

# PJM

## Data Center-Driven

# Transmission Expansion Projects

2022 - Present

Karen Sheehan



Coalition to Protect Prince William County

November 2025

- **This Review Includes:**

- **Transmission Expansion ‘Reliability’ projects**
- Require PJM board approval before proceeding to route determination and Va. SCC process
- Most are 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

## Researched PJM TEAC (Transmission Expansion Advisory Committee) decks:

- PJM started alerting to **data center driven load** in ~2022
- Dominion identified supplemental 230kV projects for **data centers** starting in about 2010:
  - Shellhorn – 2010
  - Clover Hill - 2016
  - Henrico – 2017
- July 1, 2022: Dominion made Immediate Need announcement, listing **increased data center loads starting from 2018** to that time in 2022

## 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.

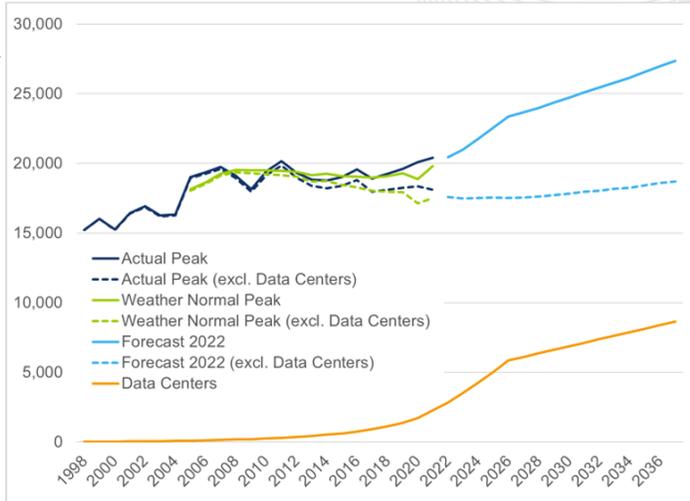
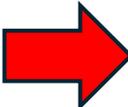
Once the PJM load forecast was updated for the 2027 RTEP, the system showed a need for reinforcements through additional source(s) to serve the load increase from the 500 and 230 kV transmission system nearby. PJM's 2027 RTEP analysis shows an extensive set of violations ranging between single contingencies, 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 2022 Load Forecast

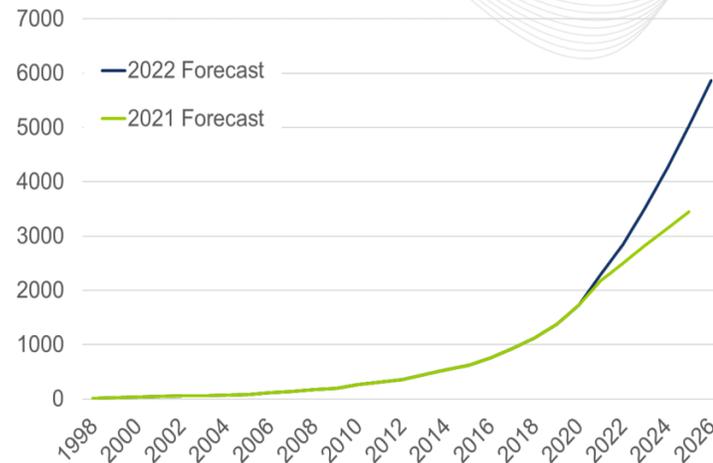


- 2022-2027 Annualized Growth Rate
  - With data centers: 3%
  - Excluding data centers: 0%

TEAC July 12, 2022:

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

## Data Center Load

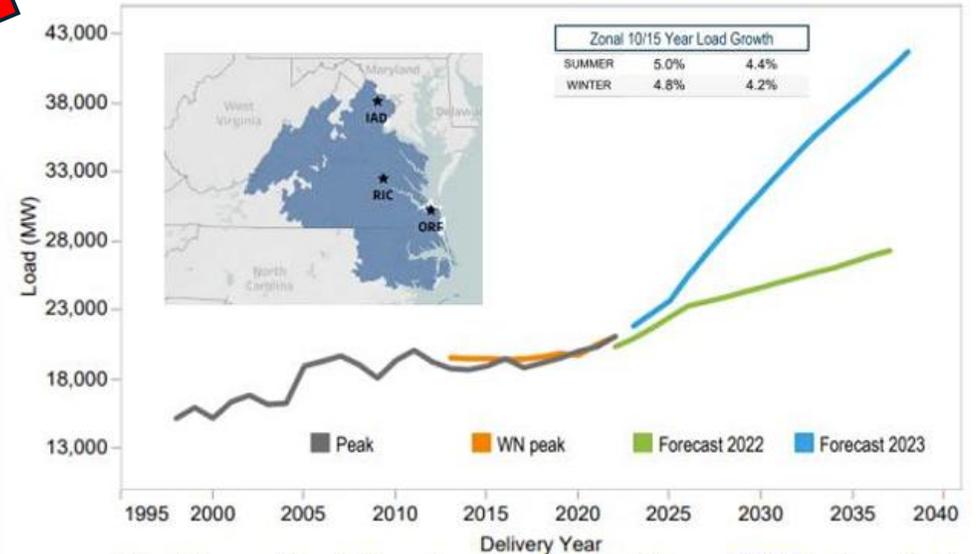


- Forecasted data center additions for the 2022 Load Forecast provided by Dominion and NOVEC were noticeably higher than were provided in the prior year.



## 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-notice/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.

# PJM – Long-Term Load Forecast Report

## January 24, 2025 ([2025-load-report.pdf](#))

### Load Adjustments

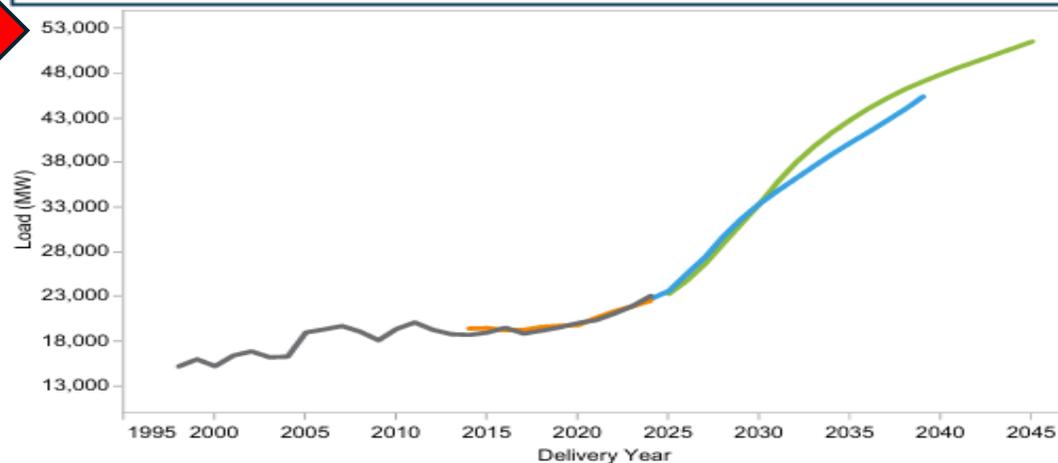
The forecasts of the following zones have been adjusted to account for large, unanticipated load changes, market adjustments, and peak shaving adjustments (see **Tables B-9** and **B-9b** and the supplement for details available on the [PJM Website](#)):

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

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

## Dominion (DOM)

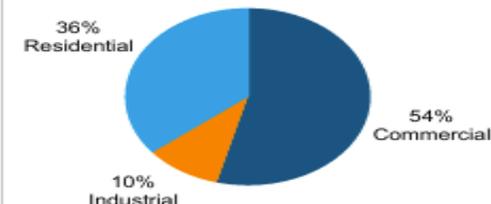
### Summer Peak



### 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



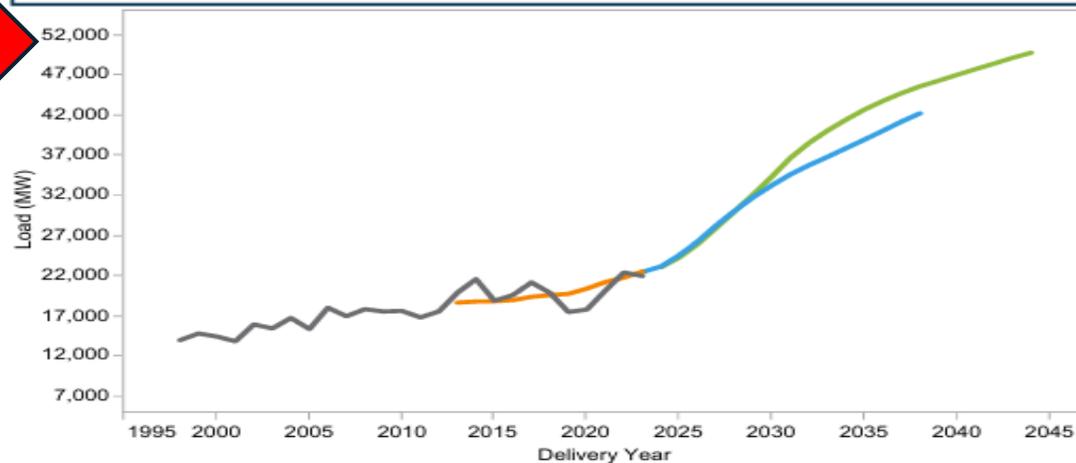
### Zonal 10/15/20 Year Load Growth

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

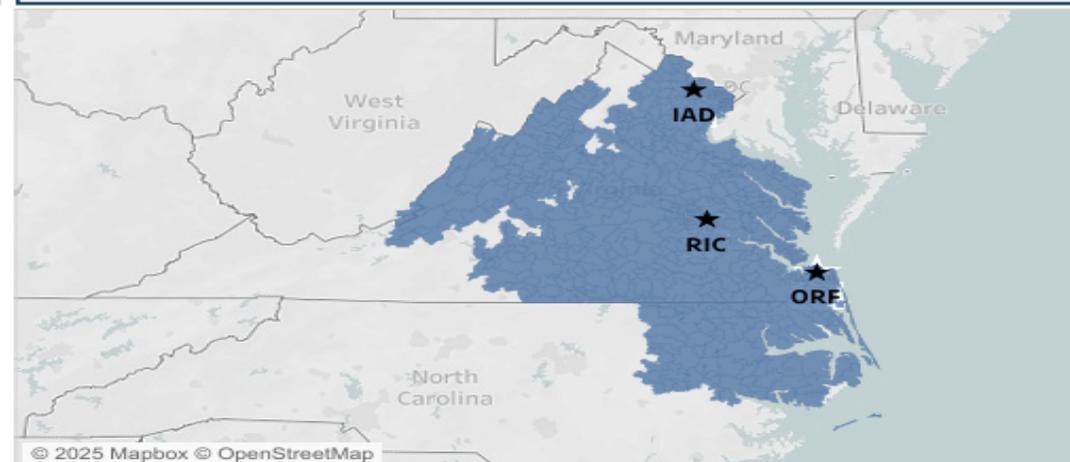
### LDA

### PJM RTO

### Winter Peak



### Metropolitan Statistical Areas and Weather Stations



■ Peak     
 ■ WN peak     
 ■ Forecast 2024     
 ■ Forecast 2025

**MSA**  
■ Virginia Commonwealth Economics

# RTEP Windows

Addressing Unprecedented Load Demand - Data Center Expansion in PJM zone  
Acknowledged Started in 2018

