

# Summary of the December 2024 JLARC Report: Data Centers in Virginia

Office of Sustainability

December 2024



# Objective

Provide background, purpose, and key recommendations of the JLARC Report in order to prepare for further in-depth discussions.

# Agenda

1. Background & Purpose
2. Report Contents & Recommendations
3. Ongoing Points of Discussion
4. Sustainability's Key Takeaways

Commonwealth of Virginia  
December 9, 2024

Report to the Governor and the General Assembly of Virginia

## Data Centers in Virginia

2024



**COMMISSION DRAFT**

**JLARC**  
JOINT LEGISLATIVE AUDIT  
AND REVIEW COMMISSION



## Background

- Dec. 11, 2023: The Joint Legislative Audit and Review Commission (JLARC) directed its staff to review the impacts of the data center industry in Virginia.
- Feb. 2024: Data center legislation shelved until this report was completed
  - SB191: Data Center Demand Cost Allocation
  - HB910: Data Center Energy Usage
  - SB284 / SB285: Siting of Data Centers
- Dec. 9, 2024: Report Published
  - Report PDF: <https://jlarc.virginia.gov/pdfs/reports/Rpt598-2.pdf>
  - JLARC's Presentation Summary: <https://jlarc.virginia.gov/pdfs/presentations/Rpt598Pres-1.pdf>
  - Report Webpage: <https://jlarc.virginia.gov/landing-2024-data-centers-in-virginia.asp>

## Purpose Set by the Study Resolution (Appendix A)

- Assess the data center industry's impact on:
  - State and local revenue
  - Virginia's energy demand and supply
  - Natural, historic, and cultural resources
  - Residents
- Forecast future growth of the industry in Virginia and determine
  - How any economic benefits could be more widely distributed
  - If Virginia's data center tax exemption could be improved

