Arizona State University

Data Center and AI Infrastructure

Sarah Porter, Director, Kyl Center for Water Policy & Professor of Practice
Kelly Barr, Associate Vice President and Chief Alliance Officer, Global Futures Laboratory

Presentation Overview

- Data Centers 101
- Water
- Energy
- Heat
- Land Use

Data Center 101 - Growth of Data Centers

Electric Power Research Institute (EPRI)

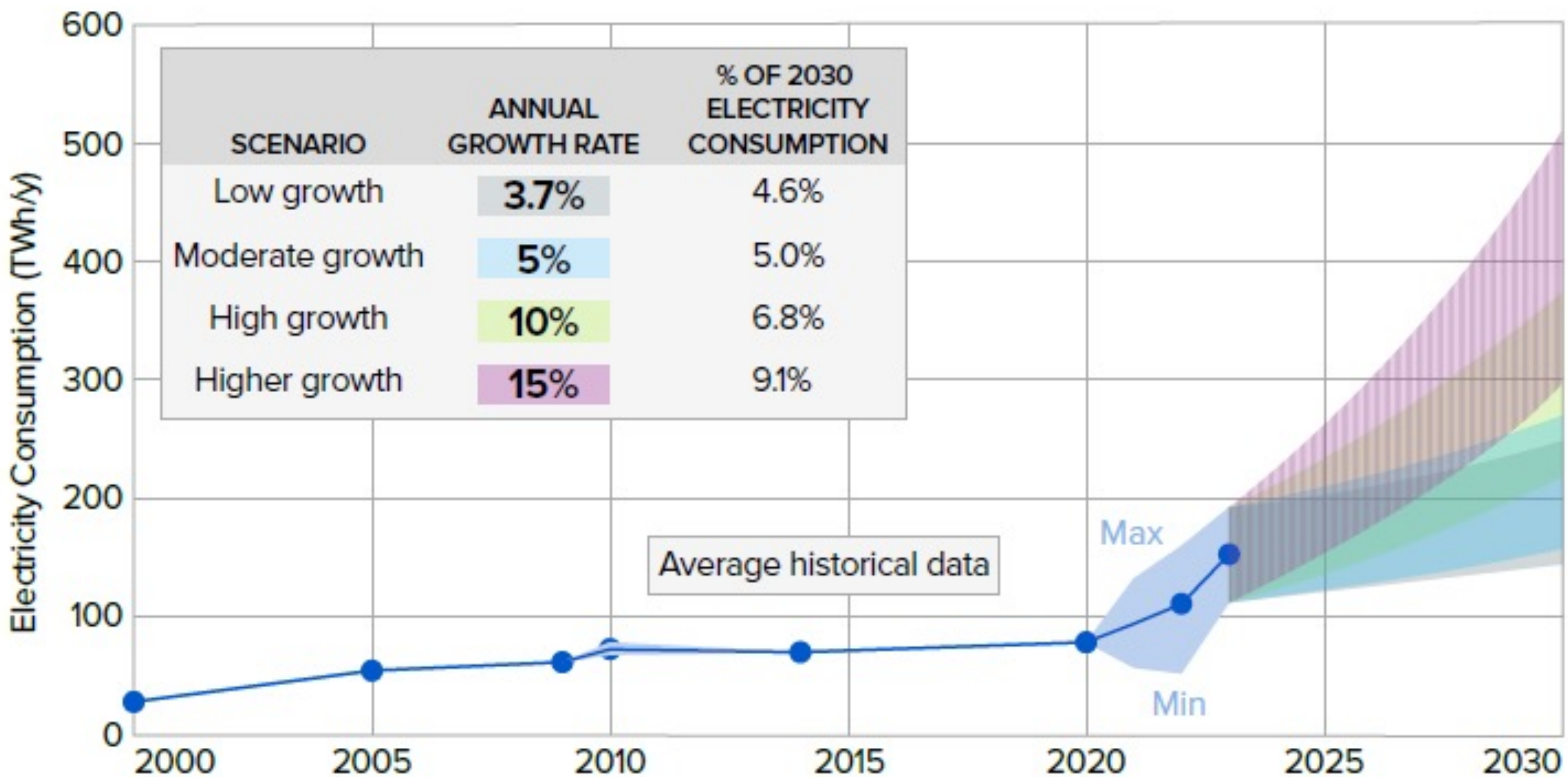


Figure ES-1. *Projections of potential electricity consumption by U.S. data centers: 2023–2030 . % of 2030 electricity consumption projections assume that all other (non-data center) load increases at 1% annually.*