- 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**

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**\$10,865.179 Billion**

- 2025 Window 1 - \$8,101.79 Billion (possible): HVDC 525kV, 765kV & 500kV  
Feb 2026 decision

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**\$18,966.969 Billion**

- 2022 Window 3 – Slides 12-14
- 2023 Window 1 – Slide 15
- 2023 Window 2 – Slide 16
- 2024 Window 1 – Slides 17-23
- 2025 Window 1 – Slides 24-53



[ProtectPWC.org](http://ProtectPWC.org)

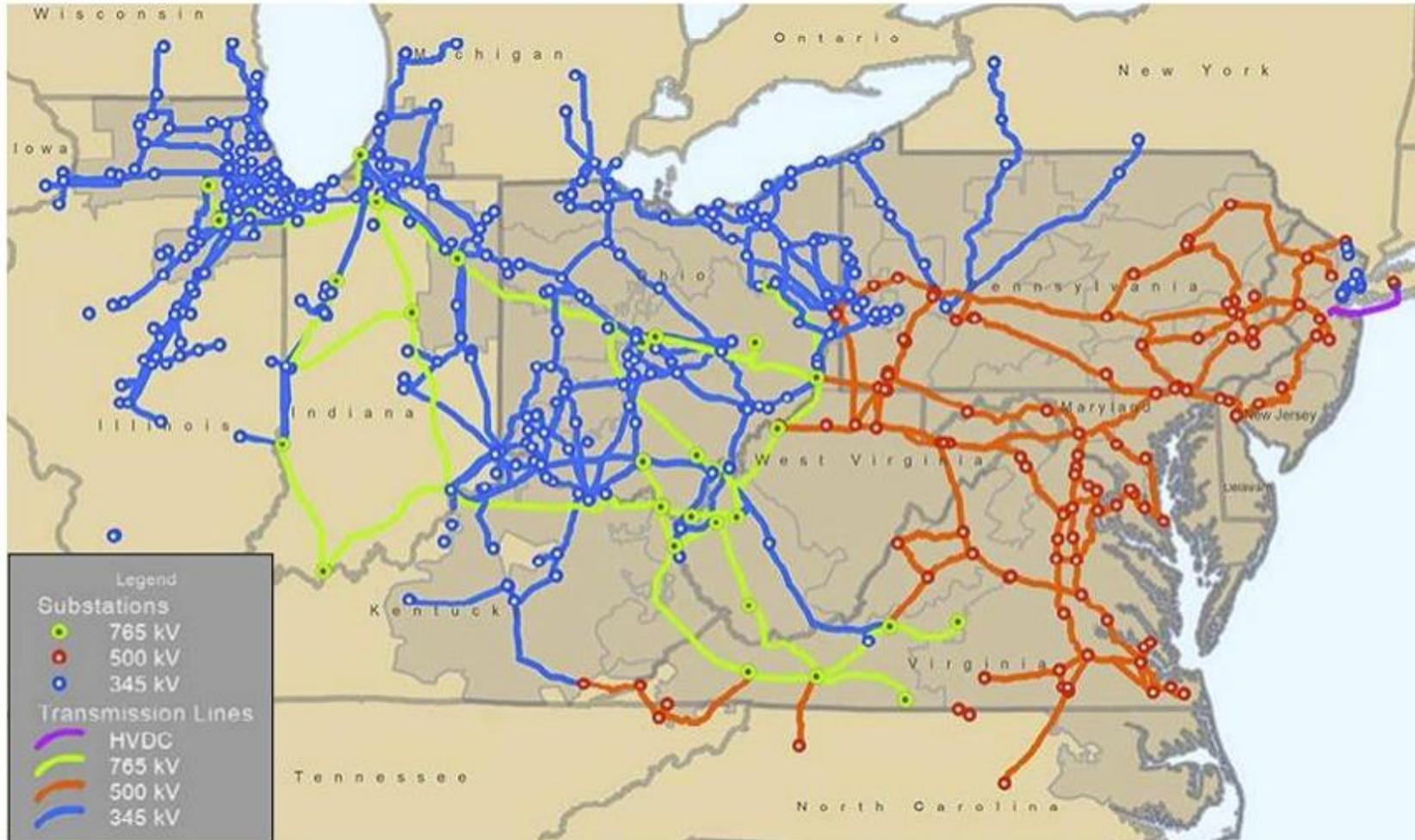
# **Moratorium on Data Centers NOW**

**\*\*\*\*\***

**STOP  
Out-Of-Control Trajectory**

# PJM Backbone Transmission System Map - Existing

Map 1.1: PJM Backbone Transmission System

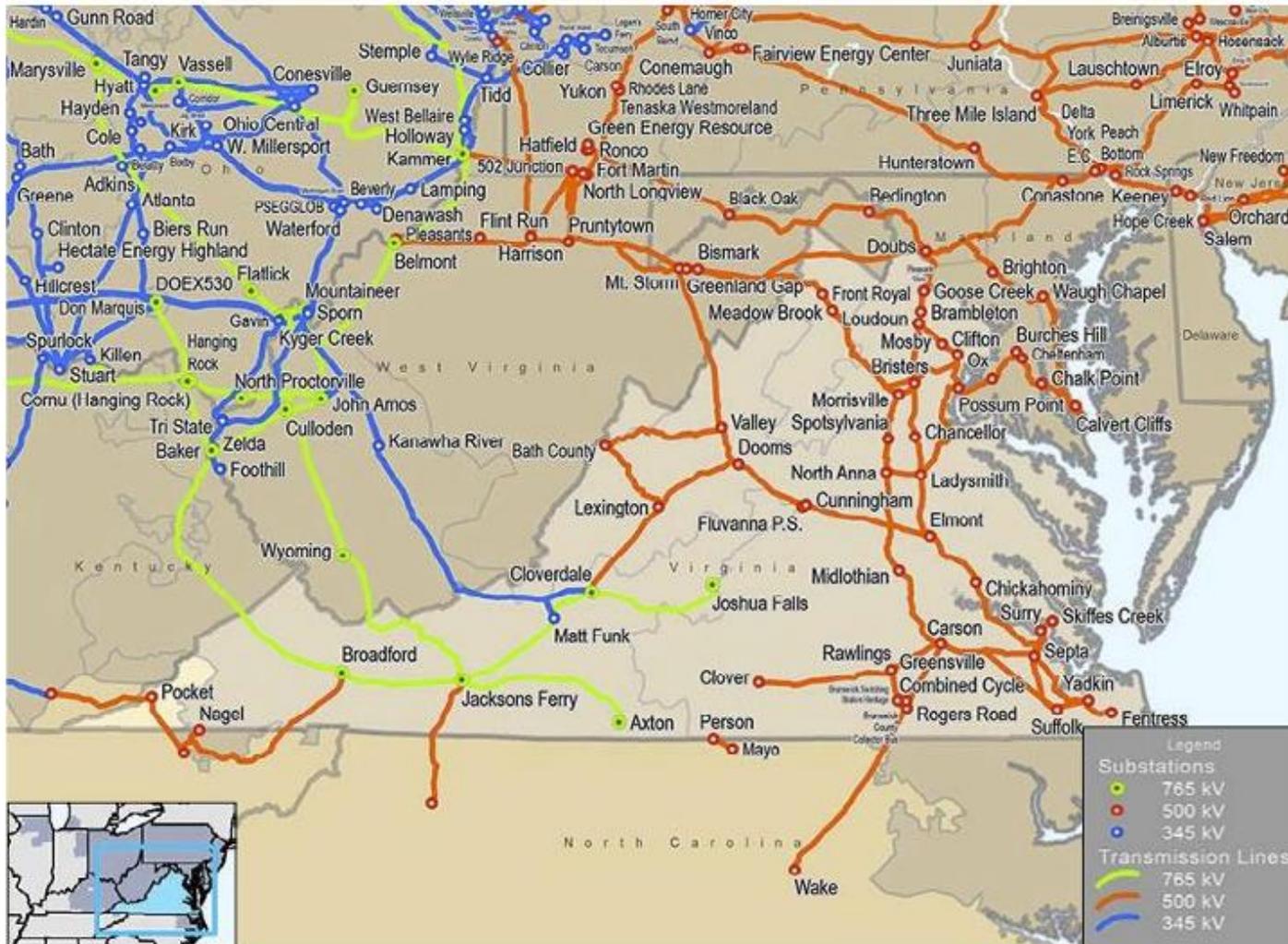


- Source: [2022-rtep-report.aspx \(pjm.com\)](https://www.pjm.com/2022-rtep-report.aspx) Dated March 13, 2023 Page 2
- **Does NOT show existing 230kV lines and substations**

Map is unchanged in 2024 RTEP Report: [2024-rtep-report.pdf](https://www.pjm.com/2024-rtep-report.pdf) Dated April 17, 2025, Page 8

# PJM Service Area in Virginia – Existing

Map 6.46: PJM Service Area in Virginia

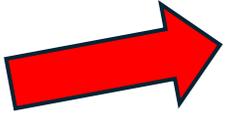


- Source: [2022-rtep-report.aspx](https://www.pjm.com/2022-rtep-report.aspx) ([pjm.com](https://www.pjm.com)) Dated March 13, 2023 Page 221
- Does NOT show ANY existing 230kV lines and substations

# 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
<b>Total</b>		<b>\$5,142.98</b>

# 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

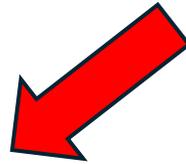
- Cost:

- 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	<hr/> \$103.89 Million
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# 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
- **Cost:** \$118.309 Million



**APPROVED -  
IN PROGRESS**

# RTEP 2024 Window 1

- Opened July 24, 2024
- PJM Board approval February 2025 (per deck 1/7/25) – 765 & 500kV
- Next two slides compare Needs Evolution - change in needs forecast - from 2023 W2 to 2024 W1 (7/9/24 Reliability deck – pages 10-12)
  - Summer and Winter load and generation flows
- **Cost:** \$5,500.00 Billion

