GHC A Catalyst for GROWTH & PROGRESS

Monthly Meeting October 2026

DATA CENTERS:
The Loudoun County Experience



FEATURED SPEAKER

Joe Kroboth

Deputy County Administrator

Loudoun County, Virginia

Long time Washington County resident and former EMS and Public Works Director for Washington County Gov't

October 30th, 2026, Regular Monthly Meeting

Please Welcome Today's Guest Speaker:



Joe Kroboth

Deputy County Administrator, Loudoun County, Virginia

Joe Kroboth, III, PE, PhD is Loudoun County's (VA) Deputy County Administrator where he oversees community development and public safety services. Prior to entering County Administration, he served as the Director of Transportation and Capital Infrastructure leading a capital transportation and public facilities program exceeding $1 Billion annually.

Before joining Loudoun County, Joe had career in Washington County, Maryland, serving as Deputy Chief Engineer, the county's first Director of Fire and Emergency Services, and ultimately Director of Public Works.

In addition to his professional accomplishments, Joe has a longstanding commitment to public service and community involvement. His background includes leadership in the volunteer fire service, where he served as Fire Chief of the Volunteer Fire Company of Halfway. He has also contributed his expertise to national initiatives focused on transportation safety and emergency responder protection.

Joe is a licensed Professional Engineer and holds a PhD, bringing a unique combination of technical expertise, executive leadership, and practical experience to his work.



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Welcome

GHC Monthly Meeting

October 2026



Tereance Moore

GHC Chair

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DATA CENTERS

THE LOUDOUN EXPERIENCE

October 30, 2026

Joe Kroboth, III, PE, PhD
Deputy County Administrator

BOTTOM LINE UP FRONT!

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- 233 DCs built or under construction
- DCs in Loudoun support 17,000 high income jobs
- Annual tax revenue $1.3 Billion (39%)
- Tax rate down $0.34 since 2016
- Land use laws in Va are much different than MD



From 2014 through present time, there has not been a single day when a data center was not under construction.

WHAT IS A DATA CENTER

Data Center Components:

- Building or group of buildings that house computer equipment – Essentially DCs are the internet
- Contain servers, data storage systems, and networking equipment to exchange data
- Facilitate everyday activities: emailing, online banking, video streaming, cloud computing, and A.I.
- Require reliable electricity, with back-up generation and BESS
- Highly secure facilities to protect the infrastructure and cyber security measures to protect the data



Types of data centers:

- Enterprise (Amazon Web Service, Verizon, Google, Meta, Oracle)
- Co-location (Space rented to users)
- Cloud Hyperscale/A.I. Learning (A.I. Learning DCs and Cloud service providers)

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PUBLIC ISSUE

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When a data center topic is on the Board's agenda, the room is full.



… and the Board's overflow room is full.

President Donald J. Trump

"My administration has inaugurated a golden age for American manufacturing and technological dominance, We will pursue bold, large-scale industrial plans to vault the United States further into the lead on critical manufacturing processes and technologies that are essential to national security, economic prosperity, and scientific leadership. These plans include A.I. data centers and infrastructure that powers them, including high-voltage transmission lines and other equipment. It will be a priority of my Administration to facilitate the rapid and efficient buildout of this infrastructure by easing Federal regulatory burdens."

President Joe Biden

"The United States must not be surpassed in its support for the development, commercialization, and operation of clean energy technologies at home and abroad, and the rapid buildout of AI infrastructure offers another vital opportunity to accelerate and deploy these energy technologies. To help ensure that new data center electricity demand does not take clean power away from other end users, result in resource adequacy issues, or increase grid emissions, the construction of AI infrastructure must be matched with new, clean electricity generation resources."

PRESIDENTIAL DIRECTIVES

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Year	Events
1988	Rt. 28 Improvement District created – Land Rights Protected by State Code
1996-98	America Online & MAE-East site operations in Loudoun & bring the fiber network
2000	Zoning Administrator declares DCs as similar to office buildings from a land use and zoning perspective
2007-08	Housing crash = loss of property tax revenue, Loudoun acts to diversify its tax base by attracting DCs as an emerging opportunity
2014	ZO amendment, definition for a DC enters Loudoun Zoning Ordinance
2016	Loudoun attains designation as the largest concentration of DCs in the world
2023	Board adopts new ZO strengthening land use regulations on DC development
2024	Board directs updates to regulations & standards for DCs & substations
2025	Board ends “by-right” development, all DCs require special exception approval
2026	Board debating an “Approval Pause” – deferred until November 2026