Powering Intelligence: Geography matters

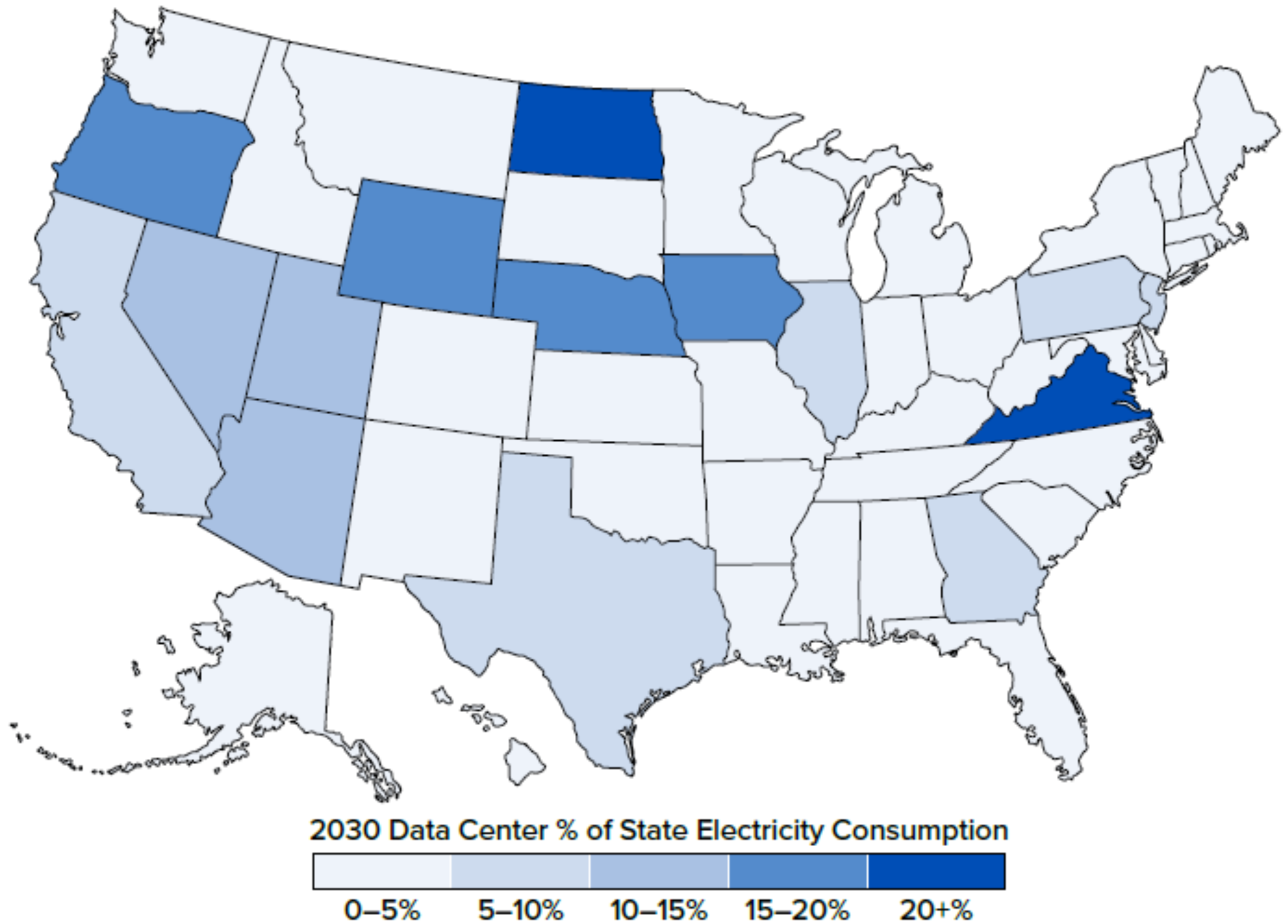


Figure ES-2. 2030 projected data center share of electricity consumption (assumes average of the four growth scenarios and that non-data center loads grow at 1% annually) [4, 8, 9]

Why Arizona?

