PJM
Data Center-Driven
Transmission Expansion Projects

2022 - Present

Karen Sheehan

Coalition to Protect Prince William County

December 2025

- **This Review Includes Transmission Expansion 'Reliability' projects:**
  - Require PJM board approval before proceeding to route determination and Va. SCC process
  - 500kV or 765kV
  - Transmission lines and substations – driven by data center load demands
- **Does NOT Include:**
  - Baseline projects
    - Require PJM board approval before proceeding to Va. SCC process
  - Supplemental projects and Immediate Need projects
    - Most are 230kV transmission lines and/or substations for data center customer needs – hundreds in the current pipeline
    - Some address end-of-life (collapsing) lines or other infrastructure – 50 to 100 years old and needing to be replaced – exacerbated by unprecedented data center load demand
    - PJM's involvement is to review and ensure nothing overlooked in design
- **Does NOT address: EQUALLY SIGNIFICANT ISSUES**
  - Power Generation Expansion and Work-Arounds
  - Fast-tracking process
  - Delayed retirements of Coal Plants

See Appendix for further details on the Data Center-Driven PJM Transmission Expansion Projects

Researched PJM TEAC (Transmission Expansion Advisory Committee) decks and Dominion Energy reports:

- PJM is a regional transmission organization (RTO) that coordinates the movement of wholesale electricity in all or parts of 13 states and the District of Columbia (New Jersey to Ohio, including Virginia).

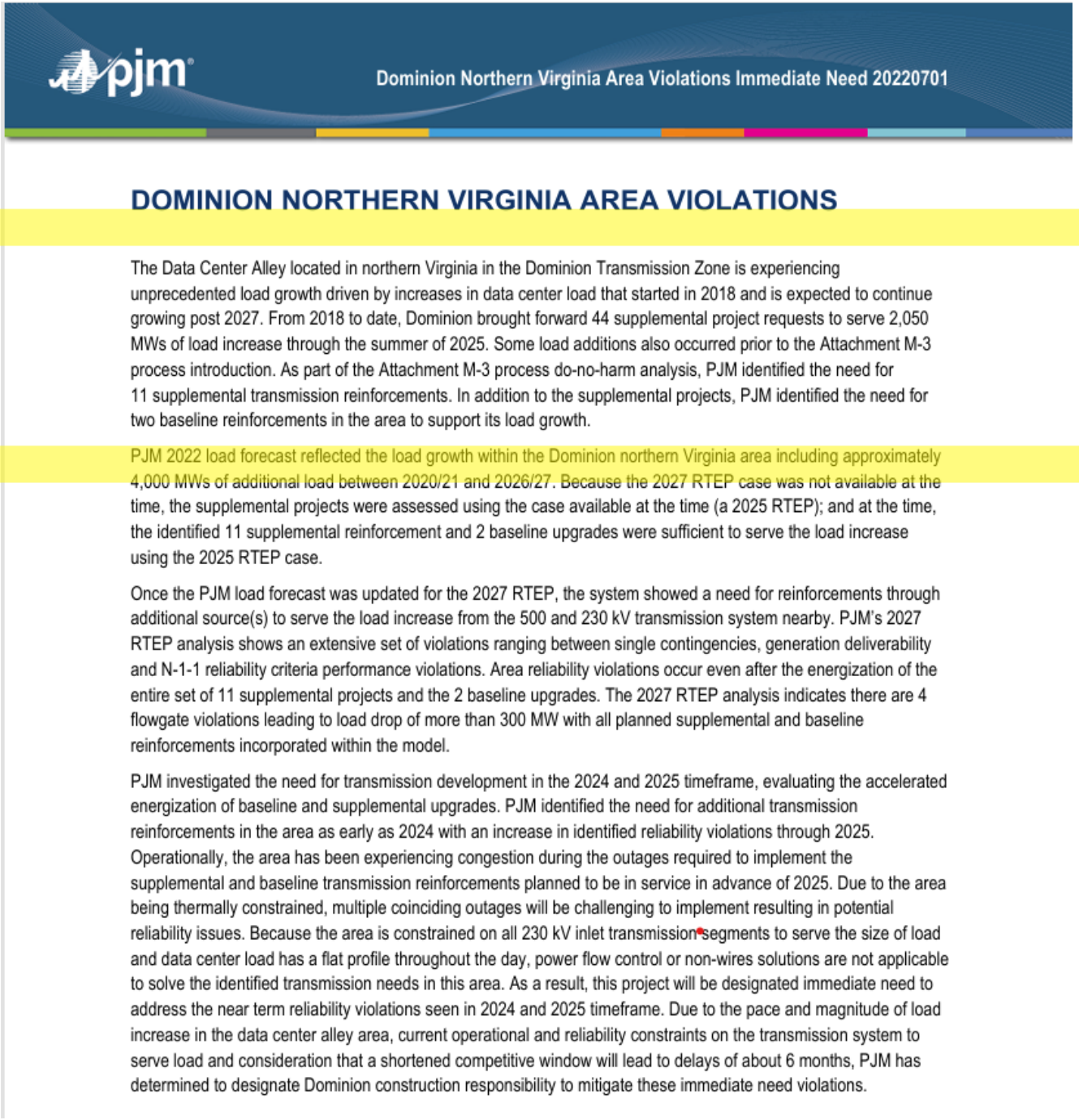
- PJM started alerting to **data center driven load** in ~2022

- Dominion Energy identified supplemental 230 kV projects for **data centers** starting in about 2010:
  - Shellhorn – 2010
  - Clover Hill - 2016
  - Henrico – 2017

- July 12, 2022: Dominion made Immediate Need announcement, listing **increased data center loads starting from 2018:**

2018 to July 2022:

- 44 Supplemental projects = 2050 MW
- 11 Supplemental transmission reinforcements
- 2 Baseline reinforcements



Dominion Northern Virginia Area Violations Immediate Need 20220701

DOMINION NORTHERN VIRGINIA AREA VIOLATIONS

The Data Center Alley located in northern Virginia in the Dominion Transmission Zone is experiencing unprecedented load growth driven by increases in data center load that started in 2018 and is expected to continue growing post 2027. From 2018 to date, Dominion brought forward 44 supplemental project requests to serve 2,050 MWs of load increase through the summer of 2025. Some load additions also occurred prior to the Attachment M-3 process introduction. As part of the Attachment M-3 process do-no-harm analysis, PJM identified the need for 11 supplemental transmission reinforcements. In addition to the supplemental projects, PJM identified the need for two baseline reinforcements in the area to support its load growth.

PJM 2022 load forecast reflected the load growth within the Dominion northern Virginia area including approximately 4,000 MWs of additional load between 2020/21 and 2026/27. Because the 2027 RTEP case was not available at the time, the supplemental projects were assessed using the case available at the time (a 2025 RTEP); and at the time, the identified 11 supplemental reinforcement and 2 baseline upgrades were sufficient to serve the load increase using the 2025 RTEP case.

Once the PJM load forecast was updated for the 2027 RTEP, the system showed a need for reinforcements through additional source(s) to serve the load increase from the 500 and 230 kV transmission system nearby. PJM's 2027 RTEP analysis shows an extensive set of violations ranging between single contingencies, generation deliverability and N-1-1 reliability criteria performance violations. Area reliability violations occur even after the energization of the entire set of 11 supplemental projects and the 2 baseline upgrades. The 2027 RTEP analysis indicates there are 4 flowgate violations leading to load drop of more than 300 MW with all planned supplemental and baseline reinforcements incorporated within the model.

PJM investigated the need for transmission development in the 2024 and 2025 timeframe, evaluating the accelerated energization of baseline and supplemental upgrades. PJM identified the need for additional transmission reinforcements in the area as early as 2024 with an increase in identified reliability violations through 2025. Operationally, the area has been experiencing congestion during the outages required to implement the supplemental and baseline transmission reinforcements planned to be in service in advance of 2025. Due to the area being thermally constrained, multiple coinciding outages will be challenging to implement resulting in potential reliability issues. Because the area is constrained on all 230 kV inlet transmission segments to serve the size of load and data center load has a flat profile throughout the day, power flow control or non-wires solutions are not applicable to solve the identified transmission needs in this area. As a result, this project will be designated immediate need to address the near term reliability violations seen in 2024 and 2025 timeframe. Due to the pace and magnitude of load increase in the data center alley area, current operational and reliability constraints on the transmission system to serve load and consideration that a shortened competitive window will lead to delays of about 6 months, PJM has determined to designate Dominion construction responsibility to mitigate these immediate need violations.

TEAC July 12, 2022:

item-08---dominion-northern-virginia-area-violations---need-statement.pdf

Dominion Load Forecasts

Increased ~165%

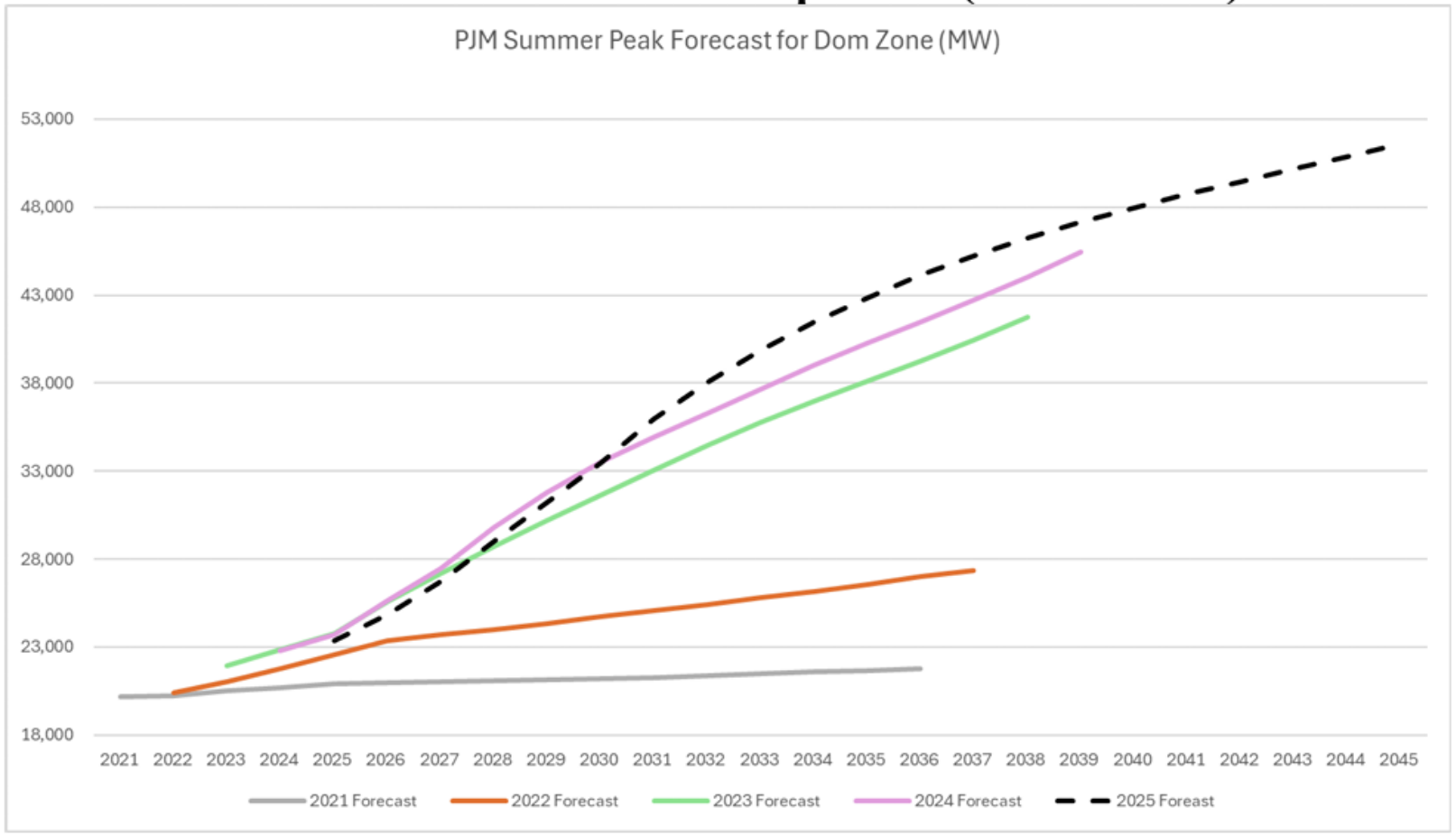
2022 – Jan. 2025

Current data center approval trajectory
has Energy Use increasing
5% per year on average

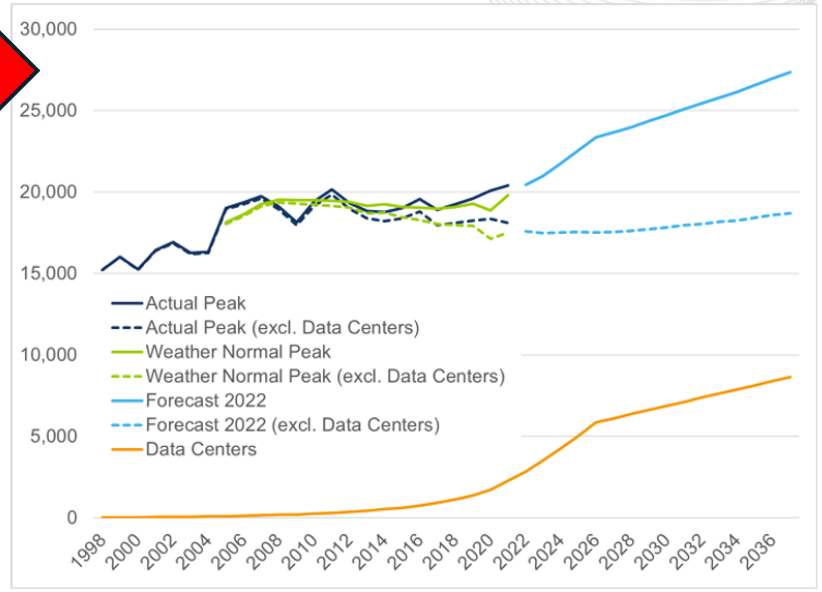
Dominion 2025 IRP update – Page 10 (2025-integrated-resource-plan-update.pdf):

Figure 2.1.3 presents the year-over-year changes in PJM's DOM Zone load forecasts. PJM's 2025 Load Forecast for the DOM Zone increased in the outer years for the fourth year in a row relative to the prior year's forecast. Increases in the data center load forecast continue to be a key driver for the year-over-year changes in the PJM DOM Zone load forecast.

Figure 2.1.3: PJM Summer Peak Forecast Comparison (2021 to 2025) for the DOM Zone



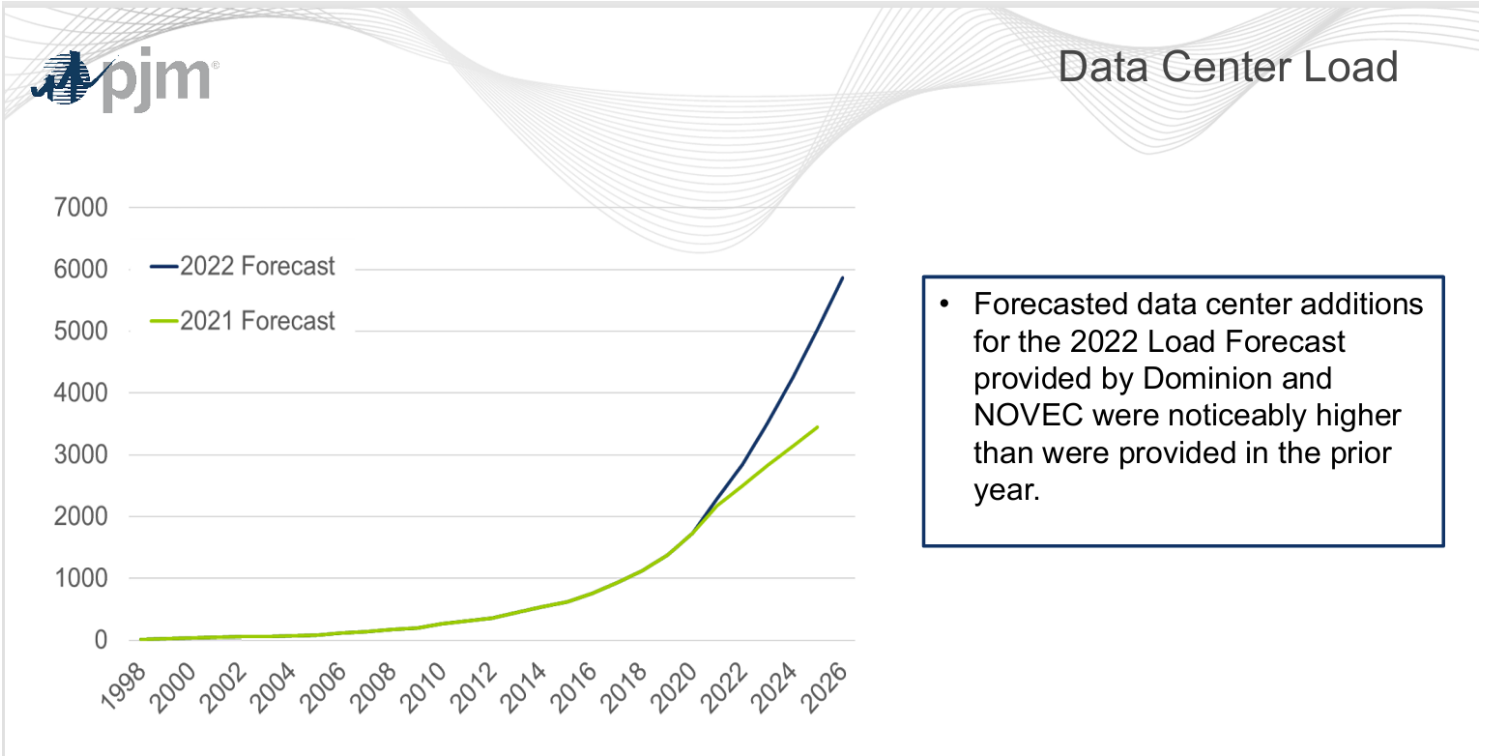
2022 Dominion Load Forecast



- 2022-2027 Annualized Growth Rate
  - With data centers: 3%
  - Excluding data centers: 0%

