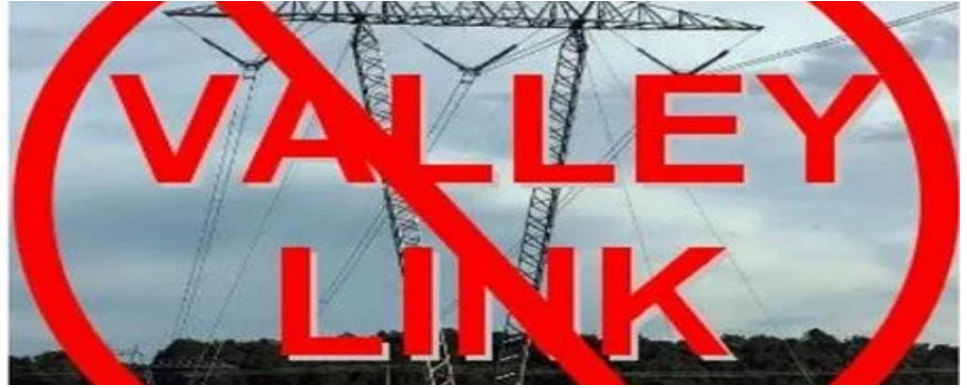


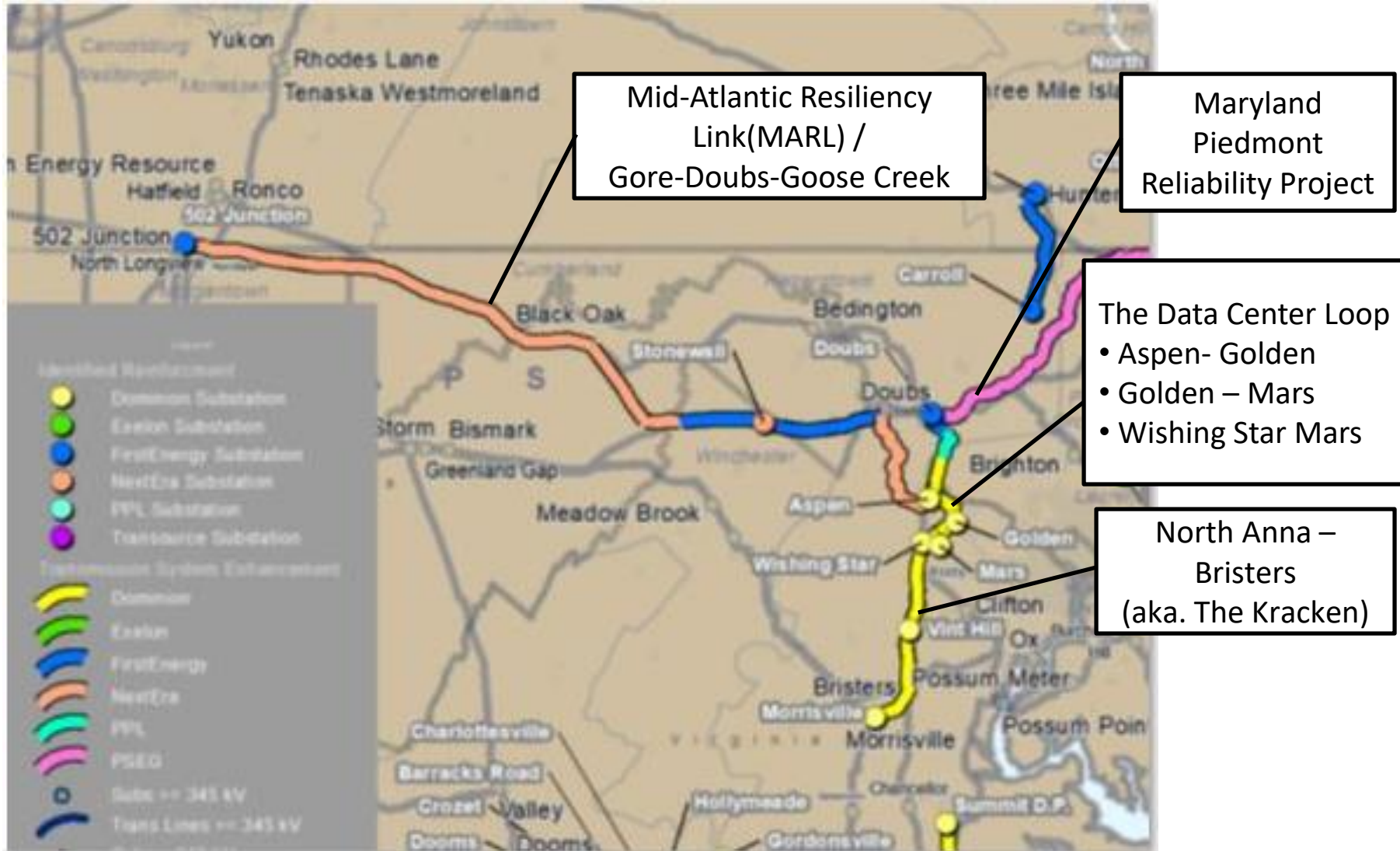


Website : stopmarlvirginia.com / stopvalleylinkvirginia.com

Handouts and Presentations available at stopmarlvirginia.com => Action => Handouts and Presentations

Presentation by Theresa Ghiorzi editor@stopmarlvirginia.com

PJM Regional Transmission Expansion Plan 2022 W3 – 500kV lines for Data Center Alley



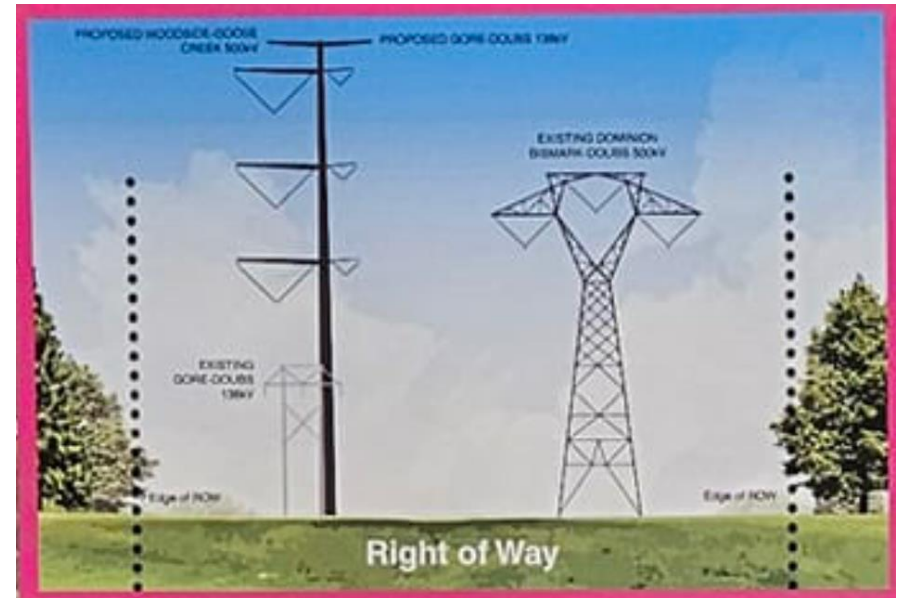
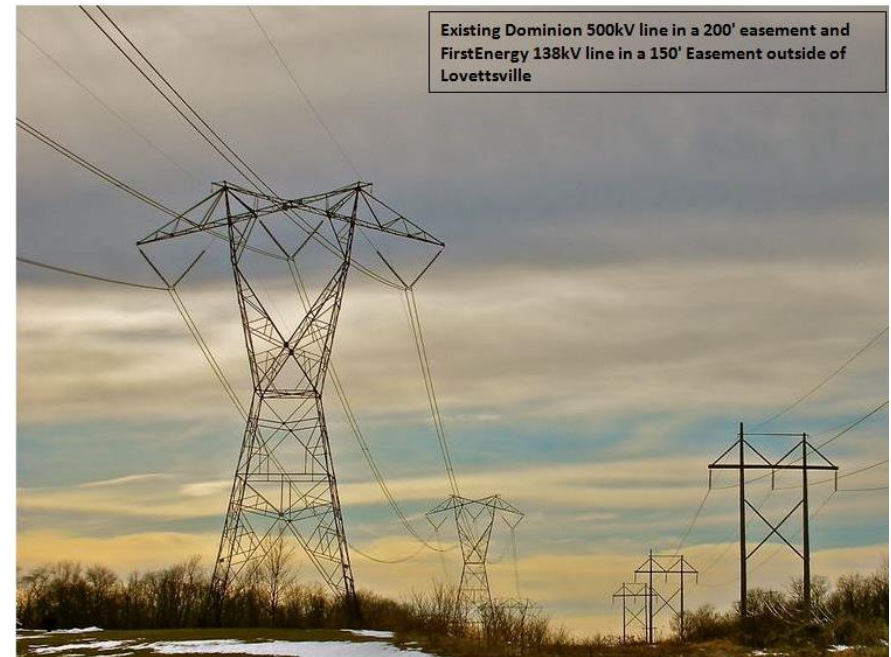
MARL/Gore-Doubs-Goose Creek 500kV

