Webinar Workshop:

How Co-ops Can Mitigate Their Risk from Data Center Growth

February 6, 2025

9 a.m. (PT) / 10 a.m. (MT)
11 a.m. (CT) / 12 p.m. (ET)

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Speaker biographies

Jeff Johnston: As the **Digital Infrastructure Economist at CoBank,** I am responsible for identifying emerging technologies, business models, risks and opportunities within the telecommunications industry, and providing strategic analyses to both internal and external stakeholders. Formerly, I served as an equity analyst covering the tech, media and telecom sectors. I have also held various senior management positions in the telecommunications industry. On a monthly nationally syndicated podcast program, ***All Day Digital***, I connect with communications executives and thought leaders to get their perspective on what's shaping our digital industry.

Teri Viswanath: In the role of **Energy Economist at CoBank** I focus on all aspects of the electricity industry, including the electric distribution, generation and transmission sectors. A former attorney and professional energy economist with more than two decades of research experience working with global energy companies and government officials. I am the co-host of the nationally syndicated podcast, ***Power Plays***, where I showcase my deep knowledge of the power industry, engaging with guests on a wide variety of topics ranging from policy and energy transition to operational efficiency and power supply.

Speaker biographies

Arman Shehabi: Staff Scientist/Engineer, Energy Analysis and Environmental Impacts Division, Lawrence Berkeley National Laboratory, U.S. Department of Energy.

Dr. Arman Shehabi has over 15 years' experience measuring and modeling the potential energy, economic, and air pollutant impacts associated with the large-scale adoption of clean energy policy and technologies for buildings and manufacturing, with extensive research focused on the information and communication technology. His current work focuses on emerging technologies and industries in data center energy/water use.

Andy Satchwell: Staff Scientist and Deputy Leader, Energy Markets and Policy Department, Lawrence Berkeley National Laboratory, U.S. Department of Energy.

Andrew Satchwell leads his department's financial analysis of electric utility regulatory and business models. His current work quantifies the financial impacts of distributed energy resources on utility profitability and customer rates and bills. He previously worked with the Indiana Office of Utility Consumer Counselor, where he served as an expert economics and policy witness on behalf of ratepayers. Mr. Satchwell also served as co-chair of the Resource Adequacy Working Group of the Organization of Midwest ISO States.

Discussion topics

U.S. data center demand is growing at an accelerating rate…

18% between 2018 and 2023, and then ranging 13% to 27% between 2023 and 2028

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2024 U.S. Data Center Energy Use Report: Summary of Findings