# What is at risk?

# EVERYTHING



Note all the Yellow Xs

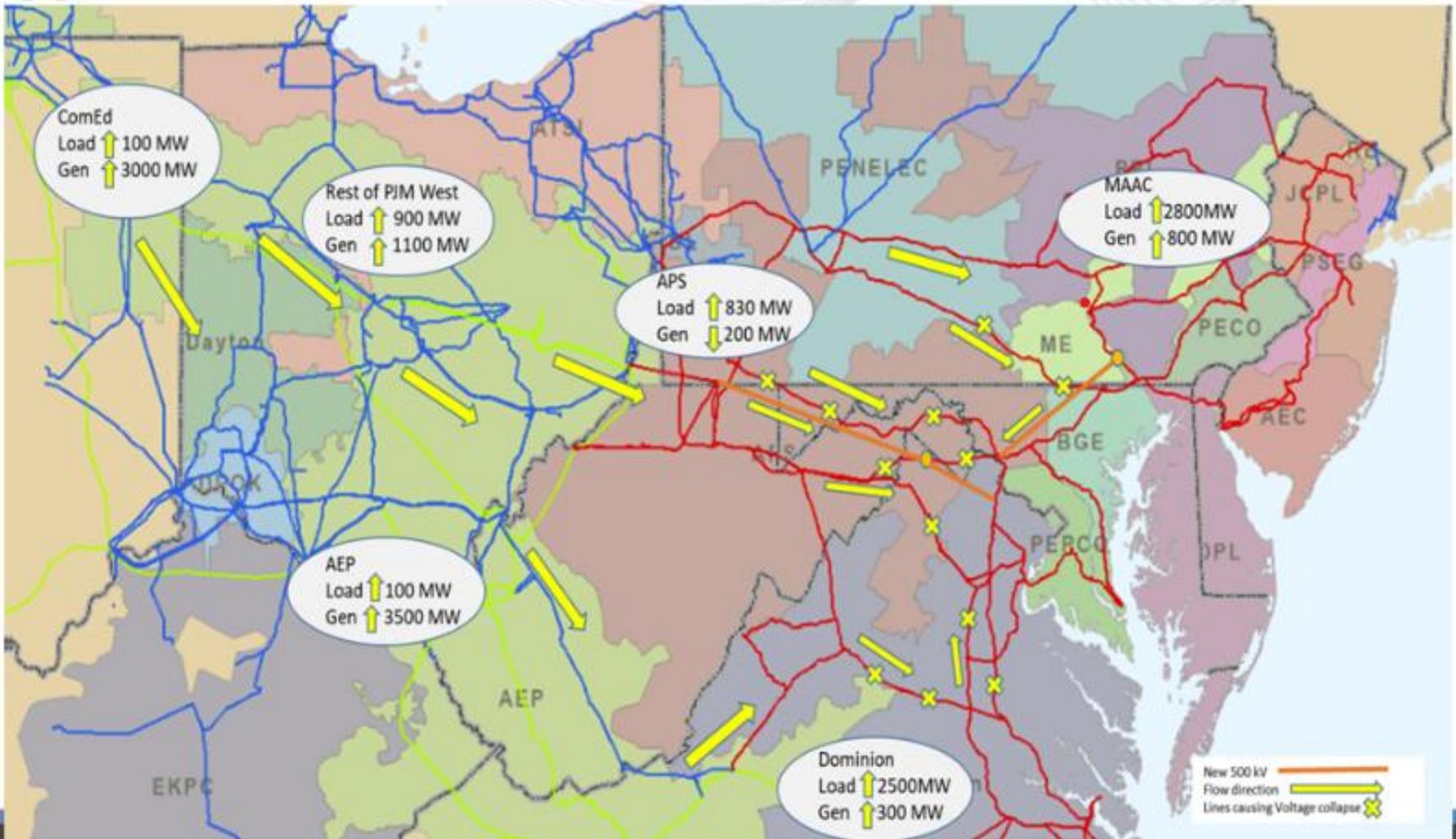
What does **LINE VOLTAGE COLLAPSE** mean?:

*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)*

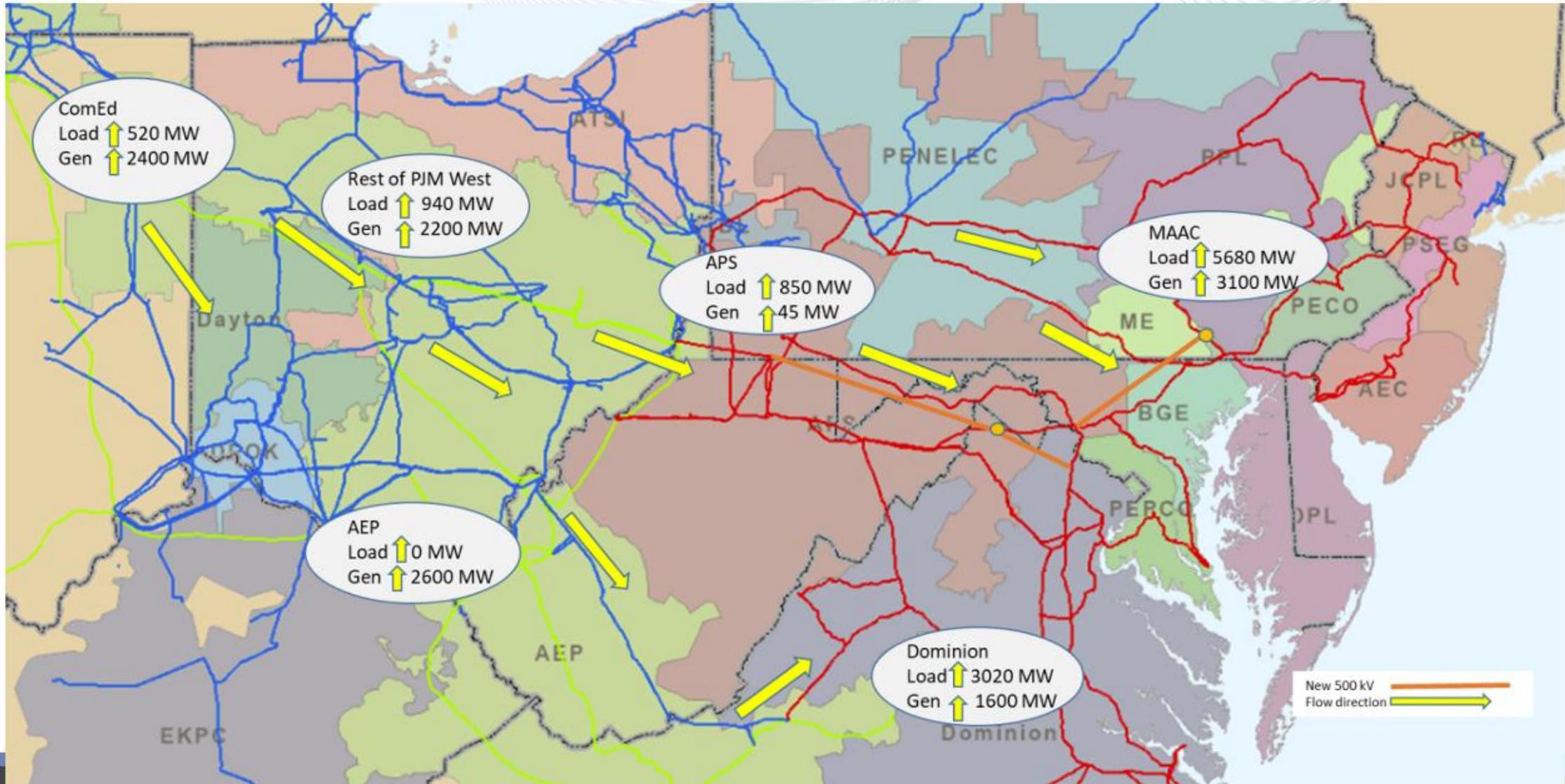
\*\*Note the flow directions\*\*

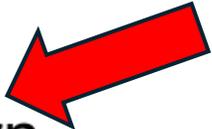
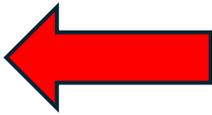


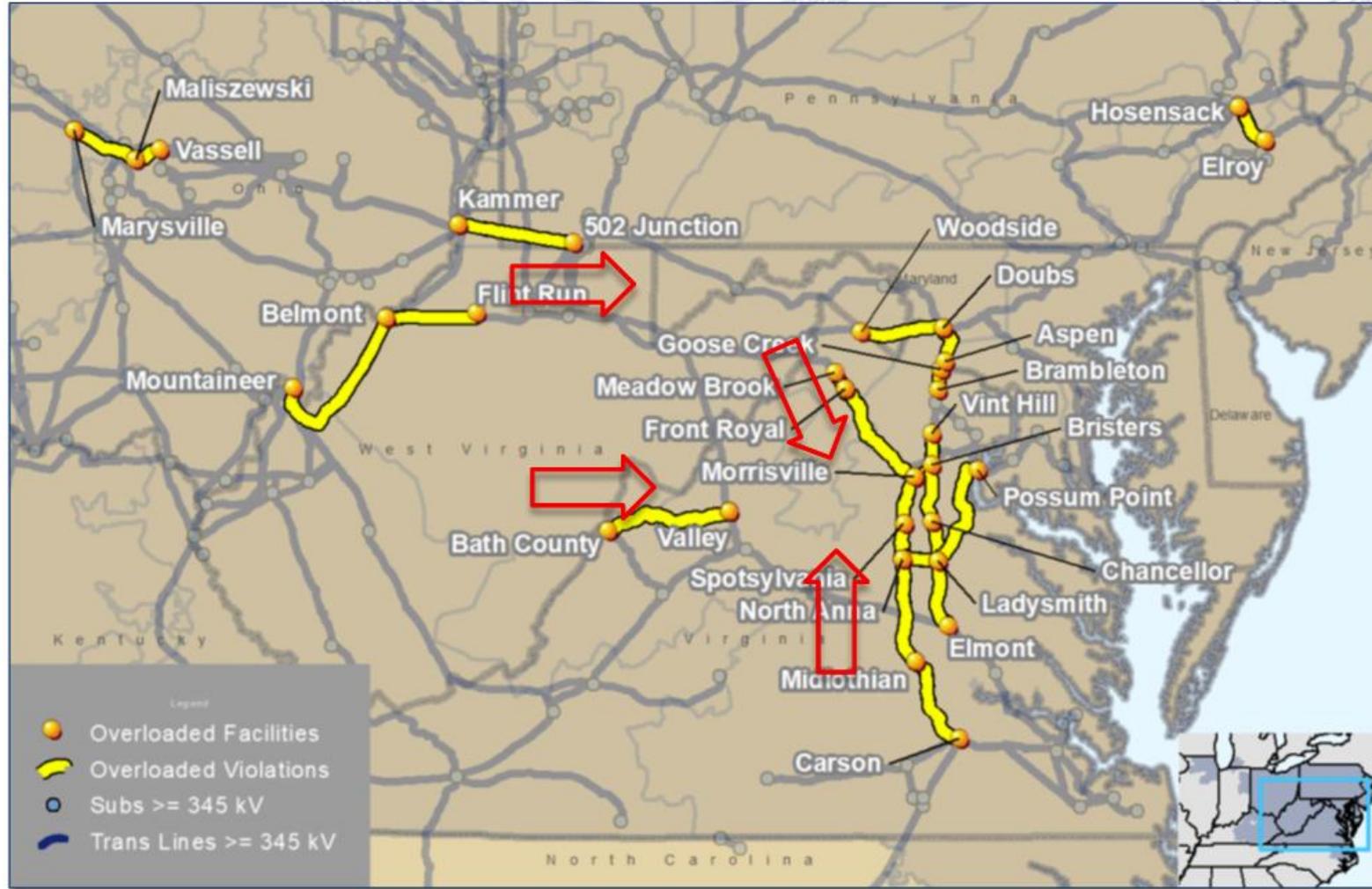
## 2028 RTEP W2 vs 2029 RTEP W1 Summer comparison