TEAC July 12, 2022:

https://www.pjm.com/-/media/DotCom/committees-groups/committees/teac/2022/20220712/item-08---dominion-northern-virginia---immediate-need.pdf



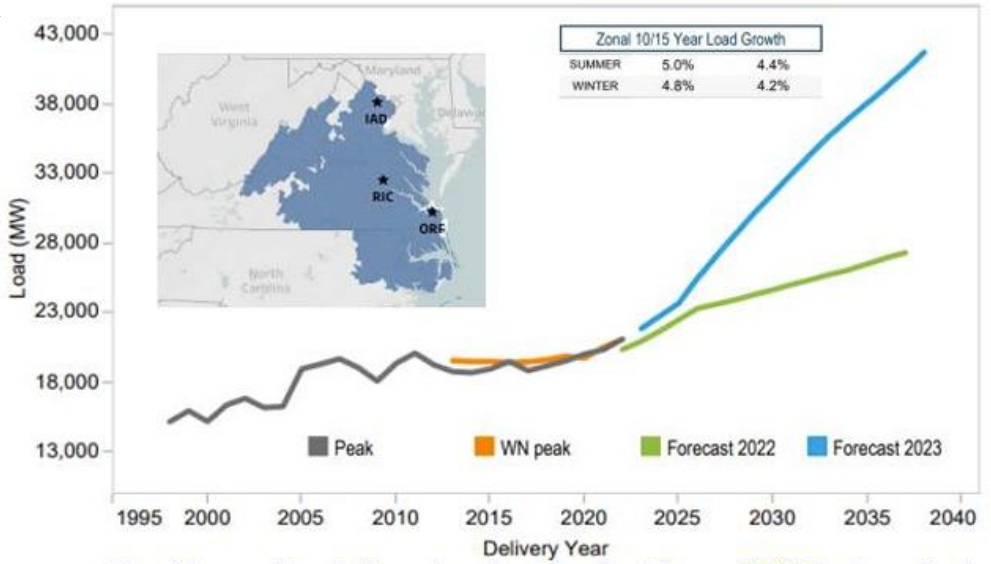
- Forecasted data center additions for the 2022 Load Forecast provided by Dominion and NOVEC were noticeably higher than were provided in the prior year.

2023 Dominion Load Forecast

TEAC Regional Transmission Expansion Planning Update to ISAC (Independent State Agencies Committee) 032723

2022 Competitive Window 3 – Data Center Load Planning Update

- Earlier in 2022, PJM shared its forecast for 2022 and indicated high Data Center Load growth activity, particularly in Northern VA
- In July 2022, PJM directed an Immediate Need transmission project to enable the integration of the forecasted load within the Dominion Data Center Alley up to and including year 2025
- Since then, Data Center Loads within Northern Virginia has been increasing at an unprecedented rate (2022 Summer Peak recorded 21,156 MW – Forecast 20,424 MW)
- The 2028 timeframe load will require major transfer reinforcements into the Doubs/Northern Virginia region to support high flows and VAR requirements
- PJM is working towards opening a competitive window in early February 2023 to address the identified violations



https://pjm.com/-/media/library/reports-notices/load-forecast/2022-load-report.ashx

VAR = Voltage and Reactive Control: To ensure that voltage levels, reactive flows, and reactive resources are monitored, controlled, and maintained within limits in Real-time to protect equipment and the reliable operation of the Interconnection.

2025 -PJM – Long-Term Load Forecast Report January 24, 2025 (2025-load-report.pdf)

Load Adjustments

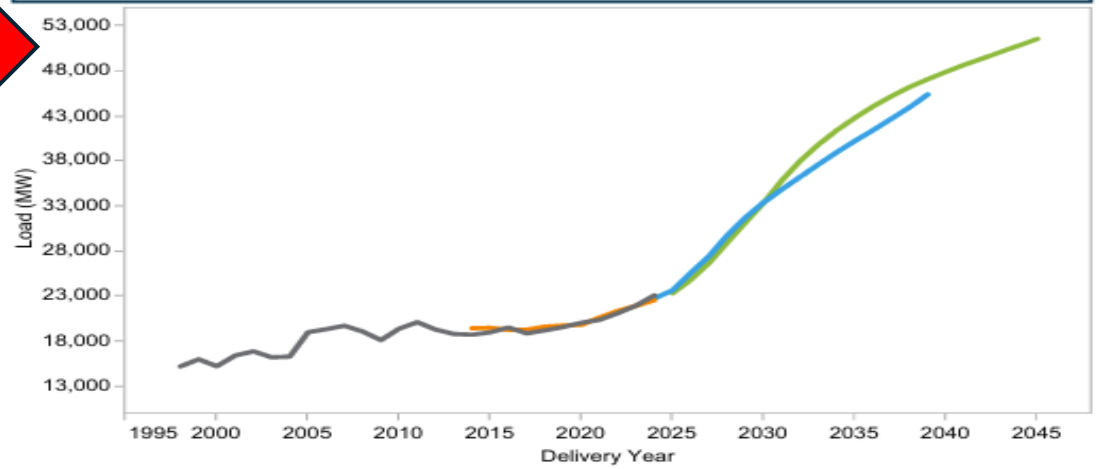
The forecasts of the following zones have been adjusted to account for large, unanticipated load changes, market adjustments, and peak shaving adjustments (see **Tables B-9** and **B-9b** and the supplement for details available on the PJM Website):

Zones	Adjusted to account for:
AEP	growth in data center load and a chip processing plant
APS, ATSI, BGE, DAYTON, PECO, and PL	growth in data center load
COMED	growth in data center load and an electric vehicle battery plant
DEOK	adjusted to account for growth in a steel facility
DOM	growth in data center load and a voltage optimization program
PS	growth in data center load and port electrification
EKPC	a peak shaving program that commenced in the 2023 DY
ATSI and DOM	Non-Retail Behind-the-Meter Generation (NRBTMG) transitioning to participation as Demand Response in the Reliability Pricing Model

2025 PJM – Dominion - Long-Term Load Forecast Report 1/24/25 (2025-load-report.pdf)

Dominion (DOM)

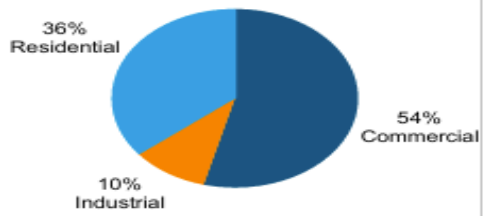
Summer Peak



Weather - Annual Average 1993-2023

Avg Summer Daily Temp	*77.0*
Avg Summer Max Temp	*97.0*
Avg Winter Daily Temp	*40.5*
Avg Winter Min Temp	*12.4*

RCI Makeup



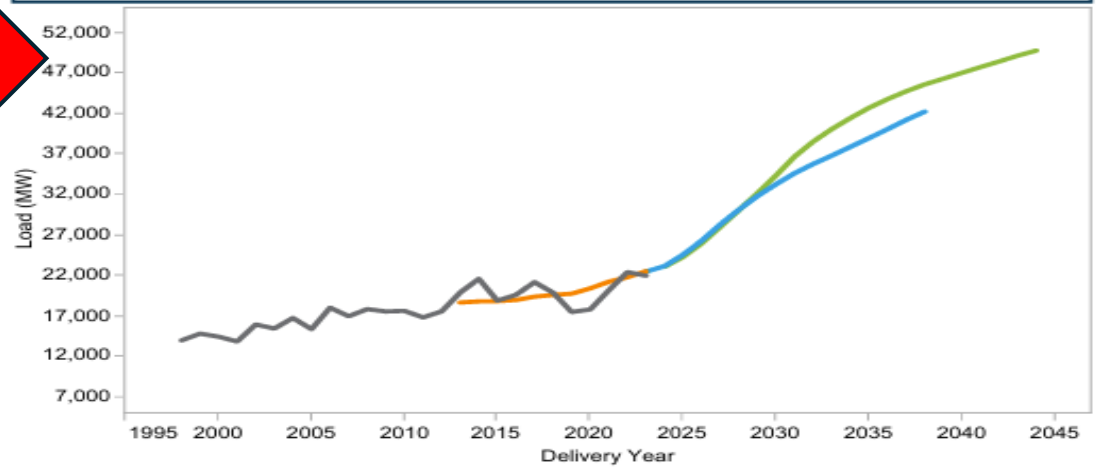
Zonal 10/15/20 Year Load Growth

SUMMER	6.3%	4.9%	4.0%
WINTER	6.0%	4.7%	3.9%

LDAs

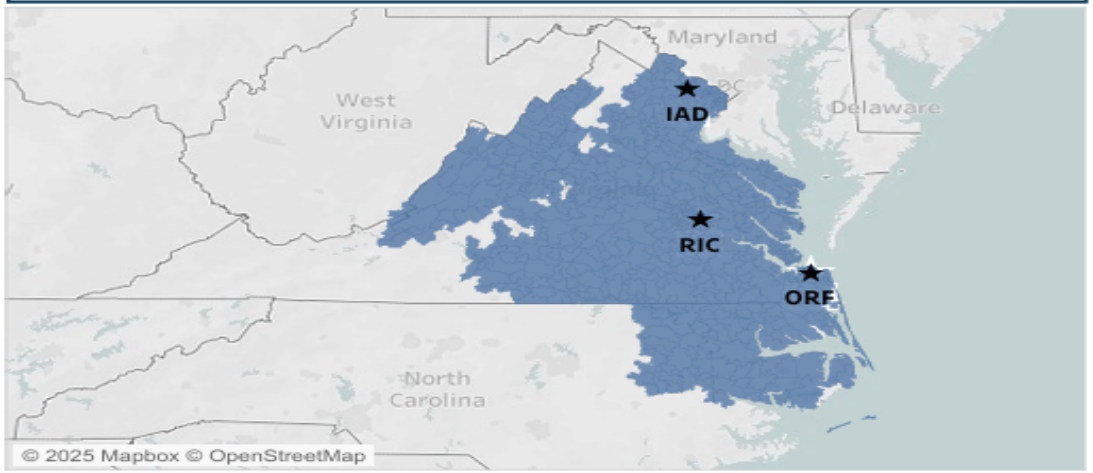
PJM RTO

Winter Peak



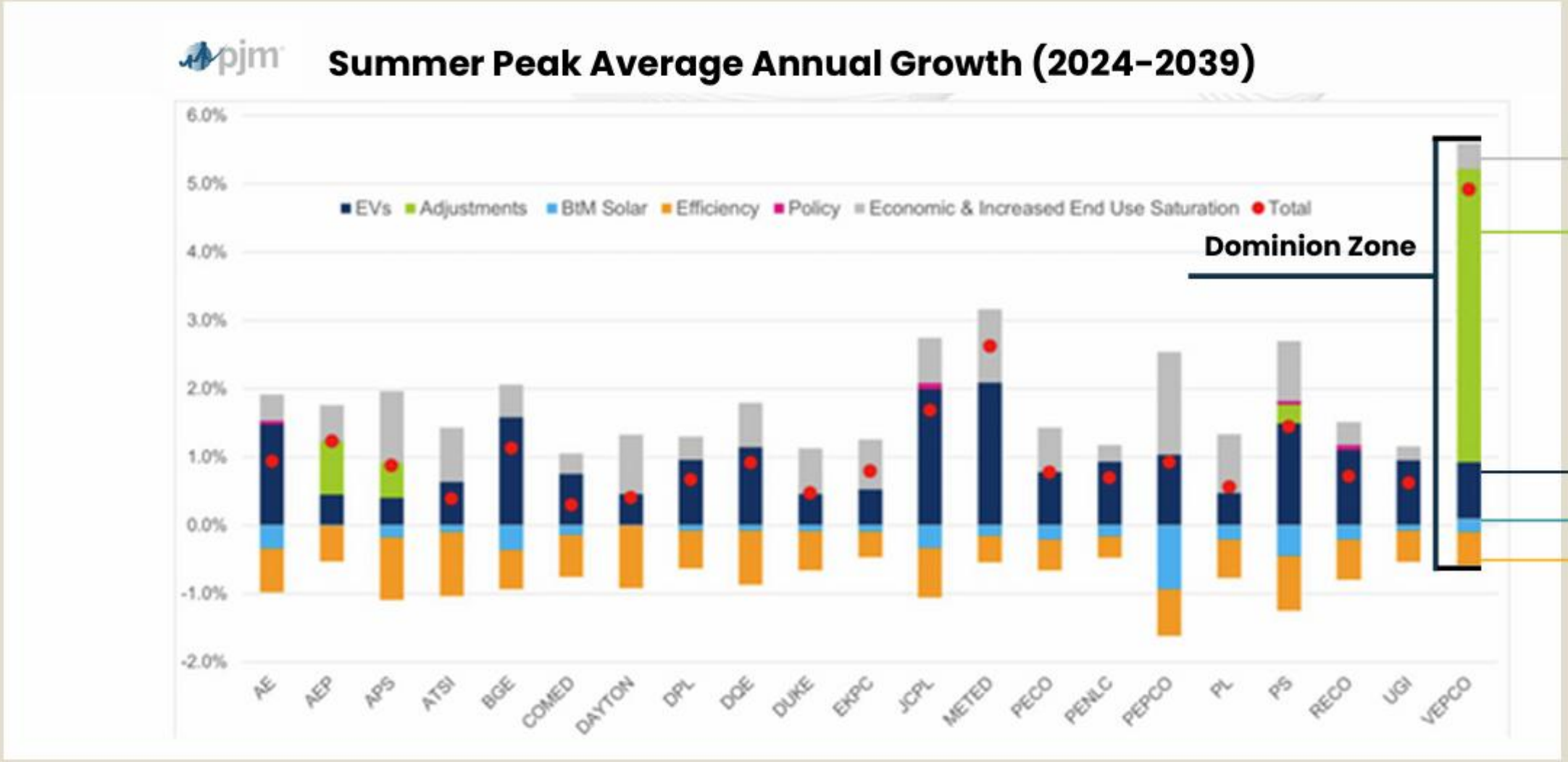
Peak WN peak Forecast 2024 Forecast 2025

Metropolitan Statistical Areas and Weather Stations



MSA

Virginia Commonwealth Economics



The Dominion PJM Zone includes Dominion's territory in Virginia and North Carolina, ODEC's Virginia membership, NOVEC, the Central Virginia Electric Cooperative, the Virginia Municipal Electric Association, the North Carolina Electric Membership Corporation and the North Carolina Eastern Municipal Power Agency in North Carolina

COST

Address Unprecedented Load Demand - Data Center Expansion in PJM region

• 2022 Window 3 -	$5,142.98	$Billion	500kV
• 2023 Window 1 -	$103.89	$Million	765/500kV transformer
• 2023 Window 2 -	$118.309	$Million	765kV & 345kV
• 2024 Window 1 -	$5,500.00	$Billion	765kV & 500kV
Approved by PJM - In Progress	**$10,865.179**	**$Billion**	
• 2025 Window 1 -	$11,640.92	$Billion	HVDC 525kV, 765kV & 500kV
Recommended – Feb 2026 PJM Board Decision			
TOTAL	**$22,506,099,000.00**	**$Billion**	

Key Transmission Expansion Driver

- **DATA CENTER EXPANSION**
  - **Every** PJM RTEP - Regional Transmission Expansion Plan – starting with the RTEP 2022 Window 3, has declared Data Center expansion as the *primary* driver
  - **Every** PJM RTEP starting in 2022 focused on grid violations caused by increased power flow required into Northern Virginia Data Center Alley
  - **Every** PJM and Dominion load forecast has increased dramatically since 2022
  - **Every** Dominion IRP – Integrated Resource Plan – since 2022 has declared Data Center growth as the *primary* driver for skyrocketing load forecasts