Dr. Arman Shehabi, Staff Scientist

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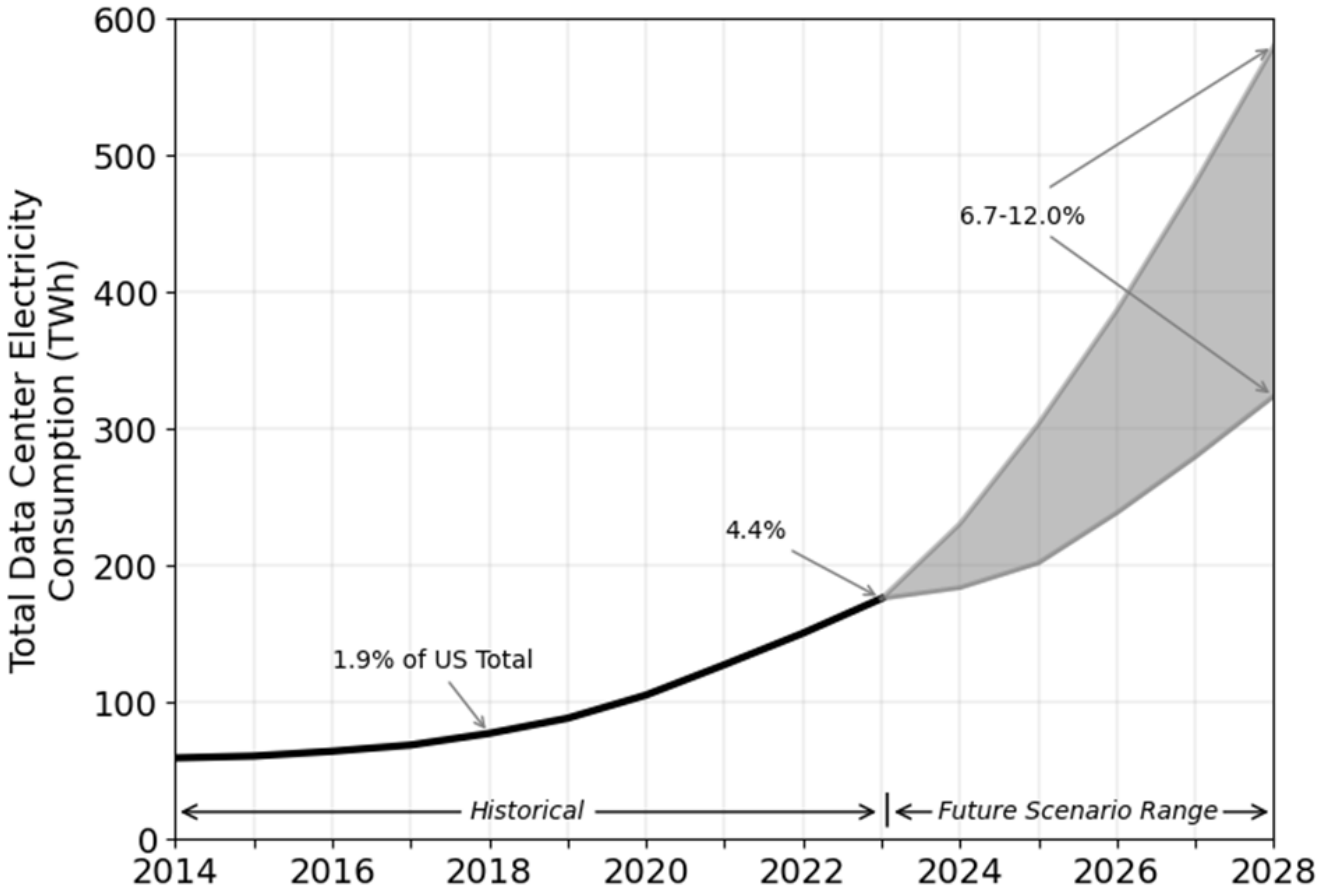
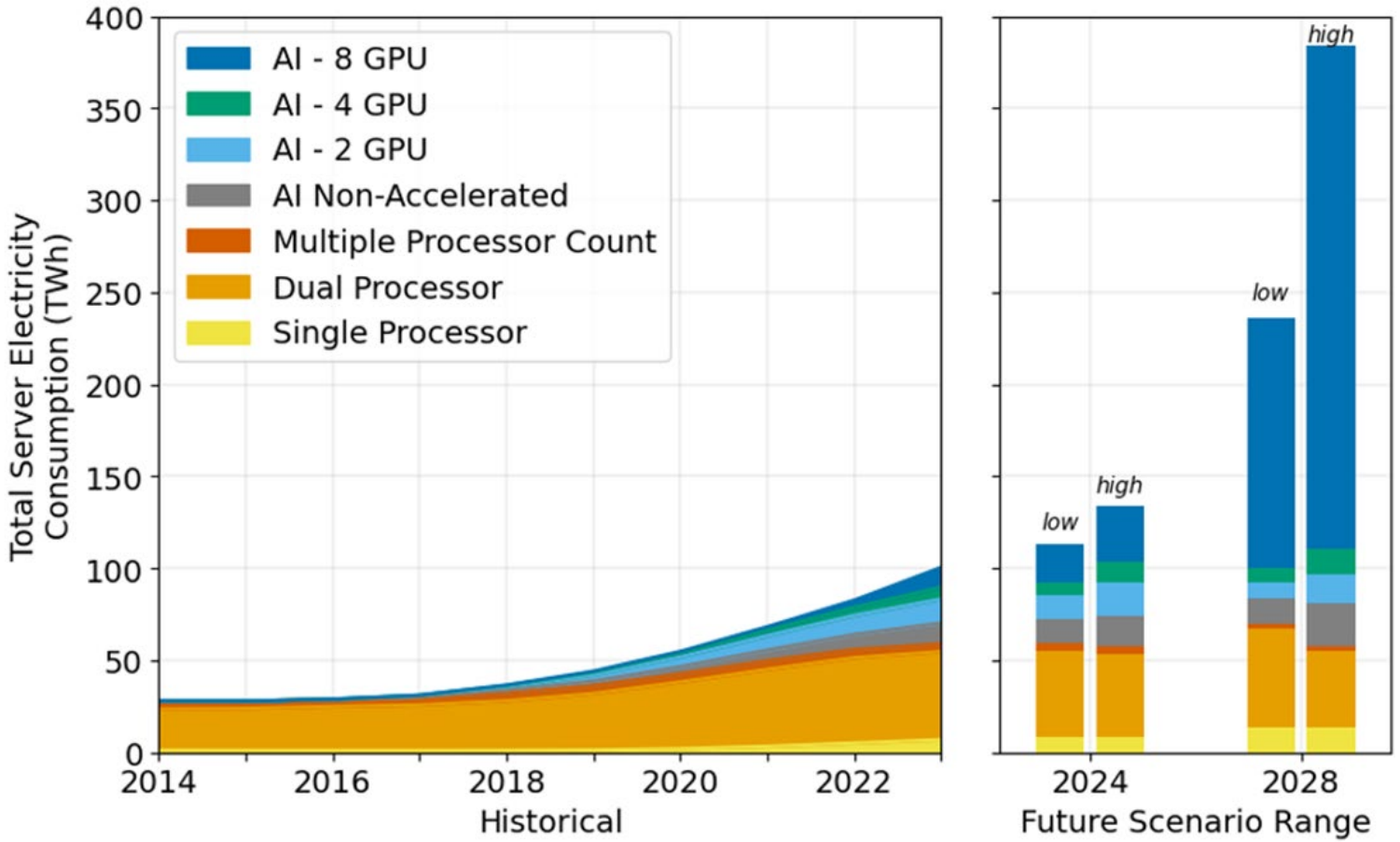
Total Data Center Estimates