153 mile 500kV transmission line from the 502 Junction in PA, thru WV, MD and VA, directly into data center alley. Takings of at least 2,6690 acres of private property for a new 200' easement, plus "rebuilding" a 138kV on 60' wooden H frames to a 185' monopole.

MARL: NextERA, 107.5 miles, new 200' easements in PA, WV, MD and VA, Lattice Towers, Frederick County, VA new easements around substations and for 2.4 miles into Gore. Approximately 17 property owners would be subject to eminent domain takings. New Woodside substation in Clearbrook

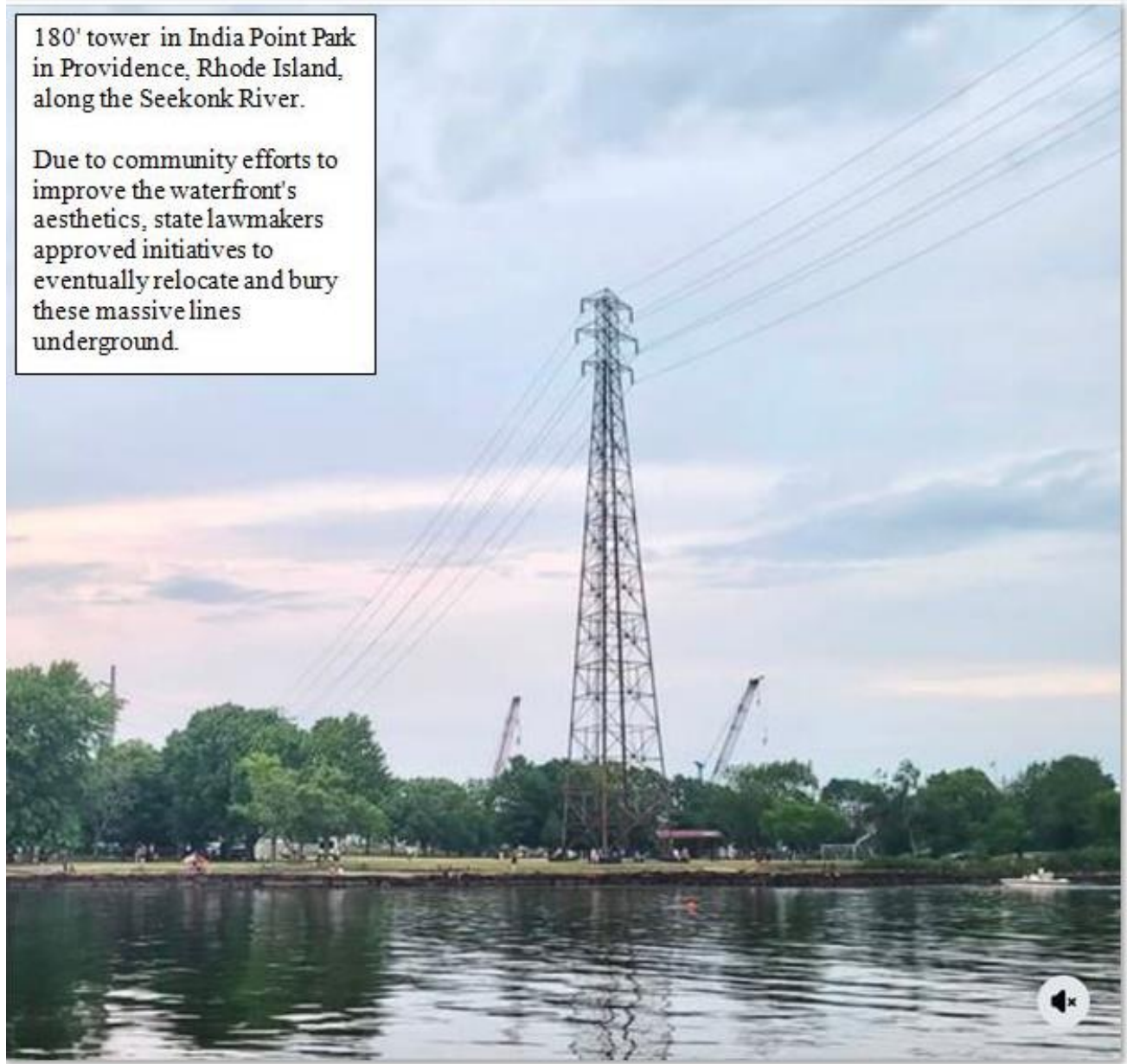
Gore-Doubs-GooseCreek : FirstEnergy, 46 miles, existing 150' easement that currently has a 138kV transmission line on an 60' H-Frame would be rebuilt to a 185' monopole with the 500kV on top and 138kV under built. Dominion's existing 500kV lattice structure is a maximum of 150' Frederick, Clarke and northwestern Loudoun counties in Virginia are impacted.

Dominion does not have any 185' structures in anywhere in Northern Virginia. 185' is the same height as an 17 story building



180' tower in India Point Park in Providence, Rhode Island, along the Seekonk River.

Due to community efforts to improve the waterfront's aesthetics, state lawmakers approved initiatives to eventually relocate and bury these massive lines underground.



PJM Regional Transmission Expansion Plan 2024 W1

The Valley Link 765kV Portfolio



Valley Link North 765kV Amos–Welton Springs– RockyPoint

This proposal is a 261-mile, 765kV transmission line from the John Amos power station in WV through 25 counties in 3 states to a new substation south of Doubs in Maryland. Approximately 6,328 acres of private property would be taken for this line.

Frederick ,Clarke and northwestern Loudoun counties in Virginia are impacted.