ProtectPWC.org

Moratorium on Data Centers NOW

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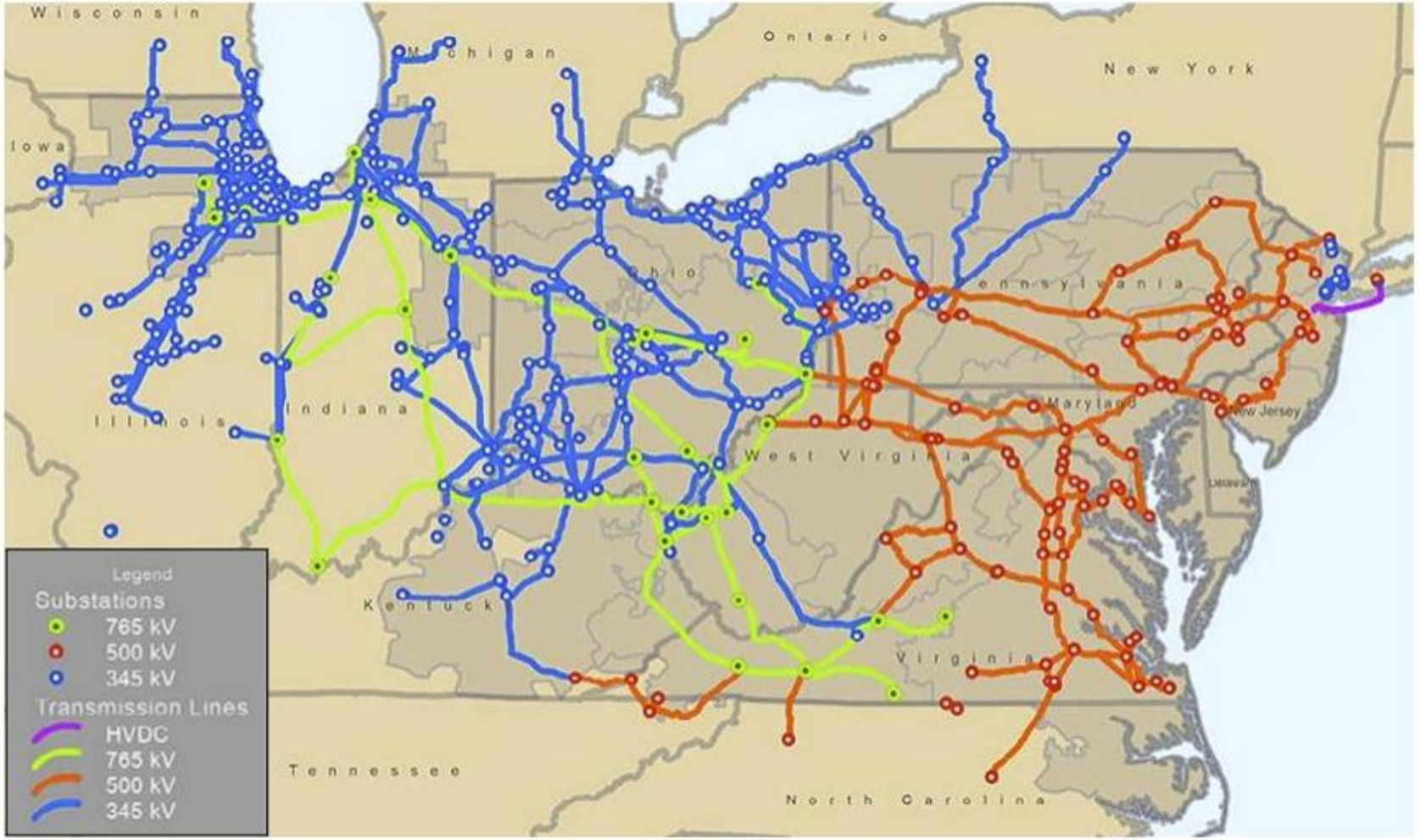
STOP Out-Of-Control Trajectory

PJM Backbone Transmission System Map - Existing

Map 1.1: PJM Backbone Transmission System

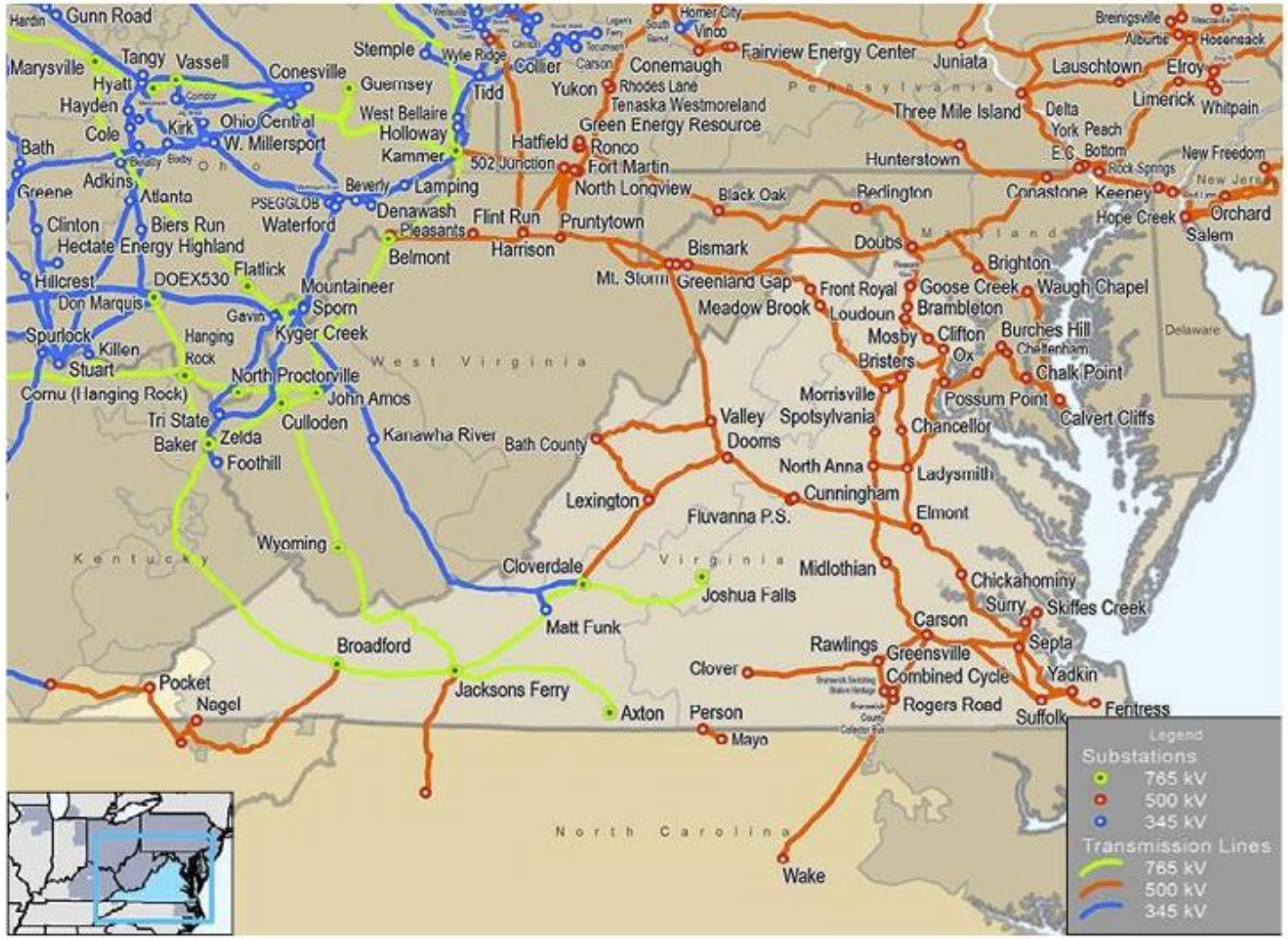


- Source: 2022-rtep-report.ashx (pjm.com) Dated March 13, 2023 Page 2
- **Does NOT show existing 230kV lines and substations**

Map is unchanged in 2024 RTEP Report: 2024-rtep-report.pdf Dated April 17, 2025, Page 8

PJM Service Area in Virginia – Existing

Map 6.46: PJM Service Area in Virginia

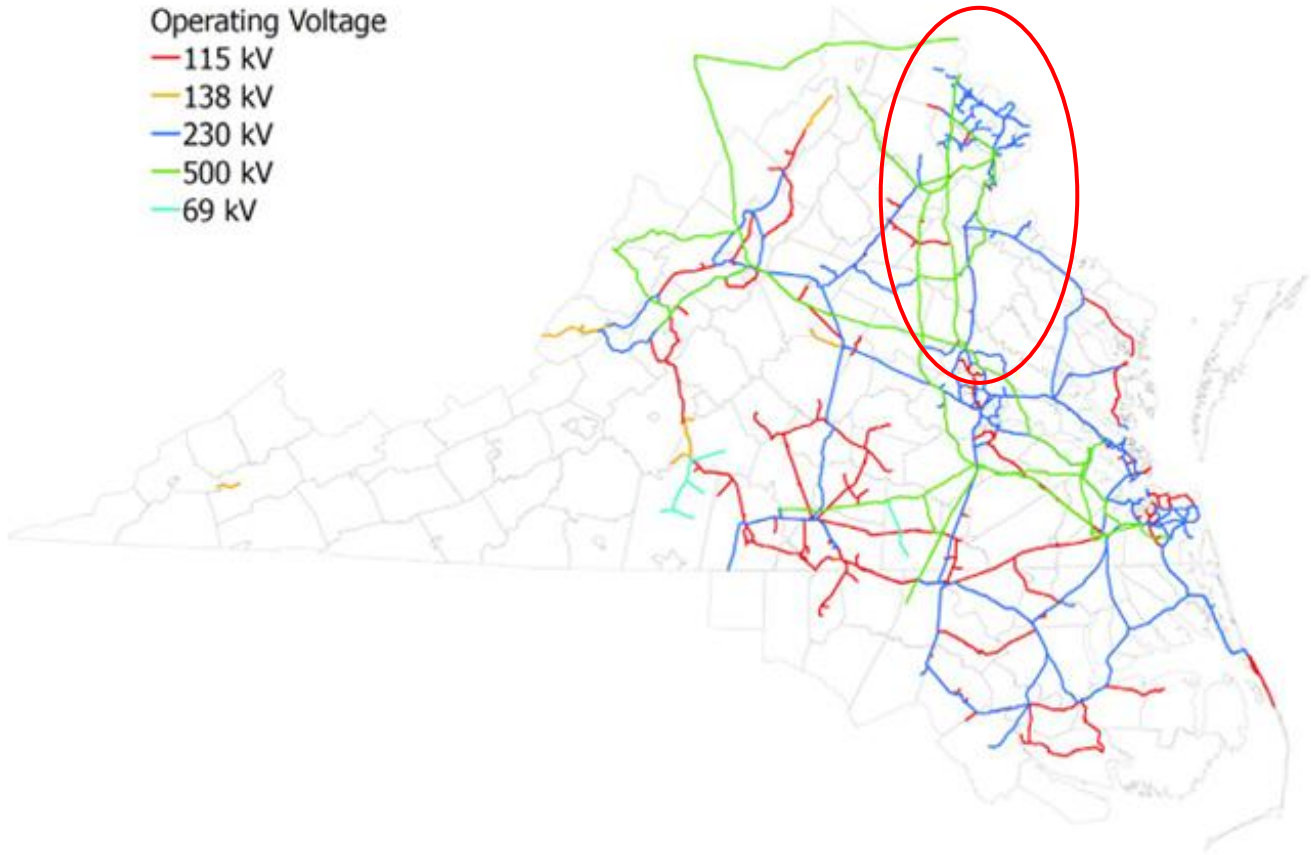


- Source: 2022-rtep-report.ashx (pjm.com) Dated March 13, 2023 Page 221
- **Does NOT show ANY existing 230kV lines and substations**

Dominion Zone – 230 kV Existing Transmission Lines – in BLUE

Dominion Energy has approximately 6,800 miles of transmission lines in Virginia, North Carolina, and West Virginia at voltages ranging from 69 kV to 500 kV, with these facilities integrated into PJM. Figure 2.3.2.1 below shows the Company's existing transmission lines.

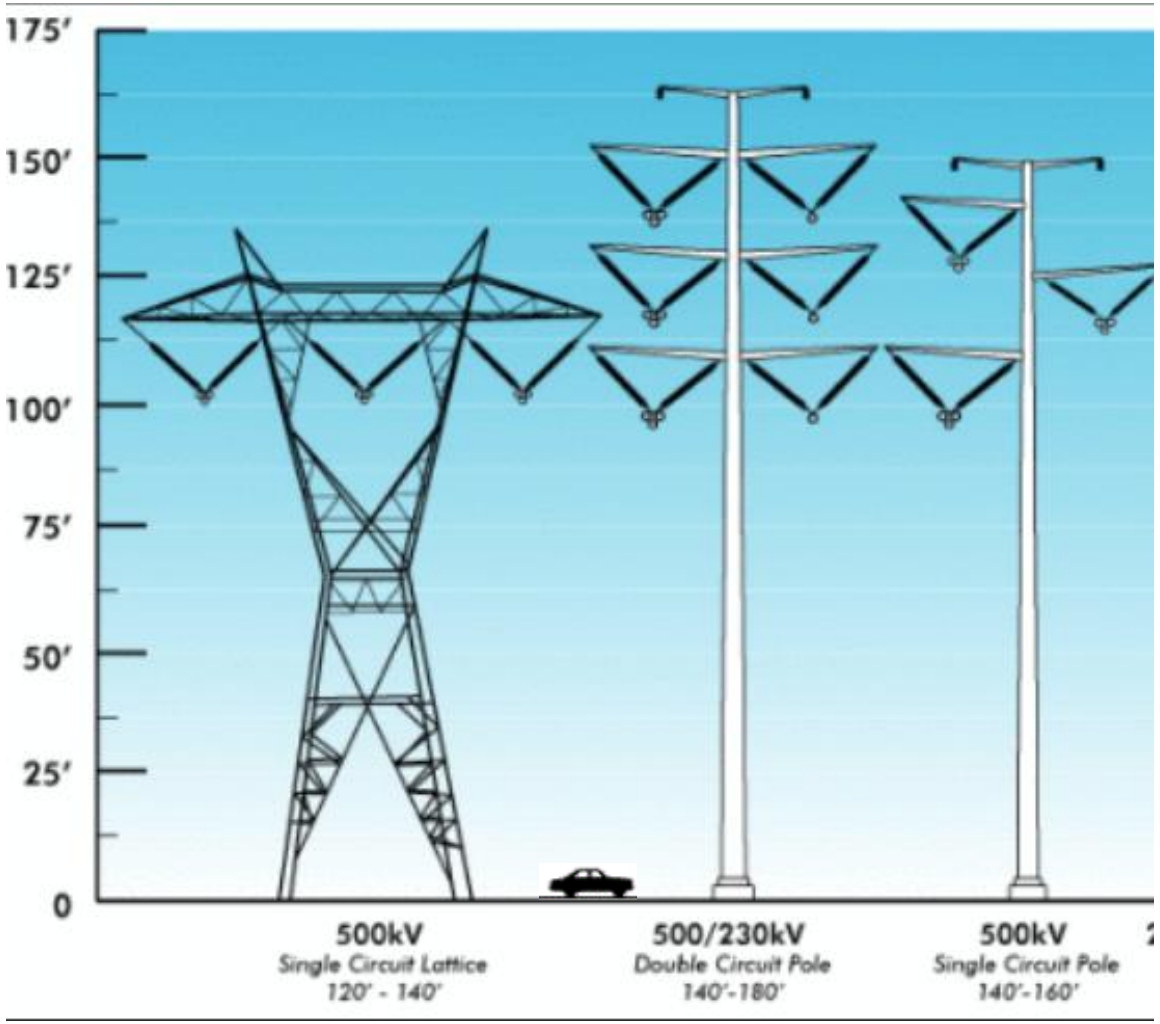
Figure 2.3.2.1: Dominion Energy's Existing Transmission Lines ≥ 69kV



[Dominion 2025 updated IRP – page 25]:

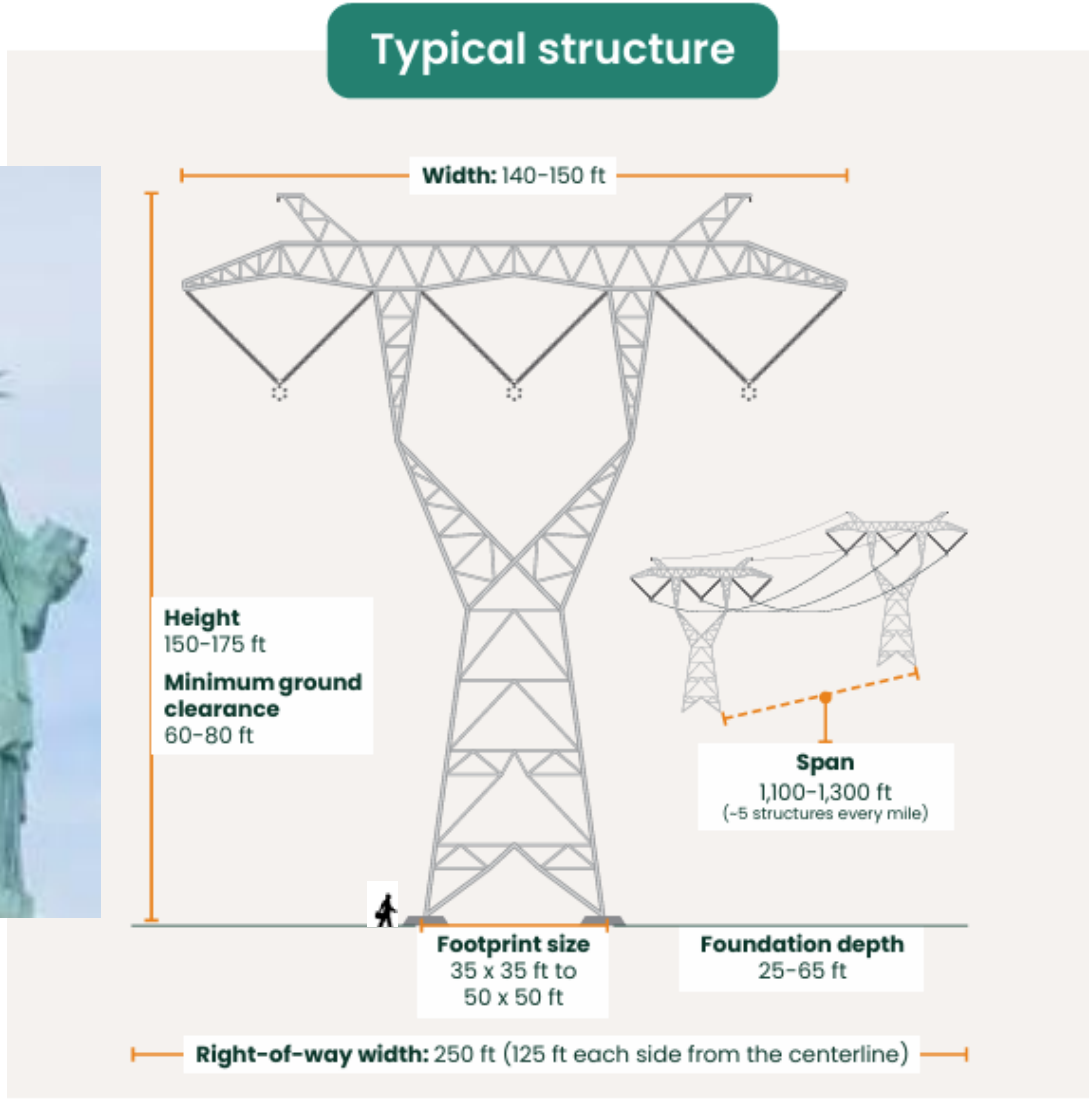
TRANSMISSION LINE TOWERS

230 & 500 kV



Right-of-way – 85' – 200'