Total electricity use 176 TWh in 2023; modeled range 325-580 TWh in 2028



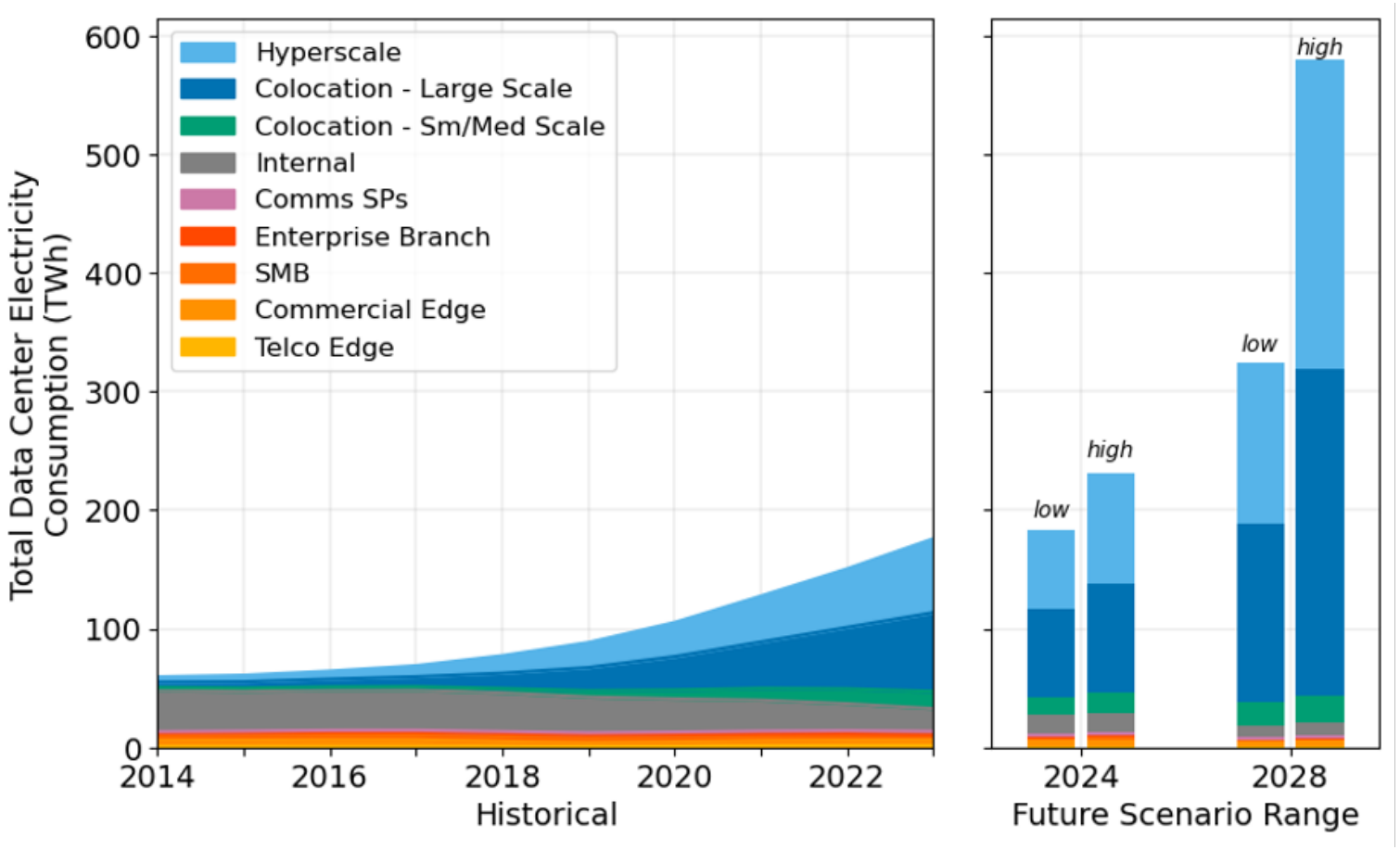
What are the key drivers?

Electricity use by server type based on report assumptions



Who is demanding this new electricity?