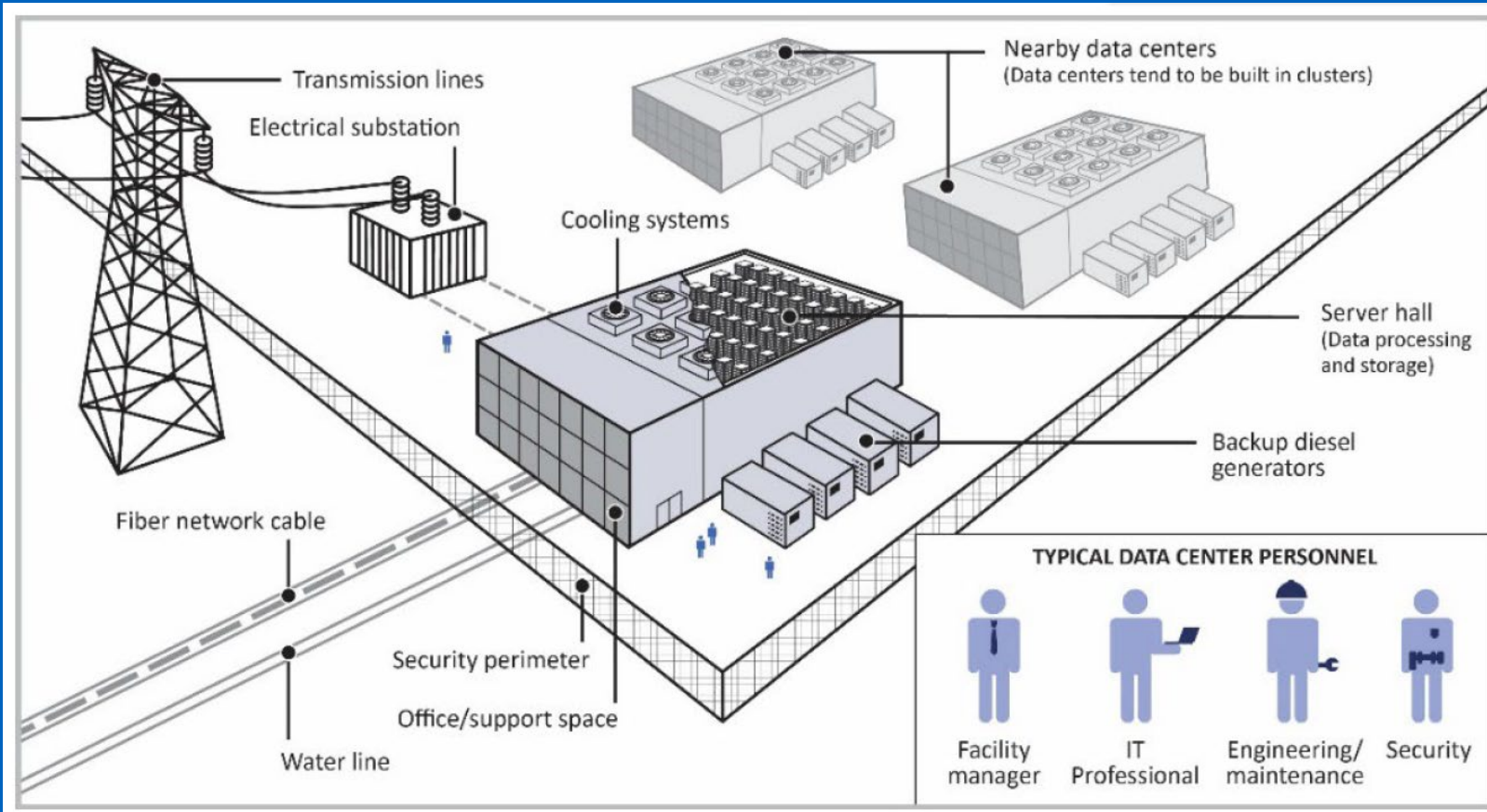


# Chapters

1. Overview of the Data Center Industry
2. Economic and Fiscal Impacts – *Extending benefits to economically distressed areas in VA*
3. Energy Impacts – *Infrastructure, Reliability, and Energy Efficiency*
4. Energy Costs – *Cost Allocation/Protecting Non-Data Center Rate Payers and Retail Choice*
5. Natural and Historic Resource Impacts – *Onsite generator emissions, water use, and viewshed*
6. Local Residential Impacts – *Planning recommendations for localities and noise impacts*
7. Potential Changes to Data Center Sales Tax Exemption to Address Policy Concerns



# 1. Overview of the Data Center Industry



- VA has > 63 Million sf of data center space on 7,200 acres  
  - Pocahontas State Park = 7,600 acres
- ~ 5,050 MW Power Use  
  - = 2 million VA households
- Data center industry still growing in established markets, but development starting to spread into new areas, such as along I-95

Figure 1-1 in Report

## Chapter 2 – 7 Recommendation Framework

- Identifies *findings* which are addressed by either *recommendations* or *policy options*
- **Recommendations**
  - Evidence suggests these are the best proposed actions to address the finding
  - All recommendations can be implemented simultaneously
  - Some of the recommendations are *legislative* or *executive actions*
  - 8 Recommendations
- **Policy Options**
  - There are multiple ways in which a report finding could be addressed and there is insufficient evidence of a single best way to address the finding (some are mutually exclusive)
  - Addressing the relevant finding could be beneficial, but not necessarily needed
  - The action proposed is a policy judgment best made by the General Assembly or other elected officials
  - 10 Policy Options

# The sales tax exemption, which has attracted large-scale data centers to VA, is the main policy lever for addressing data center concerns

- Established in 2010
- Qualifying data centers and tenants can purchase computers and other equipment without paying sales tax
  - 50 new jobs
  - Pay at least 150% of the locality's prevailing annual average wage
  - \$150 million in capital investment
- Exemption considered valuable by the industry
  - Provided \$928.6M savings in FY23 (by far Virginia's largest economic development incentive)
  - Used by 90% of industry (as measured in MW of power)
  - Industry indicates exemption is a key factor in location and expansion decisions

