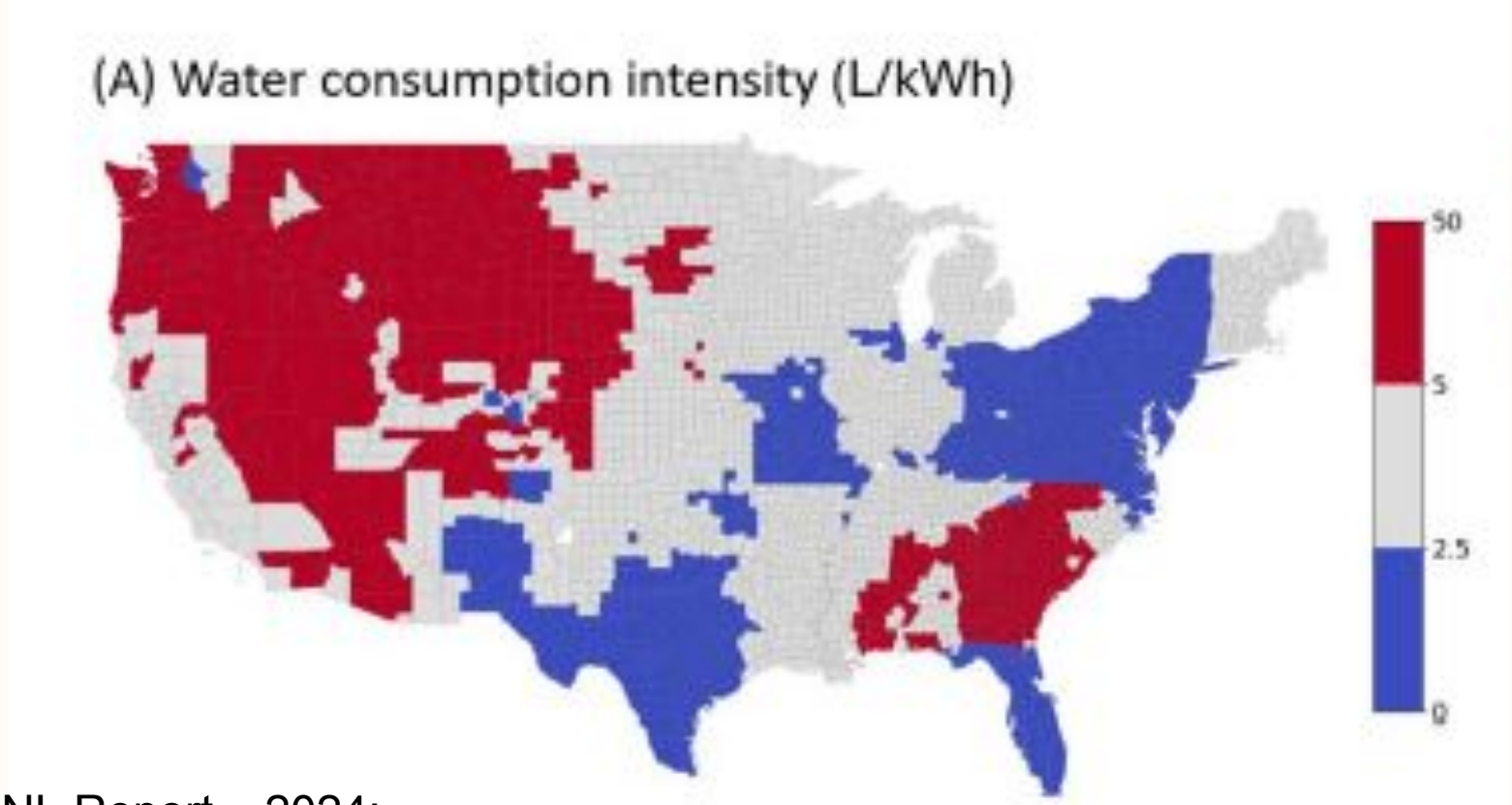
Direct Consumption

- Cooling
- Proposed chips run so hot – water will need to be chilled before circulation