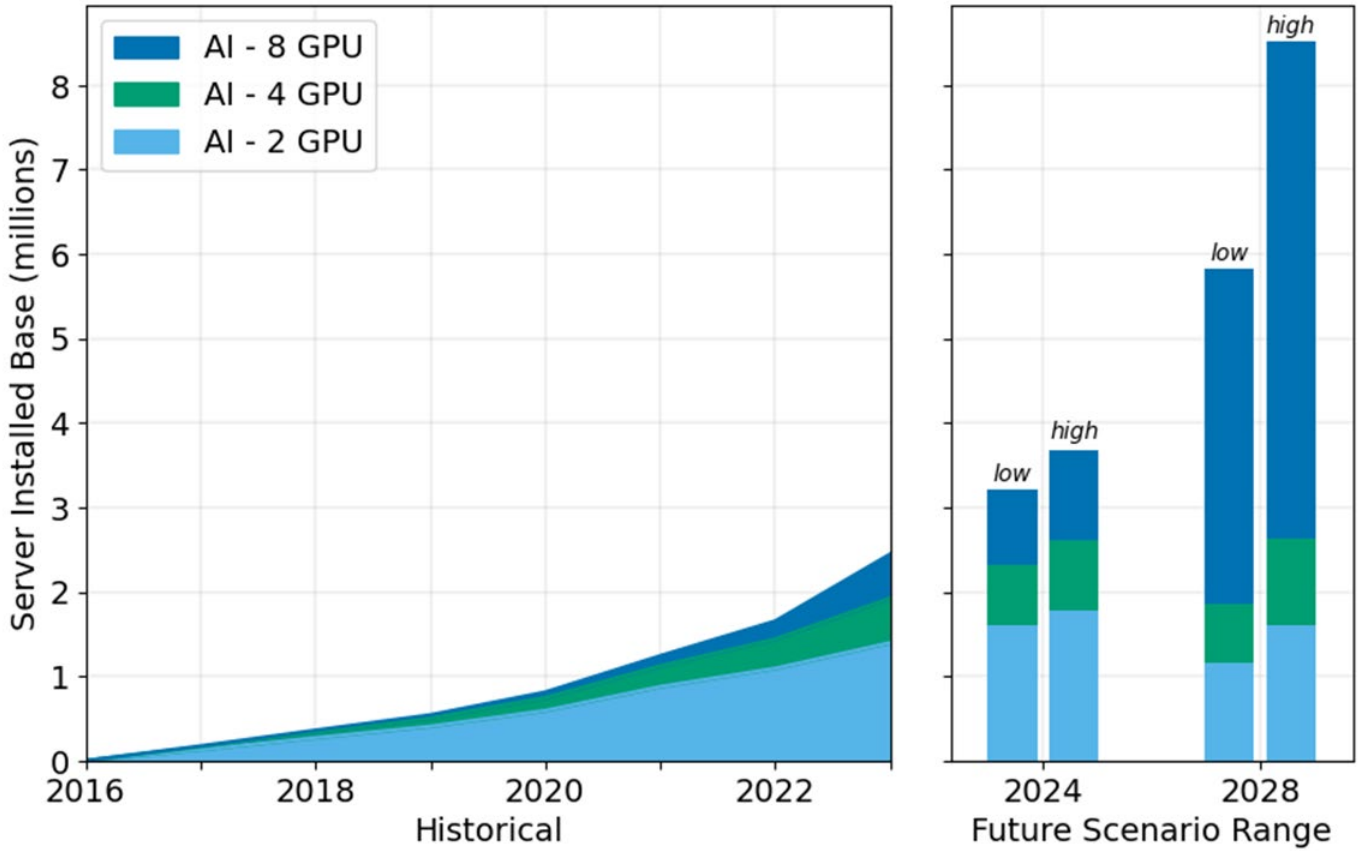
Electricity use by data center type based on report assumptions



AI Server Installed Base

Key Uncertainties

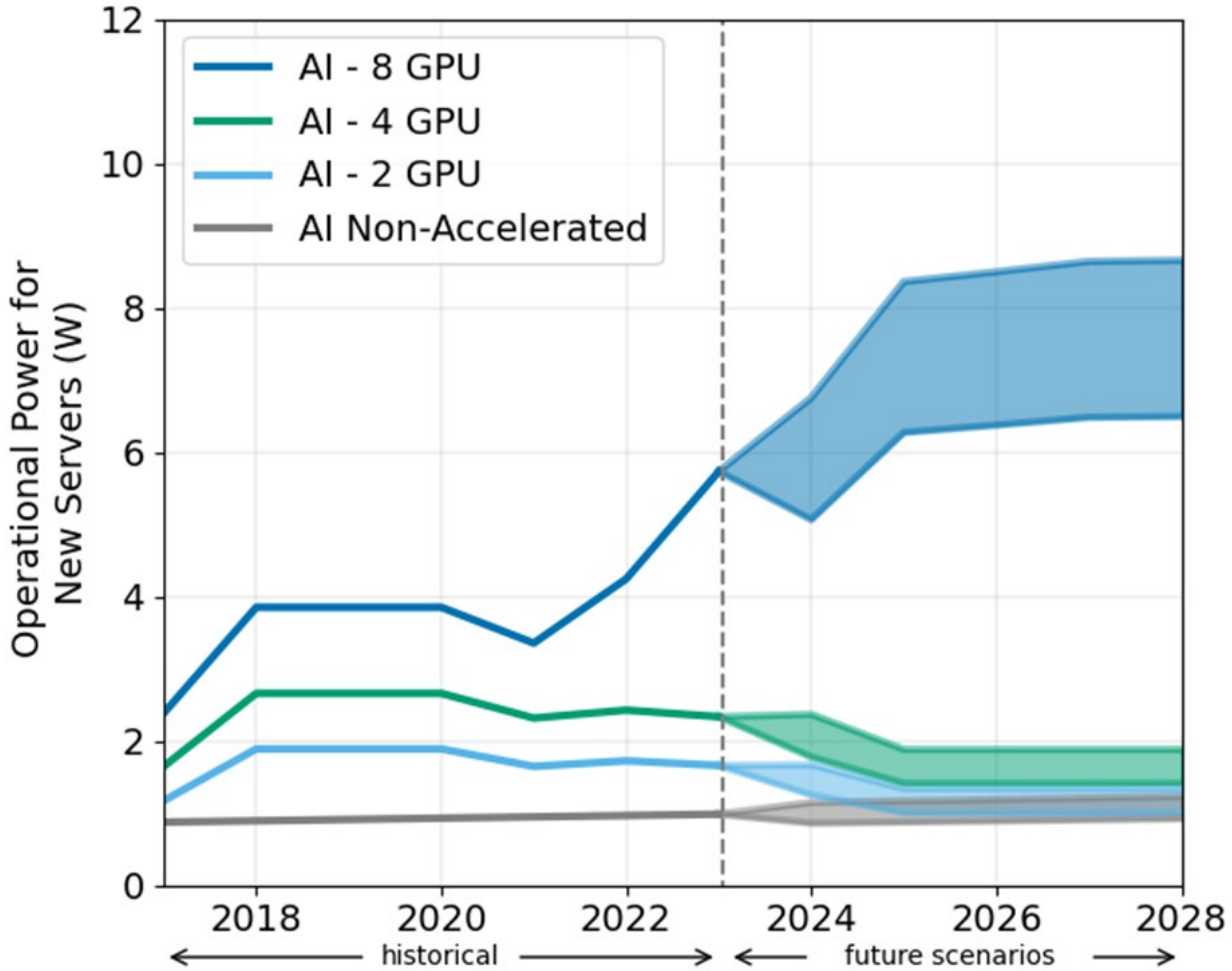
- **Future GPU shipments**
- GPU-server operational practices
- Limited info on data center location/size & electricity provider