## 2. Economic and Fiscal Impacts

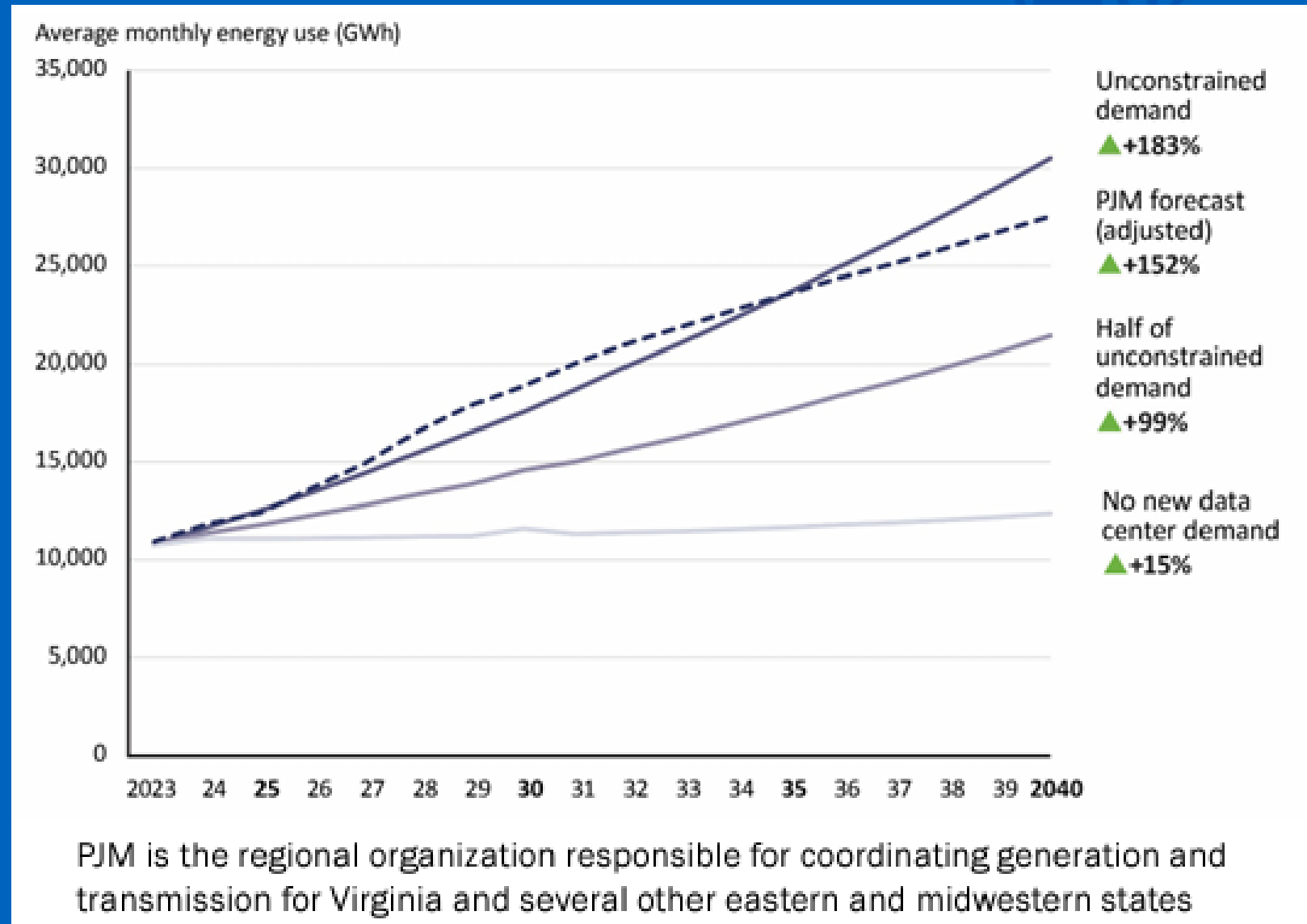
- **Findings:**
  - Data centers provide economic benefits, mostly during their initial construction.
  - Data centers can generate substantial local tax revenues for localities that have them.
    - Loudoun \$733M (31%), Prince William \$110M (7%)
  - Localities in economically distressed areas could have difficulty attracting the industry (need access to transmission lines, large/flat areas, close to customers [AI workloads are exception])
    - Localities are more attractive if they have “shovel-ready” industrial sites.
    - *Virginia Business Ready Sites Program* provides grants for site development.
- **Recommendation 1:** The Virginia Economic Development Partnership should clarify in site characterization and development guidelines that potential data center sites are eligible for grants under the *Virginia Business Ready Sites Program*.