LOUDOUN’S TIMELINE

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DATA CENTER ALLEY
ASHBURN, VA

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SITING FOR A DC

- Remember: a DC is a type of land use
- Is your community ready for DCs?
  - Review and modify your comprehensive plan to meet the public's expectations
  - Review and modify your zoning ordinance to regulate land development
- Where you allow DCs is critical
  - Enhanced buffering, screening, Viewsheds
  - Separation (setbacks)
- Orientation of the building is important (Mechanical Equipment)
- Proximity to public utility infrastructure

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LAND VALUES

- Land is a limited resource
- Land available for DC development in Loudoun is particularly in limited availability (Built-out)
- Land values where DCs are permitted by zoning are currently valued at $6 million per acre
- Multiple land value studies have found land values have not declined due to DCs or transmission lines.
- Studies have found residential land values are increasing – no negative effect from DCs
- DC companies are offering to properties in developed communities to demo homes and build DCs.

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NOISE

- Greatest frequency complaint = Noise
- Noise starts with construction activity
  - Regulate noise levels and time of day activity in your zoning ordinances
- Mechanical equipment (air handling, cooling)
- High & Low-frequency hums and vibrations
- Loudoun's regulation limits allowable noise levels to 55 dBs, many DCs operate between 49 to 53 dB, just under the allowable limit
- Emission of tonal vibrations (consistent sound)
- Back-up power generation
- Establish separation requirements between DCs and residential development: Loudoun uses 500 ft, some recommend upwards of 1 mile



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Vantage 2 Data Center, Ashburn, VA - Natural gas generators



WATER

- 75-95% of DCs use evaporative water-cooled systems for cooling
- Water usage estimates are a function of electric power use, not building square footage
  - Highly Efficient cooling: 0.1 to 0.4 L/kwh
  - Traditional water-based cooling: 1.8 to 1.9 L/kwh
- New development DCs will strive to operate as efficiently as possible given global market competition – Use lower value numbers

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Estimate of Data Center Water Usage per Day				
	Highly Efficient Cooling Systems		Traditional Water-Based Cooling System	
Power	Low Estimate [GPD]	High Estimate [GPD]	Low Estimate [GPD]	High Estimate [GPD]
50 MW	31,680	126,720	126,700	601,920
100 MW	63,360	253,440	1,203,840	1,203,804
300 MW	190,080	760,320	3,611,520	3,611,520

Note: Rate of water usage is a function of electric power consumption. Source: Nona Technologies - https://www.nona-technologies.com/blog/data-center-water-consumption



DESIGN STANDARDS

- Recall: DCs are like an office building
- Don’t allow buildings that look like a prison
- Loudoun requires:
  - Differentiated surfaces along the principal façade
  - Changes in color and texture
  - Fenestration across 30% of principal façade
  - Mechanical equipment positioning
  - Partial or full visual screening of mechanical equipment
  - Main entrance feature provided
  - Noise mitigation
  - Landscaping, buffering and berm requirements

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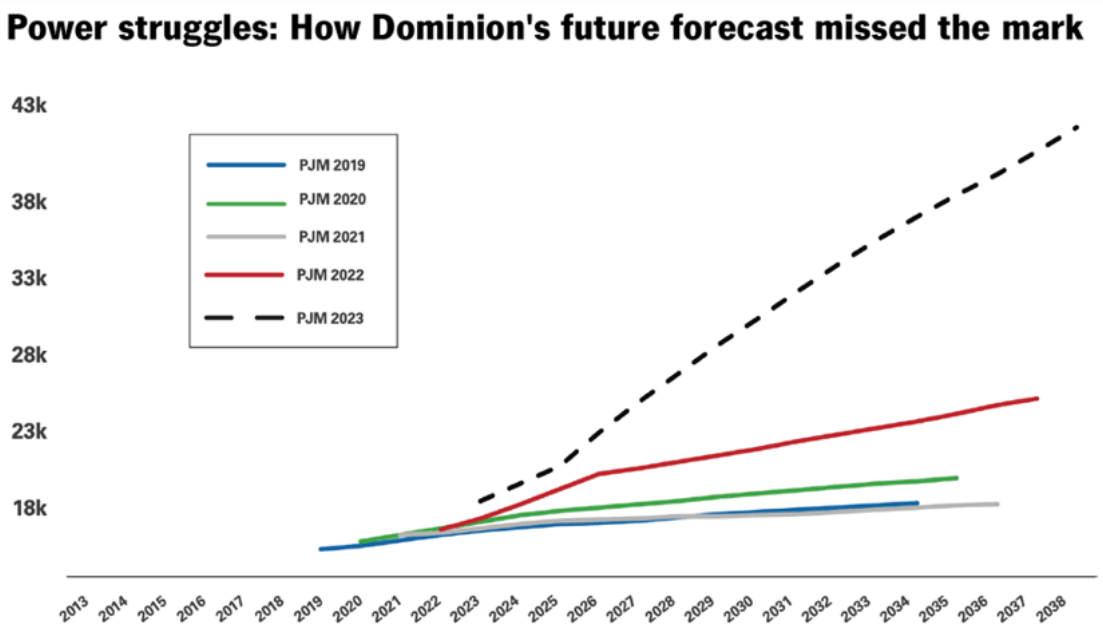
BUILDING STANDARDS & LANDSCAPING BRING ATTRACTIVE DEVELOPMENT