Tax Incentives

- **Exemption** from state, county, and local **Sales and Use Taxes** on the sale, use, installation, assembly, repair, and maintenance of data center equipment.
- Applies to a **wide range of assets, including servers, cooling systems, power infrastructure, and software.**

Low Operating Costs

- Competitive **utility rates** for power and water.

Business Continuity

- **Minimal natural disaster risk** – stable environment with low exposure to earthquakes, hurricanes, and floods.

Network Efficiency

- **Proximity to major load centers** in the Southwest and West Coast.
- **Low latency** connectivity to key markets.

Data Centers 101

2 Types of Data Centers

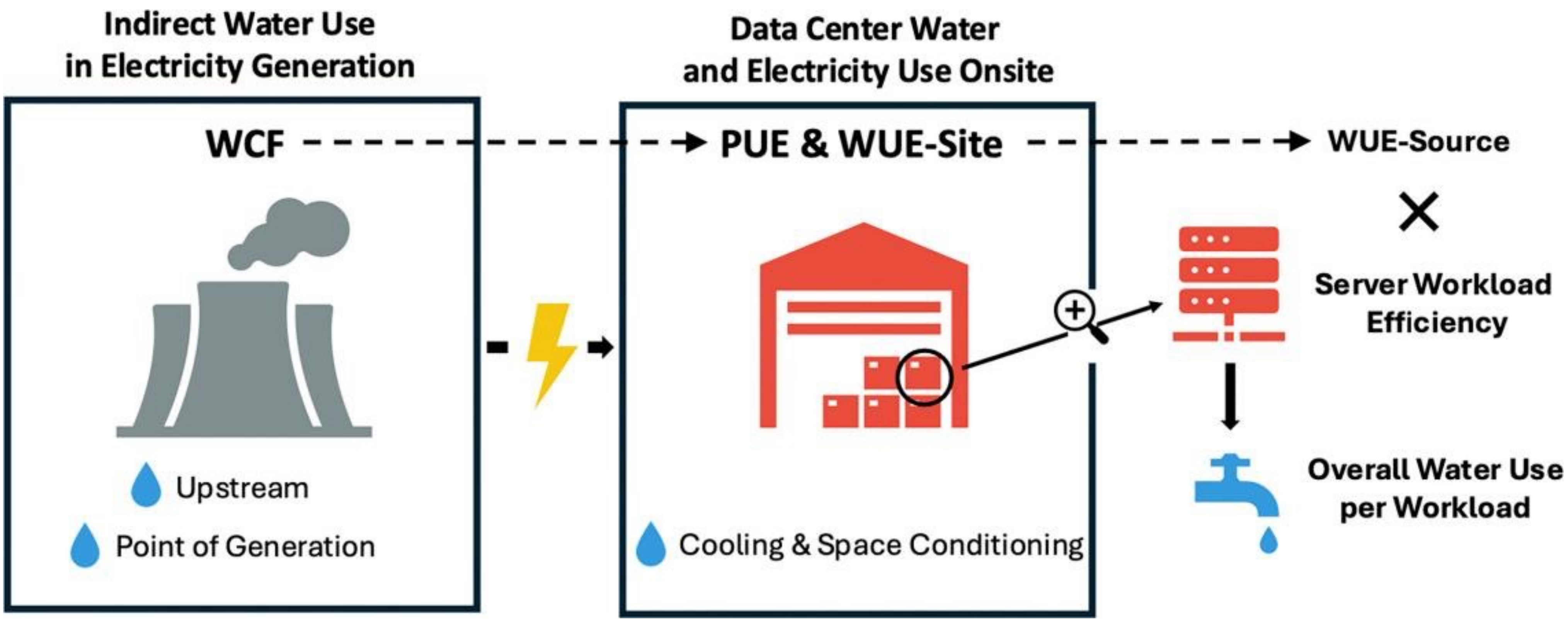
Small Scale

Large Scale

Enterprise
Co-Location
Hyperscale

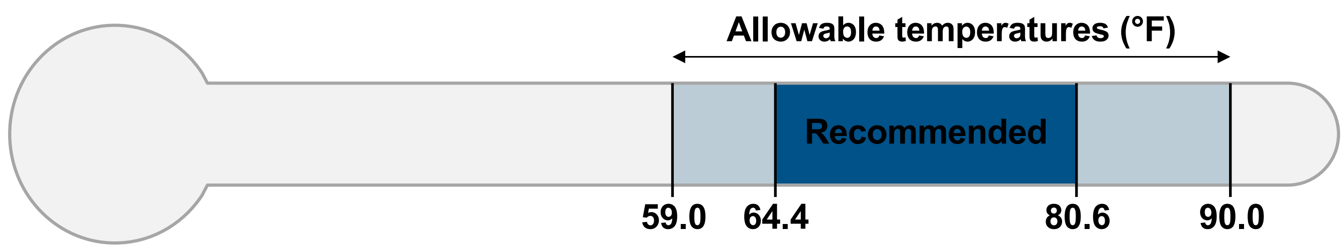
What do data centers look like?

How Data Centers Use Water

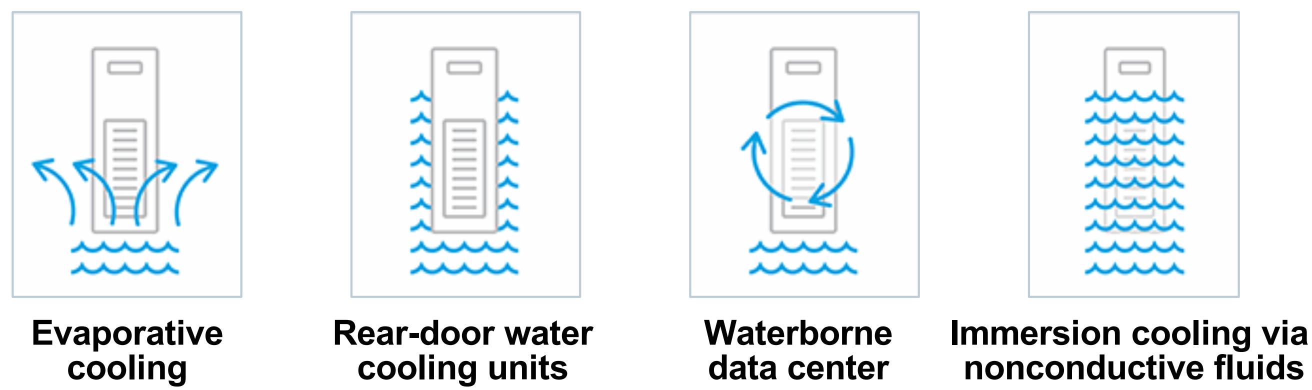


Direct Efficiency Gains

Equipment Performance
(Raise the Temperature)