# 3. Energy Impacts



# Two Build Out Rate Scenarios

- **Scenario 1: Unconstrained Demand**
  - Shows what demand would be before accounting for constraints like the ability to build enough energy infrastructure to meet demand
- **Scenario 2: Half Unconstrained Demand**
- Compared to infrastructure needed if there was no new data center demand



# Finding: Building enough infrastructure to meet growing data center demand will be difficult.

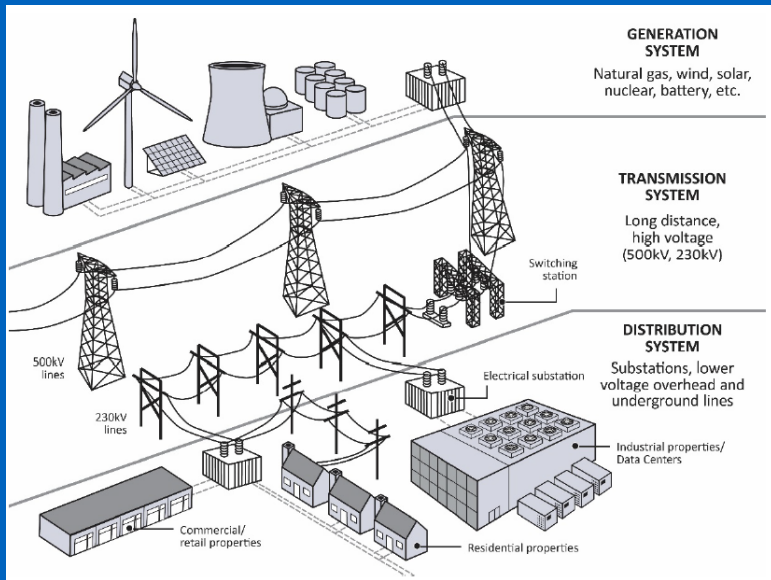


Figure 3-1 in Report

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%

*Report isolates how much of build out is driven solely by data centers*

Table 3-1 in report

		Change from 2025 to 2040					
		Scenario 1: Unconstrained demand		Scenario 2: Half unconstrained demand			
		No VCEA	VCEA	No VCEA	VCEA		
<b>Generation resources (in-state)</b>	Current system	36,000 MW capacity	Net increase	+54,100 MW	+56,300 MW	+31,200 MW	+34,700 MW
			<i>Data center share</i>	+35,600	+34,300	+12,800	+12,700
<b>Transmission (interzonal)</b>	Current system	8,700 MW capacity	Net increase	+3,500 MW	+3,500 MW	+3,100 MW	+3,100 MW
			<i>Data center share</i>	+3,500	+3,500	+3,100	+3,100
<b>Imported energy (net)</b>	Current system	38 TWh annual energy <sup>a</sup>	Net increase	+62 TWh	+73 TWh	+24 TWh	+24 TWh
			<i>Data center share</i>	+79 <sup>b</sup>	+92 <sup>b</sup>	+47 <sup>b</sup>	+43 <sup>b</sup>

# Breakdown of generation and transmission capacity needed to be added (2025 to 2040)

- Scenario 1: Unconstrained Demand**

- Solar added at 2x rate in 2024
- Large natural gas plant added every ~1.5 years
- Wind capacity exceeding all secured offshore capabilities
- New nuclear plants using technologies not yet proven viable