Expected to be proposed pretty much the same as the defeated PATH 765kV line:

- Parallel the existing lines in a new 200' easement and an alternate route to the south.
- Guyed-wire V-struct Construction is worse than PATH, it requires a 40' x 40' area for the wires.
- The closest structures of this type are the Wyoming Substation – Jackson Ferry line in South



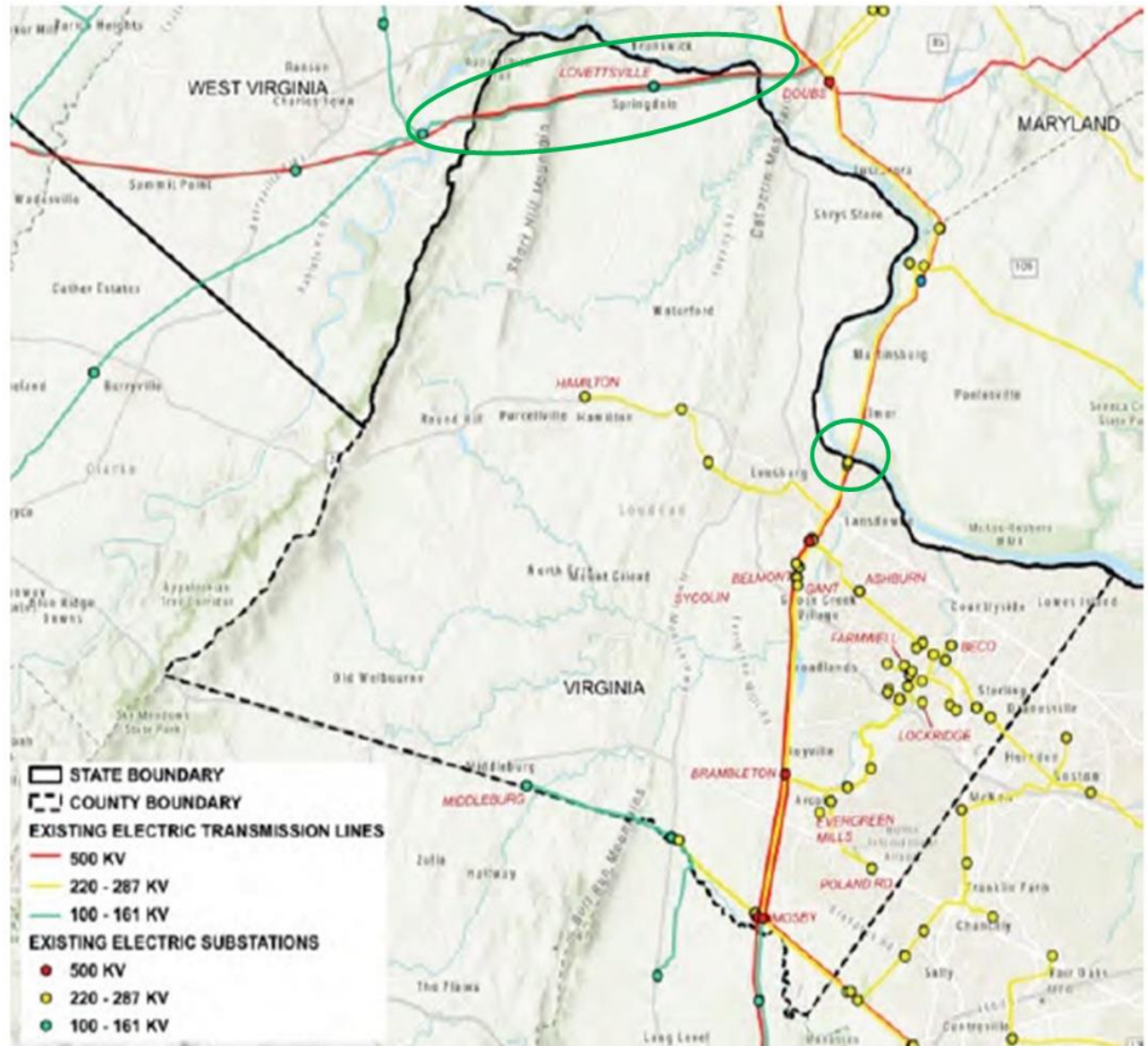


Loudoun County Existing Transmission Lines

Both the MARL/Gore-Doubs-Goose Creek 500kV transmission line and the Valley Link North 765kV transmission line have routes across the same area surrounding Lovettsville along the northwestern edge of Loudoun County crossing the Potomac into Frederick County MD.

MARL/Gore-Doubs-Goose Creek bypasses Doubs and terminates in Eastern Loudoun at the Goose Creek substation which is the primary energy source for Data Center Alley

Valley Link North will terminate at new substation south of Doubs and connect to Doubs



Property Owner Concerns

- Use of eminent domain by a private-for-profit corporation
- Loss / restrictions on the use of property taken for an easement
- Loss or devaluation of Private Property
- Generational destruction of the value of rural private property
- Personal sacrifice for corporate gain
- Diminished Quality of Life
- Increased risks from electromagnetic field produced by a 765kV line or worse TWO 500kV plus a 765kV transmission line
- Contamination of groundwater
- Damage to Land/Livestock/Crops
- Environmental consequences due to tree clearing, continued pesticide use, blasting for footers ect..
- Destruction of scenic view sheds
- Increased electric rates
- Additional information on easement impacts at:
<https://stopmarlvirginia.com/transmission-row-info>