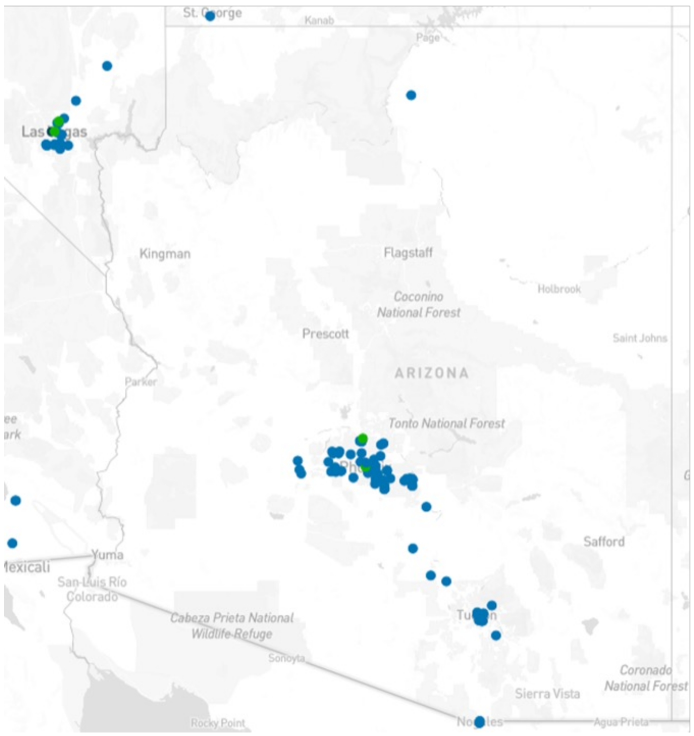


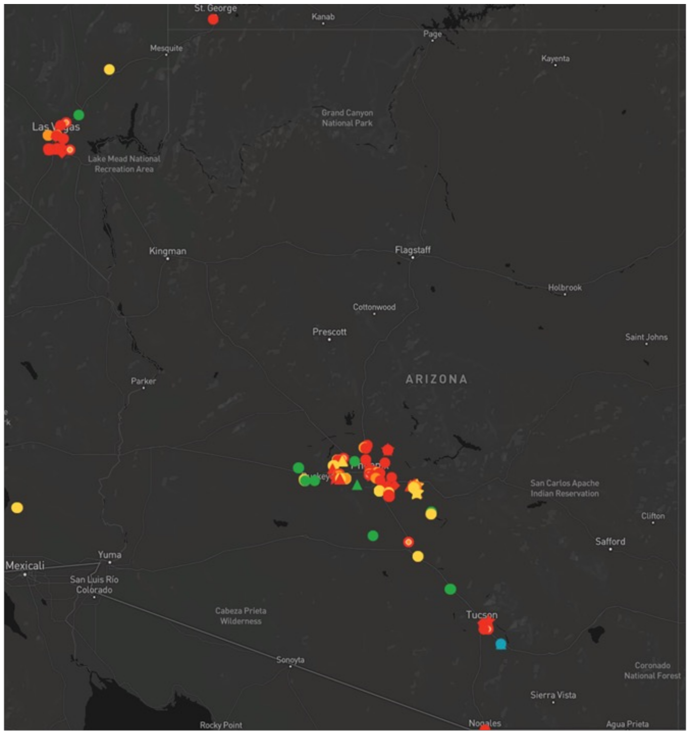
Facility Performance
(air vs liquid cooling)

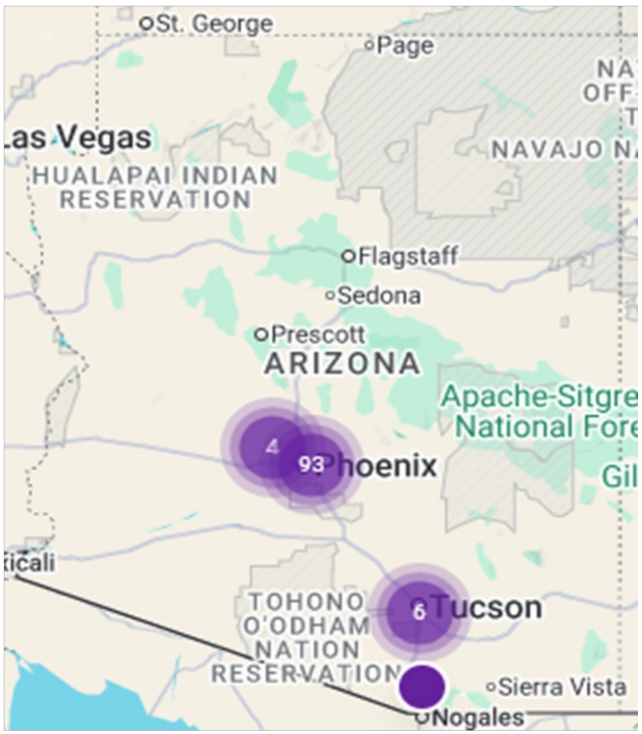


Source: EnergyStar (above) and Lawrence Berkeley Labs/TechTarget (below)

Where are the data centers?