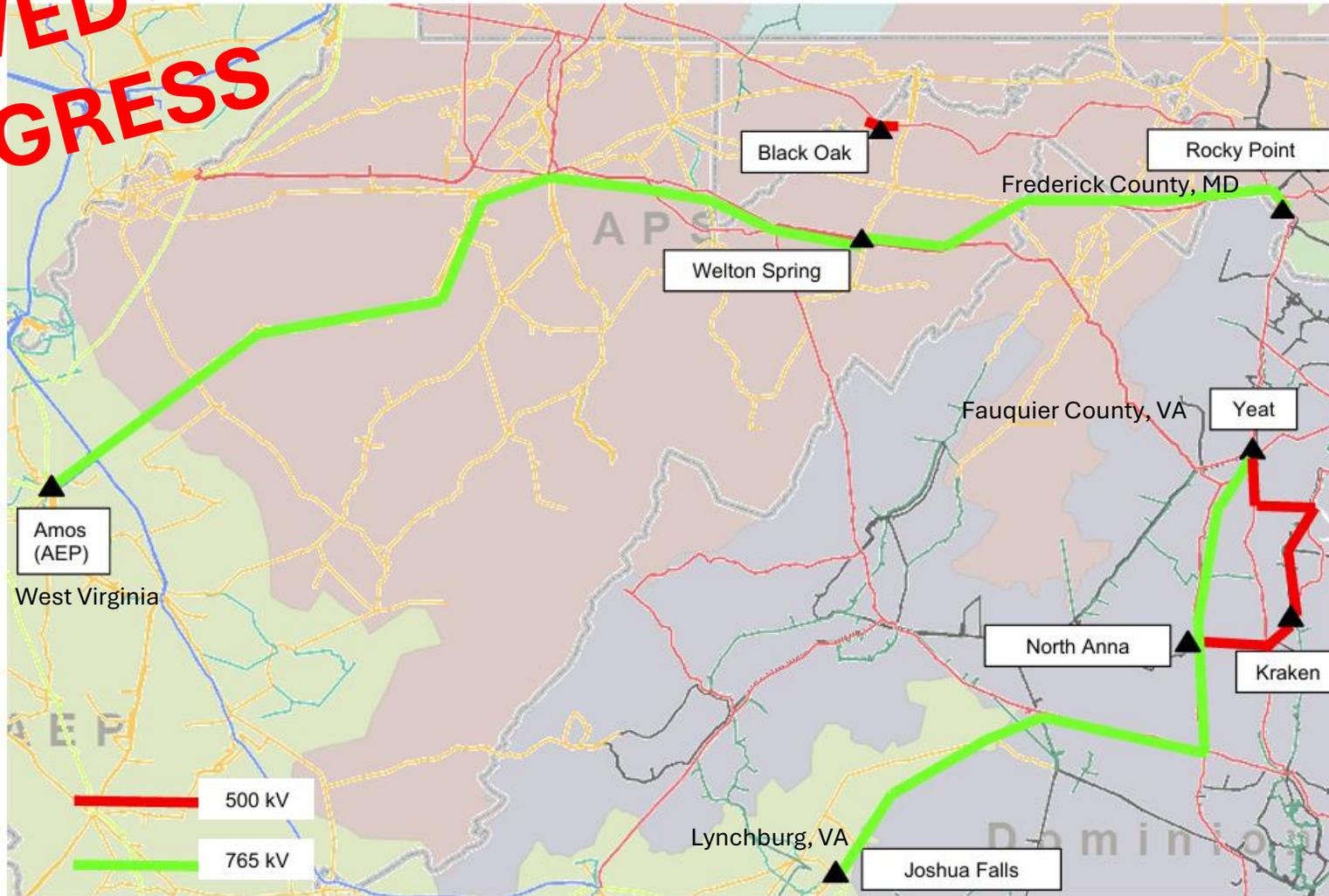
# 2028 RTEP W2 vs 2029 RTEP W1 Winter comparison



- 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



**APPROVED -  
IN PROGRESS**





# 2024 W1 Final – PJM Recommended Proposals Regional Cluster – Summary

PJM Proposal ID	Project Title/Description	Project Submittal Responsibility
967 Modified	<i>Kraken Loop</i> <ul style="list-style-type: none"> <li>Termination at Yeat (not Bristers South/Town Run)</li> <li>Refinements (reduction/deferral) of some proposed 230 kV developments.</li> </ul>	Dominion
820 Modified	<i>Joshua Falls-Yeat 765 kV (Southern Corridor)</i> <ul style="list-style-type: none"> <li>Route to follow Joshua Falls-Vontay-Morrisville South</li> </ul>	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	<i>Dominion reinforcements (230 kV and 115 kV solutions)</i> <ul style="list-style-type: none"> <li>Exclusion of 230 kV line #238 (Carson-Clubhouse) rebuild</li> </ul>	Dominion
781 Modified	<i>Dominion Reinforcements (500 kV solutions)</i> <ul style="list-style-type: none"> <li>Exclusion of 500 kV North Anna-Vontay uprate</li> </ul>	Dominion
617 Component	<ul style="list-style-type: none"> <li>Replace the wave trap and upgrade the relay at Cloverdale 765 kV</li> <li>Replace the wave trap and upgrade the relay at Joshua Falls 765 kV</li> </ul>	Transource

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

As submitted: ~ \$5,500.0 M

Optimized: ~ \$4,647.0 M

# RTEP 2025 Window 1

PJM Board approval  
targeted Feb 2026

- Initial Modeling Assumptions: Nov 2024 – Feb 2025
- Baseline Studies: May 2025
- Opened: June 18, 2025
- Latest update November 4, 2025 TEAC deck ([20251104-item-14---reliability-analysis-update.pdf](#))
- Targeted for PJM Board approval: February 2026 – 765kV (& buried 525kV HVDC) & 500kV
- COSTS – IF Recommendation to Board is most expensive proposals:
  - South – Dominion: \$4,819.51 Billion – Buried 525kV HVDC (or 765kV) & 500kV
  - Mid-Atlantic: \$1,626.14 Billion – 765kV &/or 500kV
  - West: \$2,921.12 Billion – 765kV

TOTAL \$8,101.79 BILLION

# 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***

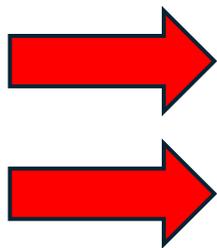


# Southern Cluster

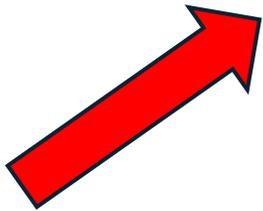
Virginia

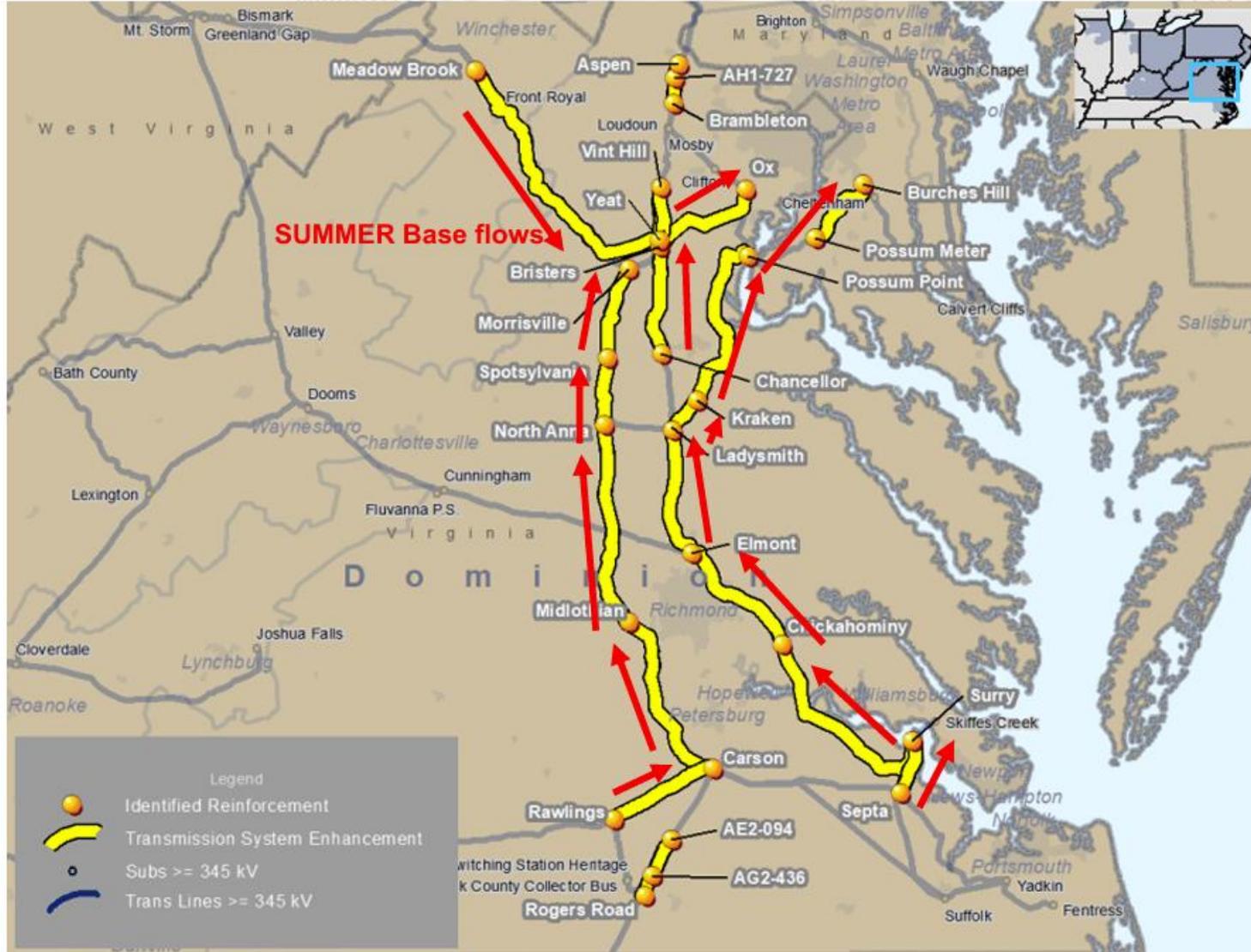


- The Dominion area is experiencing multiple 500kV violations along its primary South - North corridor in 2032.
  - Violations are predominantly being driven by:
    - Additional generation added in the south that is flowing to the load centers in northern VA (NOVA).
    - Increases in load with a heavier 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 Northern 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.