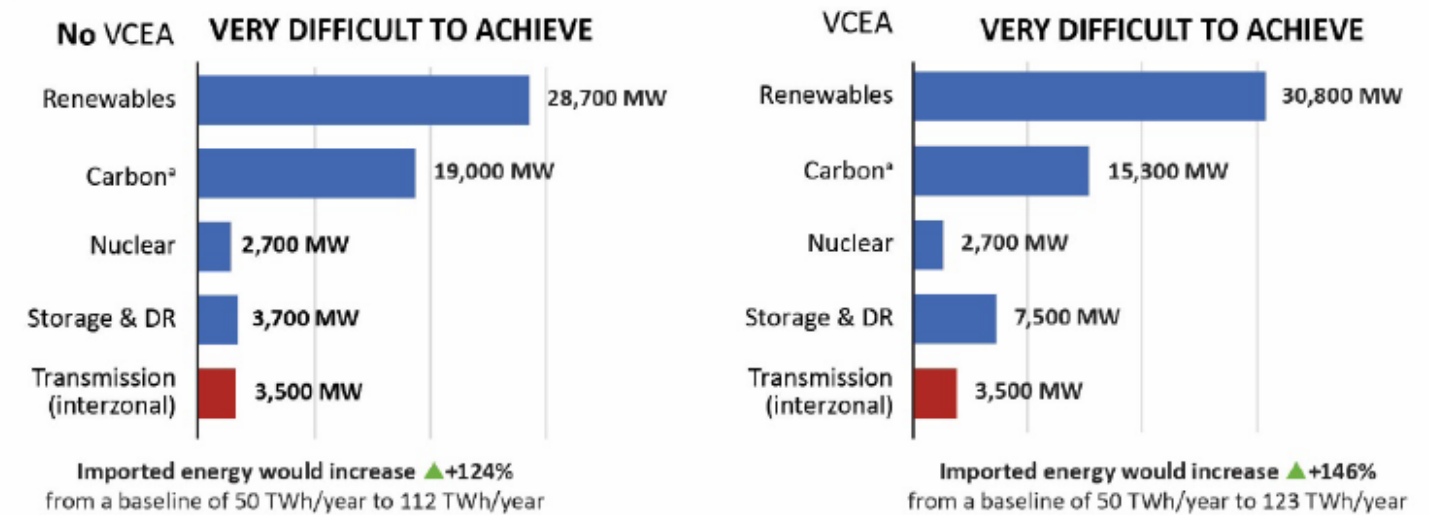
- Scenario 2: Half Unconstrained Demand**

- Less new solar and natural gas, similar wind and nuclear

- Both scenarios - many new transmission lines and new gas pipeline capacity

## SCENARIO 1: UNCONSTRAINED DEMAND

Capacity added 2025 to 2040



## SCENARIO 2: HALF OF UNCONSTRAINED DEMAND

Capacity added 2025 to 2040

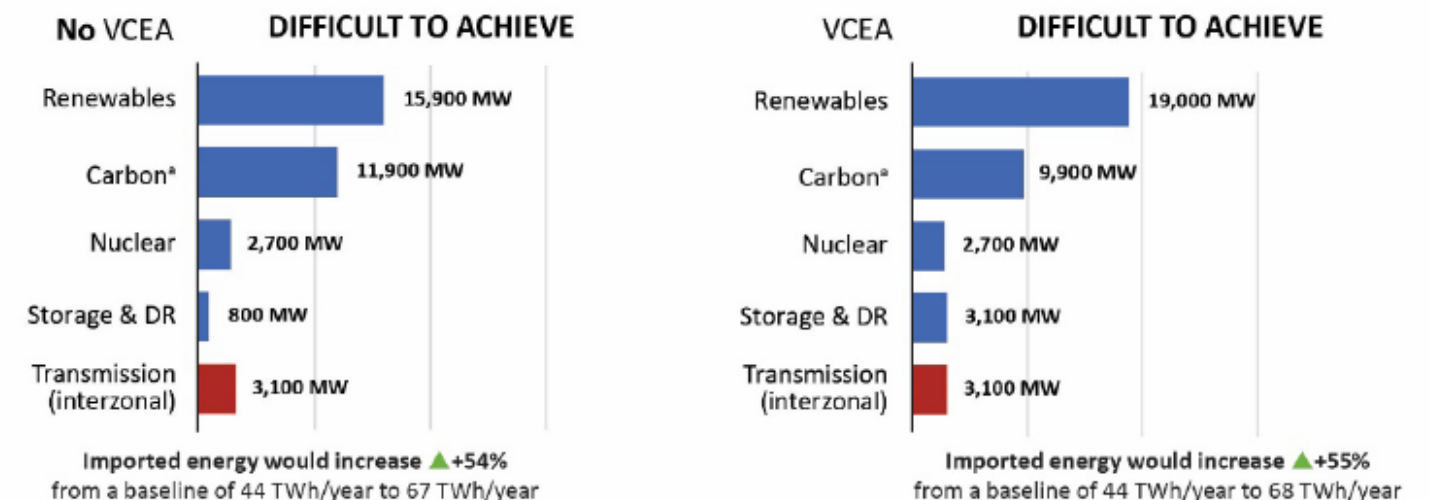


Figure 3-4 in report (VCEA = Virginia Clean Economy Act)



### 3. Energy Impacts: Ensuring Reliability

- **Findings:**
  - Demand growth raises concerns about system capacity and reliability, but existing utility requirements and processes limit risks.
    - Delaying addition of new data centers, as needed, would address risks
- **Recommendation 2:** Amend the Code of Virginia to clarify 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*.