Data Centers in AMAs

Water Provider	Built	Planned	Unreplenished Groundwater Use	LWU Ordinance	DAWS
Avondale	0	3	0.40%	Y	Y
Buckeye	0	2	87.90%	N	N
Chandler	6	1	13.40%	Y	Y
Eloy	0	1	100%	N	Y
EPCOR Santan	0	1	85.70%	Y	Y
EPCOR Agua Fria*	2	3	52.80%	Y	Y
Gilbert	1	0	6.20%	Y	Y
Goodyear	5	1	0%	N	Y
Marana	0	1	0.60%	Y	Y
Mesa	8	3	3.70%	Y	Y
Peoria	0	1	4.50%	Y	Y
Phoenix	25	5	0.90%	Y	Y
Scottsdale	5	0	9.50%	N	Y
Tempe	5	0	13.50%	Y	Y
Tucson	9	0	8.70%	Y	Y
Provider Undetermined	0	5	N/A	N/A	N/A
Total	66	27	* as part of EPCOR West Valley		

Water for Electric Power

Power Source	WCF* gal / MWh
Wind / Solar	0
Natural Gas	317
Coal	528
Nuclear	555
Hydropower	4,438

Water Consumption Factor (average)

Environmental Research Letters, 8(1). DOI: 10.1088/1748-9326/8/1/015031; Scientific Investigations Report 2014–5184.

3% — Electric power production %-age statewide water demand

WCF ↓ — Declining with transition to renewables and NG

CTW? — All economic enterprises consume power

Conclusions

- As the state’s economy evolves, so do water demands.
- Data center water use is not a problem rn.
- Water supply planning rules protect most urban users.
- Non-renewable groundwater supplies are vulnerable both within and outside of AMAs.

Energy Needs: Significant, Round the Clock and Inflexible

APS (Arizona Public Service)
- **2025 Peak Demand:** 8,631 MW (August 7, 2025)
- **Data Center Queue:** ~19,000 MW

SRP (Salt River Project)
- **2025 Peak Demand:** 8,324 MW (July 9, 2025)
- **Data Center Queue:** ~15,000 MW

Key Takeaway:
Data center demand is significant and **requires round-the-clock, high reliability electricity with limited flexibility.**