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ELECTRICAL INFRASTRUCTURE

- DC power demand is approximately 300 to 1,000 watts/SF, (1 MSF = 300 MW to 1 GW)
- Loudoun's DCs demand 25 GW, more than the next three largest DC sites in the world (London, Atlanta, and Dallas all combined) and expected to grow to 70 GW by 2031
- Loudoun's electric grid was built anticipating suburban residential development
- Sept 2022 Dominion Energy issued a warning to the DC development community – service delivery will be delayed by 3 to 7 years
- Electric grid expansion has been underway ever since, triggering a nationwide outcry

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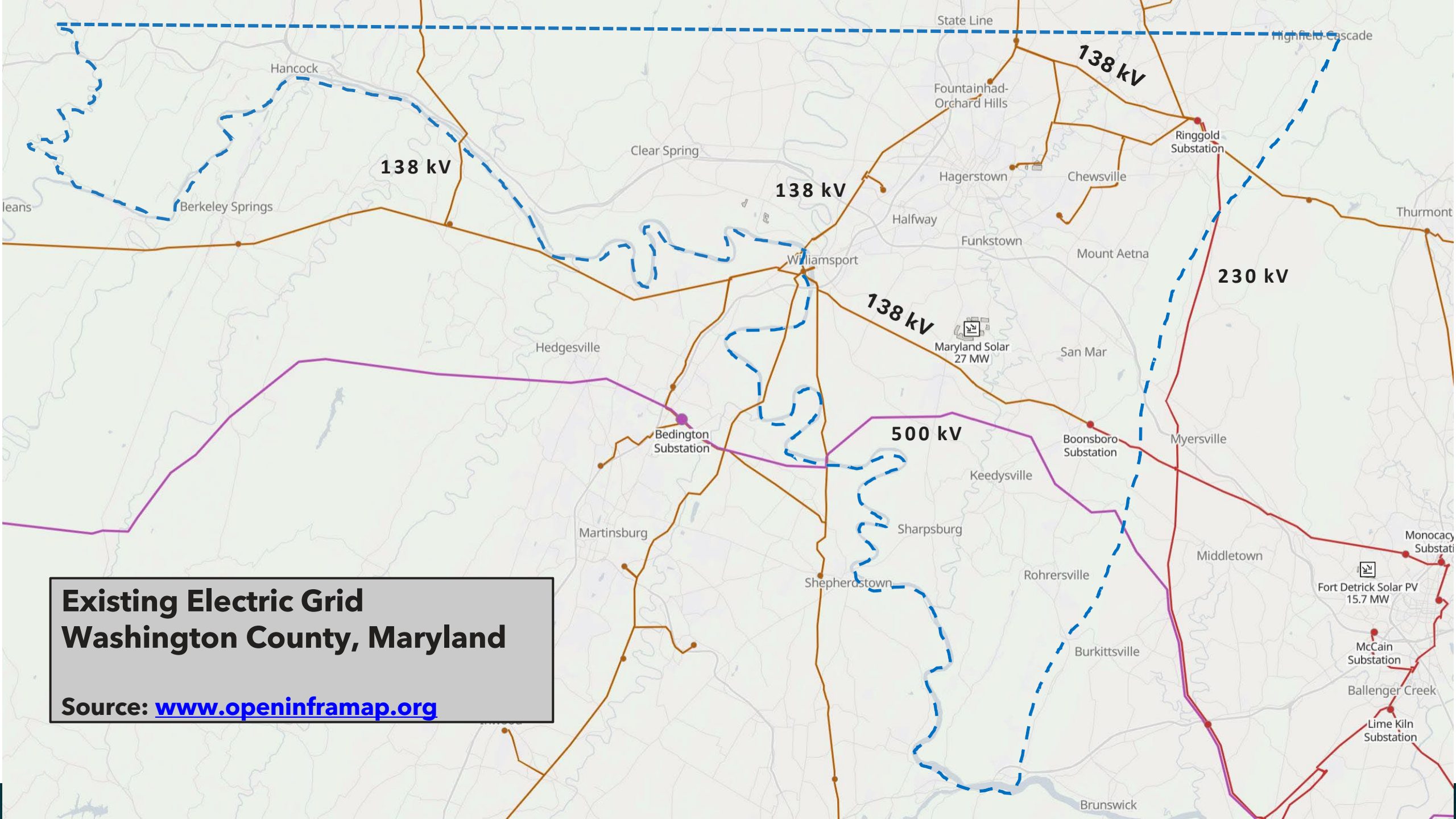
ELECTRICAL INFRASTRUCTURE