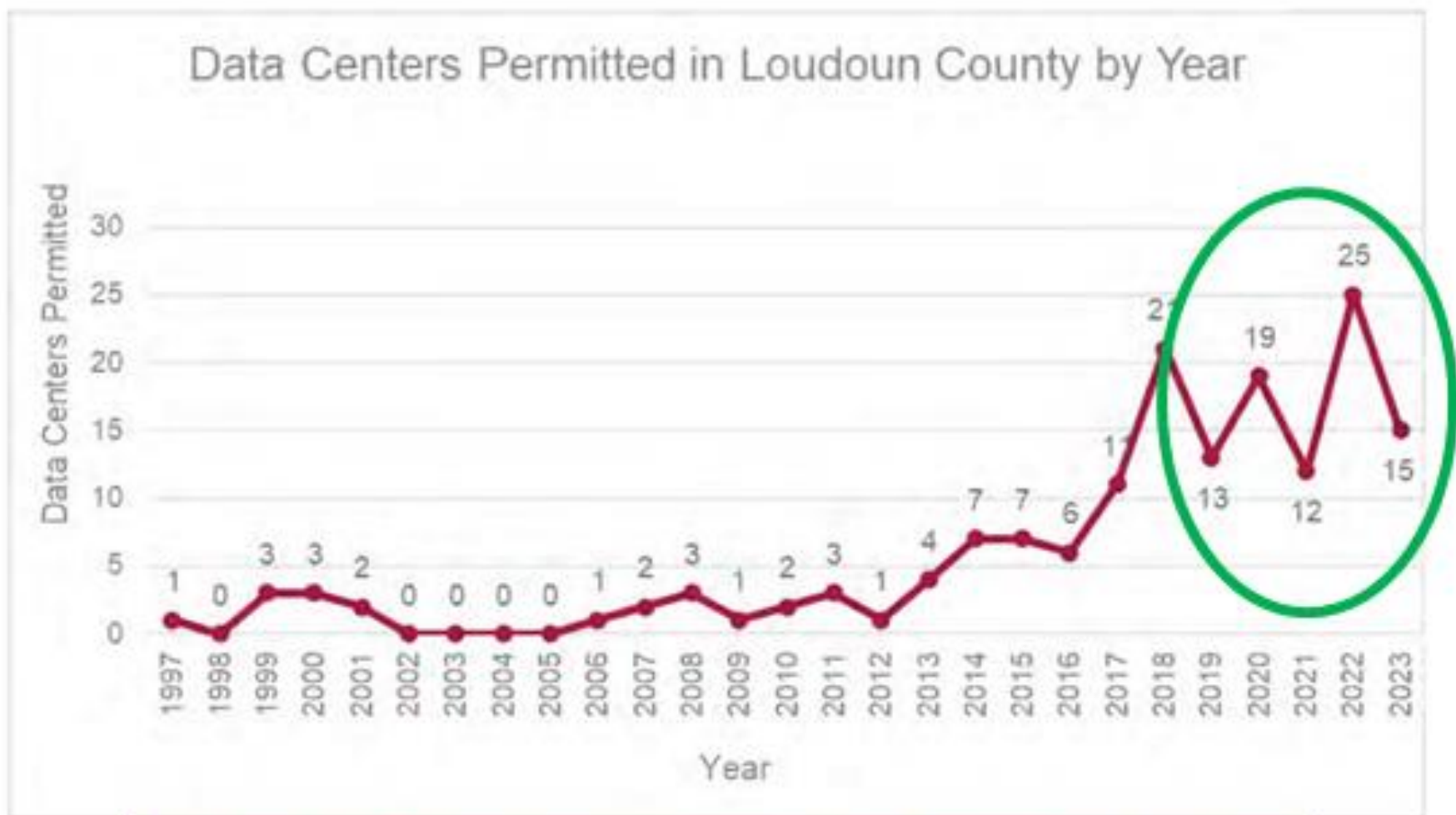
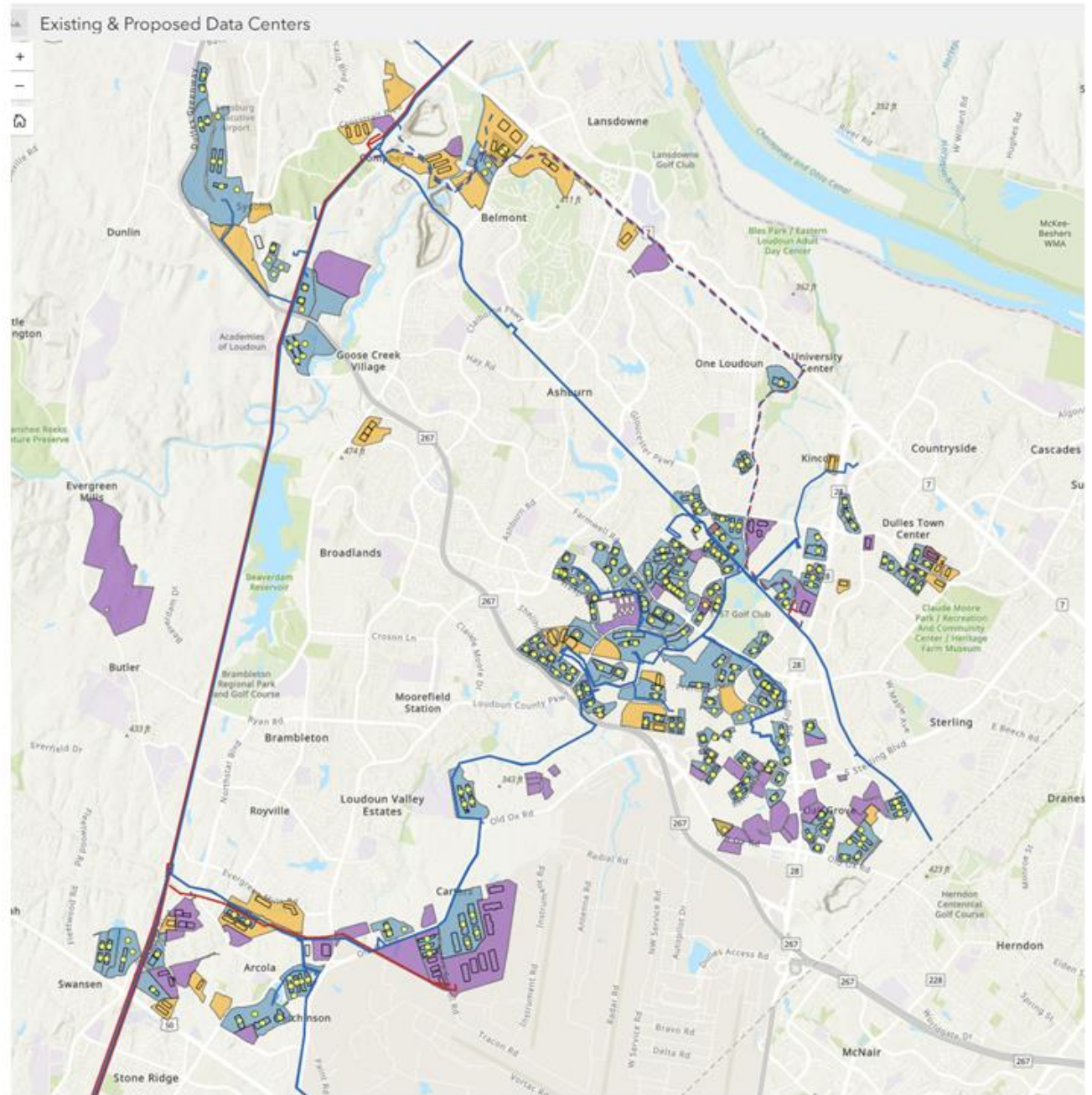


Figure 18: Data Centers Permitted in Loudoun County Per Year (1997-2023)

Loudoun County GIS Map of Existing And Proposed Data Centers (Spring 2026)