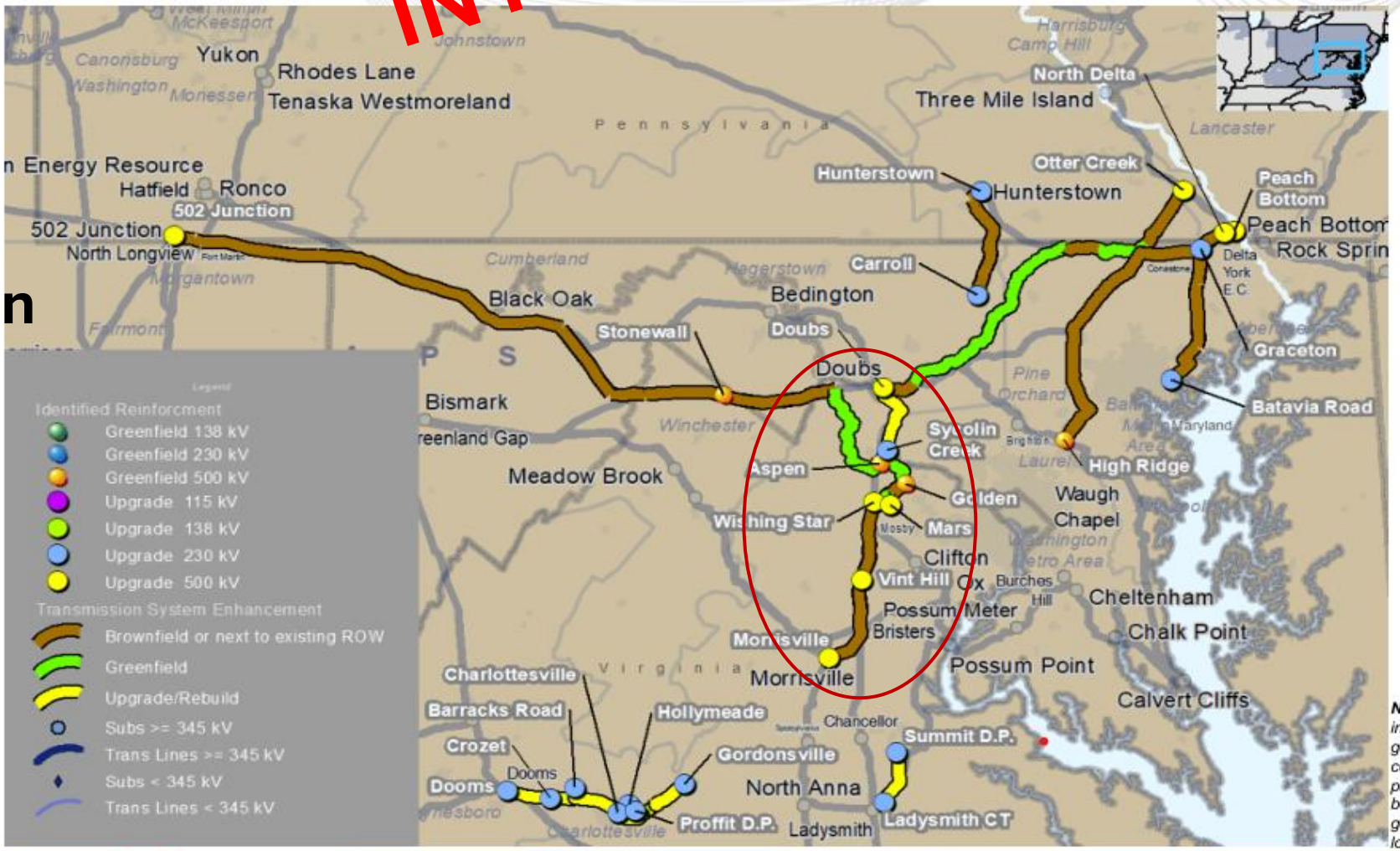
765 kV



RTEP 2022 Window 3

APPROVED – IN PROGRESS

Overview of Selected Proposals



$5.143 Billion

Projected In-service: 2027 - 2030

Primarily New 500 kV; two 230 kV

New or widened ROW

NOTE: This map is only intended to illustrate the general electrical connectivity of the projects, and should not be relied upon for exact geographical substation locations or line routes.

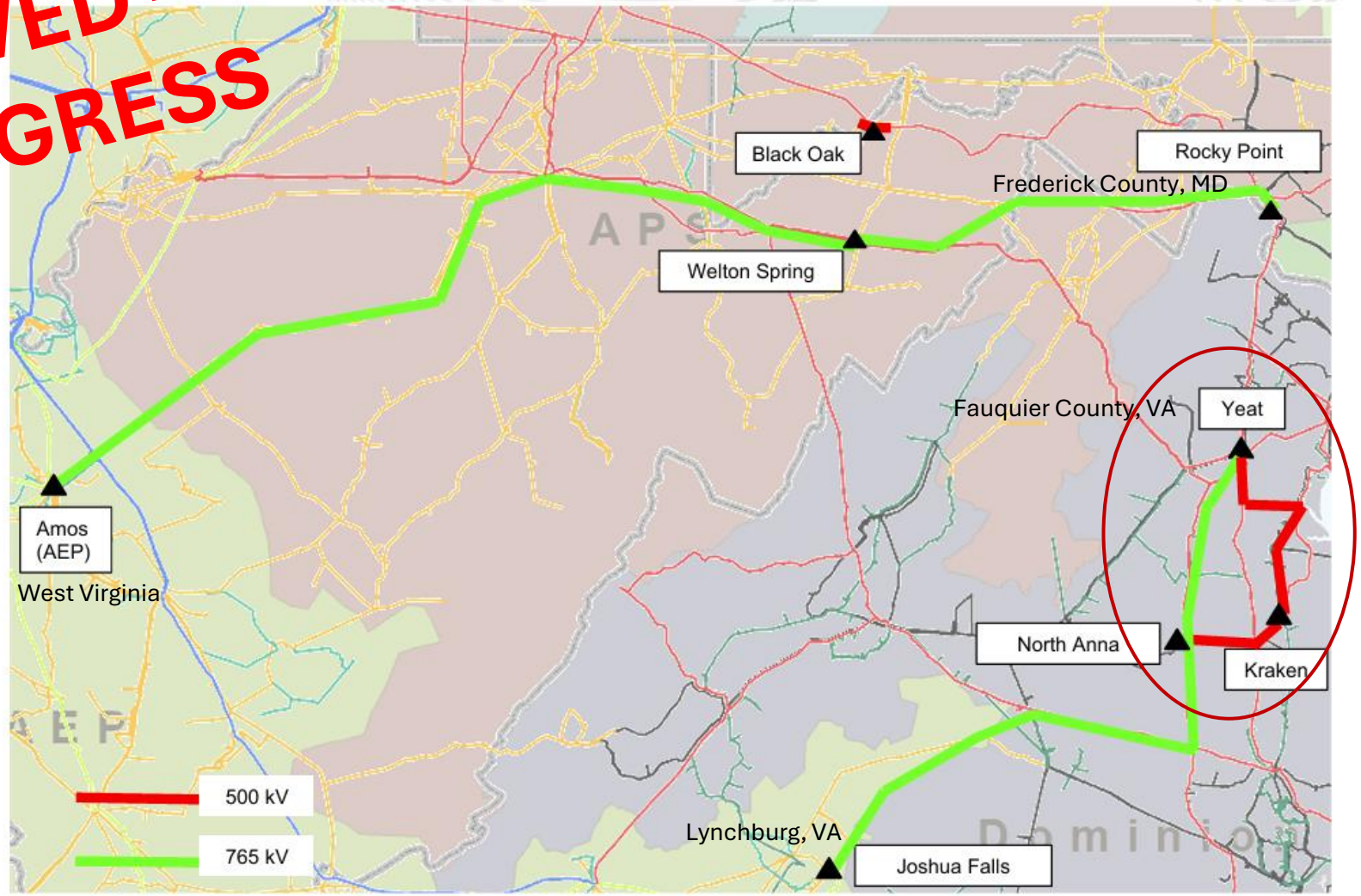
RTEP 2024 W1

Final – PJM Recommended Proposals
Regional Cluster – Summary

APPROVED – IN PROGRESS

$5.5 Billion

Projected In-Service: 2029



Primarily 765 kV; two 500 kV

New ROW

RTEP 2025 Window 1

- Initial Modeling Assumptions: Nov 2024 – Feb 2025
- Baseline Studies: May 2025
- Opened: June 18, 2025
- TEAC recommendation: December 8, 2025 (20251208-item-11---reliability-analysis-update.pdf)
- Targeted for PJM Board approval: February 2026

RECOMMENDED: 525kV *Buried* HVDC, Overhead 765kV & 500kV

COSTS

• South - VA (Dominion):	$4,817.73 Billion – Buried 525kV HVDC & Overhead 500kV
• Mid-Atlantic – PA, some WVA:	$1,738.59 Billion – 765kV & 500kV
• West – OH, some IND:	$2,768.00 Billion – 765kV
• Regional Short Circuit Upgrades	$18.5 Million
• Non-Regional:	$2,015.94 Billion

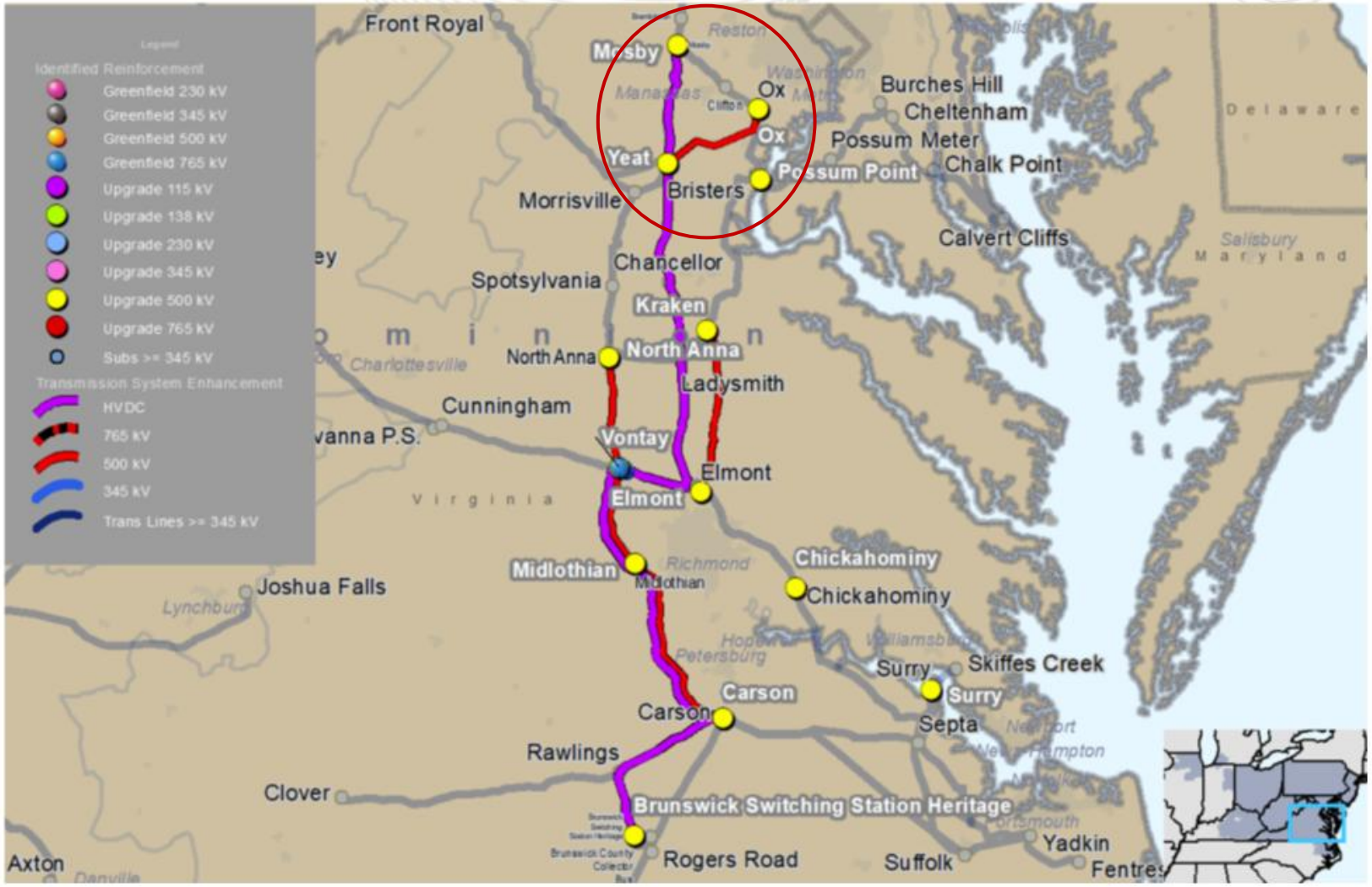
TOTAL	**$11,640.92 BILLION**

Southern – Dominion - Virginia

2025-W1-275

$4,817.73B

Projected In-Service: 2032

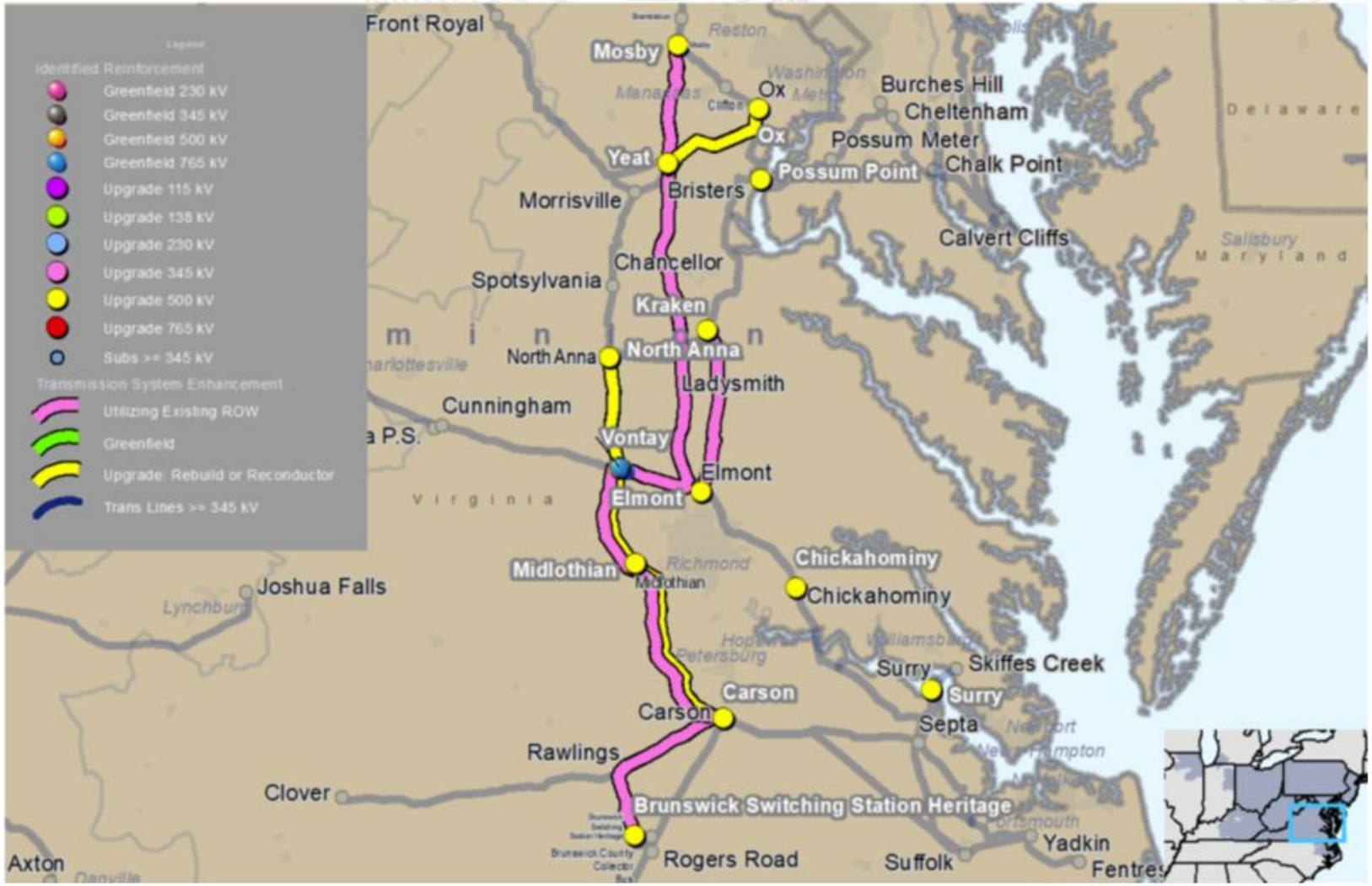


HVDC 525kV Buried (purple)

This map is only intended to illustrate the general electrical connectivity of the projects and should not be relied upon for exact geographical substation locations or line routes.