- Land near existing power transmission will be the most desirable locations for DC development
- What you should expect:
  - If a DC is to be built, anticipate a transmission line will be needed to serve it and a new utility substation will also be required
- It is the proliferation of transmission lines that has tipped the scale on the industry:
  - People dislike DCs - because DCs require transmission lines to be brought to their front door
  - In Loudoun, no where else to go but through neighbourhoods = Public outcry!

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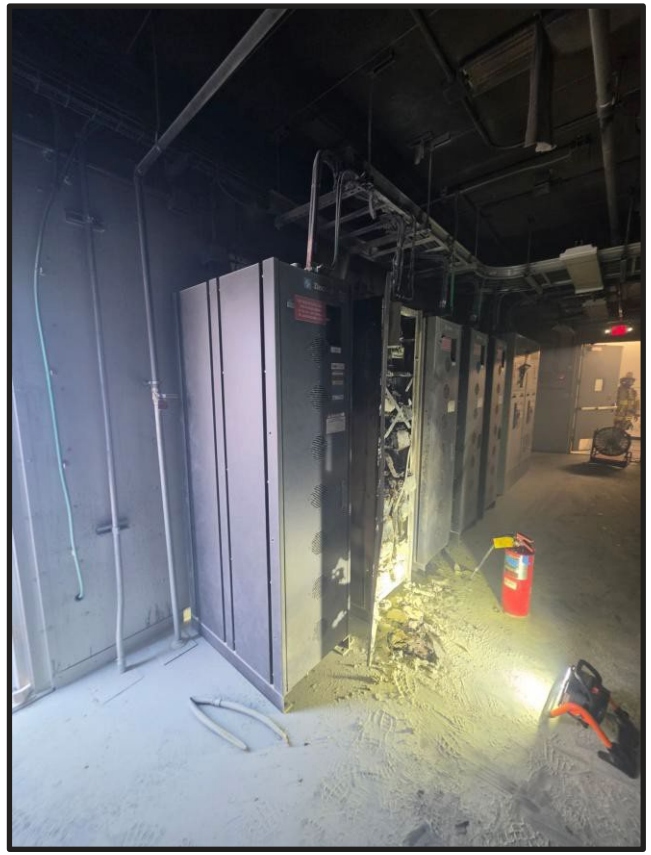


Existing Electric Grid
Washington County, Maryland

Source: www.openinframap.org

PUBLIC SAFETY

- Specialized training is essential
- DCs are highly secure requiring close coordination with operators and security staff
- Cannot treat a DC like a traditional structure fire
  - Highly complex floor plans, layers of security
  - High value equipment reacts poorly with water
  - Difficult to ventilate
  - Expansive use of lithium-Ion batteries
- Non-water-based specialized extinguishing systems are used that create limited oxygen zones during activation
- Typical fire response includes
  - Automatic fire alarms
  - Alarm malfunctions
  - Electrical fires



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"Responding to a DC fire requires a completely different approach than a typical structure fire."