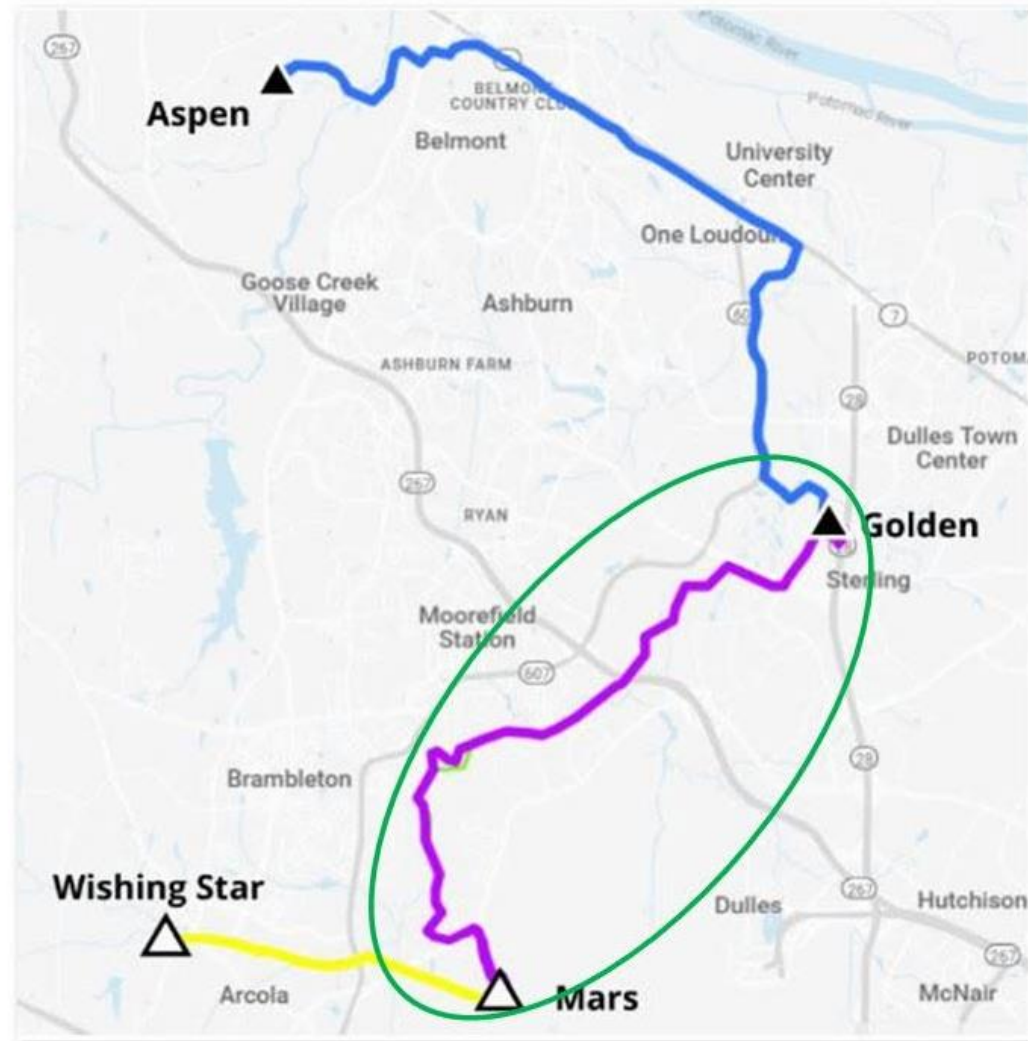


Eastern Loudoun County

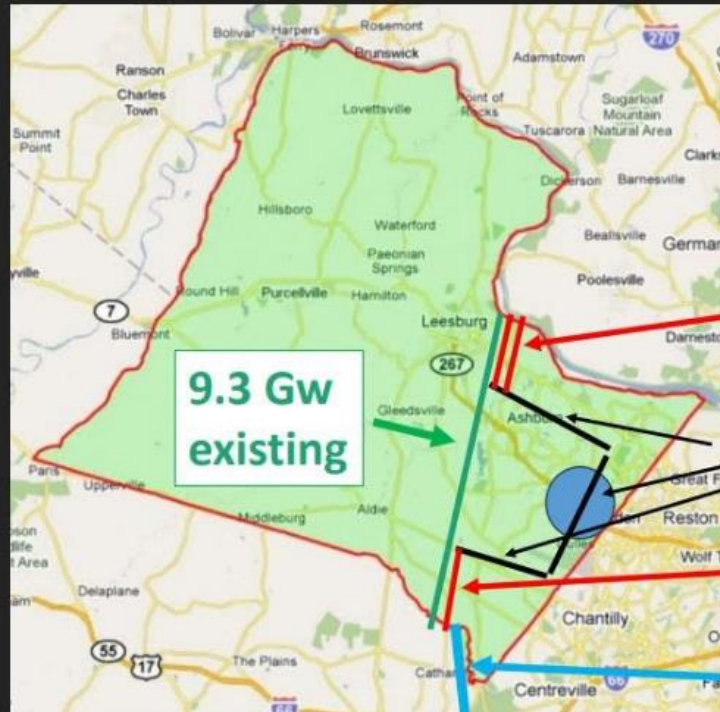
New 500kV transmission
lines to support data
center expansion

Data Center 500kV Lines

- Aspen - Golden - approved
- Mars - Wishing Star - approved
- Golden - Mars - at the VA SCC - this line will allow the connection of an additional 37 data centers plus a hyperscal data center



Based on 5 yr. trend, total needed by 2030 is **4.2 Gw**, but that does not count AI growth.



**8.6 Gw new planned
= 17.9 Gw total
available by 2030**

4.2 Gw new

**2.85 Gw connection
(5.7 new to "DC Alley")**

2.1 Gw new

2.3 Gw HVDC new

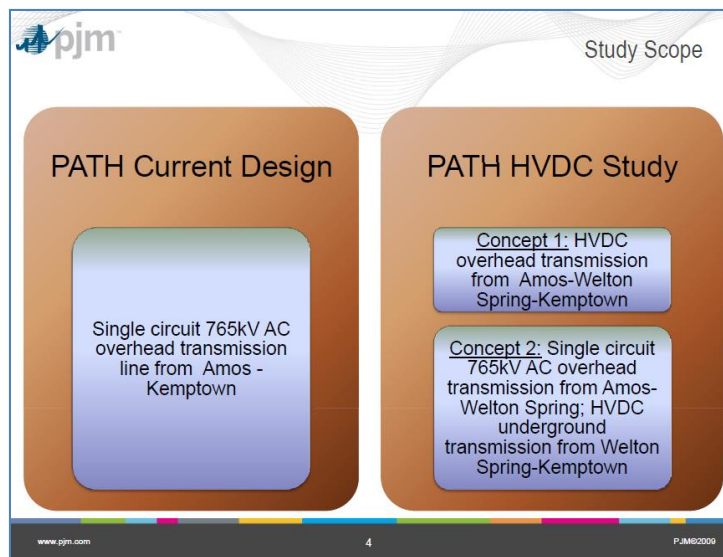
Bottom Line: These Won't Be Enough!

Lines already included in this picture:

- 3 500kV lines : MARL/Gore-DoubsGooseCreek, Maryland Piedmont Reliability Project, North Anna - Brister
- 2 765kV lines : Valley Link North, Valley Link South
- 1 Underground HVDC Transmission Line

The Alternative - Underground HVDC

- Underground HVDC can be installed along highway or railway easements as well as along existing utility easements
- For the PATH 765kV transmission line in 2009 a Black & Veatch study proved HVDC underground was a feasible through Frederick, Clarke and Loudoun Counties in Virginia and through Jefferson County, West Virginia to the Potomac River.



The table, titled "Estimated Cost Comparison", provides a detailed breakdown of costs in millions of dollars. It compares the "Current Design" with two alternative concepts. The "TOTALS" row shows that Concept 2 is the most expensive at \$3,595 M, while the Current Design is at \$1,767 M.

	Current Design	Concept 1	Concept 2
AC Overhead Line	\$1,204 M	--	\$756 M
AC Interconnection Substations	\$563 M	\$563 M	\$563 M
HVDC Overhead Line	--	\$1,002 M	--
Overhead Tap Switchyard	--	\$8 M	--
HVDC Underground Line	--	--	\$884 M
HVDC Converter Stations (LCC)	--	\$838 M	--
HVDC Converter Station (VSC)	--	--	\$1,392 M
TOTALS	\$1,767 M	\$2,411 M	\$3,595 M

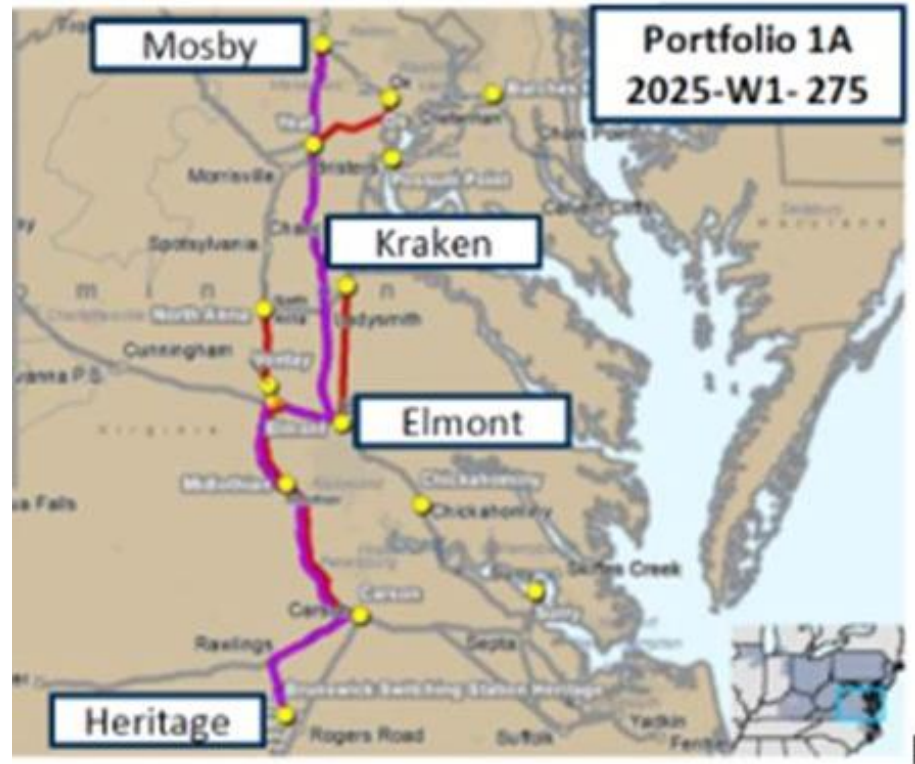
The slide includes the PJM logo and the number 9 at the bottom.

- PATH was to be built by AEP which is the parent company of First Energy.
- FirstEnergy is to build both the Valley Link North 765kV and MARL/Gore Doubs Goose Creek 500kV - *through the same communities.*
- There is plenty of existing ROW to bury 2 HVDC lines within their existing 150' easement. Additionally, there are multiple alternate routes with underground HVDC that would provide redundant paths to Data Center Alley.