Indirect Consumption

- Power Generation

Georgia: High Indirect Water Consumption



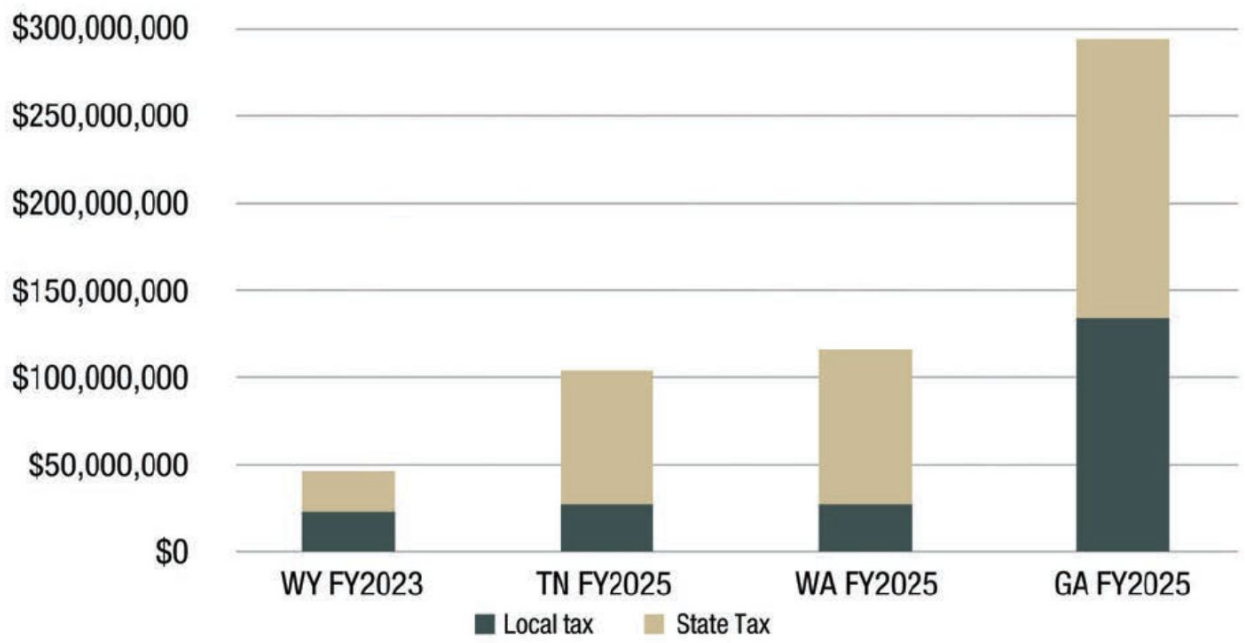
Red regions indicate high level of water consumption per kilowatt hour.
In Georgia, it takes a lot of water to generate electricity.

LBNL Report – 2024:
“U.S. data centers consumed approximately 176 TWh in 2023. The total indirect water footprint of U.S. data centers is nearly 800 billion liters, attributed to water consumed indirectly through electricity use, based on the regional electricity grid mix for U.S. data center locations “ pg 57

Lost tax revenue

GA is one of the biggest losers ~$300,000,000 lost in 2025

Figure 3: State and Local Foregone Revenue due to Data Center Incentives in Selected States



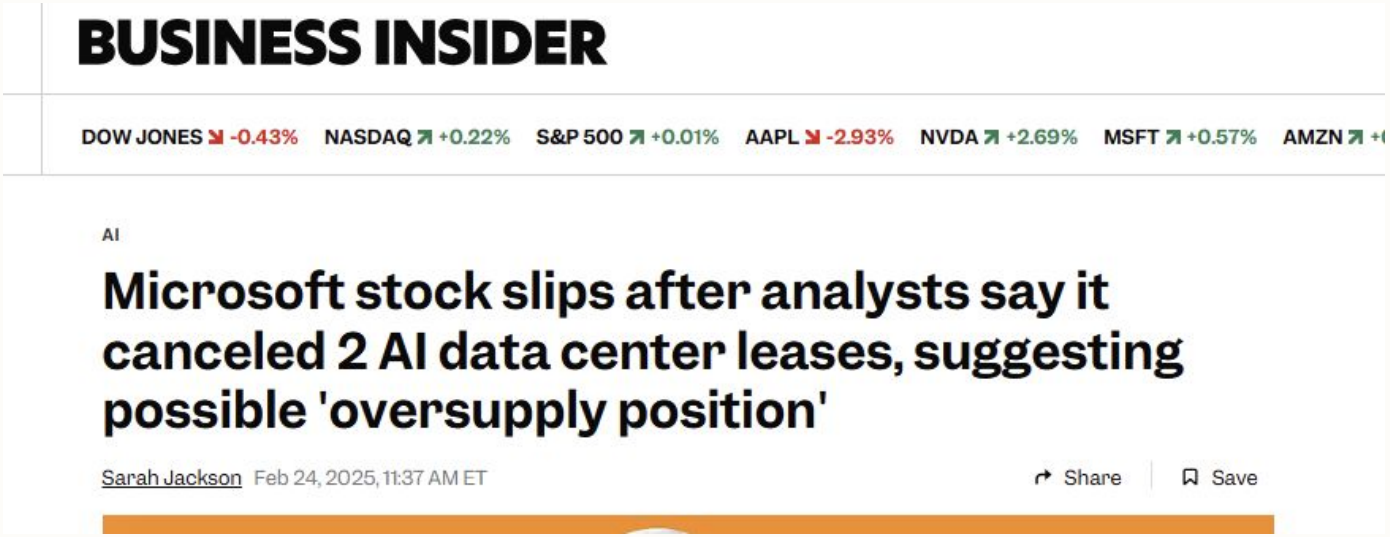
Source: Georgia's "FY 2026 Tax Expenditure Report"; Washington's "2024 Tax Exemption Study"; Tennessee's "Expenditures by Object and Funding by Source, FY 2025-2026"; Wyoming's "Broadening of Sales Tax: Repeal of Exemptions and Taxation of Services," May 16, 2024.