Deputy Chief Jasen Dodson

Loudoun County Fire-Rescue

REVENUE IMPACTS

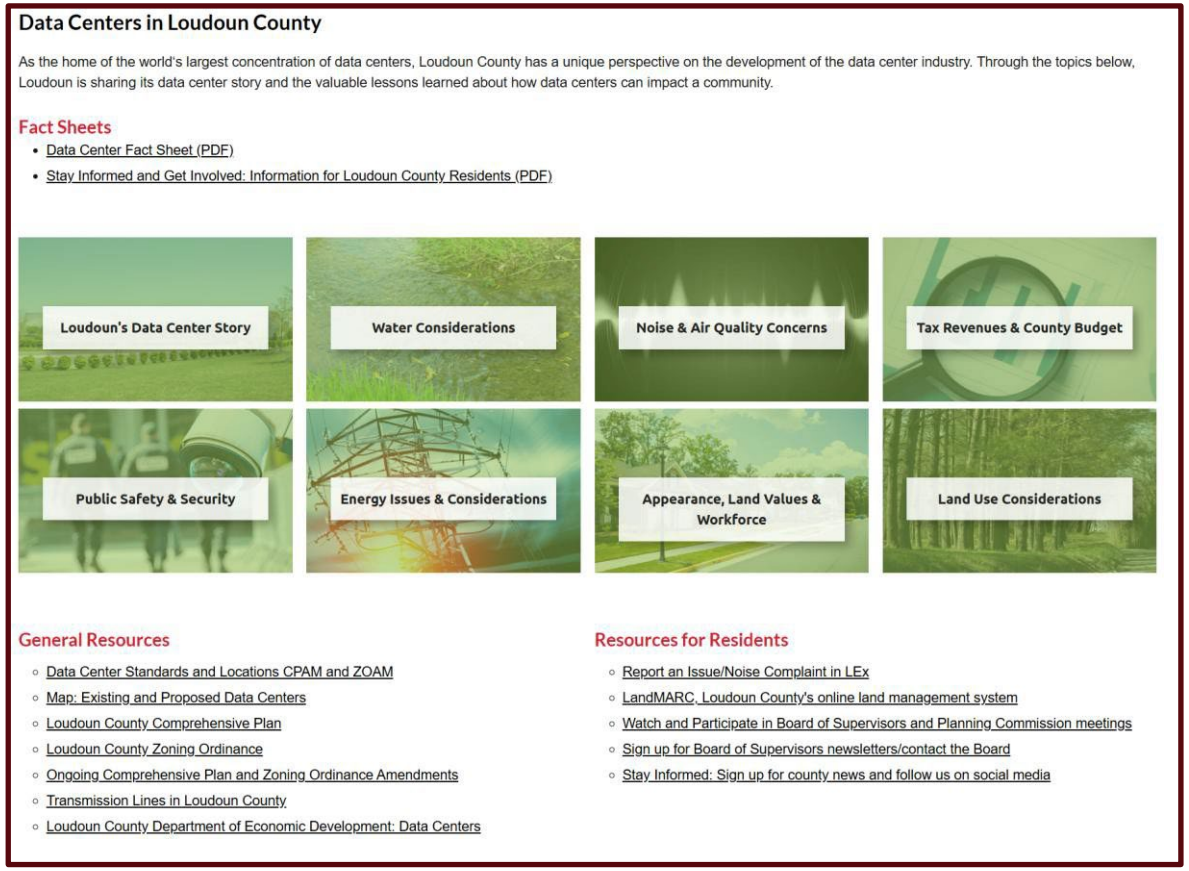
- Top 10 taxpaying corporations in Loudoun are data centers, each paying an average $1.9 million annually
- For every $1 in services that Loudoun provides to DCs, the county receives $26 in revenue
- For every job inside the data center, there are between 4-6 employees outside the data center who support the DC operation.
- Since 2008, largely attributable to the growth in DC revenues, the county's tax rate has dropped by over 1/3 from $1.21 to $0.805 per $100 in assessed value ($0.405 reduction); $0.34 per 100 in past decade.

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Tax Year	Real Property Tax Rate	Personal Property Tax Rate	Vehicle Personal Property Tax Rate
2017	1.125	4.200	4.200
2018	1.085	4.200	4.200
2019	1.045	4.200	4.200
2020	1.035	4.200	4.200
2021	0.980	4.200	4.200
2022	0.890	4.200	4.200
2023	0.875	4.150	4.150
2024	0.865	4.150	4.150
2025	0.805	4.150	4.150
2026	0.805	4.150	3.090

RESOURCES

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Data Centers in Loudoun County

As the home of the world's largest concentration of data centers, Loudoun County has a unique perspective on the development of the data center industry. Through the topics below, Loudoun is sharing its data center story and the valuable lessons learned about how data centers can impact a community.