Dominion Energy Commonwealth Energy Express HVDC Underground in the existing Easements

- **Selected by PJM in January of 2026**, PJM rejected the 500kV and 765kV alternatives even though they were less expensive
- **200 miles, underground within the existing easements.**
- This HVDC link will have a **total transmission capacity of 6,000 MW**, with 3,000 MW to be implemented in Phase 1, and an additional 3,000 MW planned for Phase 2.
- Construct two 12 acre converter stations, one at each substation (Heritage and Mosby), each with a capacity of 3,000 MW.
- Install a bipolar HVDC transmission line, approximately, fully routed underground between the two substations. In-service date: 06/2032

From Southern Virginia into
Data Center Alley in Loudoun County



***HVDC Underground has been used for multiple other projects in the US
for projects from 65 miles to lines as long as 350 miles
(More information at <https://stopmarlvirginia.com/underground-hvdc>)***

Underground HVDC Cables & Construction



A cross-section of the 5-inch, direct-current transmission cable being laid underground and underwater as part of the 339-mile Champlain Hudson Power Express. Work on the project is ongoing throughout the Capital Region. Photo provided



TenneT Energy - Netherlands, 2015, 525kV HVDC cable, 2GW



■ Installation of manholes



■ Mark location of line and dig trench



■ Lay conduit and encase in concrete



■ Backfill trench and install temporary concrete



■ Pull and splice cable



■ Final treatment with new asphalt

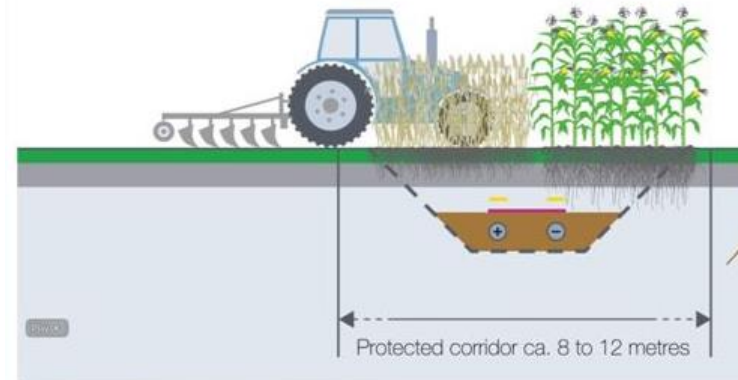


TenneT Energy - Netherlands, 2015, 525kV HVDC cable, 2GW

TenneT: Laying of direct current underground cables (HVDC)

Operating phase

TenneT Energy - Netherlands, 2015, 525kV HVDC cable, 2GW



TenneT: Laying of direct current underground cables (HVDC)

This (TennT Energy)



Not This (MARL / Gore Doubs Goose Creek & Valley Link)



Pictures of properties with existing easements and proposed new easements















Edward H. Baine
Executive Vice President
Utility Operations and President-Dominion Energy Virginia

600 East Canal Street, Richmond, VA 23219
DominionEnergy.com



February 2, 2026

Via Electronic Mail

PJM Interconnection, L.L.C.
PJM Board of Managers
2750 Monroe Boulevard
Audubon, PA 19408
custsvc@pjm.com

Dear PJM Board of Managers:

Dominion Energy is committed to providing reliable, affordable, increasingly clean energy to power our customers every day. Through planning, operational excellence, and investment in proven technologies, we continue to meet customer expectations and fulfill our obligations as a PJM member.

As our industry faces unprecedented demand growth, we are pursuing an all-of-the-above strategy for both generation and transmission. The High Voltage Direct Current (HVDC) proposal before you—recommended by the Transmission Expansion Advisory Committee (TEAC)—is a forward-looking, resilient solution. Our portfolio, HVDC proposal 275, builds on the TEAC's appropriate decision to plan for the 2032 case and best positions the PJM Region to meet the growing demands of our customers.

Dominion Energy has a strong track record of delivering major infrastructure projects on time, within scope, and with disciplined cost management. PJM can count on us to execute this project responsibly and effectively.

Our HVDC solution delivers unmatched benefits:

- **Direct capacity injection** into Northern Virginia, the fastest-growing load pocket in PJM. This method avoids the added costs and delays of solutions that do not reach Loudoun County.
- **Significant avoided costs**, including an estimated \$1.8 billion in future project savings and nearly \$300 million in avoided costs associated with black start operations and short circuit impacts.
- **Minimal impacts and maximum constructability**, leveraging existing rights of way and fully underground installation to reduce permitting and real estate acquisition risks. Furthermore, planned construction and grid integration will significantly reduce the need for outages.

Dominion Energy believes that this is the right moment for a forward-looking HVDC solution that delivers long-term value to PJM members and their customers. We recognize the scale of our proposal and the responsibility that comes with it. We are committed to delivering value to our customers and all stakeholders across the PJM Region if this project is awarded.

Dominion Energy and PJM are uniquely positioned to meet the needs of one of the fastest growing load regions in the world with the right technology and precise execution, deployed at the right time. We appreciate the TEAC's recommendation and the PJM Board for its consideration.

Respectively submitted to the record with no expectation of a response.

Thank you,

A handwritten signature in black ink, appearing to read "Edward H. Baine". The signature is fluid and cursive, with the first name "Edward" being more prominent.

Edward H. Baine
Executive Vice President-Utility Operations
and President-Dominion Energy Virginia

Cc: Michele Greening, PJM
Dave Anders, PJM
Sami Abdulsalam, PJM

Exhibit 4 : List of Current Underground HVDC Projects



<https://stopmarlvirginia.com/underground-hvdc>

For the PATH 765kV transmission line Black & Veatch did a study that proved HVDC underground was a feasible solution through our area. That study was : Black & Veatch, "PJM Interconnection Potomac-Appalachian Transmission Highline (PATH) Project, HVDC

Conceptual Study, B&V Project No.164996, B&V File 42.2004 , FINAL November 17, 2009 This was entered into the record as part of the Virginia SCC Case PUE 2009-00043 Application of PATH Allegheny Virginia Transmission Corporation. Recent projects:

Dominion Heritage To Mosby HVDC Backbone (aka the Commonwealth Energy Express)



- PJM Approved, Estimated Completion Date June 2032 ([Project Site](#))
- From the Heritage substation in Brunswick County, Virginia to the Mosby substation in Loudoun County, Virginia to serve Data Center Alley.
- 525kV, Total transmission capacity of 6,000 MW, with 3,000 MW to be implemented in Phase 1, and an additional 3,000 MW for Phase 2
- HVDC XLPE Cables
- 185 Miles
- \$4.8 billion **This is a PJM Ratepayer funded project.**
- "The project is expected to primarily follow existing rights-of-way, limiting the need for property acquisitions."
- "The physical footprint of the duct banks is assumed to be 8 feet wide. For typical operations and maintenance practice, 15-ft is added to each side of the duct banks. The total permanent new Right-of-Way necessary for the underground cable system would be 40-ft. For trench-less crossings, 150ft of ROW is needed for Horizontal Directional Drilling and 50ft of ROW is needed for Jack and Bore. At locations where splice vaults are required, the ROW will need to expand to 40-ft to accommodate the larger footprint of the system."
- each of the two required High Voltage Direct Current converter stations (built at the Heritage and Mosby substation ends) is estimated to require a land footprint of approximately **12 acres**

SSO Green HVDC Link



- In Progress - Estimated Completion Date 2031 ([Project Overview](#))
- Mason City, Iowa to Yorkville, Illinois , Connecting MISO in the Midwest, and PJM in the East.
- 2,100 MW, 525KV
- HVDC XLPE Cables
- "The project will use two 5-inch diameters (about the size of a wine bottle), 525KV extruded cross-link polyethylene (XLPE) insulated cables installed in a 3-foot wide by 5-foot deep trench. SSO Green HVDC Link will construct two VSC power converter stations at either end of the 350-mile HVDC line."
- 350 miles
- All underground with transmission line running along existing rail corridors from Iowa to Illinois

This is a privately funded project.