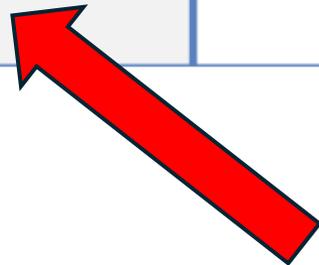


Also included in 6/5/25 TEAC Reliability deck – as ‘Preliminary’ violations

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.

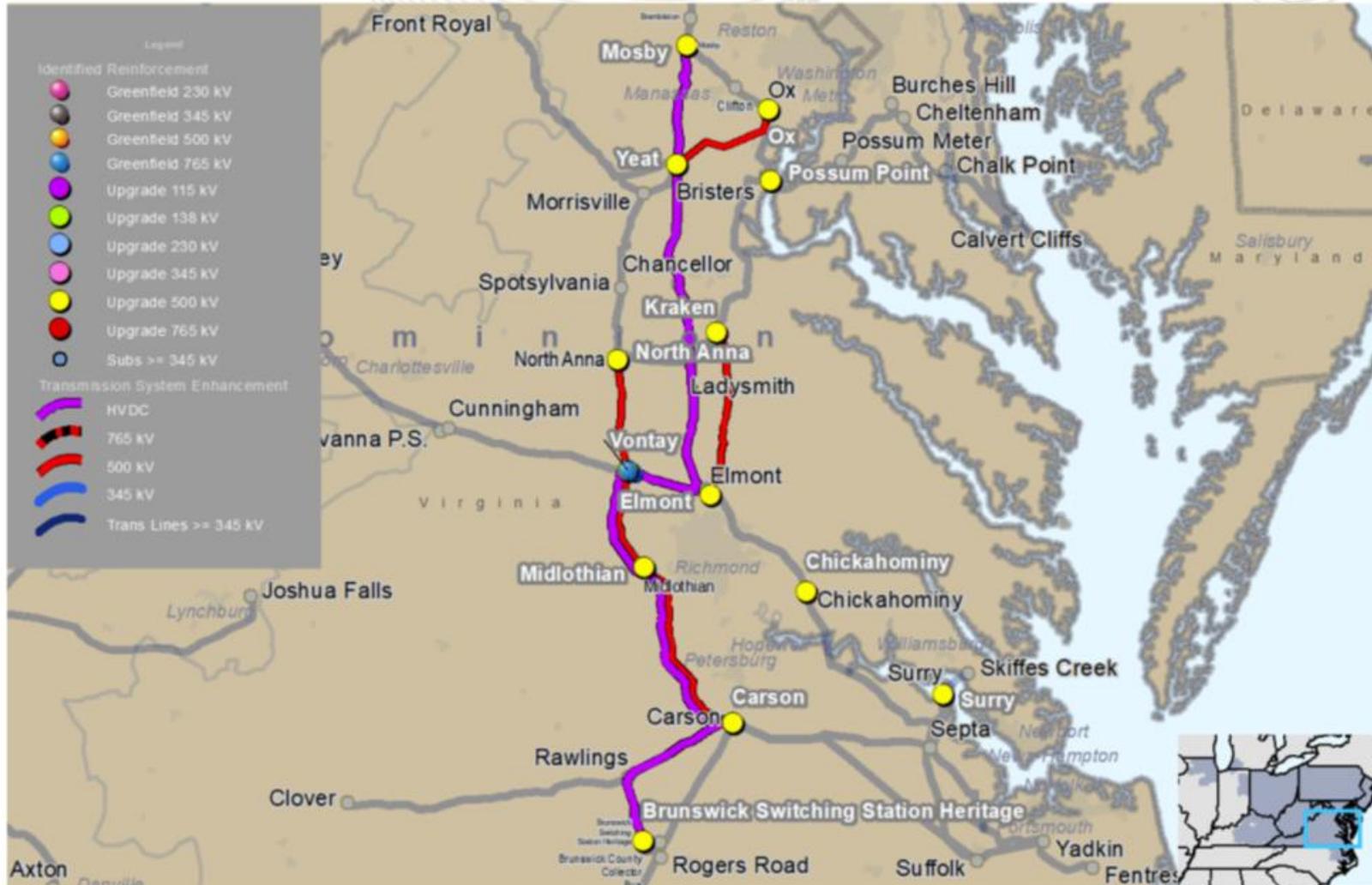
- 4 Dominion proposals recommend a +/- 525 kV HVDC link variants from Heritage to Mosby.
- Multiple proposals offer 765 kV developments with one or more lines heading to the Morrisville area.
- A couple of proposals focus on 500 kV developments with some additional 230kV reinforcements in the northern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



### Dominion Regional Cluster Proposals – 2032

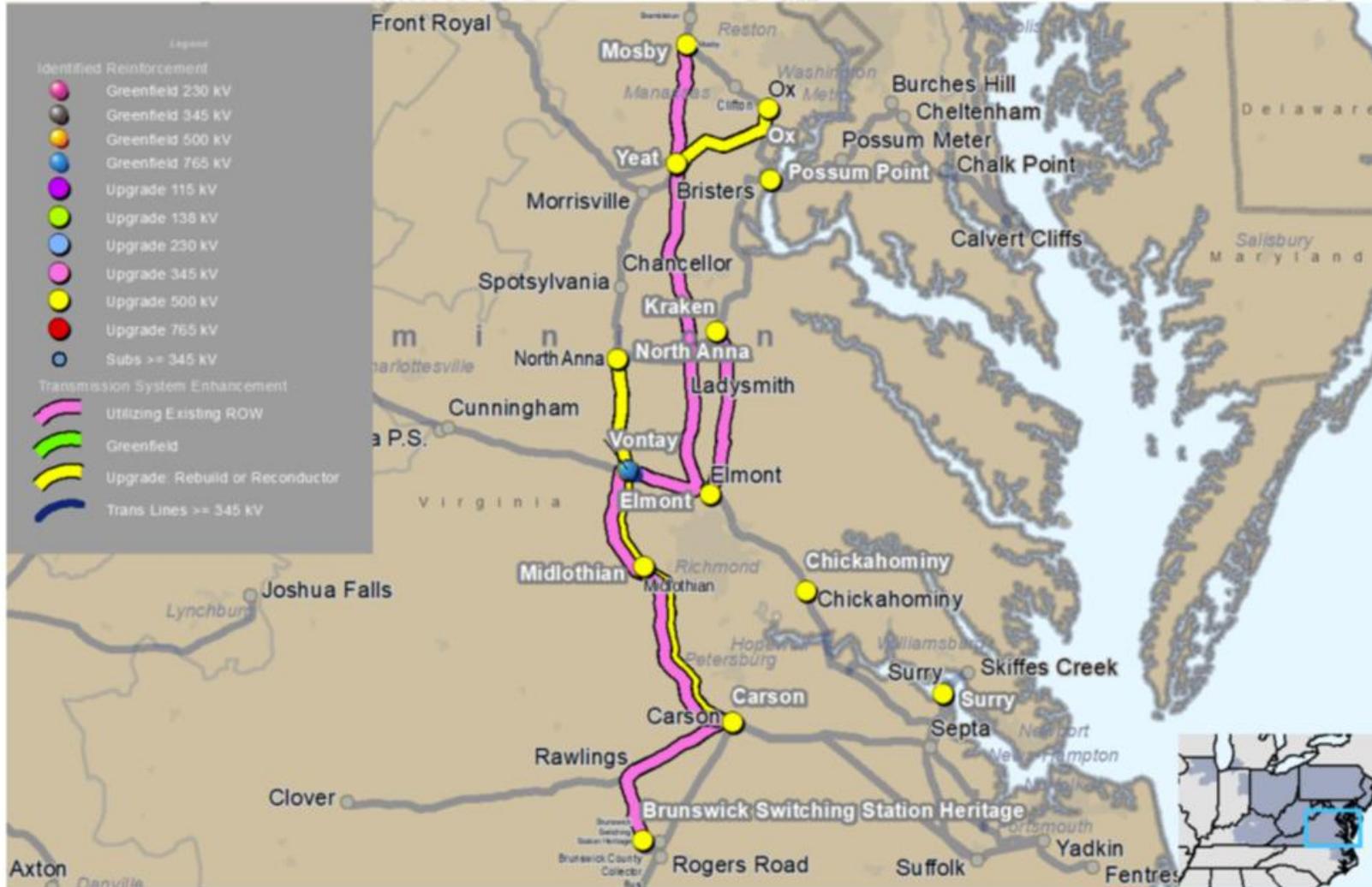
Proposing Entity	Proposal ID	High Level Discription	Total Cost (\$ M)
→ Dominion	2025-W1-275 (1A - HVDC)	• New HVDC Transmission Link from Heritage to Mosby (~185 miles), new 500kV line Elmont-Kraken, various 500kV rebuilds, new 765/500kV switching station & various substation equipment upgrades.	\$4819.51
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

- All HVDC proposals have similar configuration and cost.
- All 765 kV solutions follow similar routes (reinforcing South - North) corridor and will require heavy greenfield development.
- 500 kV option(s) considered in view of offered capacity vs ROW greenfield impact introduced by 765kV developments.
- Narrow down and consequently shortlist a front runner HVDC option and HVAC option for final evaluation/selection (shortlist).