Fact Sheets

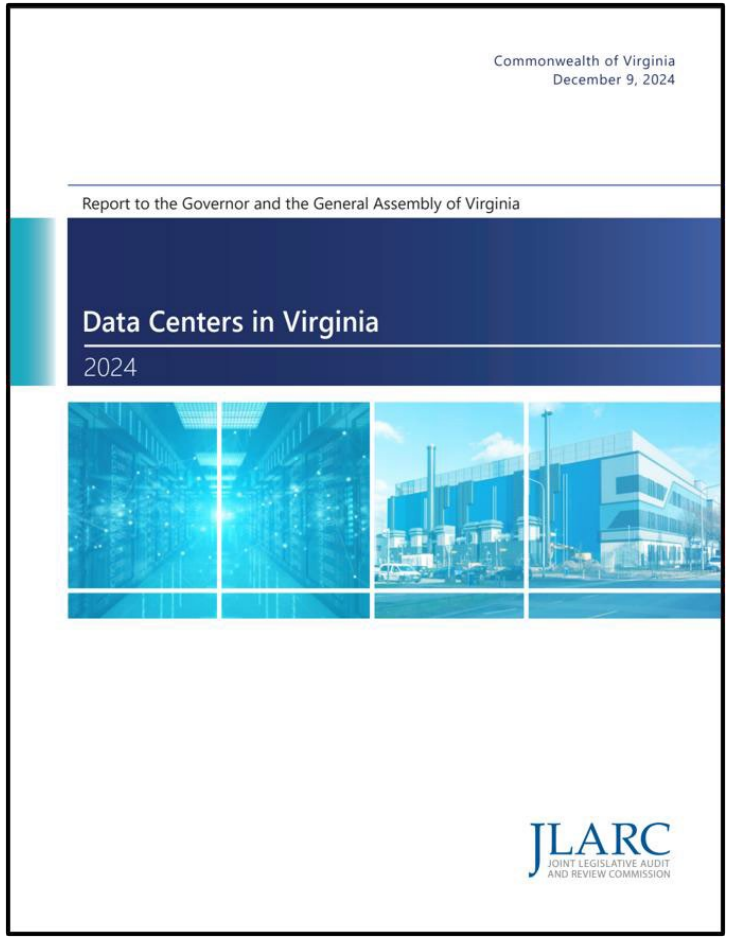
- Data Center Fact Sheet (PDF)
- Stay Informed and Get Involved: Information for Loudoun County Residents (PDF)

General Resources

- Data Center Standards and Locations CPAM and ZOAM
- Map: Existing and Proposed Data Centers
- Loudoun County Comprehensive Plan
- Loudoun County Zoning Ordinance
- Ongoing Comprehensive Plan and Zoning Ordinance Amendments
- Transmission Lines in Loudoun County
- Loudoun County Department of Economic Development: Data Centers

Resources for Residents

- Report an Issue/Noise Complaint in LEx
- LandMARC, Loudoun County's online land management system
- Watch and Participate in Board of Supervisors and Planning Commission meetings
- Sign up for Board of Supervisors newsletters/contact the Board
- Stay Informed: Sign up for county news and follow us on social media



SOURCE: WWW.LOUDOUN.GOV/DATACENTERS

Making the Distinction Between a Traditional "Data Center" and "A.I. Data Center

Comments from GHC Member Dave Lehr (Meritus) staff wanted to share

In the article attached, there are 10 points. All except two points (#3 and #9) are just **old-fashioned "data centers" -** Meaning a room the size of the Chamber office drawing less than one megawatt of power. We've had these for decades. There are surely dozens of them in Washington county today, including one at the Hospital. It could be misleading to confuse these with the new **AI data centers** that want to build here.

The "AI data centers" are another thing entirely. The one that is planned in Berkley County is 600MW. The average power draw for the entire city of Baltimore is 697 MW. So, the single A.I. data center is going to draw almost the same amount of energy as the entire city of Baltimore. In one building. Of course, that is why they now often require onsite electric generation to create your own power.

Meritus also does onsite generation with 2 CHP generators*, each the size of a tractor trailer. Combined, these two tractor trailers generate 2.2 MW of power. To get to 600MW, we're talking another beast entirely. *(See picture below.)*



Now this can be positive for power rates assuming they stay connected to the grid. The loads on AI data centers can swing pretty wildly, meaning that the power plant will have more capacity than the average load, and they can be a net exporter of power, bringing power rates down. But the knee-jerk reaction to datacenters is to tell them they must be 100% behind the meter, neither importing nor exporting. This causes expensive engineering problems for them and also removes a potential benefit for the community.