Southern – Dominion - Virginia

2025-W1-275



This map is only intended to illustrate the general electrical connectivity of the projects and should not be relied upon for exact geographical substation locations or line routes.

Dominion Transmission Zone: Baseline Regional Solution: 2025-W1-275 Portfolio Components

Proposal ID #	Project Title	Cost ($M)
2025-W1-9	Line 576 Partial Rebuild - Vontay to Midlothian	$104.86
2025-W1-117	Line 539 Rebuild - Yeat to Ox	$125.25
2025-W1-126	Line 567 Terminal Upgrade Chickahominy & Surry	$2.49
2025-W1-238	Line 563 Rebuild - Carson to Midlothian	$237.06
2025-W1-243	Carson Substation Equipment Upgrade	$12.44
2025-W1-247	New 765/500kV Switching Station - Vontay	$239.49
2025-W1-253	Line 5008 Cut-in into Mosby Substation	$16.25
2025-W1-306	New 500kV Line - Elmont to Kraken	$180.30
2025-W1-339	Line 576 Partial Rebuild - North Anna to Vontay	$104.86
2025-W1-815	New HVDC Transmission Link from Heritage to Mosby	$3790.85
2025-W1-916	Line 560 Rebuild - Possum Point to Burches Hill	$3.89
N/A	Scope Change: Yeat - Vint Hill Uprate	$0
		$4817.73

Selected Proposal
Dominion Area - Summary

- **PJM is recommending the HVDC-based Proposal #275 for development**
  - Proposal is the technically superior solution
    - Offers 500 ~ 1000 MWs higher South - North transfer capability
    - Significantly lower area impact than 765 kV overhead solution (use of Dominion existing rights-of-way and underground routing of the HVDC line)
    - Operational flexibility
    - Short circuit level mitigation (major concern in Dominion / Northern and Central VA)
  - Next leading solution is Transource Proposal #331 aided with a few Dominion 500 kV local fixes
  - HVDC proposal #275 is approximately $2Bn more expensive compared to proposal #331
    - Preliminary cost allocation analysis shows Dominion Zone carrying 50% of the cost (approximately)

Southern Cluster – Dominion Zone - Virginia

Common merits among Preliminary Shortlisted Proposals

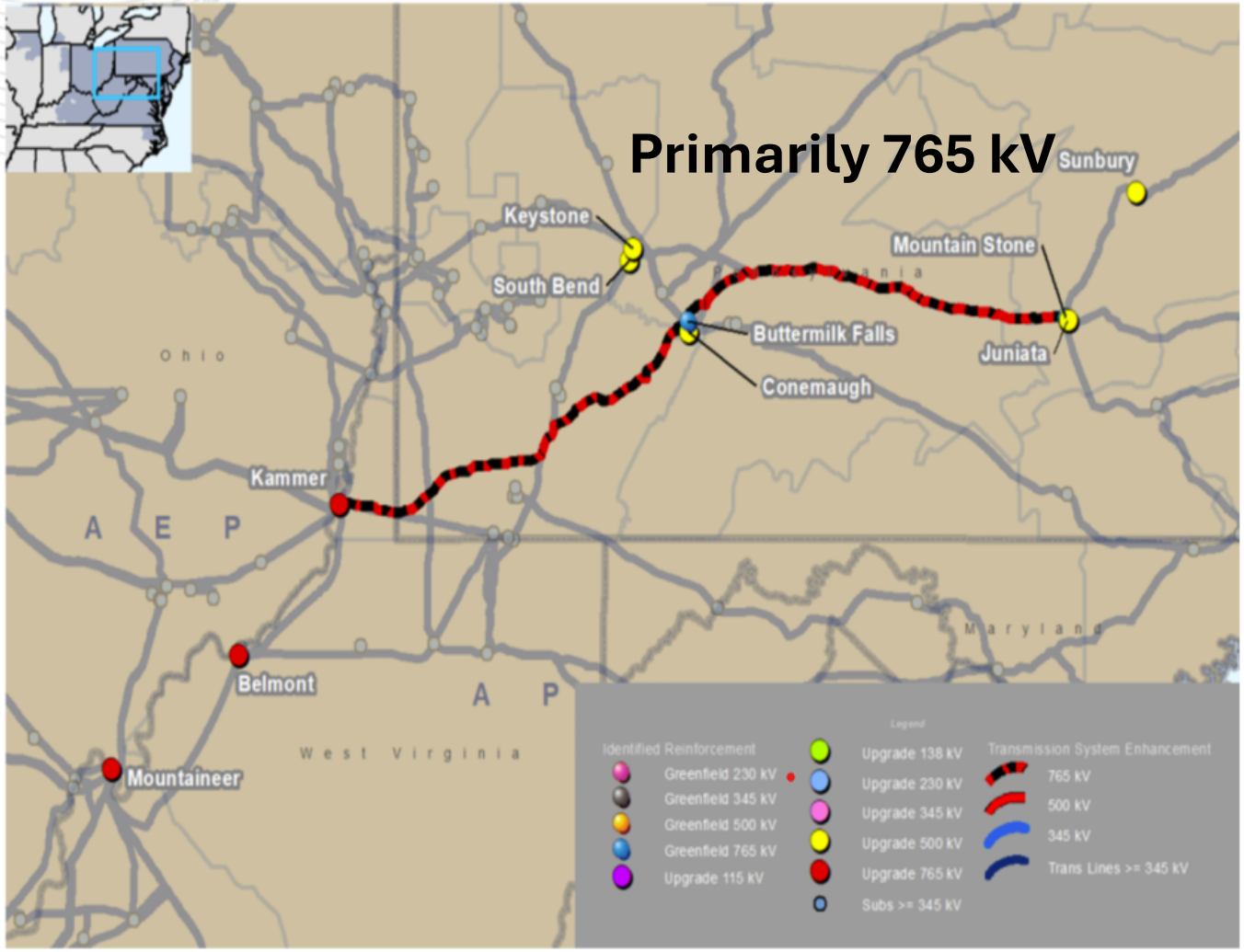
- All shortlisted proposals offer additional backbone paths from southern Dominion “towards” the Morrisville 500 kV Station
  - Direct path to connect generation in the south to the load center in the north
- While all preliminary short-listed proposals meet the posted need (at varying degrees), some offer more complete and even additional benefits / robustness merits such as:
  - Higher transfer capability from south to north
  - Direct injection of power closer to the data center alley area in Northern Virginia
  - More operational flexibility between north and south transfers
  - Minimizing short circuit issues that are already present in Dominion
  - Land use, environmental, social and constructability risk mitigation

Mid-Atlantic Cluster MAAC - Pennsylvania

Process Stage: First Read

Proposed Solution: 2025-W1-237

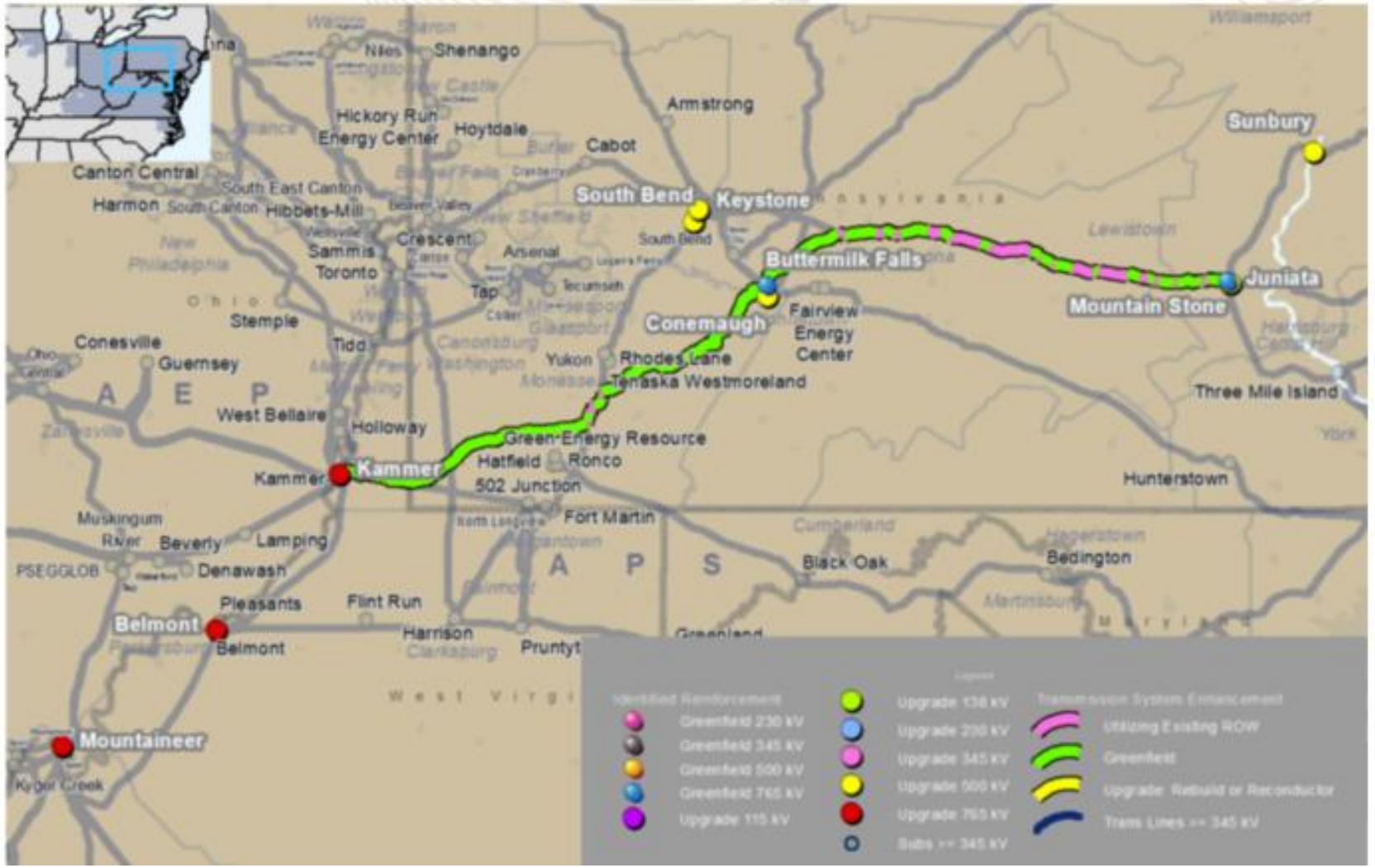
PJM Proposal ID	Component title
237	B-30-A) South Bend - Keystone 500kV terminal equipment upgrade
237	B-32-A) Keystone-Juniata 500 kV terminal equipment upgrade
237	B-33-A) Mountaineer-Belmont 765 kV terminal equipment upgrade
237	B-01-A) Kammer substation upgrade
237	B-07-A) Juniata substation upgrade
237	B-31-A) Sunbury 500 kV substation upgrades
237	B-34-A) Conemaugh circuit breaker upgrades
237	B-20-A) Kammer - Buttermilk Falls 765kV
237	B-21-A) Buttermilk Falls - Mountain Stone 765kV
237	B-24-A) Mountain Stone-Juniata 500kV
237	B-06-A) Mountain Stone 765kV Substation
237	B-19-B) Buttermilk Falls 765kV Substation



Estimated Total Cost: $1738.6M

Projected ISD: 6/1/2031

2025-W1-237



New ROW

PEPCO Transmission Zone: Baseline Exelon/PEPCO Cluster

Process Stage: First Read

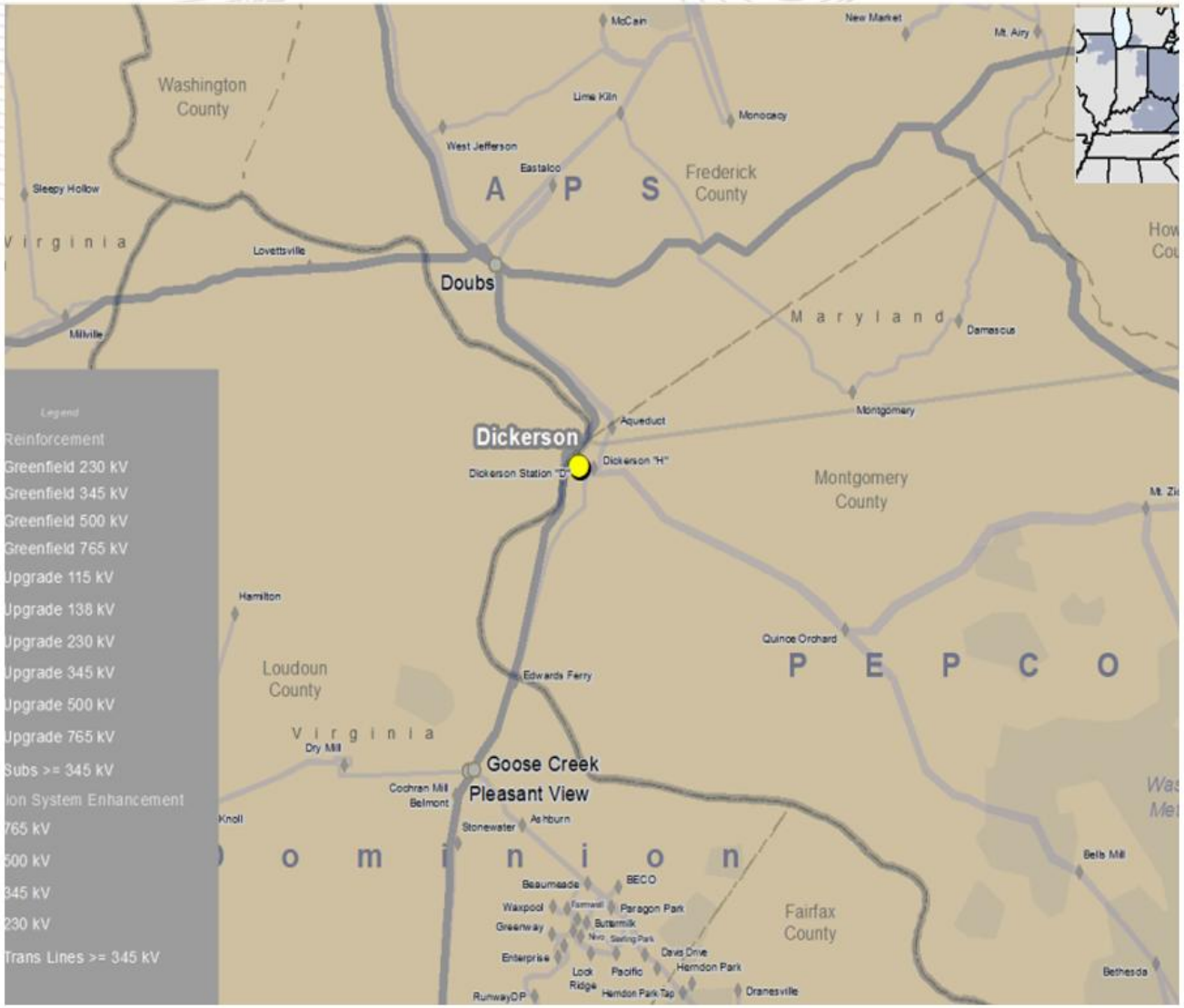
Proposal ID: 2025-W1-919

Proposed Solution (2025-W1-919):

Proposal ID	Project Description	Total Cost ($M)
919	New 500 kV substation (Dickerson) by cutting into the Aspen - Rocky Point 500 kV line installing two new 500/230kV transformers.	257.61
Additional Upgrade (component from 851)	Replace 2- Breakers, 1- Bushing CT, 1- Stranded Bus Conductor, 4- Disconnect Switches at Brighton 500 kV Substation	8
Additional Upgrade	Replace 1- Stranded Bus Conductor, 3- Thermal Relay, 2- Disconnect Switches at Quince Orchard 230 KV Substation	3.75
Additional Upgrade	Replace Bells Mill T3 XF with new PEPCO standard 260 MVA 230/138 kV Transformer	12.8
Total		**282.16**