**HVDC 525kV  
Buried  
(purple)**

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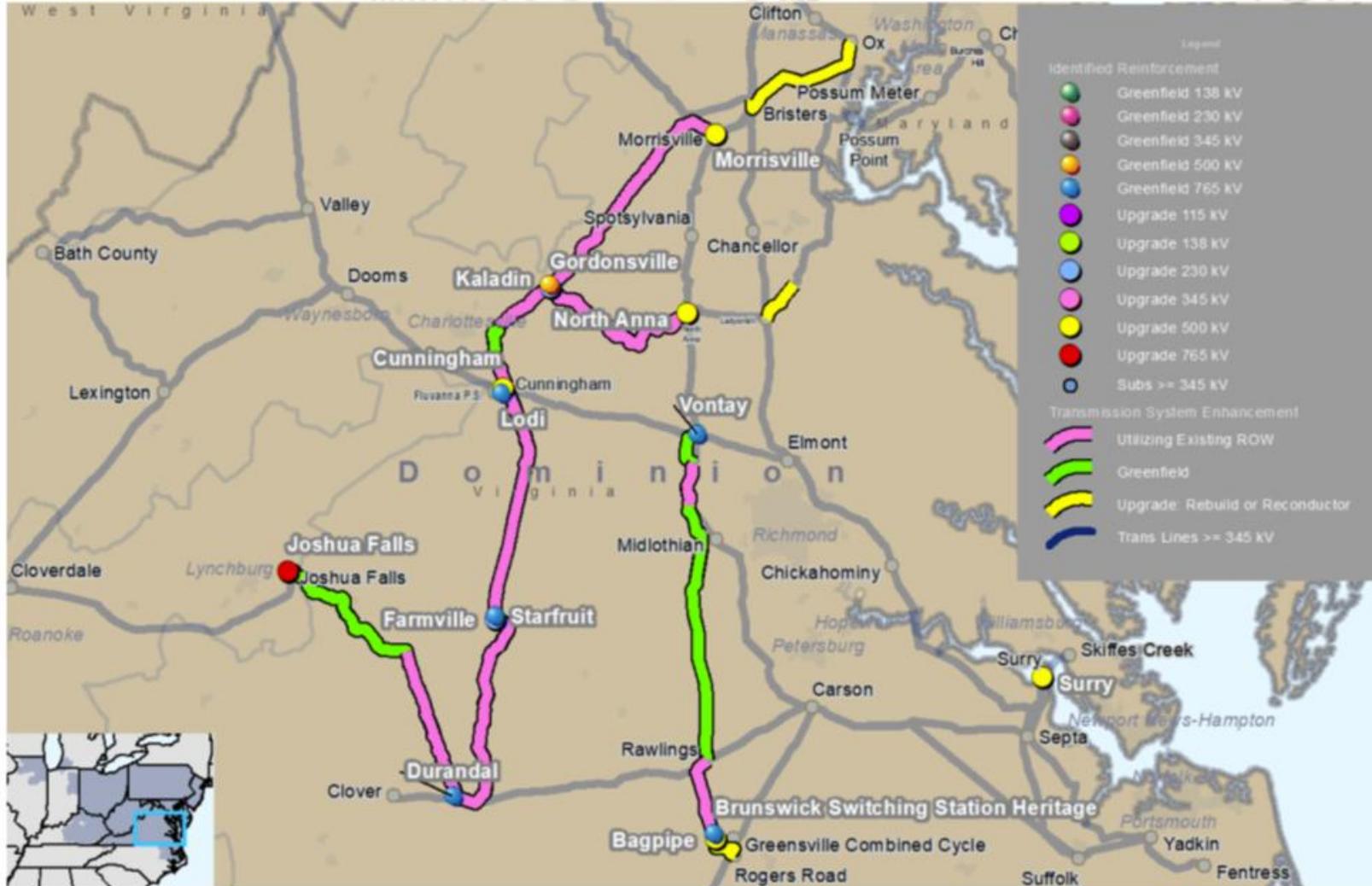


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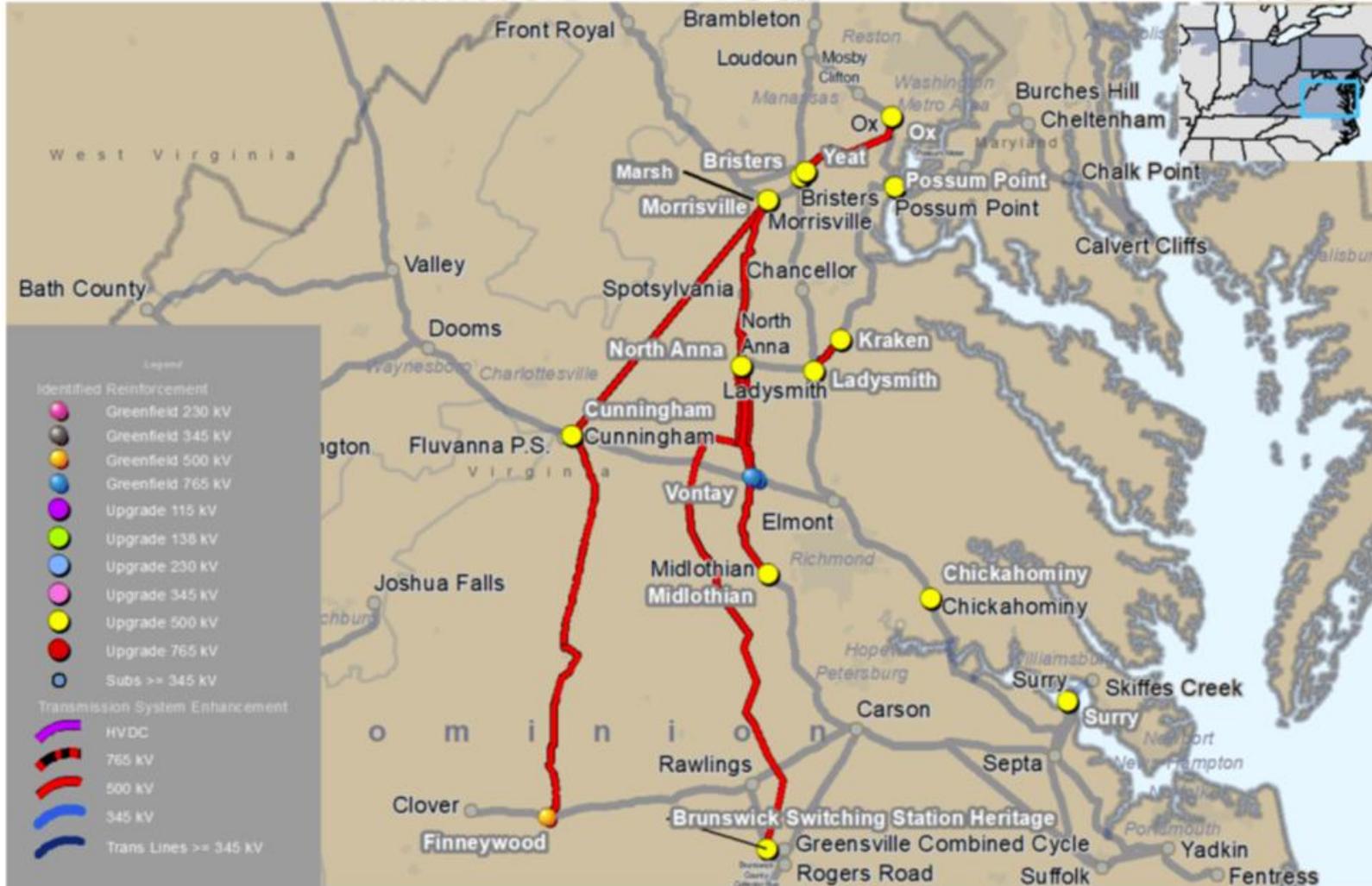


**765kV  
Overhead  
Red-Black  
(HVAC)**

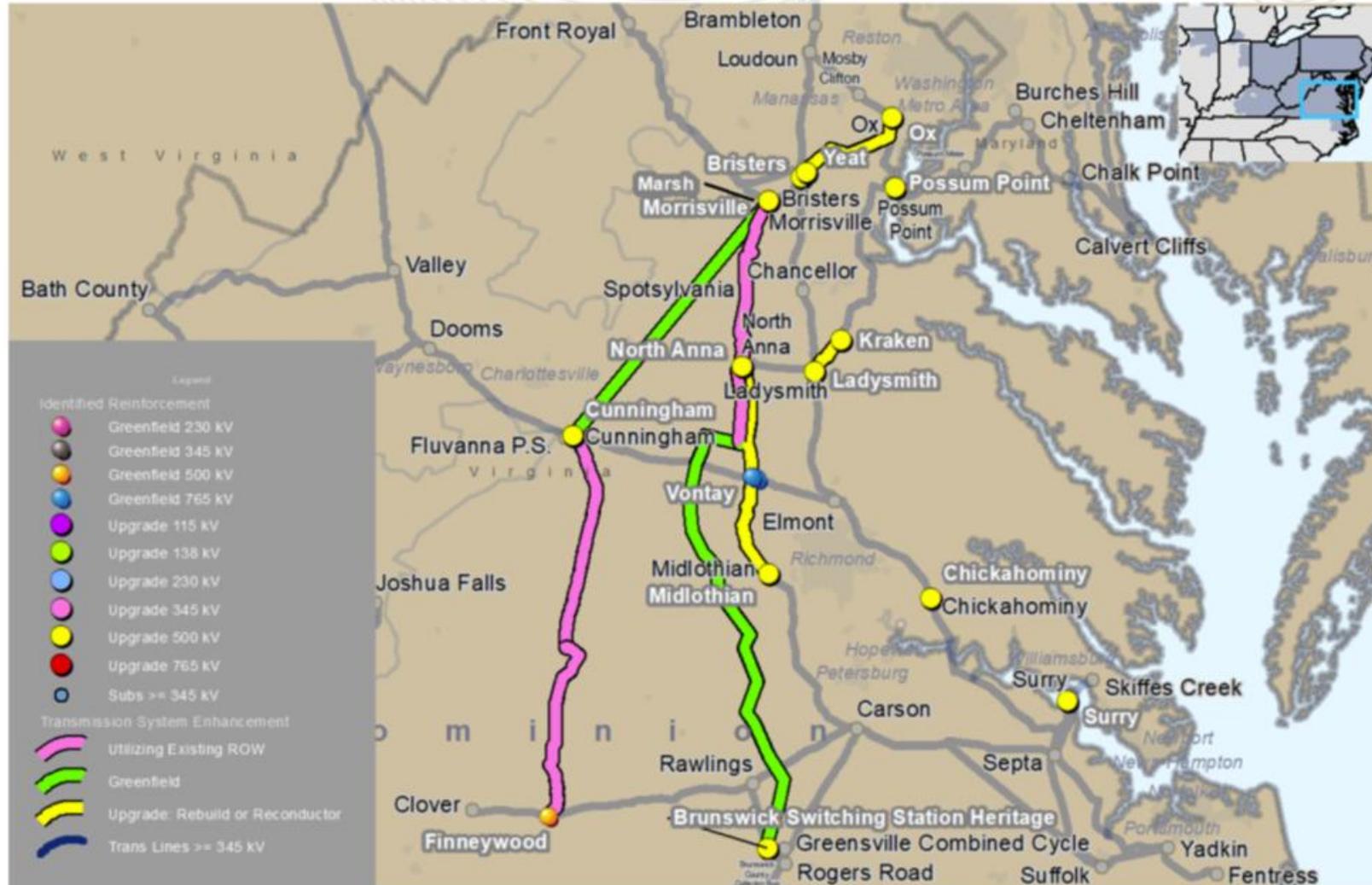
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# 2025 Window 1 RTEP MAAC Regional Transfer Cluster Proposal Summary