[Read 2.1-GW SSO Green transmission project advances with Iowa agreement](#)

View video on the construction techniques being used [here](#)

Champlain Hudson Power Express



- November, 2022 - Completed May 13, 2024 ([Project Overview](#))
- Canadian Border to Queens, New York
- 1,250 MW - enough power for more than 1 million homes
- HVDC cable
- 339 miles with 60% in waterways and 40% buried underground
- The main conversion facility in Astoria, Queens occupies a total site area of approximately 4.5 acres. The primary high-voltage direct current (HVDC) converter building measures roughly 165 feet by 325 feet (a footprint of about 1.2 acres) and stands about 70 feet tall.
- "This project is entirely privately funded, and the overall cost is approximately \$6 billion" ([CHPE Q&A](#))
- " The reason for the unusual approach of a submerged and buried line is that it reduces the local opposition that always accompanies large transmission line construction projects. "

Watch the [webinar on under water installation](#) (Expand & Click Marine Installation and Studies)

[Read more about North America's Longest Underground Transmission Line](#)

New England Clean Power Link



- Construction began in 2021 - Completed January 16, 2026 ([Project Overview](#))
- Canadian border to Vermont
- 1,000 MW
- 300 kV - 320 kV HVDC cable
- 150 miles, all under water or **buried underground in existing rights-of-way**
- **\$1.6 billion merchant line will be privately financed and will not use taxpayer dollars**
- "Ensured the permanent conservation of 50,000 acres of Maine wilderness, creating one of the largest contiguous conservation areas in the region. This land preservation initiative safeguards critical wildlife habitats, protects biodiversity, and ensures sustainable forestry practices."

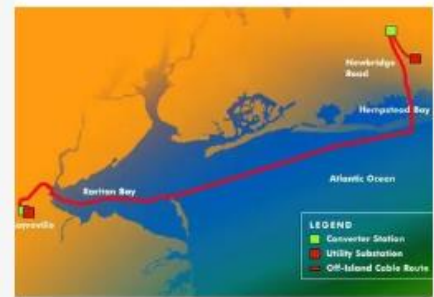
Press Release: [Avangrid's New England Clean Energy Connect Project Is Complete and Energized](#)
[DOE New England Clean Power Project Summary](#)
[ISO New England Consumer Liaison Group Presentation](#)

The Hudson Project



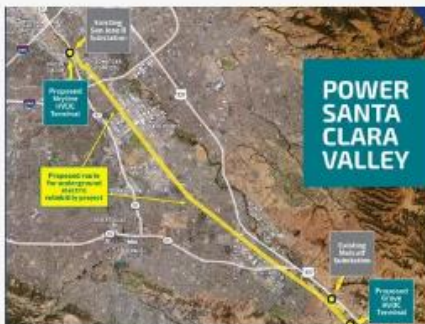
- May 2011 - Completed June 2013 ([Project Overview](#))
- New Jersey, Long Island New York
- 660 MW - enough power for about 600,00 homes
- 345 kV HVDC cable
- 7.5 miles, entirely underground & underwater. It follows existing railroad rights-of-way, through an inactive railroad tunnel to the edge of the Hudson River in Edgewater. It is then buried beneath the Hudson for approximately three-and-a-half miles
- \$850 Million

Neptune Transmission



- June 2005 - Completed June 2007 ([Project Overview](#))
- New Jersey To Long Island, New York
- 660 MW, enough power for about 600,000 homes
- 500 kV HVDC cable
- 65 miles, @15 miles buried underground & @60 miles underwater
- **\$650 Million, This project was privately funded.** ([Neptune Project In Operation](#))

Power Santa Clara Project



- Construction started May 2026 with a completion date in 2028 ([Project Overview](#))
- California
- 500 kV and 320 kV HVDC cables
- 1 mile 500 kV buried underground and 13 miles 320 kV buried underground
- \$450 Million

Sign our petition for an Underground HVDC Alternative



Subscribe to stopmarlvirginia.com for updates, check back for news, petitions and actions





PATH HVDC Conceptual Study

TEAC Meeting

10/22/09

Potomac-Appalachian Transmission Highline (PATH) Project:

•Scope

- New 765kV line from Amos to Kempton with intermediate Welton Spring 765 / 500kV substation

• Planning Driver

- Based on the PJM analysis of 2014, the Amos – Kempton project is required to resolve numerous thermal and reactive problems starting June 1, 2014

•APS and AEP assigned baseline project with PJM id's

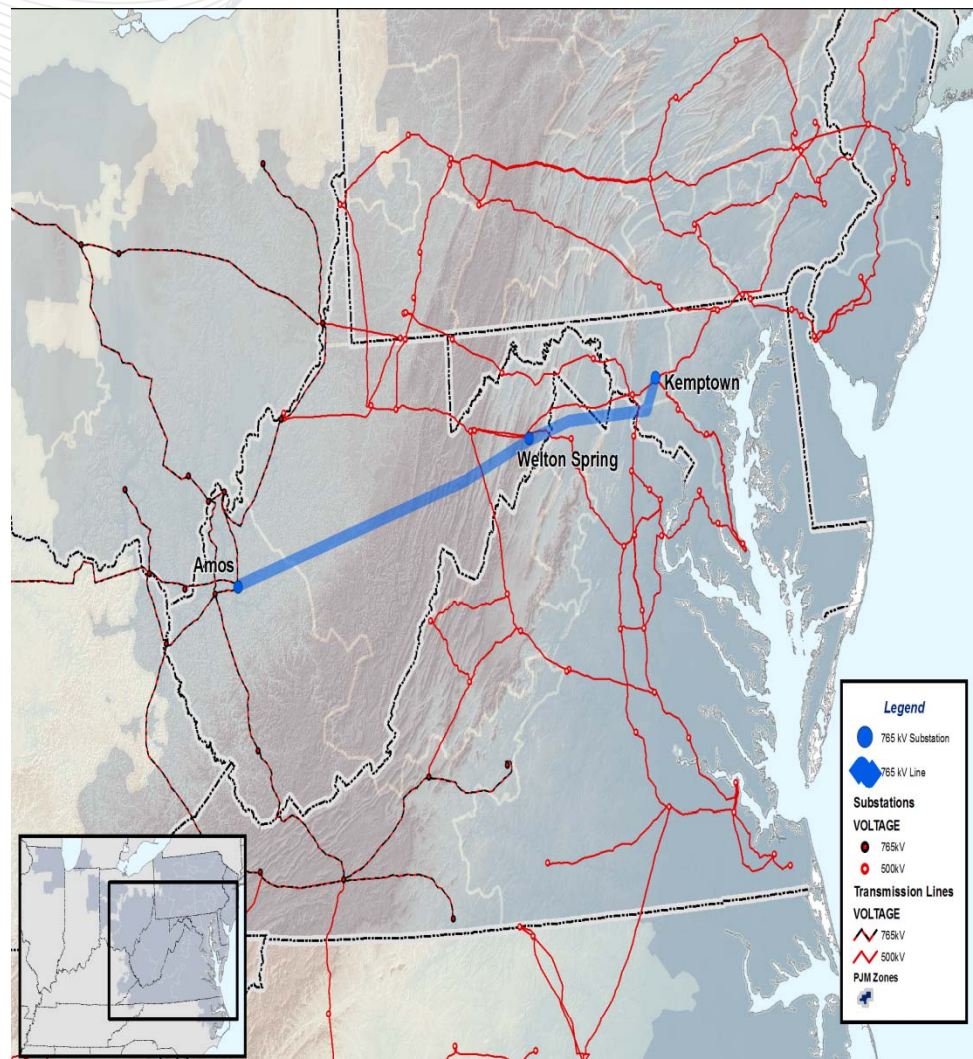
- AEP b0490
- APS b0491 and b0492

• Energization

- Expected in service: 6/1/2014

•Related Information

<http://www.pathtransmission.com/>



- Develop Scope of work for study
- Solicit proposals from vendors
- Black & Veatch (w/ ABB) awarded PO
- PJM identified project requirements
- Study completed in two steps:
 - Welton Spring – Kemptown
 - Amos – Welton Spring