Water is another issue if the data center uses a cooling tower vs the more water friendly closed-loop systems. In our county, with our water infrastructure, closed-loop would be necessary due to capacity and we should insist on it.

Data centers may be good for our county if done right: high positive impact on tax base, minimal impact on water, and positive impact on power. But it's important we do not confuse a database server rack with an AI hyperscaler as we sort through the information and consider land use and economic development policy.

***CHP Generator -** A **Combined Heat and Power (CHP)** system—also called **cogeneration**—simultaneously generates electricity and captures useful heat from a single fuel source.

How It Works (Versatile Thermal Output)

- **Electricity Generation:** The system burns a fuel (often natural gas, but could be hydrogen, or biogas) to power a generator, providing a highly reliable source of continuous, on-site electricity.
- **Heat Recovery:** Traditional power plants waste up to two-thirds of their energy as heat. A CHP system captures this exhaust heat through a heat exchanger.
- **Flexible Facility Utilization:** This captured heat is adapted to match the specific needs of the building:
  - **Data Centers (Cooling):** Funneled into an absorption chiller to produce chilled water for server racks.
  - **Hospitals & Commercial Buildings (HVAC/Sanitation):** Redirected to power space heating, central climate control (HVAC), laundry, hot water, and equipment sterilization. [1]

How It Acts as Backup Power

- **Continuous Active Operation:** Unlike traditional emergency diesel generators that sit idle until a blackout occurs, CHP systems run continuously. This eliminates cold-start delay or failure risks. [1]
- **Indefinite "Island Mode" Runtime:** During a grid outage, a CHP system instantly enters "island mode". Because many systems are fueled by underground natural gas pipelines rather than finite on-site diesel tanks, they can provide uninterrupted power indefinitely through severe weather. [1]

Financial Payback Periods

The time to recover the initial investment depends heavily on local utility rates and how consistently the facility reuses the captured heat:

- **Hospitals (Typical Payback: 3 to 8 Years):** Hospitals operate 24/7/365 and have a high, unyielding demand for *both* electricity and hot water/steam. They achieve consistent cost reductions that lead to a predictable, steady return on investment. [1, 2, 3]
- **Data Centers (Typical Payback: 2 to 5 Years):** Data centers often see a faster payback. This is because cooling servers represents a data center's largest recurring operational expense. Converting waste heat directly into cooling ("trigeneration") drastically offsets massive electrical chiller bills, cutting ongoing utility costs immediately. [1, 2]

Key Benefits

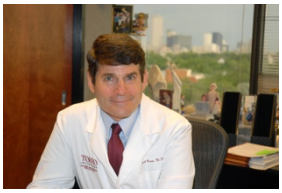
- **Massive Efficiency:** Elevates overall energy efficiency from roughly 50% up to **65%–90% total efficiency** by utilizing waste heat.
- **Enhanced Resilience:** Secures uninterrupted uptime for critical infrastructure to prevent power or climate control failure
- **Lower Operating Costs:** Drastically reduces utility bills by generating two utility products (power and thermal energy) from a single fuel source.
- **Reduced Emissions:** Cutting total fuel consumption significantly lowers the facility's carbon footprint and greenhouse gas emissions. [1, 2]

Data centers' impact on American health care

Blog|**Articles**|October 23, 2026

Author(s)Neil Baum, MD Fact checked by: Keith A. Reynolds

Neil Baum, MD, weighs the 10 benefits and eight risks data centers bring to physicians as the facilities spread across rural America.



When we listen to the news, we are inundated with stories about the impact of data centers on the economy, the environment and the potential vulnerability of losing patients' health care data. Data centers are becoming a critical, but often overlooked, part of American health care. They are the infrastructure behind electronic health records, medical imaging, telemedicine, patient portals, billing systems, genomic databases and increasingly, artificial intelligence. The issue is not whether health care needs data centers, because we currently depend on them. The key issue physicians must address is how to gain the benefits while managing the considerable costs and risks of data centers popping up in rural America. In this article, I will explore the benefits and risks of data centers and their impact on American health care.

Benefits of data centers for health care

1. Greater access to data. Data centers allow physicians to quickly view a patient's medical records, imaging studies, medications, laboratory results and other important information from any location. This immediate access can help physicians make faster and better-informed decisions.