Estimated Total Cost: $282.16 M

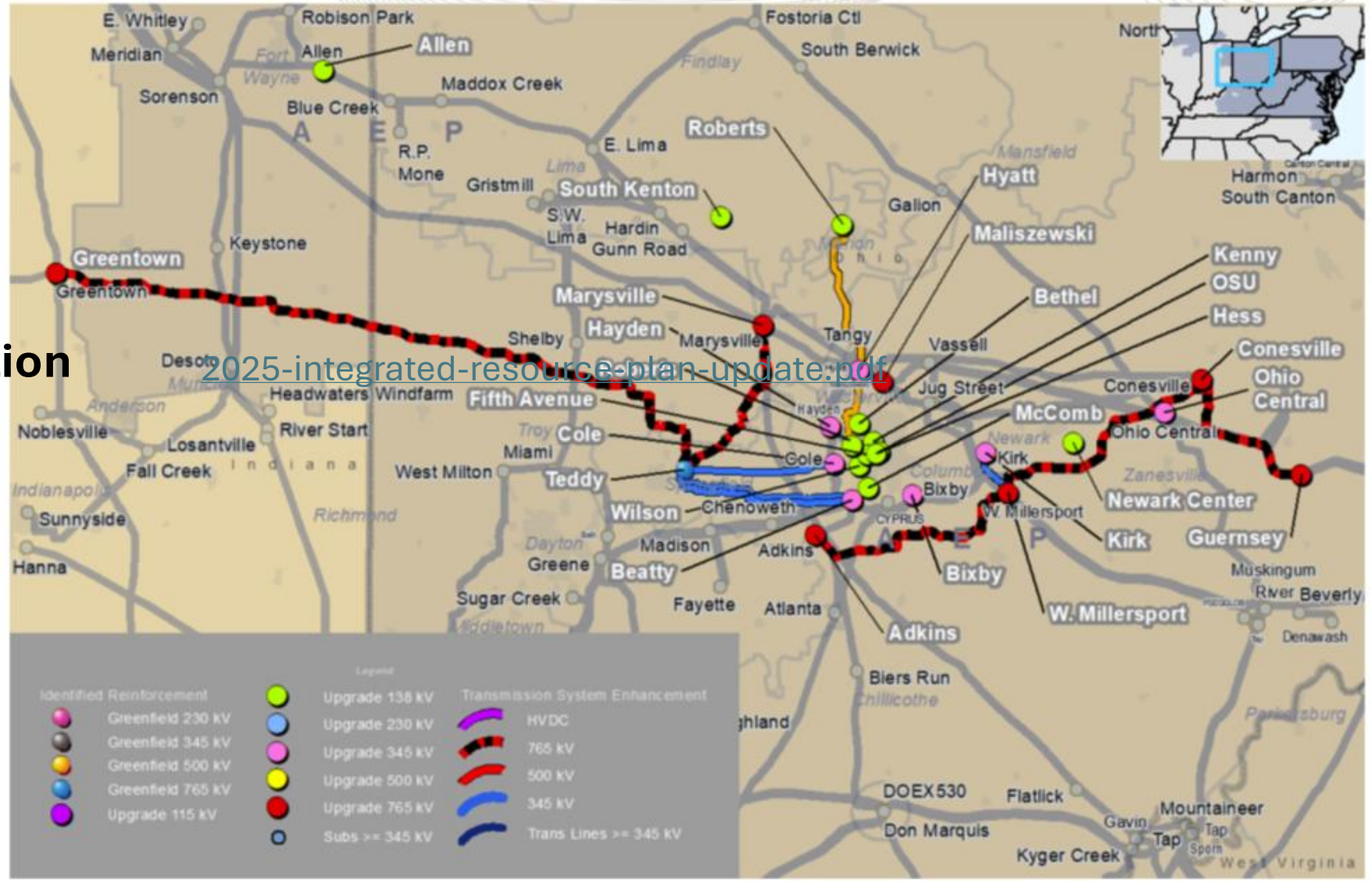
Projected ISD: 6/1/2031



Western Cluster – AEP/Dayton/ATSI/DEOK - Ohio

2025-W1-570

$2,768.00 Billion

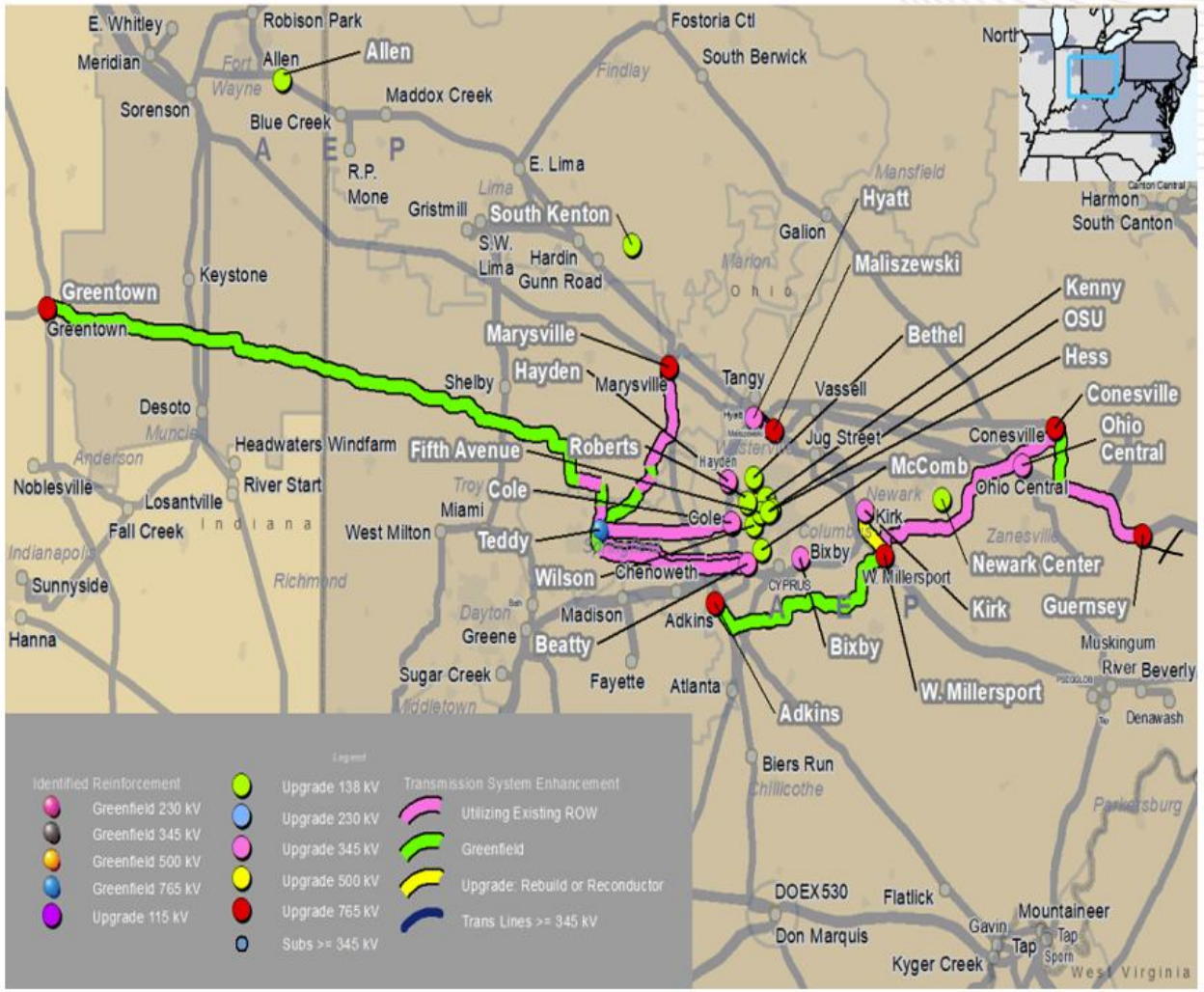


Primarily 765 kV

Western Cluster – AEP/Dayton/ATSI/DEOK - Ohio

Selected Solution: Modified Proposal 570

Required IS Date: 6/1/2030



PJM Recommends Transource Proposal #570

- Technically superior to other proposals with significantly better voltage performance under N-1-1 conditions
- More cost effective: Approx. ~$600M less than proposal #152 based on independent cost
- Lower constructability and regulatory risk and higher utilization of existing ROWs.

APPENDIX

2022 Window 3

RTEP 2022 Window 3

(20231205-item-15---reliability-analysis-update-2022-window-3.pdf)

- Opened February 24, 2023
- **Purpose:**
  - Address reliability needs in the Dominion and APS zones primarily associated with Data Center Load forecasts (up to 7,500 MWs by 2027-28)
  - Seeking robust and flexible solutions to address the reliability needs in those specific areas
- Board approved in January 2024
- **Cost: $5,142.98 Billion**

2022 Window 3 Overview of Selected Proposals

Cluster	Overview	Proposal Cost ($M)
East	New and upgrade 500 kV lines New and expanded 500 kV stations	$1,443.12
West	New 500 kV line New 500 kV station New voltage support devices	$940.85
Northern VA	New 500 kV and 230 kV lines New 500 kV station	$1,418.3
South	New and upgraded 500 kV and 230 kV lines New voltage support devices	$1,265.85
Local	Station reconfiguration	$11.59
Short Circuit	500kV and 230KV Breaker replacement	$63.27
	Total	**$5,142.98**

2023 Window 1

RTEP 2023 Window 1

APPROVED – IN PROGRESS

- Nothing in Virginia
- All in Illinois
- 765kV transformer – enable flow to Eastern data center load demand
- Recommended solution to PJM Board February 2024
- Projected In-Service - 2028

- Cost:
  - Cluster 1 - $42.05 Million (20240109-final-review-and-recommendation---2023-rtep-window-1---cluster-1.pdf)
  - Cluster 2 - $61.84 Million (20240305-final-review-and-recommendation---2023-rtep-window-1----cluster-2.pdf)

TOTAL $103.89 Million

2023 Window 2

RTEP 2023 Window 2 (20240709-item-10---reliability-analysis-update.pdf)

- Shortened window – Immediate Need project
- Opened March 6, 2024
- Closed April 5, 2024
- Approved 4:
  - AEP – for new data center loads in Columbus, Ohio area – 765kV & 345kV
  - Dominion 588 – End of Life - 500kV
  - PSEG – thermal issues – mostly 230kV
  - Additional 'reliability' issues
- Projected In-Service: 2027-2028

- **Cost:** $118.309 Million

APPROVED – IN PROGRESS

2024 Window 1

RTEP 2024 Window 1

- Opened July 24, 2024
- PJM Board approval February 2025 – 765 & 500kV
- **Cost:** $5,500.00 Billion

What is at risk? **EVERYTHING**

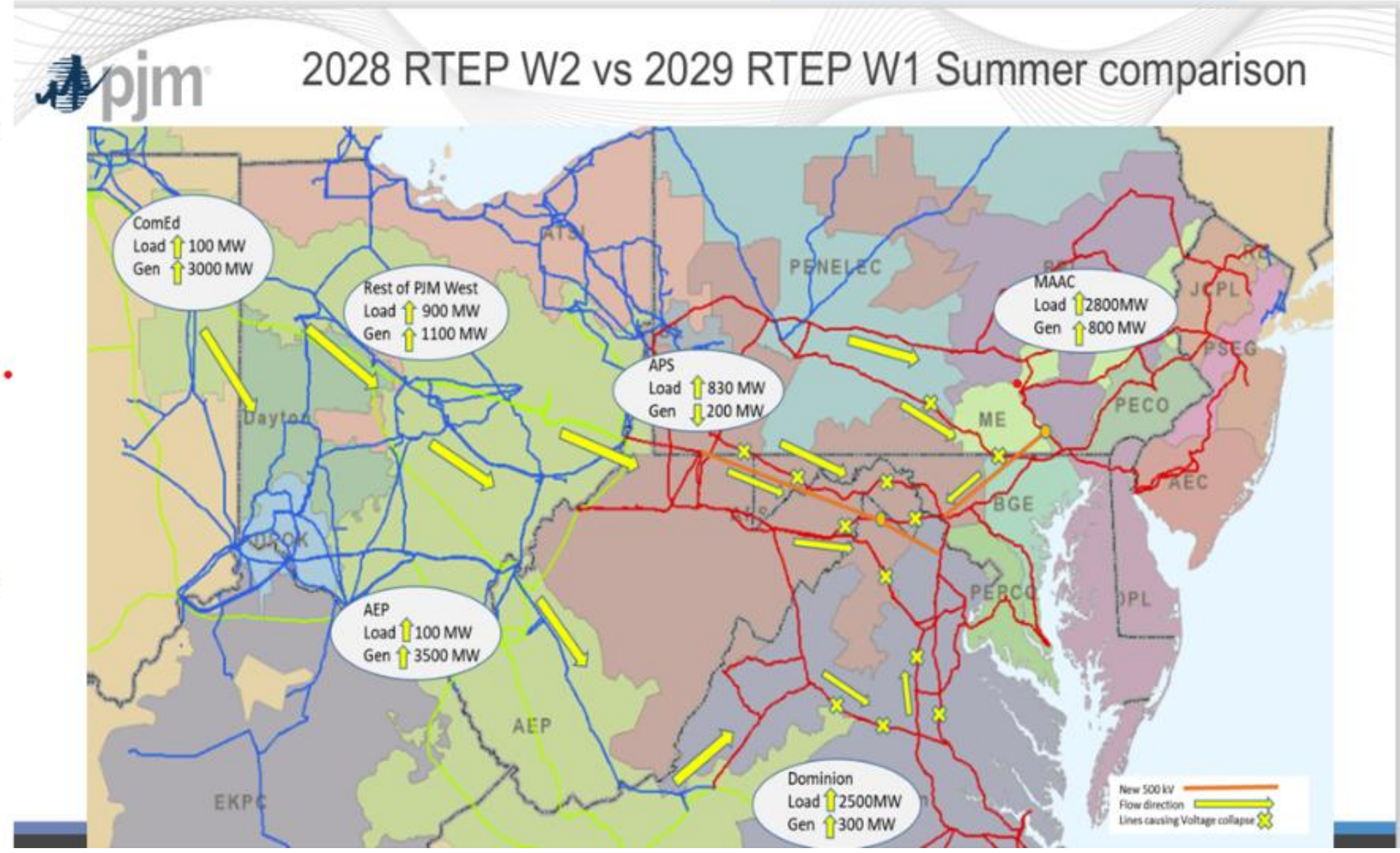
New 500 kV
Flow direction
Lines causing Voltage collapse

Note all the Yellow Xs

What does **LINE VOLTAGE COLLAPSE** mean?:

Voltage collapse is a type of instability in an electric power system that can lead to a blackout. It occurs when a system becomes heavily loaded and voltage levels decline, causing a cascading outage. Voltage collapse is often linked to a lack of reactive power in the system, which can be caused by a shortage of production or transmission (Industry's definition)

Note the flow directions

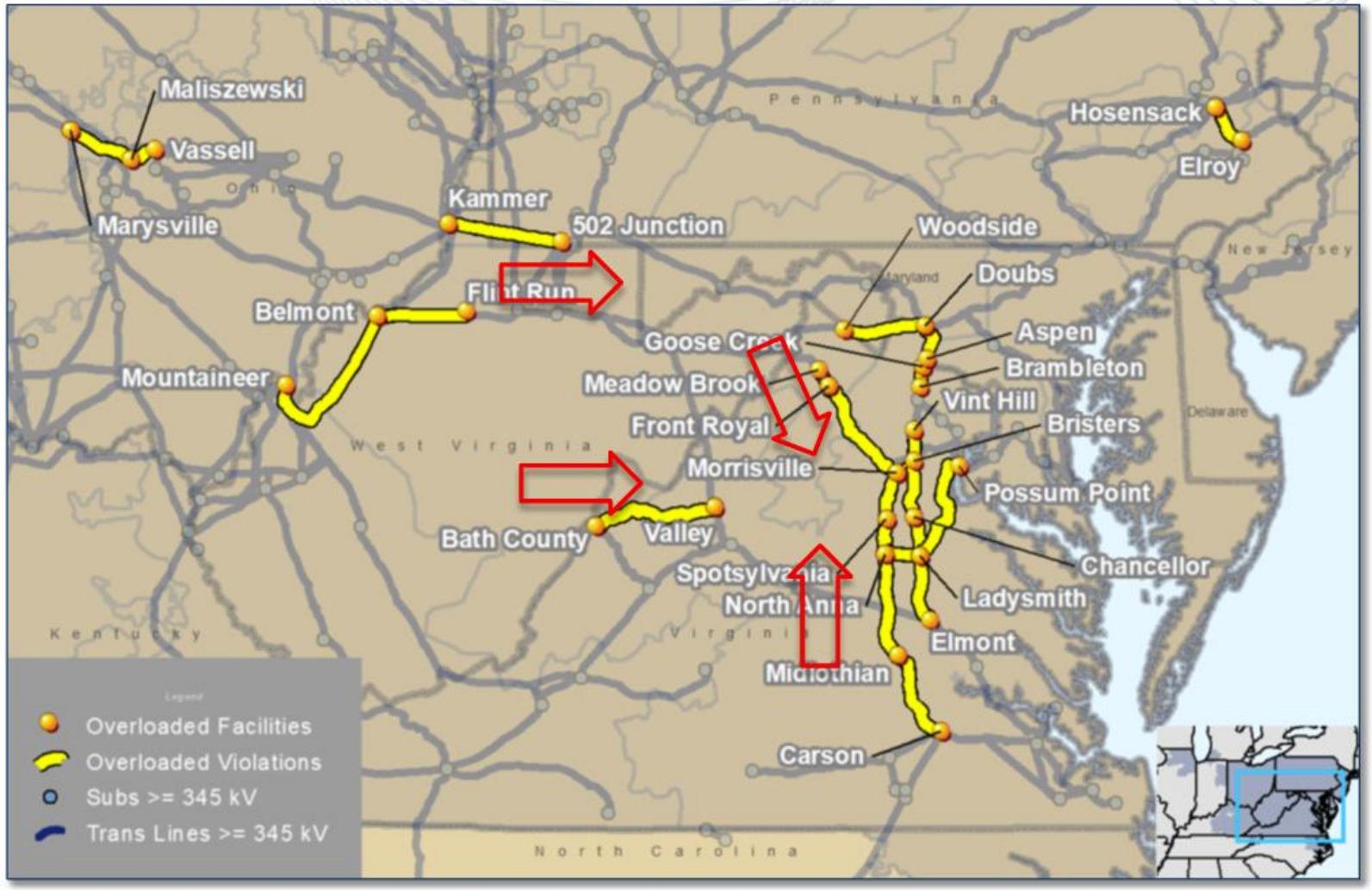


2024W1 RTEP – Needs Summary (5-Years)