Cooling Type Impacts Energy Requirements

Cooling Systems Matter

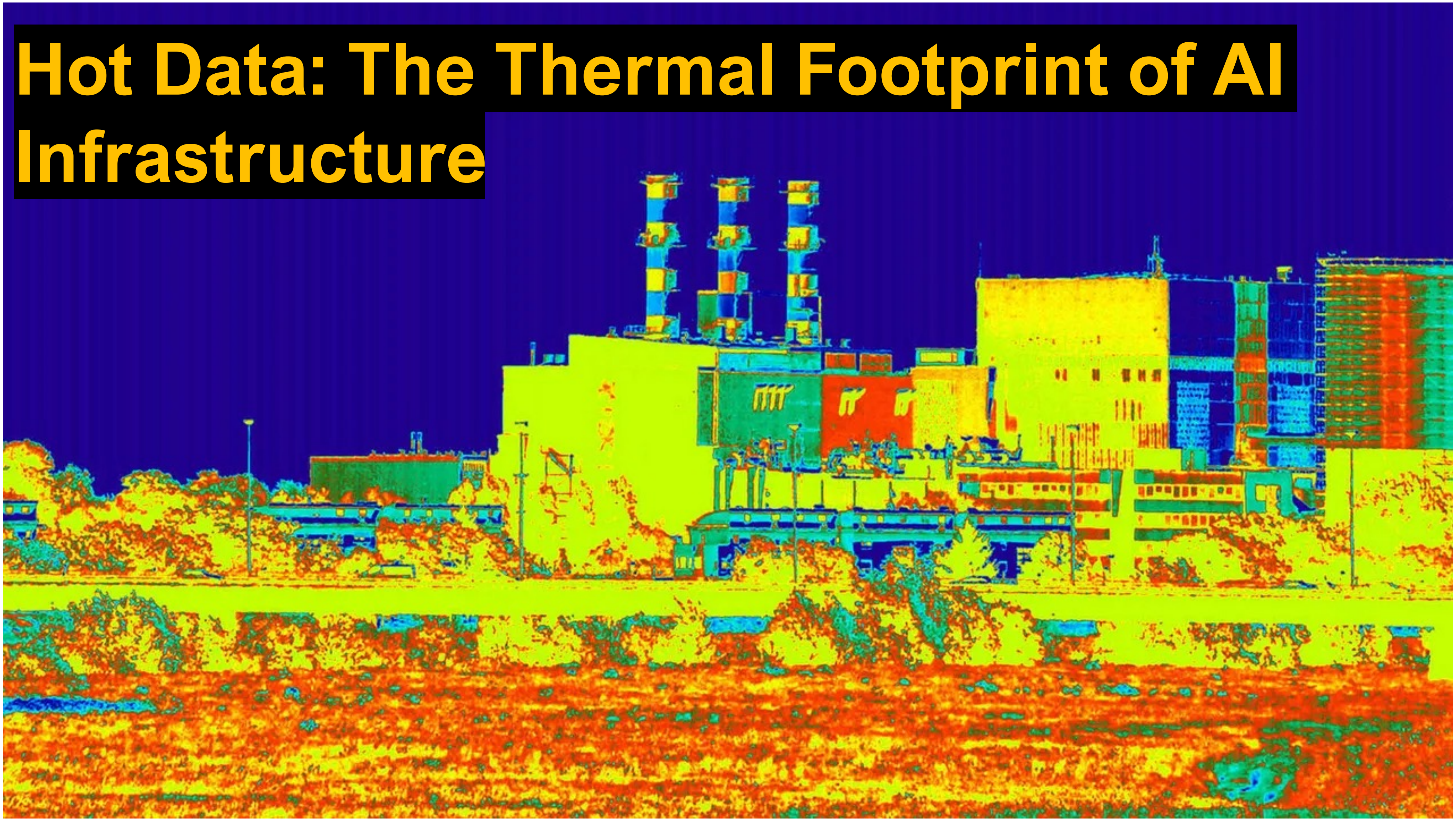
- Air cooling can increase total energy use by **10–30%** compared to liquid or hybrid systems.

Data Center Use Case Matters

- AI workloads demand **much higher compute density** and **greater cooling power**.
- A single AI inquiry can consume **many times more energy** than a standard Google search.

Key Takeaway

Both **cooling design** and **application type** drive significant differences in overall energy requirements.


Hot Data: The Thermal Footprint of AI Infrastructure

AI’s Real Estate: The Spatial Demands of Intelligent Infrastructure

- Data centers require **large parcels of land** — often 50 to 500+ acres per campus — to house buildings, substations, cooling systems, and buffer zones.
- Data centers need **direct access to high-capacity electrical transmission** — frequently leading to new substations, transmission lines, or on-site generation.
- Data centers are **typically large, windowless structures** that disrupt landscape character.
- **Community benefits are key**.

Key Takeaways

Manageable Water Use
Water impacts can be minimized through smart siting and efficient cooling.

- **High Energy Demand**
  Data centers require major electricity resources and new energy infrastructure.
- **Heat Emissions Matter**
  We need better data on heat impacts and their role in the urban heat island.
- **Land-Use Tradeoffs**
  Communities must weigh impacts and determine appropriate local benefits.

Data Center Knowledge Exchange

Objective:
Bringing together all stakeholders in relation to AI and Data Center Development to exchange knowledge, needs, expectations and intentions to advance AI and Data Center sustainability in AZ.

Unifying Across Silos

- Bringing together industry, municipalities, communities, utilities and experts.

Providing Deep Knowledge

- Multiple breakouts dedicated to deep dives in water, economics and heat impacts.

Encouraging Networking

- Providing opportunities for engagement with presentations
- Providing time for extended networking following every presentation.

Save the Date

February 11, 2026 ASU Walton Center Auditorium

Questions?

Thank You

Kelly Barr
Assoc. VP and Chief Alliance Officer, Global Futures Laboratory

Kelly.Barr@asu.edu

Sarah Porter
Director, Kyl Center for Water Policy

S.Porter@asu.edu