### 3. Energy Impacts: Energy Efficiency

- **Findings:**
  - State could encourage or require data centers to take actions to help address their energy impacts (e.g., investing in renewables, improving PUE), but actions would have small effect on demand.
    - Energy saved from efficiency gains likely to be used to perform more computing activity.
    - “At the end of the day, a 200 MW data center is going to be a 200 MW data center.”
- **Recommendation 3:** Amend the Code of Virginia to expand the Accelerated Renewable Buyers program, which allows large customers of energy utilities to claim credit for purchases of solar and wind energy to offset certain utility charges, to include credit from battery energy storage systems.
- **Recommendation 4:** Amend the Code of Virginia to require that utilities establish a demand response program for large data center customers and to require that these customers participate in the program.
- **Policy Option 1:** Amend the Code of Virginia to require that, as a condition of receiving the sales tax exemption, data center companies meet and certify to an energy management standard, such as the International Organization for Standardization’s 50001 standard for energy management.

## 4. Energy Costs: Cost Allocation

- **Findings:**

- Data centers are currently paying full cost of service (current rates appropriately allocate costs to the customers responsible for incurring them), but growing energy demand is likely to increase costs for other customers.
  - Generation and transmission costs are either passed through to individual data center customers or allocated to customer classes that largely consist of data centers. Distribution costs are directly charged to data center customers or collected through contractually obligated minimum payments
  - **Example:** As data center demand grows, some transmission lines could be upgraded to higher voltages to meet demand. For example, an existing 115kV transmission line could be upgraded to a 230kV line. This can require distribution-side upgrades to all existing substations connecting to the high voltage line, including those that serve and are paid for by non-data center customers.
  - Utilities would need to import more power and could be more susceptible to spikes in energy market prices
- **Recommendation for Utilities:** Utilities could help insulate non-data center customers by
  - Creating a separate data center customer class
  - Adopting new cost allocation methods
  - Adjusting rates more frequently
- SCC is in best position to address and has scheduled a technical conference on cost concerns 12/16/2024

## 4. Energy Costs: Risk of Stranded Assets

- **Findings:**
  - Data center growth creates additional financial risks to utilities and their customers.
    - Data center demand could drive infrastructure to be overbuilt, stranding costs with existing customers
- **Recommendation 5:** Amend the Code of Virginia to direct *Dominion Energy to develop a plan for addressing the risk of generation and transmission infrastructure costs being stranded* with existing customers and file that plan with the State Corporation Commission as part of its biennial rate review filing or as a separate filing.

## 4. Energy Costs: Protecting Non-Data Center Co-Op Customers

- **Findings:**
  - Data centers pose particular risks to electric co-ops
    - Could account for 80% 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
    - Creating a for-profit subsidiary company to serve data center customers would ensure business continuity for the co-op if a data center did not pay its bills, only the subsidiary company would be affected. SCC has previously rejected this type of request because it did not believe it had the legal authority to allow it.
- **Policy Option 2:** Amend the Code of Virginia to allow electric **cooperatives to create for-profit subsidiary companies** that could fulfill their legal obligation to provide energy services (retail sales) to customers with load capacity of over 90 MW.

## 4. Energy Costs: Retail Choice

- **Findings:**
  - Data center company participation in retail choice program could shift generation costs to other customers
    - Large load customers, including most data centers can participate in retail choice (purchase energy through a provider of their choice). Small number of data centers currently participate in retail choice.
    - Utilities are required to build or secure enough generation to meet all customer demands. If a customer leaves the utility for retail choice, the fixed cost of any recently built generation is divided among the remaining customers.
    - Utilities also indicated that, because they are legally obligated to serve any customer in their territory as a provider of last resort, they must plan for the capacity needs of current and future customers
- **Policy Option 3:** The General Assembly could consider amending the Code of Virginia to require that electric utilities establish ***caps on participation in retail choice*** that protect ratepayers from undue costs, and that such caps be approved by the State Corporation Commission through a formal case process.