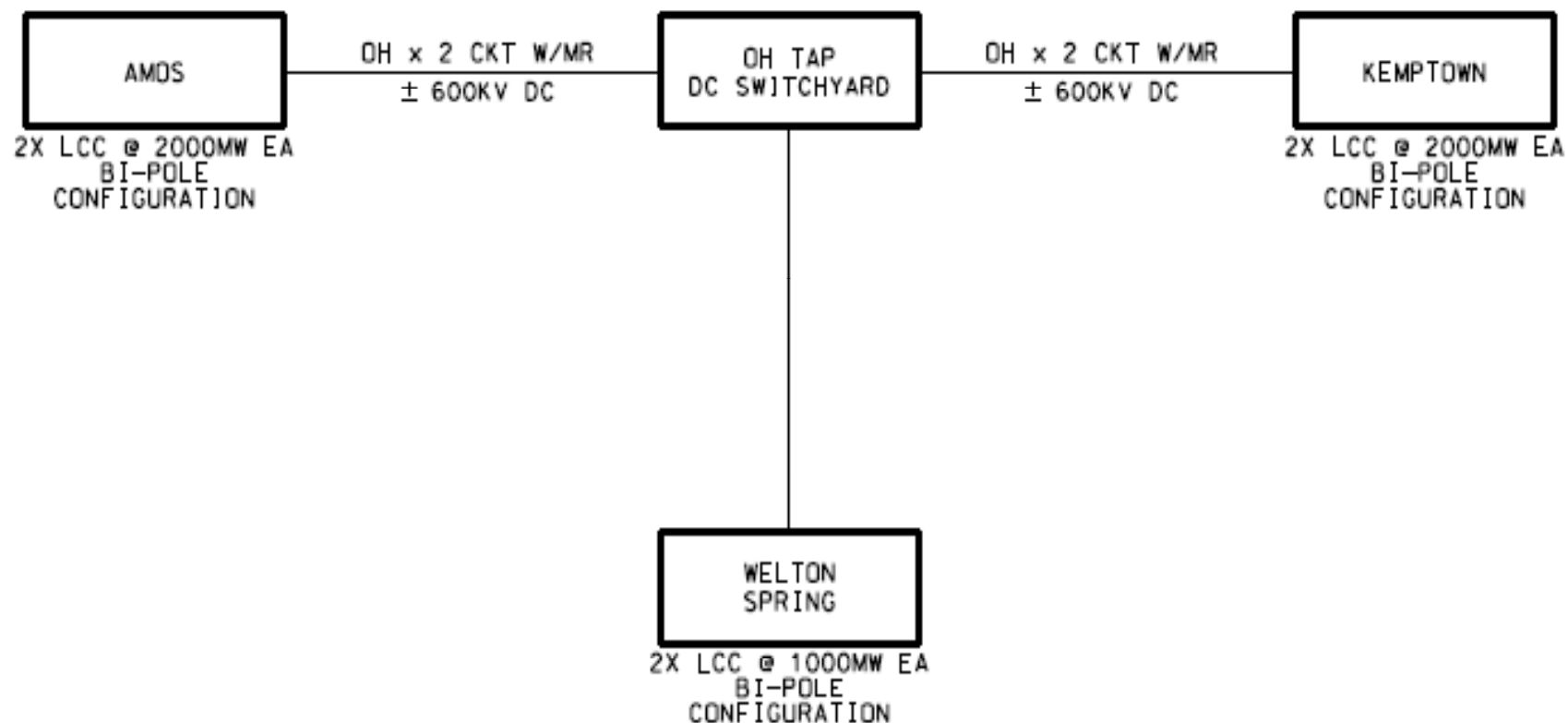
PATH Current Design

Single circuit 765kV AC
overhead transmission
line from Amos -
Kempton

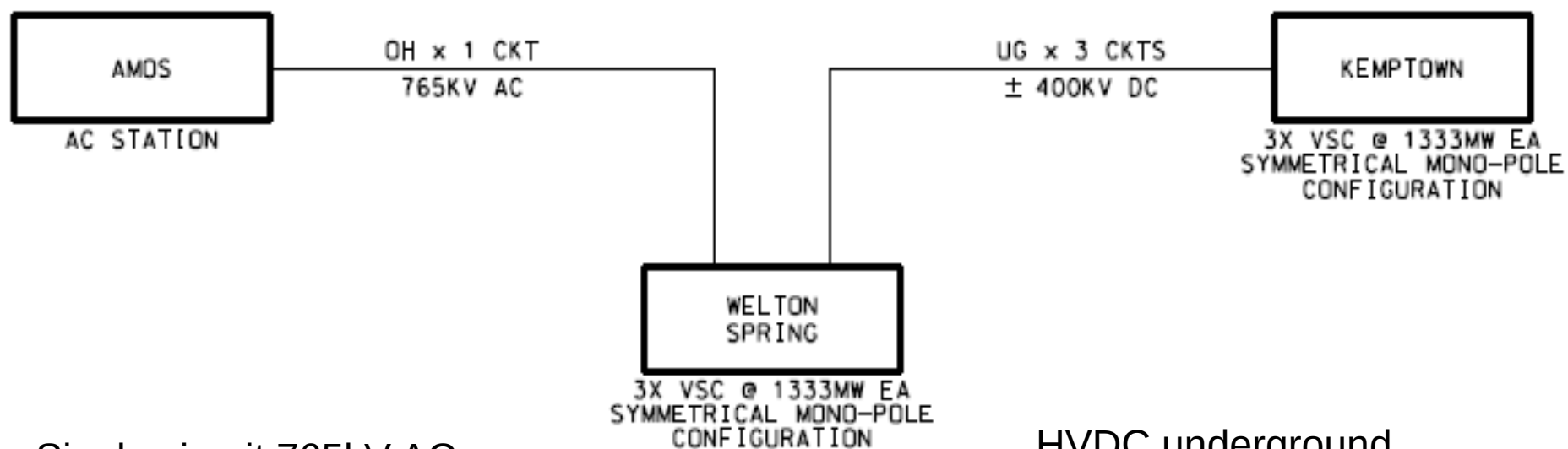
PATH HVDC Study

Concept 1: HVDC
overhead transmission
from Amos-Welton
Spring-Kempton

Concept 2: Single circuit
765kV AC overhead
transmission from Amos-
Welton Spring; HVDC
underground
transmission from Welton
Spring-Kempton



HVDC overhead transmission from Amos - Welton Spring - Kemptown



Single circuit 765kV AC
overhead transmission from
Amos - Welton Spring

HVDC underground
transmission from Welton
Spring - Kempton

Key Physical Features Comparison Summary

	Current Design	Concept 1	Concept 2
Structures			
Max Structure Height	130 ft	150 ft	N/A
Max Structure Width	150 ft	80 ft	N/A
Right-of-Way			
Amos – Welton Spring	200 ft	150 ft	200 ft
Welton Spring - Kemptown	200 ft	150 ft	110 ft

- Permitting
- Future Expansion
- Operations and Reliability
- Maintenance

	Current Design	Concept 1	Concept 2
AC Overhead Line	\$1,204 M	--	\$756 M
AC Interconnection Substations	\$563 M	\$563 M	\$563 M
HVDC Overhead Line	--	\$1,002 M	--
Overhead Tap Switchyard	--	\$8 M	--
HVDC Underground Line	--	--	\$884 M
HVDC Converter Stations (LCC)	--	\$838 M	--
HVDC Converter Station (VSC)	--	--	\$1,392 M
TOTALS	\$1,767 M	\$2,411 M	\$3,595 M

- Complete final edits to report
- Post report by mid November