## Pennsylvania

## PPL Load Growth:

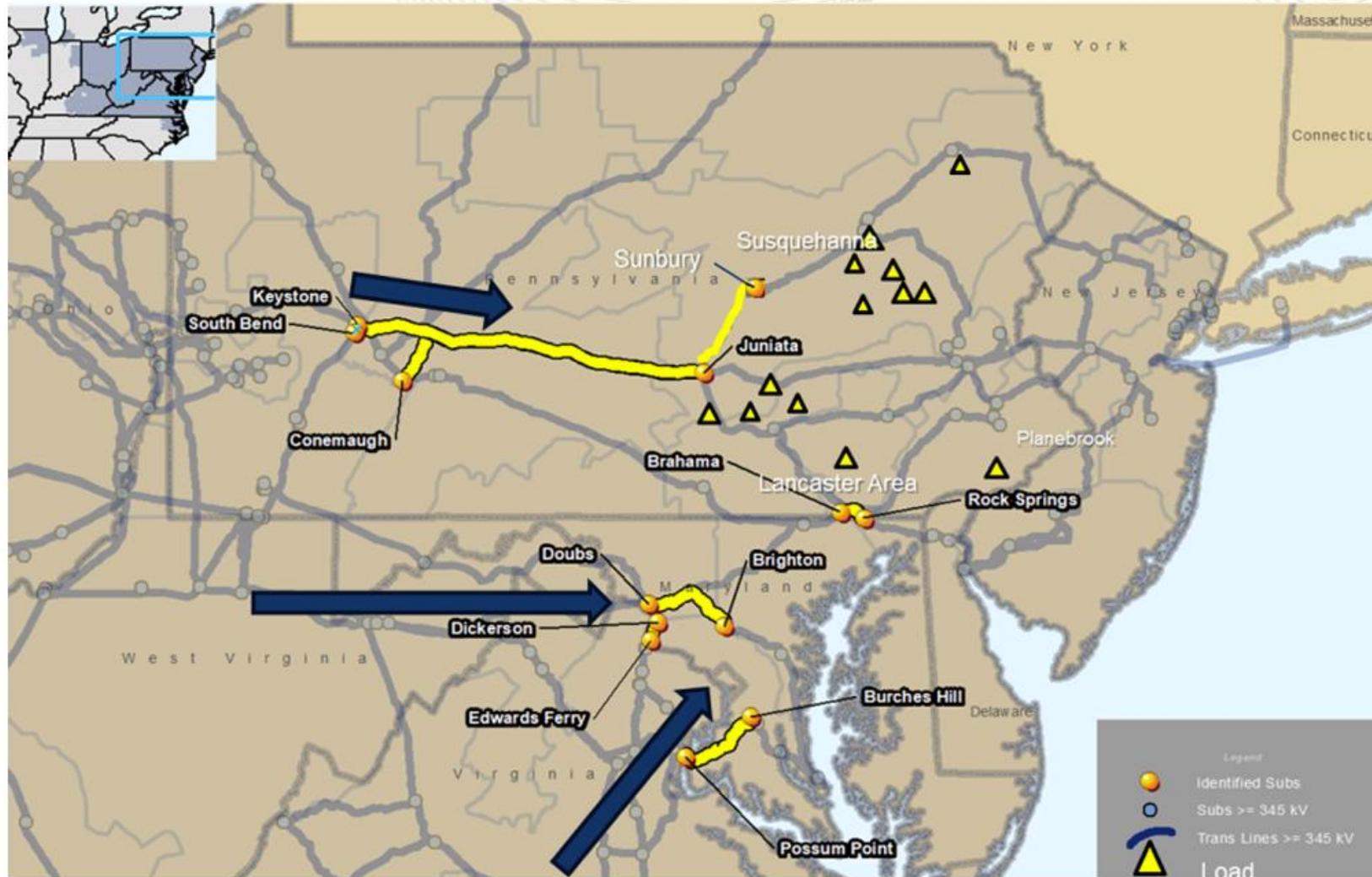
- PPL zonal load in the year 2030 increased by approximately 5 GW from the 2024 to the 2025 load forecast
  - The load growth is primarily driven by data center demand and trends indicate this growth will continue beyond the 2030
  - PPL submitted additional ~3.5GWs not included in the 2025 load forecast

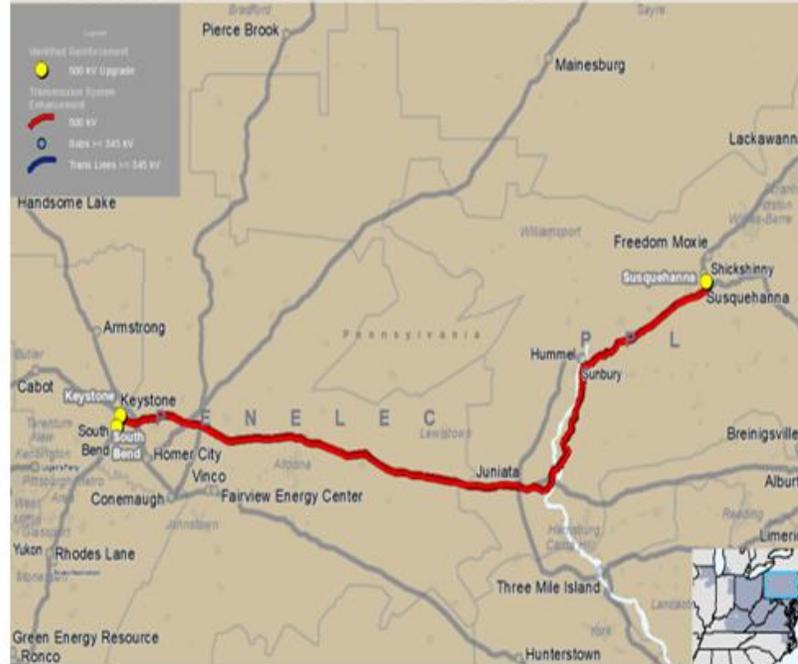
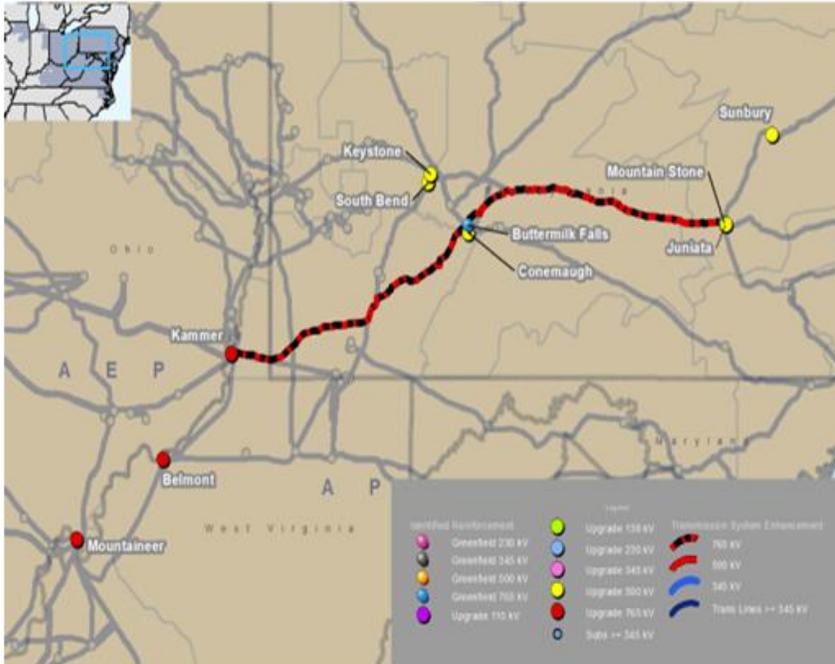
## NJOSW In-service Delay Impact:

- 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 1 (1 - 765 kV circuit)
- NextEra/Exelon Proposal ID 237
  - (Kammer – Juniata 765 kV)

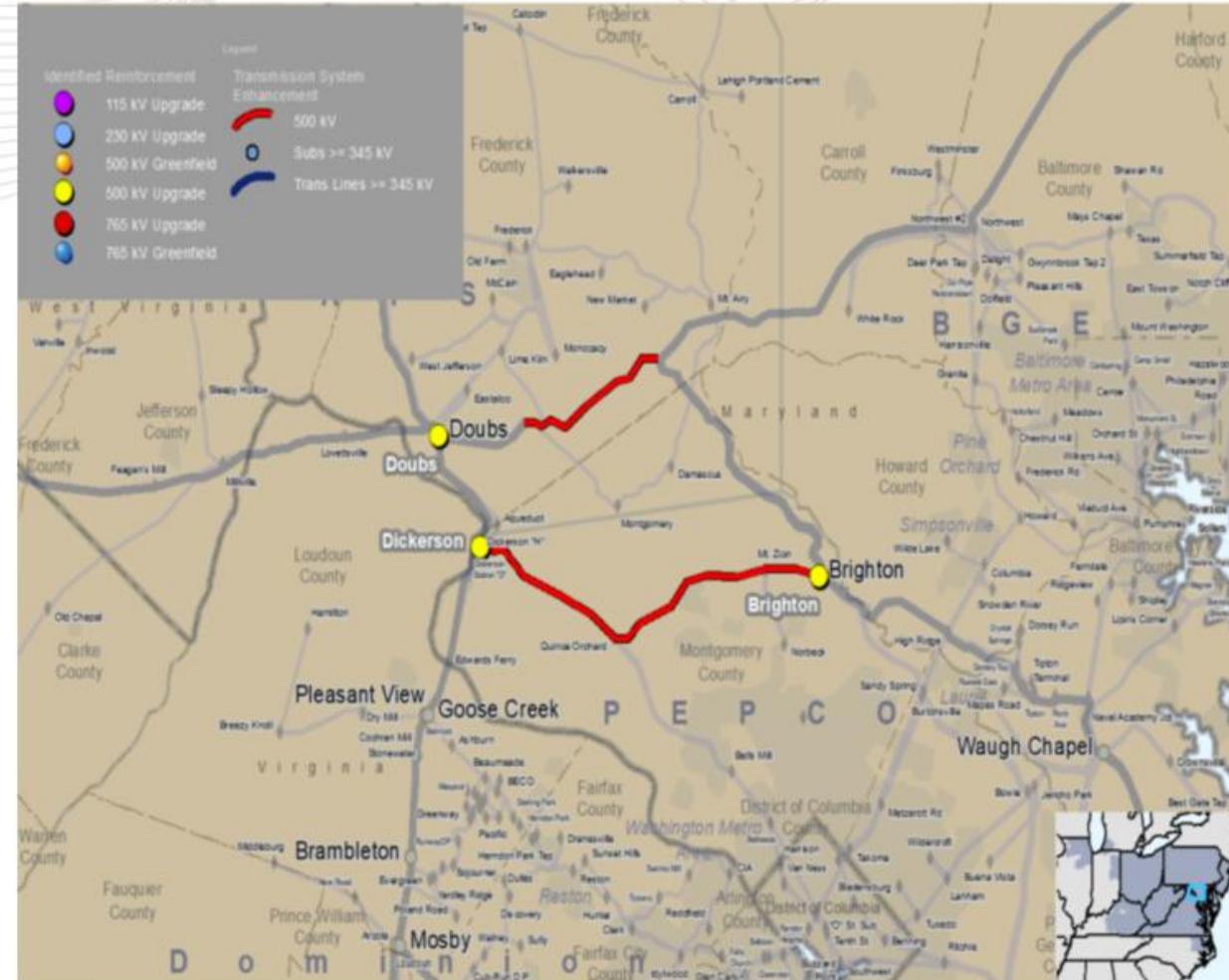
- MAAC 2 (Double circuit 500 kV)
- MAIT-First Energy Proposal ID 826
  - (Keystone – Susquehanna 500 kV)

- MAAC 3 (1 - 765 kV & 1-500 kV circuits)
  - NextEra/Exelon Proposal ID 237 (Kammer – Juniata 765 kV)
  - Component from MAIT-First Energy Proposals (Keystone – Susquehanna 500 kV)

## Proposals still under investigation/evaluation:

- PEPCO submitted Three proposals to address Violations identified in the South PEPCO vicinity including ties between Dominion and PEPCO.
- This area is impacted by reinforcements in the MAAC and Dominion regions.
- Proposal further indicates the need for additional transmission reinforcement into BGE (import capability)
- PJM is still evaluating these proposals – will finalize by the December TEAC (final selection/First Read).