## 5. Natural and Historic Resource Impacts: Emergency Generators

- **Findings:**
  - Data center backup generators emit pollutants, but their use is minimal, and existing regulations largely curb adverse impacts.
    - Regulated by DEQ using state and national standards
    - Backup generators rarely run for prolonged periods
    - Backup generators <4% of regional nitrogen oxides emissions and 0.1% of carbon monoxide and particulate matter
    - A “worst-case” prolonged, large-scale regional outage could contribute to temporary air quality issues
    - DEQ launched study to monitor data center generator emissions in Northern Virginia
- **Policy Option 4:** Amend the Code of Virginia to require that, as a condition of receiving the data center sales and use tax exemption, all new data center developments in the Northern Virginia Ozone Nonattainment Area **use only Tier 4 generators**, Tier 2 generators with selective catalytic reduction systems, **or generators with equivalent or lower emission rates.**

## 5. Natural and Historic Resource Impacts: Water Use

- **Findings:**
  - Data center water use is currently sustainable, and state ensures future sustainability through regulation.
  - State regulates sustainability of water withdrawals, but some localities should consider local impacts
- **Recommendation 6:** Amend the Code of Virginia to *expressly authorize local governments* to (i) require proposed data center developments to *submit water use estimates* and (ii) *consider water use* when making rezoning and special use permit decisions related to data center development.
- **Policy Option 5:** Amend the Code of Virginia to require that, as a condition of receiving the sales and use tax exemption, data center companies *meet and certify to an environmental management standard*, such as the International Organization for Standardization's 14001 standard for Environmental Management Systems.



## 5. Natural and Historic Resource Impacts: Historic Resources

- **Findings:**
  - Data center impacts on historic resources are similar to other developments, but current protections could be strengthened
- **Policy Option 6:** Amend the Code of Virginia to require that, as a condition for receiving the sales and use tax exemption, data center companies conduct a ***Phase I historic resource study*** of a proposed development site, as well as a ***viewshed analysis*** when a proposed site is located within a certain distance of a registered historic site and report the study findings to the appropriate locality prior to development.

## 6. Local Residential Impacts: Local Planning and Zoning

- **Findings:**

- Growing number of data centers are being built close to residential areas, impacting nearby residents, and some localities have taken steps to minimize impacts.
  - Data centers are industrial facilities that are largely incompatible with residential uses
- Effectiveness of local efforts to minimize residential impacts ultimately depends on elected officials
- Nature of data center impacts does not appear to merit state intervention, and localities appear to be taking needed actions

- **Recommendation for Localities:** Localities should implement several practices to minimize residential impacts

- Classify data centers as industrial use
- Revise zoning maps to prevent by-right data centers next to residential
- Ensure sufficient minimum requirements for data center developments are sufficient (setbacks, building heights)
- Designate optimal locations for data center development (away from residential, close to transmission)
- Require pre-development sound modeling and revise ordinances to better prevent and address noise conflicts

# Data center planning and zoning changes since 2019 (Appendix L)

**Prince  
William**

**Additional standards required in data center overlay district (adopted 6/18/2019)**

- Created requirements for data centers in the data center overlay district, including for building façade and fence design, screening mechanical equipment and substations near residential areas and certain roads, and buffer yards of data centers near residential areas
- To encourage data center development in the overlay, increased density allowed by right within the overlay
- Adjusted borders of data center overlay on map

**Comprehensive review of data center overlay (initiated 3/2/2021)**

- Scope included zoning ordinance, comprehensive plan, and other formal county policies
- Products included reports by county's economic development office and two consultants regarding data center industry trends, appropriate land in Prince William, and recommended standards for development
- Process included public meetings and stakeholder interviews

**Data center ordinance advisory workgroup (created 2/28/2023)**

Responsible for continuing review of county's data center policies. Draft timeline includes Board of Supervisors vote on noise ordinance amendments in spring 2025 and vote on policy changes relevant to other topics later in 2025.