AI Server Operational Power

Key Data Gaps

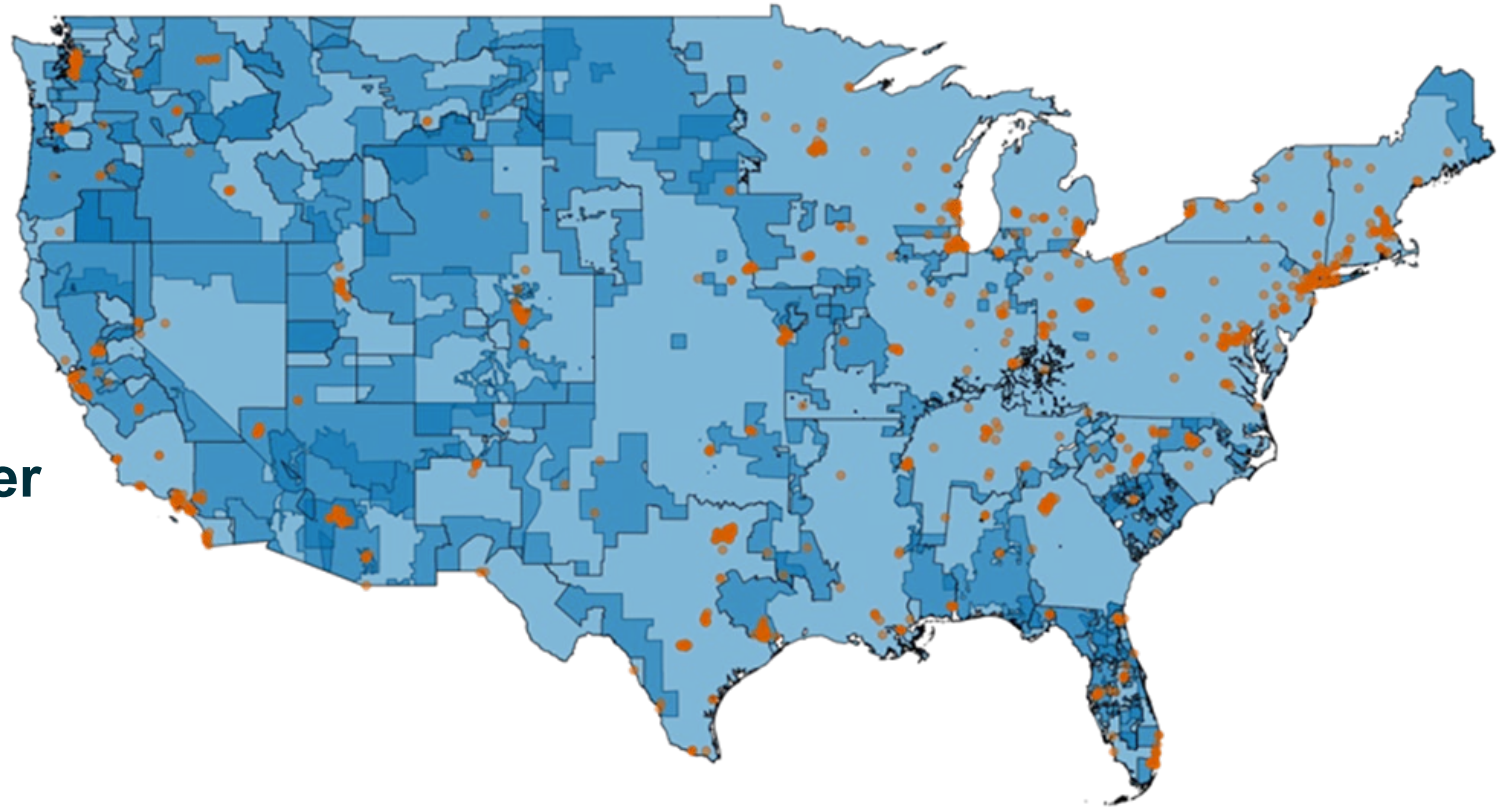
- Future GPU shipments
- **GPU-server operational practices**
- Limited info on data center location/size & electricity provider