2. Better continuity of care. Data centers allow important medical information to follow patients as they move between hospitals, specialists, emergency departments, primary care practices and other health care settings. When information is readily available, clinicians are less likely to make decisions based on incomplete or outdated information.

3. AI becomes possible at scale. Modern artificial intelligence requires enormous amounts of computing power and data storage. Data centers provide the infrastructure needed for generative AI, ambient AI scribes, predictive analytics, radiology AI and clinical decision-support systems to operate at scale.

4. Telemedicine. Data centers provide the infrastructure that supports virtual visits, remote patient monitoring and the transmission of medical images, laboratory results and physiologic data available from wearables. As health care moves beyond traditional brick-and-mortar exam rooms, reliable data infrastructure becomes essential.

5. Population health. Large health care datasets allow physicians, hospitals, academic institutions or medical organizations to identify trends and patterns that may not be apparent when looking at individual patients. Health care organizations can use these data to identify high-risk patients, predict readmissions, recognize medication-related problems, monitor outcomes, monitor epidemics in real time and identify disparities in care.

6. Research. Data centers allow researchers to analyze enormous datasets, including millions of medical records and large genomic databases. This computing capacity can dramatically accelerate research that once required years of analysis using traditional computing methods.

7. Disaster recovery. I have experienced firsthand the impact of Hurricane Katrina, which destroyed patient records and made follow-up care difficult. Properly designed, redundant data centers help preserve medical records and essential health care services when a practice or hospital's local computer systems fail. Whether the cause is a hardware failure, cyberattack, natural disaster or other disruption, redundant systems can provide an important safety net.

8. Scalability. Hospitals and health care organizations will not need to purchase ample computing capacity to manage their peak demand. Cloud-based data center infrastructure can expand or contract as demand changes, allowing organizations to increase computing capacity when needed without maintaining all the infrastructure themselves.

9. Lower administrative burden. Data centers provide the computing power necessary to automate many time-consuming administrative tasks, including scheduling, billing, documentation, coding and claims processing. Although technology will not eliminate health care's administrative burden, it can reduce the time physicians and staff spend on nonclinical, administrative work.

10. The foundation for continuous care. One of the most important benefits is the ability to move health care from episodic to continuous care. Wearable devices, home monitoring systems and other connected technologies can continuously transmit information about a patient's health rather than waiting for the patient to develop symptoms and appear in the physician's office or require a visit to the emergency department or admission to the hospital. Data centers provide the infrastructure needed to collect, store, analyze and act on this continuous stream of information.

The risks and disadvantages of data centers

1. Enormous energy consumption. Data centers consume large amounts of electricity. AI growth is accelerating that demand. For health care, this creates a paradox: we may use technology to make health care more efficient while simultaneously increasing the energy required to run it.

2. Water consumption. Many large data centers use substantial quantities of water for cooling and preventing the computers from overheating. In regions experiencing water shortages, this can create a negative environmental impact.

3. Cybersecurity. A centralized digital health care infrastructure creates an enormous target for cybercriminals seeking access to patients' health care data. A cyberattack could disrupt an entire hospital system. Recent ransomware attacks show this is not theoretical.

4. Privacy. Health care data is among the most sensitive forms of personal information. Putting millions of medical records into centralized digital environments creates enormous responsibility for protecting patients' confidentiality.

5. Concentration of power. If a relatively small number of technology companies operate the data centers on which American health care depends, health care organizations may become dependent on those companies.

6. Cost. Building and operating sophisticated data centers requires billions of dollars. Those costs ultimately must be paid by someone: technology companies, hospitals, insurers, taxpayers or patients.

7. Infrastructure vulnerability. Data centers depend on electricity, telecommunications, cooling systems and physical security. A natural disaster, prolonged power outage, cyberattack or other infrastructure failure can interrupt access to critical information.

8. The digital disparity. A sophisticated digital health care infrastructure doesn't automatically produce equal access to health care. Patients without reliable broadband, smartphones, digital literacy or the ability to navigate the internet may be left with less health care.

Bottom line: Data centers are becoming the invisible infrastructure of modern medicine. We may never see them, but they increasingly determine how we practice medicine, access information, use artificial intelligence, protect patient privacy and ultimately care for our patients. We need to recognize the enormous benefits data centers provide but also understand the risks of becoming increasingly dependent on them. In medicine, the infrastructure we cannot see may have the greatest impact on the care we provide.

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THANK YOU

Optional contact information



https://www.youtube.com/watch?v=gyZYyQDI2mI

GHC Monthly Meeting October 2026



Adjourned