- Heavy transmission interface flows West-East driven by load increase in Dominion/East and sourced generation in both Western and Eastern PJM
- PJM earlier identified need for additional West-East reinforcement is materializing earlier – higher anticipated load in MAAC/Dominion
- Proposed reinforcement through 2022W3 and 2023W1/W2 performing well
- Additional upgrades within AEP and ComEd will be needed to support West-East interface bulk flows

2024 RTEP Window 1 Needs: 500 kV & 765 kV

Overloaded



2024 W1 Final – PJM Recommended Proposals Regional Cluster – Summary

PJM Proposal ID	Project Title/Description	Project Submittal Responsibility
967 Modified	*Kraken Loop* • Termination at Yeat (not Bristers South/Town Run) • Refinements (reduction/deferral) of some proposed 230 kV developments.	Dominion
820 Modified	*Joshua Falls-Yeat 765 kV (Southern Corridor)* • Route to follow Joshua Falls-Vontay-Morrisville South	Transource
708	John Amos-Welton Springs-Rocky Point 765 kV (Northern Corridor)	First Energy
551	Woodside/Chanceford 500 kV terminal swap at Doubs	First Energy
81	AEP incumbent upgrades for Portfolio #1, 2 and 3	Transource
24 Modified	*Dominion reinforcements (230 kV and 115 kV solutions)* • Exclusion of 230 kV line #238 (Carson-Clubhouse) rebuild	Dominion
781 Modified	*Dominion Reinforcements (500 kV solutions)* • Exclusion of 500 kV North Anna-Vontay uprate	Dominion
617 Component	• Replace the wave trap and upgrade the relay at Cloverdale 765 kV • Replace the wave trap and upgrade the relay at Joshua Falls 765 kV	Transource

Regional and Dominion/APS selected proposal costs (approximate):

As submitted: ~ $5,500.0 M

Optimized: ~ $4,647.0 M

2025 Window 1

RTEP 2025 Window 1

- Drivers:
  - South - Dominion - Virginia
    - 500kV violations in North-South corridor
    - Data center load demand in NoVa and from Pennsylvania
  - MAAC – Mid-Atlantic Area Council – Pennsylvania
    - Data center load growth demand
    - Overload on five 500kV transmission lines
  - West – Ohio
    - Load increase in Columbus and Melissa areas (*data centers*)
    - Thermal violations due to increased exported flows to Eastern and Southern PJM

- ***Primary drivers for all: Data center demands***

2025 Window 1

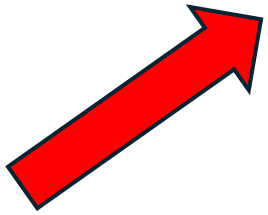
Southern Cluster

Virginia

2025 Window 1 - Dominion Needs Overview

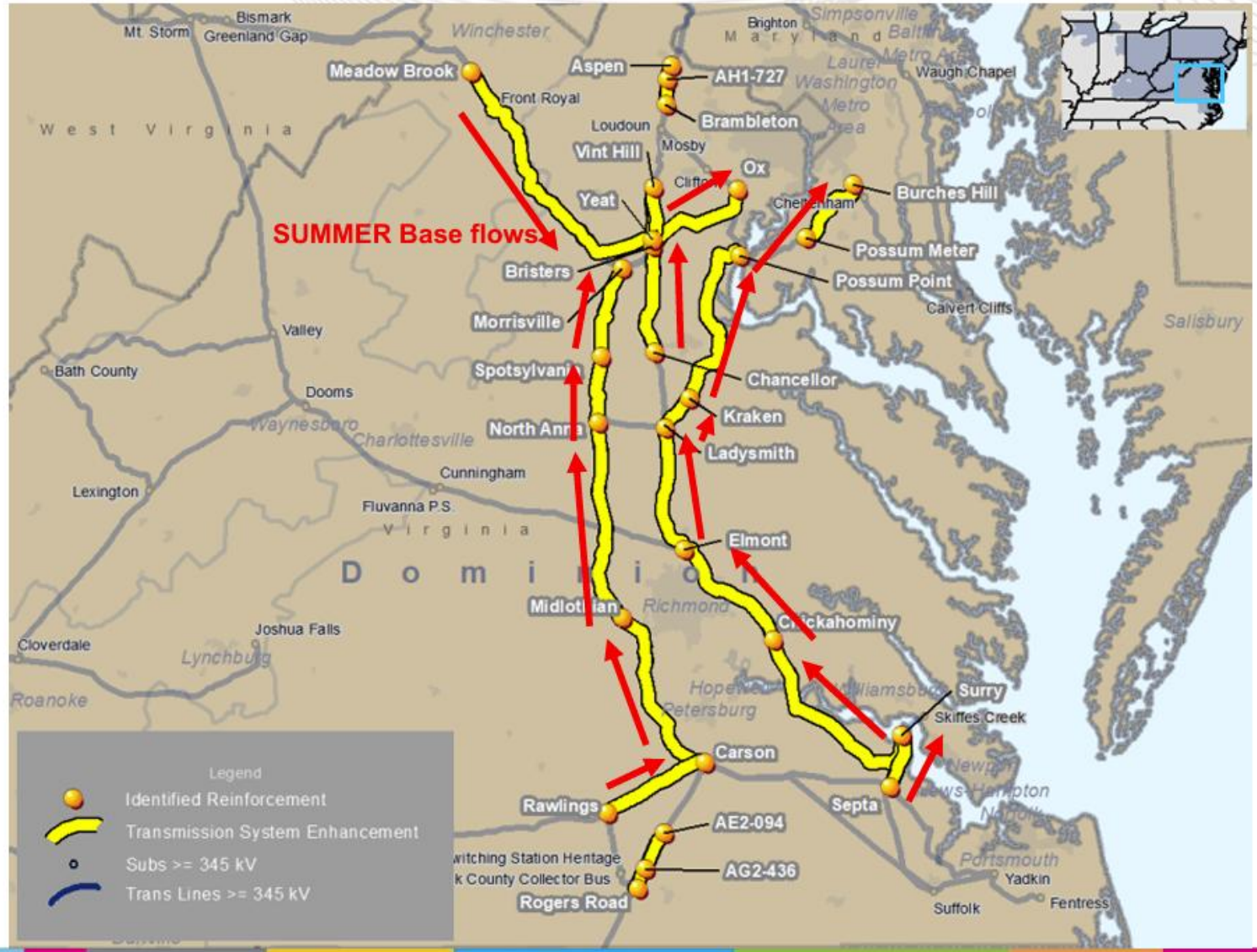
- The Dominion area is experiencing multiple 500kV violations along its primary South - North corridor in 2032.
  - Violations are predominantly being driven by:
    - Additional generation added in the south that is flowing to the load centers in northern VA (NOVA).
    - Increases in load with a heavier concentration in the NOVA area.
    - Further increase in PJM load overall – currently, an increase in data center load external to Dominion (PPL zone).
  - These needs require long-lead, backbone enhancements requiring more than 5 years to develop.

- The 2032 case is showing the need to reinforce the southern 500 kV transmission backbone.
  - This 500 kV corridor includes multiple South - North 500kV elements.
  - The southern transmission backbone will support the transfer of resource capacity from the southern edge of the PJM system into the Northen VA and help balance flows between West - East and South - North.



- 230 kV transmission lines: Chesterfield – Basin & Chesterfield – Hopewell will be addressed as part of the 2030 set of violations.

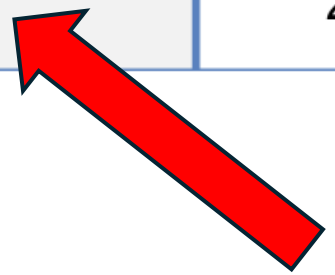
2032 Dominion Violations – 500 kV



Also included in 6/5/25 TEAC Reliability deck – as 'Preliminary' violations

All proposals submitted to address Dominion 2032 regional flows recommend 765 kV, 500kV or HVDC developments:

All proposals offer additional south to north paths to transfer power from planned generation in the south to load centers in the north.



- 4 Dominion proposals recommend a +/- 525 kV HVDC link variants from Heritage to Mosby.
- Multiple proposals offer 765 kV developments with one or more lines heading to the Morrisville area.
- A couple of proposals focus on 500 kV developments with some additional 230kV reinforcements in the northern Virginia area.

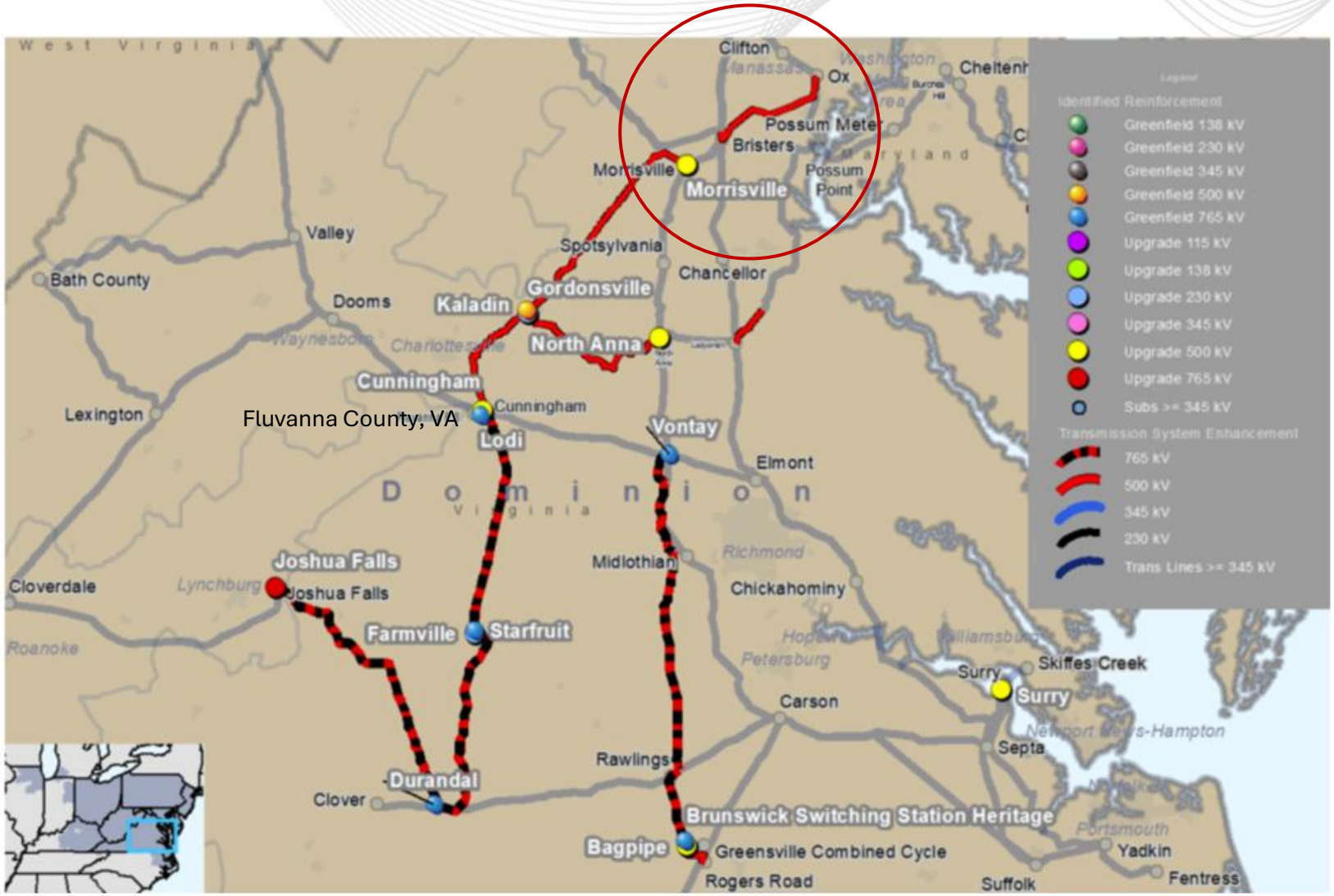
2025 RTEP Window 1

Proposals Overview

Dominion Regional Cluster Proposals – 2032			
Proposing Entity	**Proposal ID**	**High Level Discription**	**Total Cost ($ M)**
Dominion	2025-W1-275 (1A - HVDC)	• New HVDC Transmission Link from Heritage to Mosby (~185 miles), new 500kV line Elmont-Kraken, various 500kV rebuilds, new 765/500kV switching station & various substation equipment upgrades.	$4819.51
Dominion	2025-W1-326 (1B - HVDC)	• New HVDC Transmission Link from Heritage to Mosby (~185 miles), new 500kV line Chickahominy-Kraken, new 500kV line Skiffes Creek-Chickahominy, various 500kV rebuilds, new 765/500kV switching station & various substation equipment upgrades.	$5009.03
Dominion	2025-W1-547 (1C - HVDC)	• New HVDC Transmission Link from Heritage to Mosby (~185 miles), new 500kV line Vontay-Kraken, various 500kV rebuilds, new 765/500kV switching station & various substation equipment upgrades.	$4904.5
Dominion	2025-W1-352 (1D - HVDC)	• New HVDC Transmission Link from Heritage to Mosby (~185 miles), new 500kV line North Anna-Vontay, various 500kV rebuilds, new 765/500kV switching station & various substation equipment upgrades.	$5013.97
Dominion	2025-W1-705 (2A – 765kV)	• New 765kV line from Heritage to Yeat (~152 miles), new 500kV line Chickahominy-Kraken, new 500kV line Skiffes Creek-Chickahominy, various 500kV rebuilds, new 765/500kV switching station & various substation equipment upgrades.	$2864.73
Dominion	2025-W1-848 (2B – 765kV)	• New 765kV line from Heritage to Yeat (~152 miles), new 500kV line Vontay-Kraken, various 500kV rebuilds, new 765/500kV switching station & various substation equipment upgrades.	$2969.05
Dominion	2025-W1-352 (2C – 765kV)	• New 765kV line from Heritage to Yeat (~152 miles), various 500kV rebuilds & various substation equipment upgrades.	$2273.85
Dominion	2025-W1-616 (3A – 616)	• New 500kV line from Heritage-Morrisville, new 500kV line Finneywood-Cunningham, new 500kV line Morrisville-Cunningham, various 500kV rebuilds, new 765/500kV switching station & various substation equipment upgrades.	$2349.26
Transource	2025-W1-331 (2-765kV)	• Construct Bagpipe 765kV, Vontay 765kV, Durandal 765/500kV, Starfruit 765/230kV, Lodi 765/500kV, and Kaladin 500/230kV substations. Construct Bagpipe–Vontay, Joshua Falls–Durandal 765kV, Durandal–Starfruit 765kV, Starfruit–Lodi 765kV, Lodi–Cunningham 500kV, Lodi–Kaladin 500kV, Kaladin–North Anna 500kV, and Kaladin–Morrisville 500kV lines.	$2895.32
Transource	2025-W1-781 (1-765kV)	• Construct Durandal 765/500kV, Starfruit 765/230kV, Lodi 765/500kV & Kaladin 500/230kV substations. Construct Joshua Falls–Durandal 765kV, Durandal–Starfruit 765kV, Starfruit–Lodi 765kV, Lodi–Cunningham 500kV, Lodi–Kaladin 500kV, Kaladin–North Anna 500kV, and Kaladin–Morrisville 500kV lines.	$1986.45
TRAIL	2025-W1-938 (765kV)	• New Lea Anna 765 kV, Ladysmith 765 kV, Rogers Rd 765 kV, Centerville Rd 765 kV, Perkins Rd 765 kV, Creekward 500 kV Switchyards, substation expansions at the following locations: Bristers 500 kV, Morrisville 500 kV, Rogers Rd 500 kV, Carson 500 kV, new substations at the following locations: Bristers 765/500 kV, Morrisville 765/500 kV, Lea Anna 765/500 kV, Ladysmith 765/500 kV, Rogers Rd 765/500 kV, Perkins Rd 765/500 kV, new transmission lines: Lea Anna - Ladysmith 765 kV, Ladysmith - Bristers 765 kV, Lea Anna - Morrisville 765 kV, Centerville Rd - Rogers Rd 765 kV, Rogers Rd - Perkins Rd 765 kV, Perkins Rd - Lea Anna 765 kV, Carson - Creekward 500 kV Line & relay setting revisions at Ladysmith	$3426.93
LS Power	2025-W1-260 (500kV)	• New 765/500kV Middle Fork, 500kV South Fork and 500kV Turkey Creek Substations, Substation expansions at the following locations: Warrenton, Wheeler, Brickyard, Vint Hill, Cunningham, Morrisville, Rawlings, Carson Expansion, new 500kV lines: Front Royal - Vint Hill, Cunningham - Middle Fork #1 & #2, Middle Fork - Morrisville #1 & 2 and Rawlings - South Fork.	$2207.36