Data Center Location and Electricity Provider

Key Data Gaps

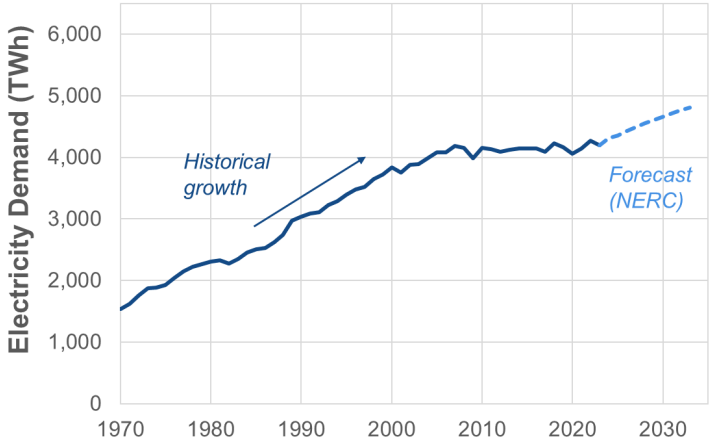
- Future GPU shipments
- GPU-server operational practices
- **Limited info on data center location/size & electricity provider**



Limited locations of identified data centers (orange dots) in each U.S. balancing authority

Additional considerations

- Forecasts are very uncertain
  - Short timeline (3-4 years) can be based on orders placed for chips, facilities under construction, etc.
  - Longer timelines are anyone's guess, especially when considering local demands



- Unit conversions can be tricky
  - LBL reporting focuses primarily on **electricity consumed (e.g. kWh, TWh)**
  - Data center industry tends to talk in terms of **facility nameplate capacity** (e.g. MW, GW). This does not relate directly to the peak load of the facility, or the peak consumption of the IT equipment, or any value that can be used to convert to estimated consumption.
- Context is important
  - Data center demand growth is real, and it is happening fast. But other demand growth in **building electrification, EVs, and industry** is expected. These should all be considered holistically.

Sources: NERC Electricity Supply and Demand Data, 2023; EIA, Monthly Energy Review;

Risk of underutilized investments or insufficient energy supply with implications for all ratepayers

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Electricity Rate Designs for Large Loads: *Evolving Practices and Opportunities*

Andy Satchwell

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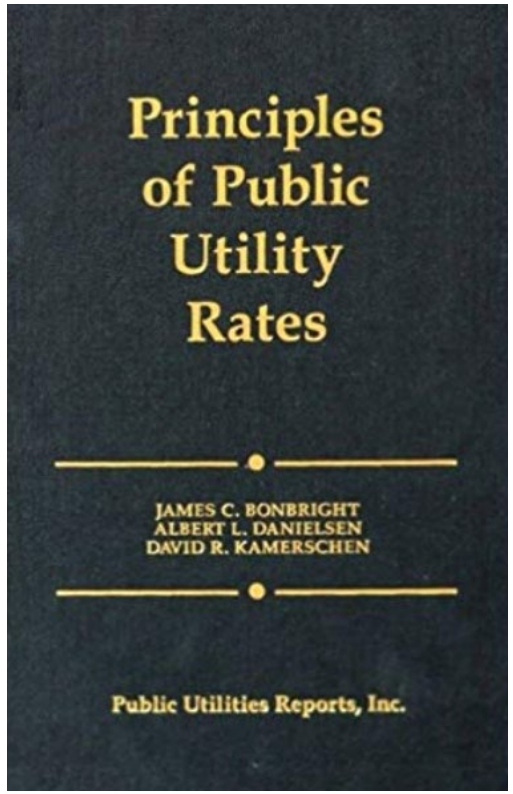
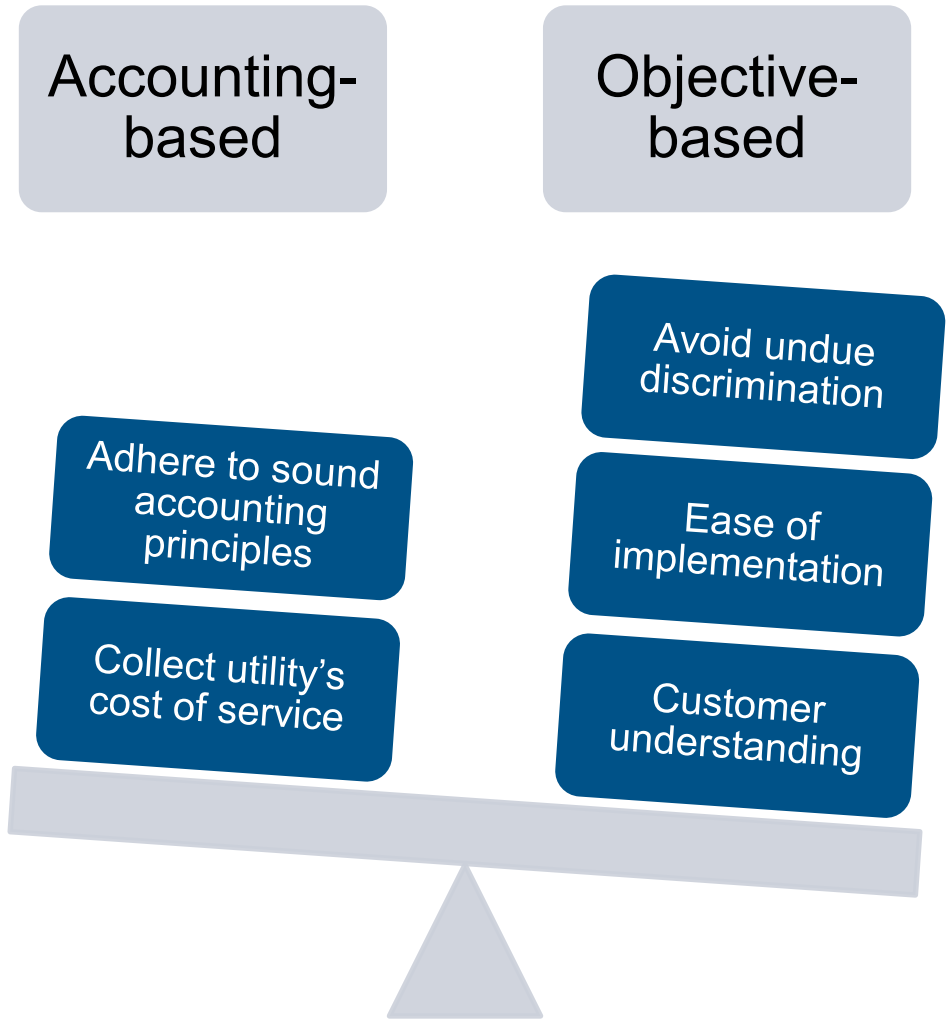
With contributions from Natalie Mims Frick, Peter Cappers, Sanem Sergici, Ryan Hledik, Goksin Kavlak, and Glenda Oskar

