



Data Centers in Virginia

Finding

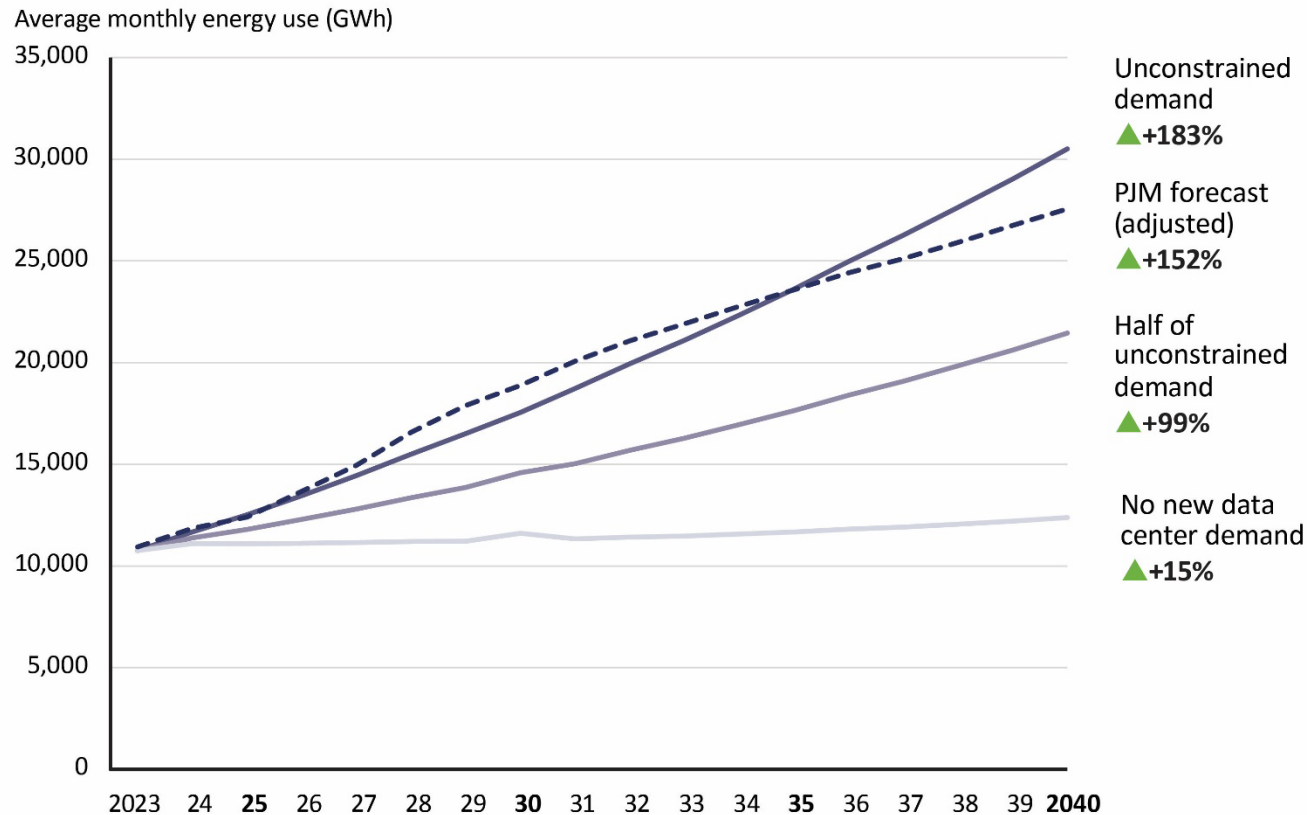
Data center industry is driving immense increase in energy demand, and building enough new generation and transmission infrastructure to address demand will be difficult.

Modern data centers use substantially more energy than other commercial or industrial operations

- New “hyperscale” data centers draw from 100 to over 200 MW, more than most Virginia industrial consumers
- Planned data center campuses are expected to consume well over 1,000 MW
 - Compare to Virginia’s two nuclear plants: North Anna two 950 MW reactors, Surry two 850 MW reactors

MW = megawatts of power capacity is the common metric for measuring data center size

Data center industry is forecast to drive immense increase in Virginia's energy demand



PJM, equivalent to Ontario's IESO, is the regional organization responsible for coordinating generation and transmission for Virginia and several other eastern and midwestern states.

Addressing energy demand would require substantially increasing current system capacity and energy imports

Change from 2025 to 2040

	Scenario 1: Unconstrained demand	Scenario 2: Half unconstrained demand
Generation (in-state)	+150%	+90%
Transmission (Interzonal)*	+40%	+35%
Imported energy (net)	+150%	+55%

Scenarios shown assume that Virginia Clean Economy Act (VCEA) renewable requirements are met.
*Transmission capacity is only interzonal lines to and from the Dominion transmission zone, where most data centers are located and most growth is expected to occur.