Not Selected in 2025 Window 1

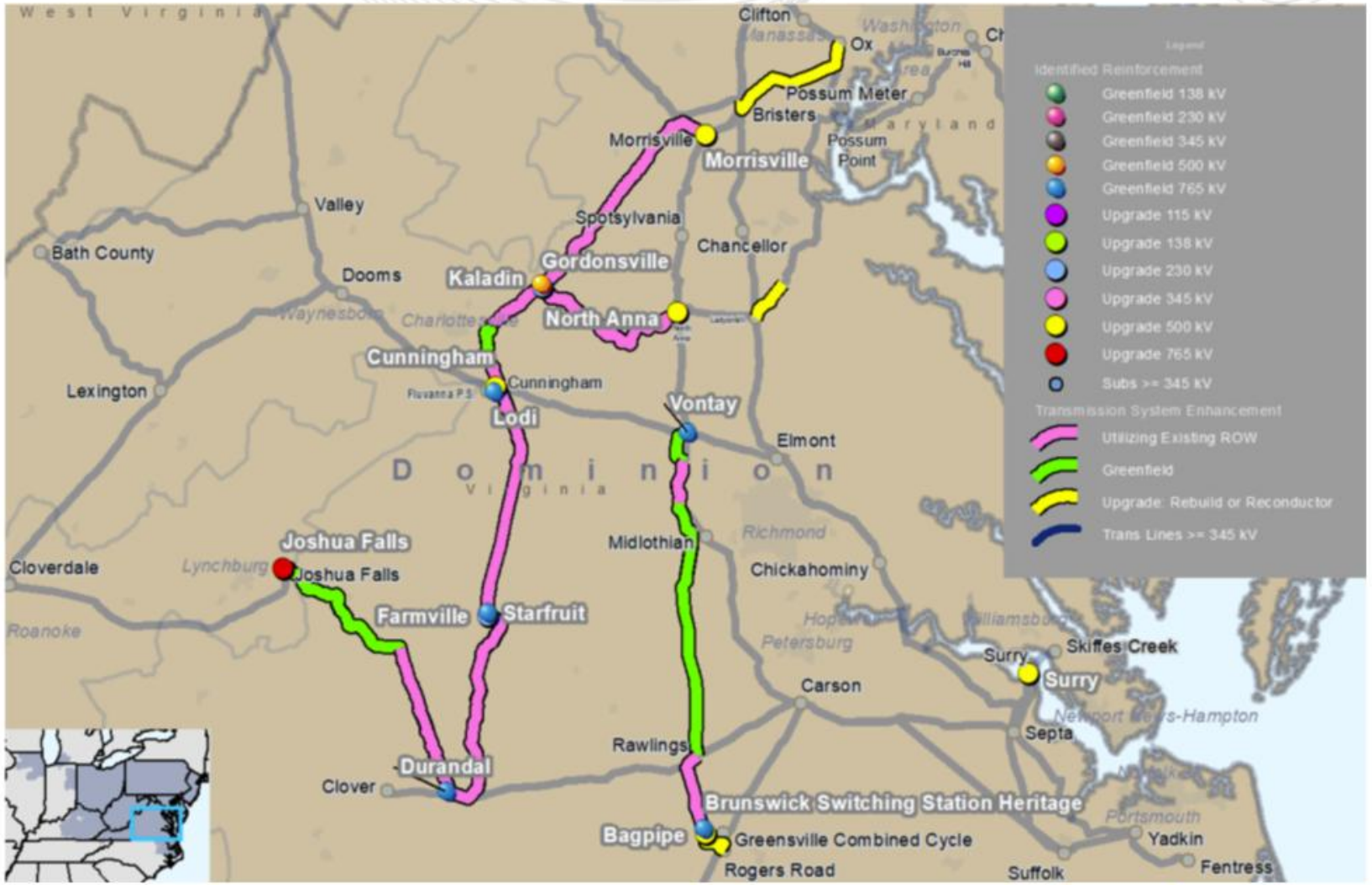
2025-W1-331



765kV Overhead Red-Black (HVAC)

This map is only intended to illustrate the general electrical connectivity of the projects and should not be relied upon for exact geographical substation locations or line routes.

2025-W1-331



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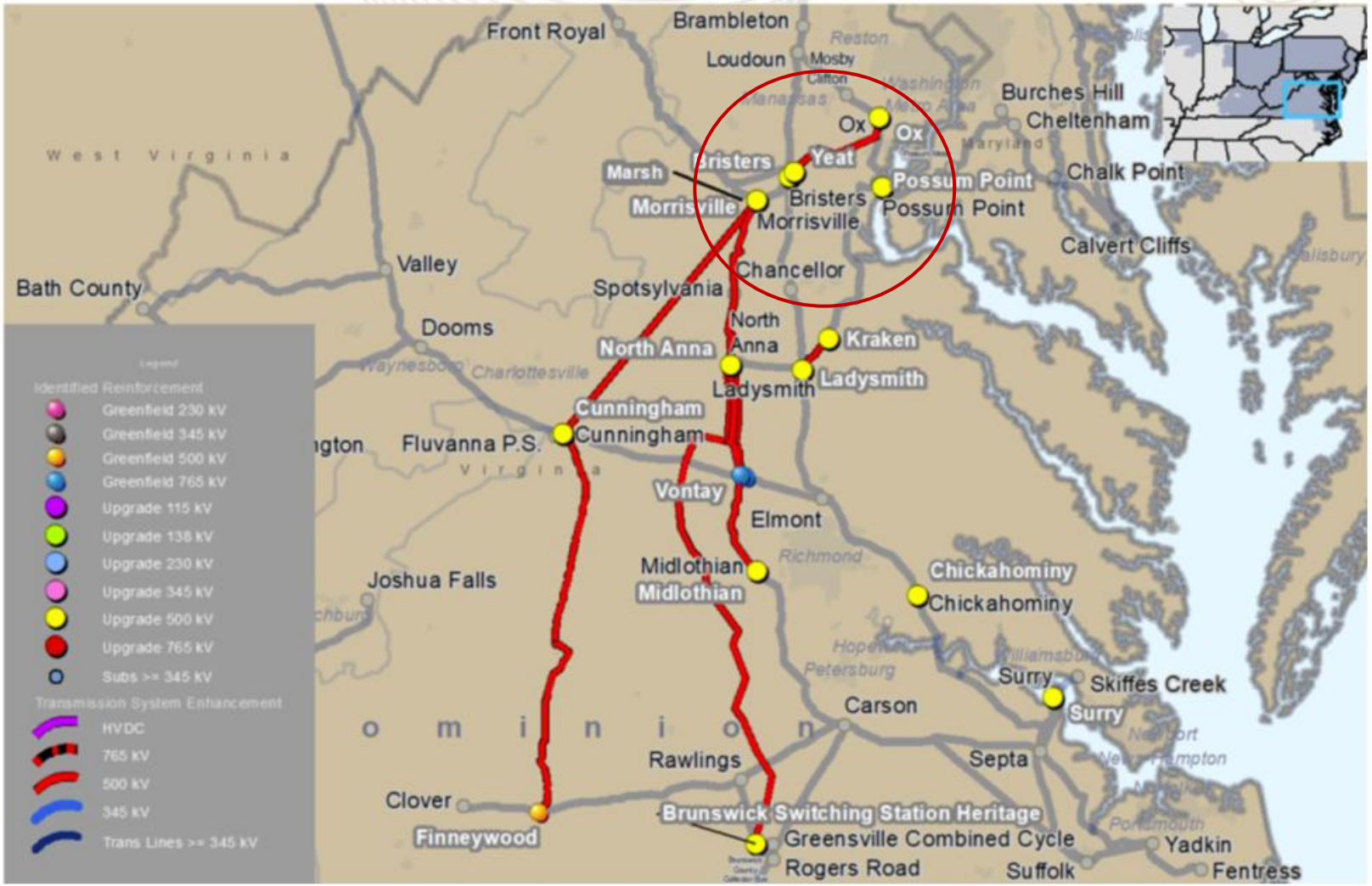
Not selected in 2025 Window 1

2025-W1-616



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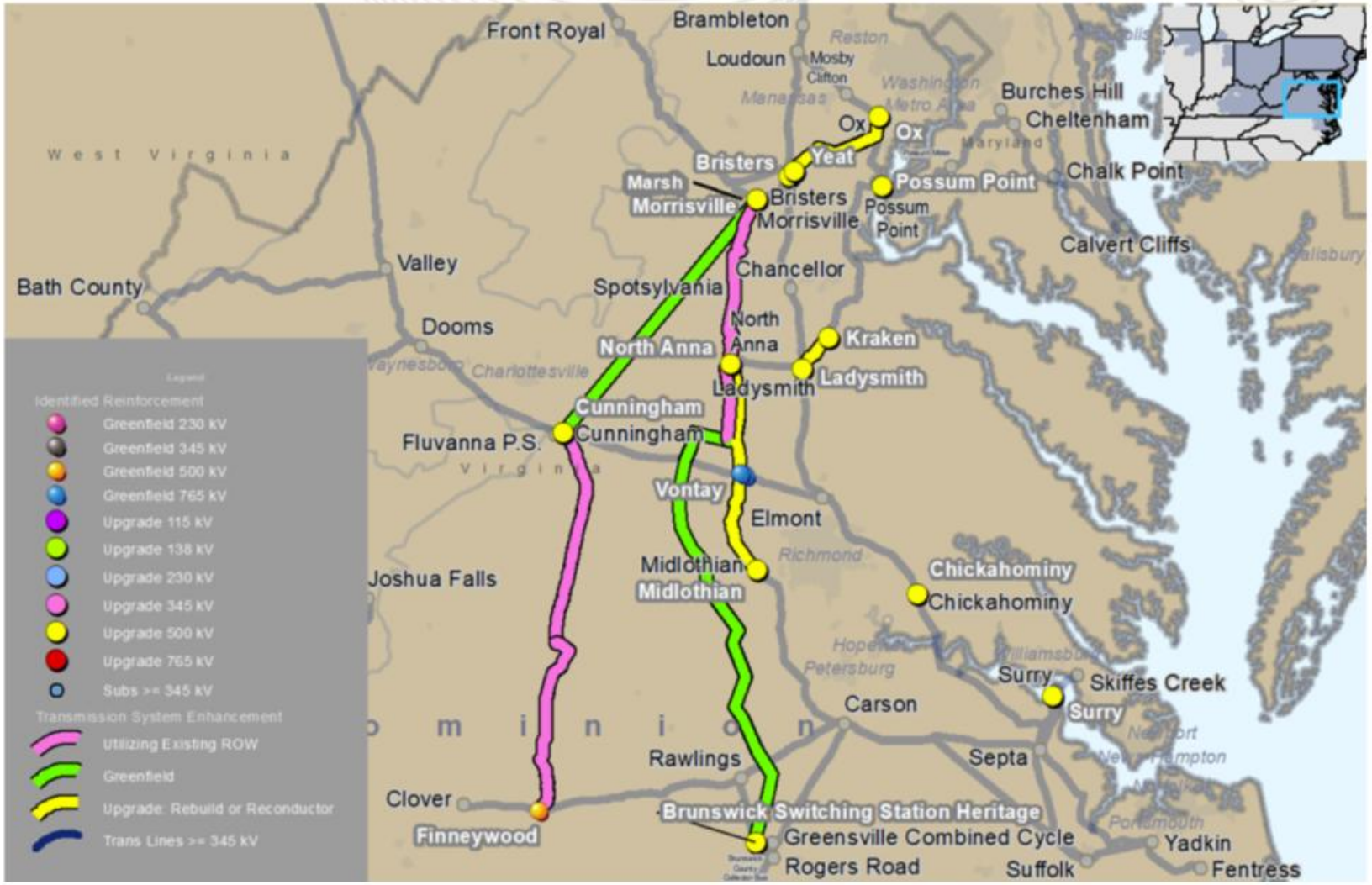
2025-W1-616



This map is only intended to illustrate the general electrical connectivity of the projects and should not be relied upon for exact geographical substation locations or line routes.

2025 Window 1 RTEP
MAAC Regional Transfer Cluster Proposal Summary

Pennsylvania

2025 RTEP Window 1 - MAAC/PPL Needs Overview

PPL Load Growth:

- PPL zonal load in the year 2030 increased by approximately 5 GW from the 2024 to the 2025 load forecast
  - The load growth is primarily driven by data center demand and trends indicate this growth will continue beyond the 2030
  - PPL submitted additional ~3.5GWs not included in the 2025 load forecast

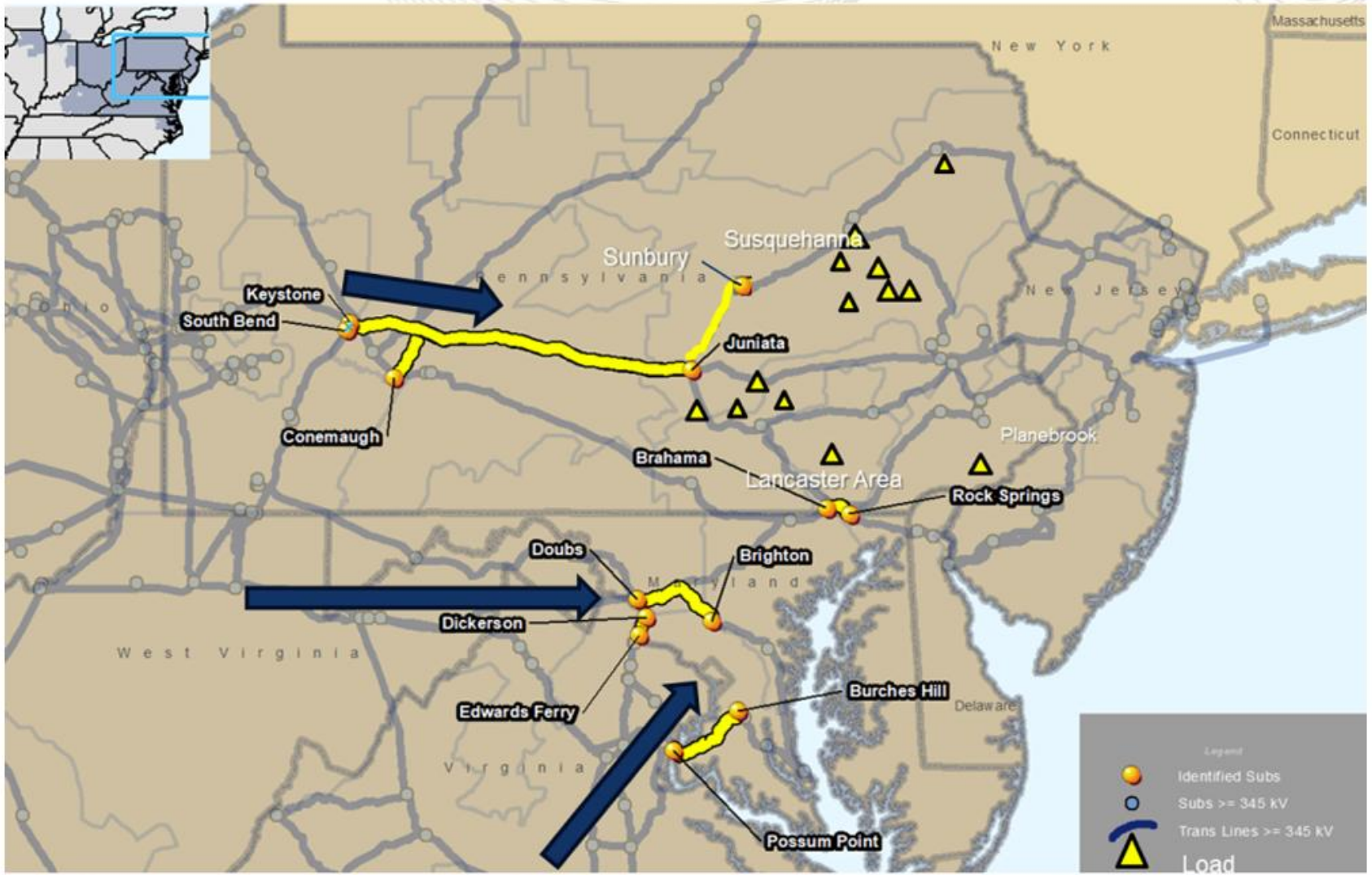
NJOSW In-service Delay Impact:

- The scenario with the removal of the 7.5GW NJOSW in-service increases the transfer to the Mid-Atlantic region
- The need for regional transfer to MAAC from West and South increased, resulting in additional overload on five 500 kV transmission lines.
- These lines primarily support power flows from the west and south toward the Mid-Atlantic region
  - The Keystone – Juniata 500 kV is overloaded regardless of NJOSW or the additional PPL Load (West to East flows)

NJOSW In-service Delay + PPL (~3.5GWs) Load

- The removal of the NJOSW combined with the additional PPL (~3.5GWs) load further increased the need for transfer to Mid-Atlantic region.
- This increase represents the increase in the short term (due to NJOSW delays) or for the further timeframe (due to forecasted MAAC load increase/retirements)

MAAC Regional Needs Overview (2032)



2025 Window 1

West Cluster (AEP/DATYON/ATI/DEOK)

Ohio

Western Cluster – Needs Overview

Drivers
- Load increase in Columbus area
- Load increase at Melissa area
- Regional flows towards Eastern and Southern PJM Regions.

Violations
- Thermal overloads in AEP/Dayton/ATSI
- Widespread voltage issues in AEP/Dayton/ATSI/DEOK