Publication available here: https://emp.lbl.gov/publications/electricity-rate-designs-large-loads

Rate design balances several principles





Utilities and regulators may have specific rate design objectives for data centers

- Resource adequacy
- Affordability
- Desire to attract large-load customers
- Emissions/air pollutant reductions

Tariff elements to fairly allocate electricity system costs

Applicability to specific customer types

Marginal pricing

Economic development payments

Tariff elements to mitigate utility and ratepayer financial risks

Minimum load requirements and demand charges

Credit rating and collateral requirements

Upfront payments and exit fees

Contract duration, sizing, and resizing

Tariff elements to mitigate operational and resource adequacy risks

Minimum load factor

Behind-the-meter resources as backup and supplemental power

Ramp times

Tariff elements to accommodate the diverse needs of large-load customers

Clean energy requirements

Opportunities to leverage specific generation technologies

Addressing the Power Supply Challenge

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Are data center power supply requirements changing?

FOX BUSINESS

Chevron, Engine No. 1, GE Vernova team up to build US data centers

Chevron announced an in-service target by the end of 2027

The Washington Post

Microsoft deal would reopen Three Mile Island nuclear plant to power AI

The New York Times

Hungry for Clean Energy, Facebook Looks to a New Type of Geothermal

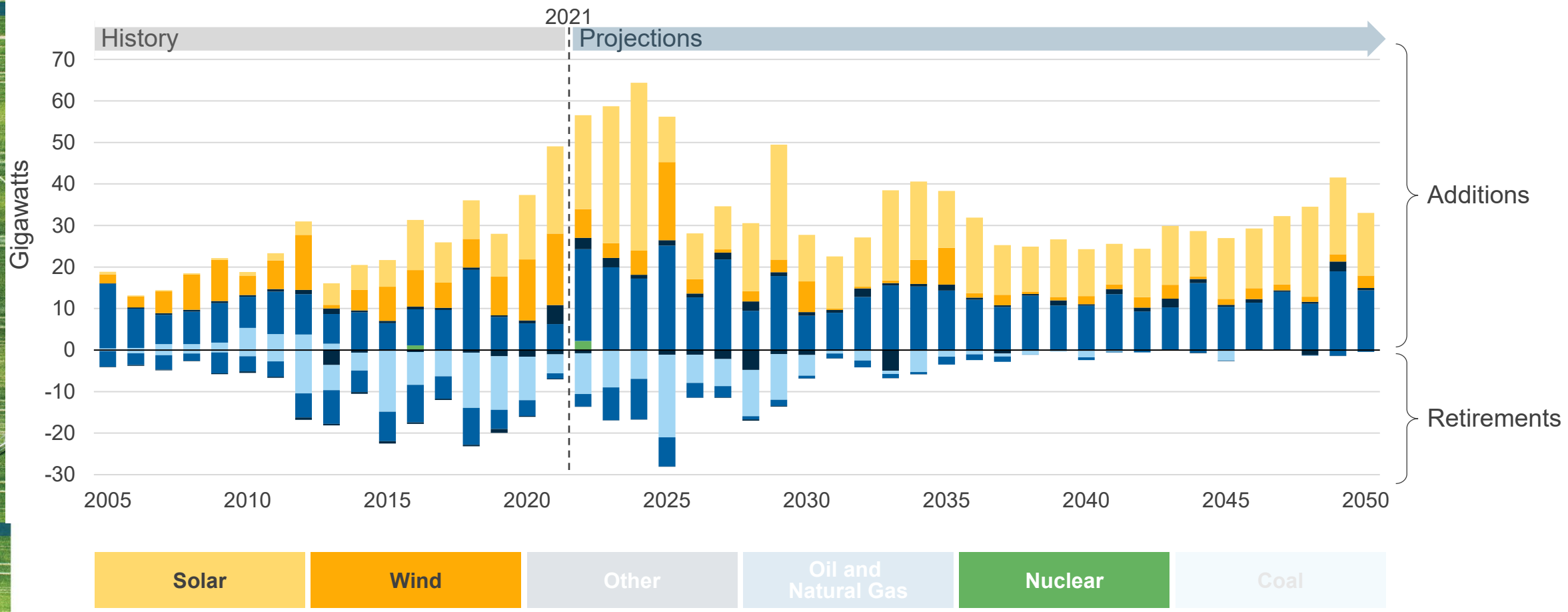
SLATE

America Needs More Power

Source: Fox Business, The Washington Post, The New York Times, Slate