[Cloudy with a Loss of Spending Control: How Data Centers Are Endangering State Budgets - Good Jobs First]

Unknown Unknowns

Is this a bubble?

- Growth is speculative
- What happens if they fold leaving us with empty shells and a ton of new power generation capacity?

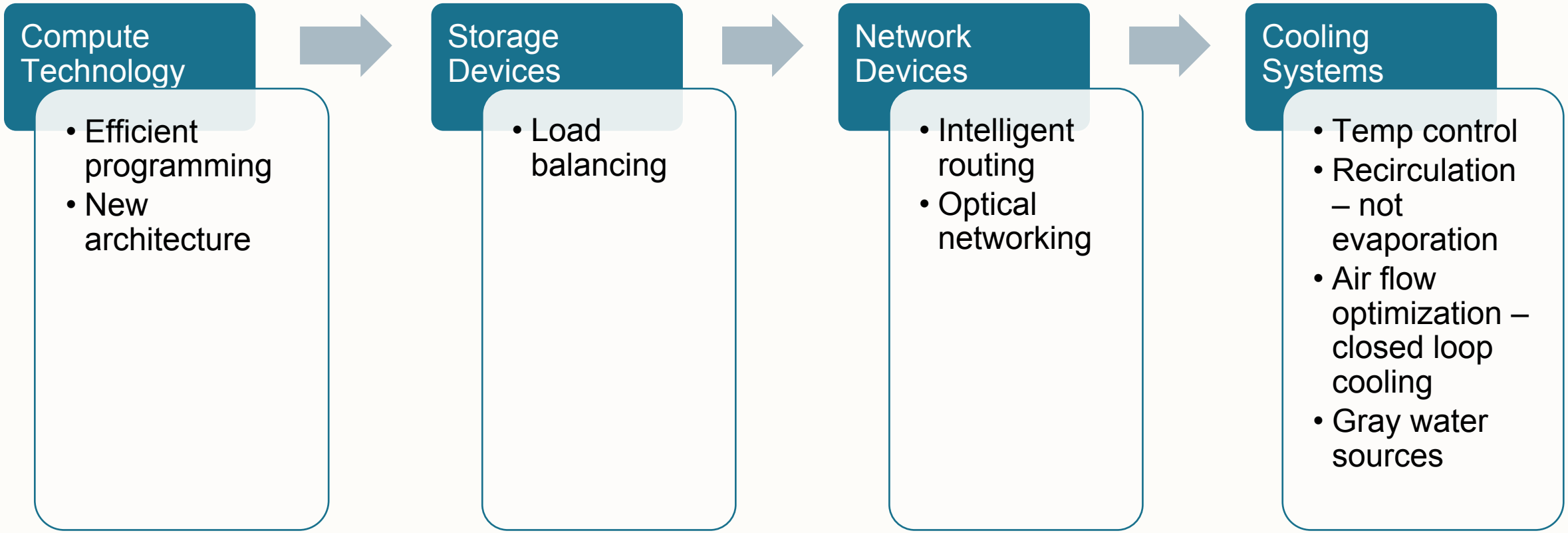


Critical Infrastructure?

- Are they mission critical like hospitals?
- What happens when we have a drought, or heat wave, or ice storm?
- After a disaster:
  - When do they get turned on in the queue?
  - How many diesel generators will they need for 24/7 operation?
  - Augusta, Valdosta, the Coast – didn't have water for 2 weeks, power for 4 after Helene – do people not get running water so we can have cat videos?

Things the data centers can do

Use that AI for optimal load balancing, intelligent routing, and cooling



Things Georgia Can Do

Transparency

Reporting of resource use, taxed paid, and jobs created.

State Oversight

Just like any other industry – level the playing field

Pay-to-Play

Companies, not rate payers pay for upgrades.

Incentivize Efficiency

Tax breaks dependent on power and water efficiency.

Tools to help – State Level

- SB 34 – Pay to Play - If data centers require more power generation, only raise power rates on data centers (not consumers)
- SB 94 - Reestablishment of a Consumer Utility Council (CUC – ‘a consumer ombudsmen’).
- HB 528 - High use facilities transparency act. Requires high resource use facilities to submit annual disclosure reports providing detailed information about their energy and water usage, and the taxes they pay to the state.
- HB 559 - shorten the sunset on data center tax breaks from 2031 to 2026.

Tools to help – local level

- We have sample local ordinances
  - Moratoriums to slow the spread
  - How to zone so they are good neighbors