**Expanded noise ordinance applicability to data centers (adopted 2/28/2023)**

- Limited exemption for nighttime cooling systems to residential homes
- Originally planned to sunset in a year but extended to provide time to "assess the noise impacts associated with data centers"

## 6. Local Residential Impacts: Noise

- **Findings:**
  - In a few cases, noise from data centers has negatively affected nearby residents, and noise impacts can be difficult to resolve.
- **Recommendation 7:** Amend the Code of Virginia to **expressly authorize local governments to require sound modeling studies** for data center development projects prior to project approval.
- **Policy Option 7:** Amend the Code of Virginia to require that, as a condition for receiving the sales and use tax exemption, **data center companies conduct a sound modeling study prior to development** within a certain distance of a residential development/zone.
- **Recommendation 8:** Amend the Code of Virginia to **expressly authorize local governments to establish and enforce maximum allowable sound levels** for data center facilities, including (i) using alternative **low frequency noise metrics** and (ii) **setting noise rules and enforcement** mechanisms in their zoning ordinances, separate from existing noise ordinances.

## 7. Potential Changes to Data Center Sales Tax Exemption to Address Policy Concerns

- **Findings:**

- Exemption could be (1) extended to maintain data center growth and economic benefits, (2) allowed to expire to slow growth and reduce energy impacts, or (3) modified to balance these priorities.
  - Exemption could be changed to address policy concerns related to energy efficiency, natural and historic resources, and local residential impacts, but changes could make the exemption a less effective economic development tool.
- **Policy Option 8:** Amend the Code of Virginia to extend the expiration date for the state's sales and use tax exemption for data centers from 2035 to 2050.
- **Policy Option 9:** Allow the sales and use tax exemption for data centers to expire in 2035.
- **Policy Option 10:** Amend the Code of Virginia to extend a partial sales and use tax exemption for data centers from 2035 to 2050.
  - See also Policy Option 5 (environmental management standards), Policy Option 4 (lower emission generators), Policy Option 6 (Phase 1 historic resource and viewshed studies), and Policy Option 7 (sound modeling studies)



## December 10<sup>th</sup> Board Meeting

- Dominion - 60% data center growth is in cooperative territory
  - JLARC Agrees:
    - “a majority of projected data center growth (~60 percent) is expected to occur in co-op service territories.”
    - “Based on the half of unconstrained demand forecast, the industry could account for 80 percent or more of annual energy sales in three Virginia co-ops by 2030.”
  - NOVEC purchases generation from PJM and operates one power plant, owns their distribution, uses Dominion transmission
  - VCEA and Renewable Portfolio Standard (RPS) do not apply to co-ops; therefore, does not make as big of a difference as might be expected
- Dominion confirmed small module reactors (SMRs) would be needed to meet energy demand, but would not be operational until 2035; JLARC Report agrees new nuclear is needed.
- Dominion confirmed increasing operations at Possum Point (burning Natural Gas) instead of retiring the plant.
- Dominion stated it would be difficult for data centers to source enough natural gas from existing distribution lines to develop onsite natural gas plants for electricity production.

# December 10<sup>th</sup> Board Meeting

- Changes to Dominion's Rate Structure – Who pays for it?
  - Dominion and JLARC Disconnect: JLARC says data center pays for substation, whereas Dominion says it's socialized
  - JLARC
    - “Establishing a separate data center customer class is a first step utilities could take to help insulate residential and other customers from the energy cost impacts of the industry.”
    - “Utilities could obtain contractual agreements from data centers customers to provide minimum payments that ensure the costs of major generation and transmission buildouts are not stranded with other customers”
    - “Utilities could directly assign some or all costs of smaller projects, such as transmission line extensions, to the customers or customer class for whom the line is primarily being built to serve.”
  - Cost allocation addressed in 12/16/2024 SCC Technical Conference





## Sustainability's Key Takeaways

- Gap in addressing environmental and climate impacts from indirect emissions (new fossil generation needed to meet demand):
  - “Large natural gas plants would also need to be added at an equal or faster rate than the busiest build period for these facilities (2012 to 2018), depending on VCEA compliance.”
  - **Appendix F Energy Infrastructure Project Impacts and Regulation** focuses on community opposition to solar and transmission projects as well as possible grid enhancing technologies.
    - Does not incorporate Dominion’s IRP projections for new natural gas plants and non-retirement of existing fossil fuels.
- Deny vs. delay clarification
- Recommendation for localities to consider water use and impacts on a project basis
- Plan to track 2025/2026 legislation in response to JLARC Report