New Capacity Additions Come Largely from Renewables

Annual Electricity Generating Capacity Additions and Retirements

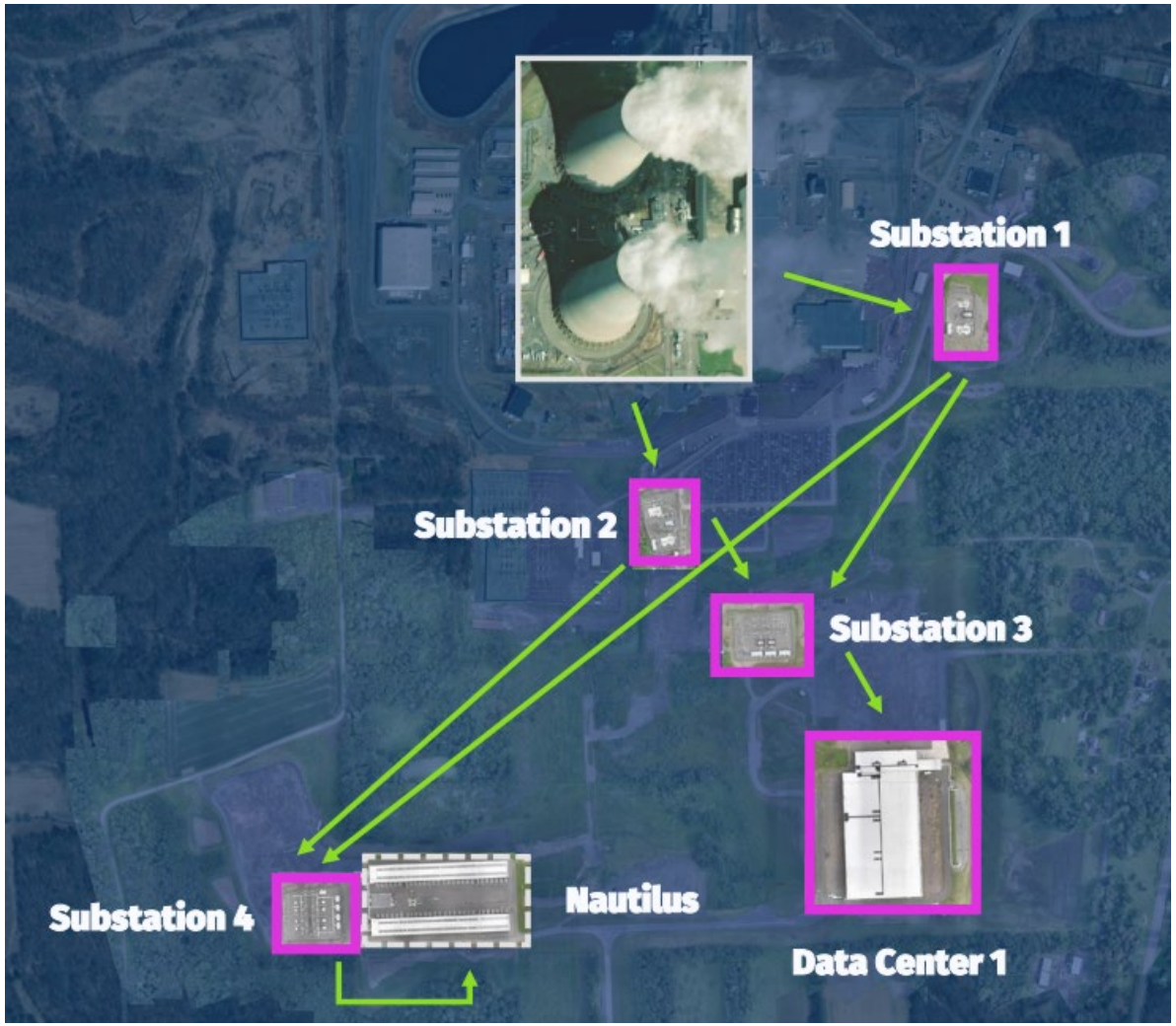


Source: EIA

Co-Location Conundrum — Susquehanna ISA Rejection

Background

- **Talen's Susquehanna Nuclear Power Plant** is the 6th largest in the country with 2 generating units representing **2.5 GW**.
- PJM study determined that any **'behind-the-meter' load greater than 480 MW would cause system issues**.
- **FERC rejected the amended Interconnection Service Agreement —** increasing the co-located load from 300 to the 480 MW limit — on procedural grounds.



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Problem Boils Down to Who Pays for the Grid?

- Protests to PJM's filing of the Amended ISA questioned **why Susquehanna's co-located load would not pay any transmission rates,** if it is receiving benefits from the transmission system.
- Protestors also argued that this would be the **first time that co-located would be designated as "not Network Load."** By way of context, under the PJM tariff, there are only two types of load: (1) Network Load and (2) load that must make its own arrangements for Point-To-Point Transmission Service.
- **FERC suggested that PJM should file proposed changes to its tariff to establish procedures for accommodating behind-the-meter load that could address the reliability, cost allocation, and other issues raised by the parties in the proceeding**.

Three Key Messages

What the latest data center energy usage findings mean

Rate design strategies to mitigate financial and operational risks

How to navigate evolving power supply options for serving growth