Finding

Demand growth raises concerns about system capacity and reliability, but existing utility requirements and processes limit risks.

Demand growth raises grid reliability concerns, and utilities are responsible for ensuring reliability

- Utilities have obligation to serve new data center customers, but **foremost responsibility is to ensure grid reliability**
 - Regulated by federal agency and international standards
- Transmission reliability concerns appear effectively addressed through existing requirements
- Generation capacity concerns partially addressed through existing requirements, but some risk remains
 - Demand could increase faster than new generation is added, regional *reserve* capacity projected to be insufficient by 2030

The Federal Energy Regulatory Commission (FERC) oversees the nation's electrical grid.

The North American Electrical Reliability Corporation (NERC) sets reliability standards for the grid.

Recommendation

The General Assembly may wish to consider clarifying that electric utilities have the authority to delay, but not deny, service to customers when the addition of customer load cannot be supported by the transmission system or available generation capacity. (Not implemented)

Finding

State could encourage or require data centers to take actions to help address their energy impacts, but actions would have small effect on growing energy demand.

Data centers could take actions to help address energy impacts, but would not affect demand

- Data centers could invest more in renewable and other energy generation to help meet generation needs
 - Grid and “behind the meter” resources
- Participation in demand response programs could offset some energy demand and reduce future infrastructure needs, but flexibility is needed
 - Shift computing loads, temporary operating adjustments, battery storage, Tier 4 diesel generators instead of Tier 2
- Improving data center efficiency (e.g., PUE) makes better use of energy but has marginal impact on total energy use

PUE = Power Usage Effectiveness ratio, which measures efficiency of cooling and other building systems, but not computing activity that makes up most data center energy use

Recommendation

The General Assembly may wish to consider expanding Virginia's statutory Accelerated Renewable Buyers program, which effectively encourages large utility customers to invest in solar and wind projects, to include battery storage. (Implemented)

The General Assembly may wish to consider requiring utilities to establish demand response programs for large data center customers and requiring that these customers participate in those programs. (Not implemented)

Policy option

The General Assembly could consider requiring that, as a condition of receiving the sales tax exemption, data center companies meet and certify to an energy management standard. (Not implemented)

Virginia's sales tax exemption for data centers is discussed in more detail in the JLARC report (Chapter 7)

Finding

Data centers are currently paying full cost of service, but growing energy demand is likely to increase costs for other customers.

Growing data center energy demand is likely to increase costs, including for other customers

- Generation and transmission costs could increase \$10B to \$18B by 2040, mostly because of data center demand
- Portion of “fixed costs” associated with new infrastructure would be billed to non-data center customers
- Energy supply may not keep pace with growing demand, so energy prices would increase for all customers
- Utilities would need to purchase more power from market and could be more susceptible to spikes in market prices

Cost increases are for the unconstrained and half of unconstrained demand scenarios, assuming that Virginia Clean Economy Act (VCEA) renewable requirements are met.

Utilities, under state regulator (SCC), could help insulate customers from systemwide cost increases

- Utility rates not designed to account for rapid cost increases to serve small number of very large customers
- Utilities could help insulate non-data center customers by
 - Creating separate data center customer class (Implemented)
 - Adopting new cost allocation methods
 - Adjusting rates more frequently
- Utility cost allocation and rate design are highly technical; practicality & legality of changes require detailed analysis
- Utilities and SCC have authority and expertise needed to address

SCC = Virginia State Corporation Commission regulates state electric utilities, equivalent to OEB

Finding

Data center growth creates additional financial risks to utilities and their customers.

Data center growth creates additional financial risks to utilities due to sheer scale of energy use

- Data center demand could drive infrastructure to be overbuilt, stranding costs with existing customers
- Data centers pose particular risks to Virginia's smaller electric distribution utilities ("co-ops")
 - Could account for 80 percent or more of energy sales for some co-ops by 2030
 - Delayed or disputed payments from a single large customer could create substantial financial liabilities
- Data center company participation in retail choice (energy shopping) program could shift costs to other customers

Electric cooperatives (co-ops) are not-for-profit electric utilities.

Recommendation

The General Assembly may wish to consider directing Dominion Energy to develop a plan for addressing the risk of generation and transmission infrastructure costs being stranded with existing customers and file it with the SCC.
(Not implemented)

Dominion Energy is Virginia's largest electric utility and is responsible for providing generation and transmission to much of the state, including areas where most of the state's data center industry is concentrated.

Policy options

The General Assembly could consider amending the Code of Virginia to allow electric cooperatives to create for-profit subsidiary companies to provide energy services to customers with load capacity of over 90 MW.

(Implemented)

The General Assembly could consider amending the Code of Virginia to require that electric utilities establish caps on participation in retail choice, and that such caps be approved by the SCC. (Not implemented)

Questions?

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