Proposal ID	Total Cost (\$ M)	High Level Description
371	857.22	New 500 kV substation (Dickerson) by cutting into the Aspen - Rocky Point 500 kV line. New 500 kV line (Dickerson - Brighton (25 miles) - mix of greenfield and brownfield). One Dickerson 500/230 kV transformer.
851	101.86	Rebuilding the BGE portion of the Doubs – Brighton line 500kV (approximately ~11 miles)
919	257.61	New 500 kV substation (Dickerson) by cutting into the Aspen - Rocky Point 500 kV line installing two new 500/230kV transformers.





# MAAC Regional Transfer Cluster Result Summary

Portfolio / Combination #	Entity	2032 Scen 4 Performance	2032 PPL Δ Load Performance	Cost \$
MAAC #1	MAIT/FE	1 - 500 kV loading >100% 3 - 500 kV loading >90%	2 - 500 kV loading >100% 4 - 500 kV loading >93%	\$1,155
MAAC #2	NextEra/Exelon	2 - 500 kV loading >94% 3 - 500 kV loading >90%	3 - 500 kV loading >100% 3 - 500 kV loading >90%	\$1,739
MAAC #3	NextEra/Exelon /MAIT	1 - 500kV >90%	N/A	\$2,816
MAAC #4	MAIT/FE	See MAAC 1	2 - 500 kV loading >100% 3 - 500 kV loading >93%	\$2,418
MAAC #5	MAIT/FE	1 - 500 kV loading >104% 3 - 500 kV loading >90%	3 - 500 kV loading >105% 2 - 500 kV loading >100% 2 - 500 kV loading >94%	\$1,077

# West Cluster (AEP/DATYON/ATI/DEOK)

Ohio

## Drivers

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



## Violations

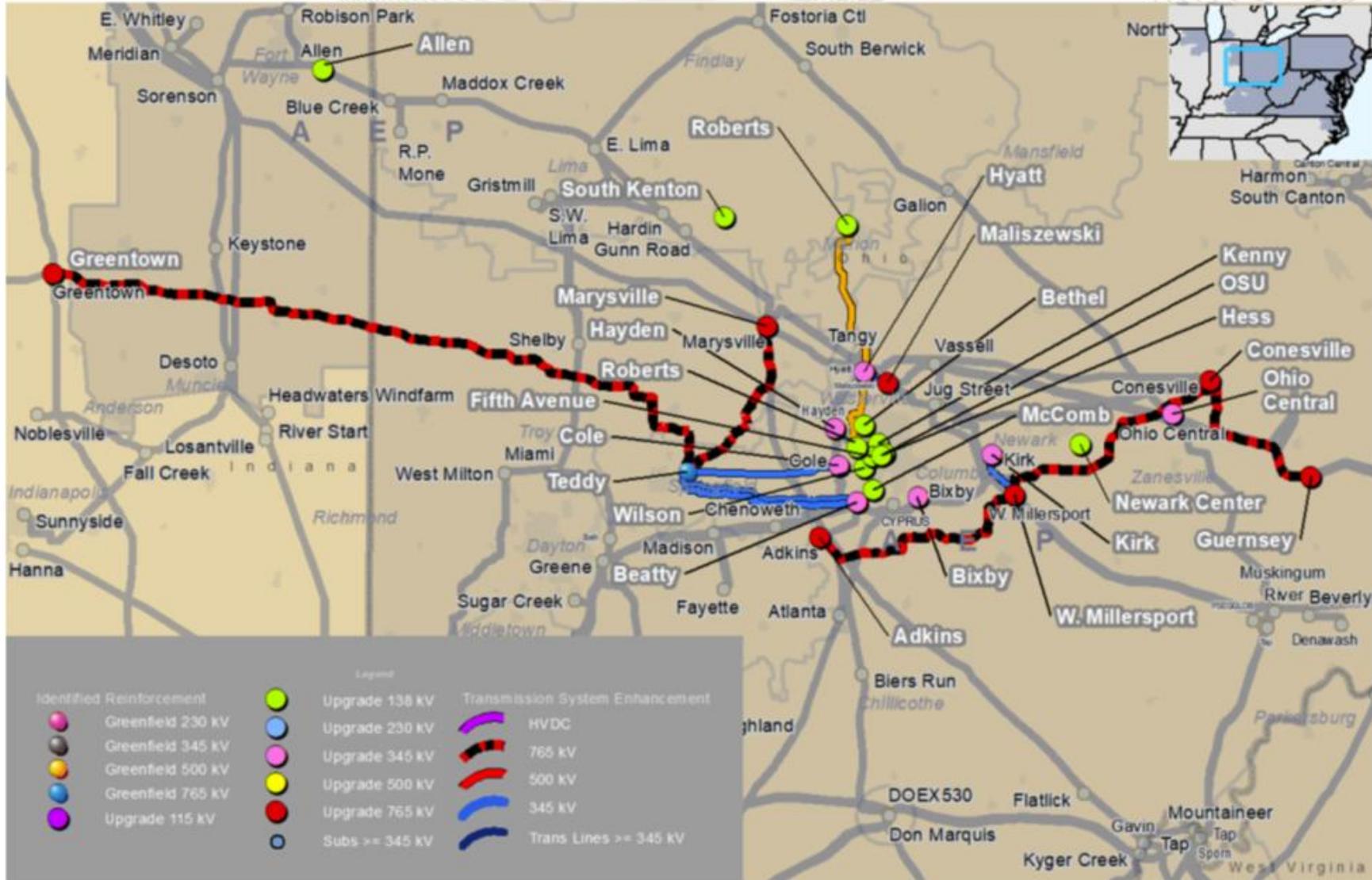
- Thermal overloads in AEP/Dayton/ATSI
- Widespread voltage issues in AEP/Dayton/ATSI/DEOK

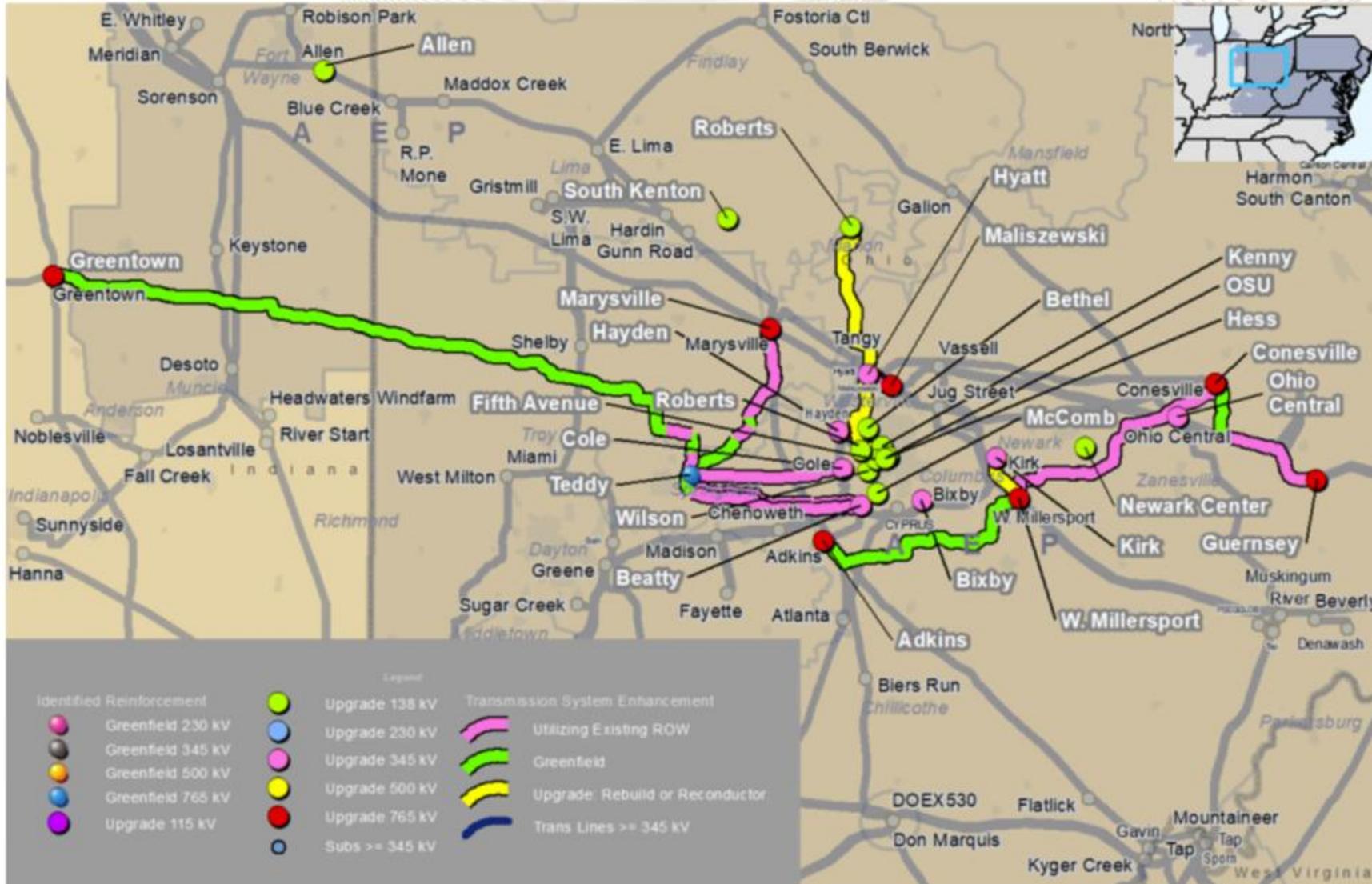


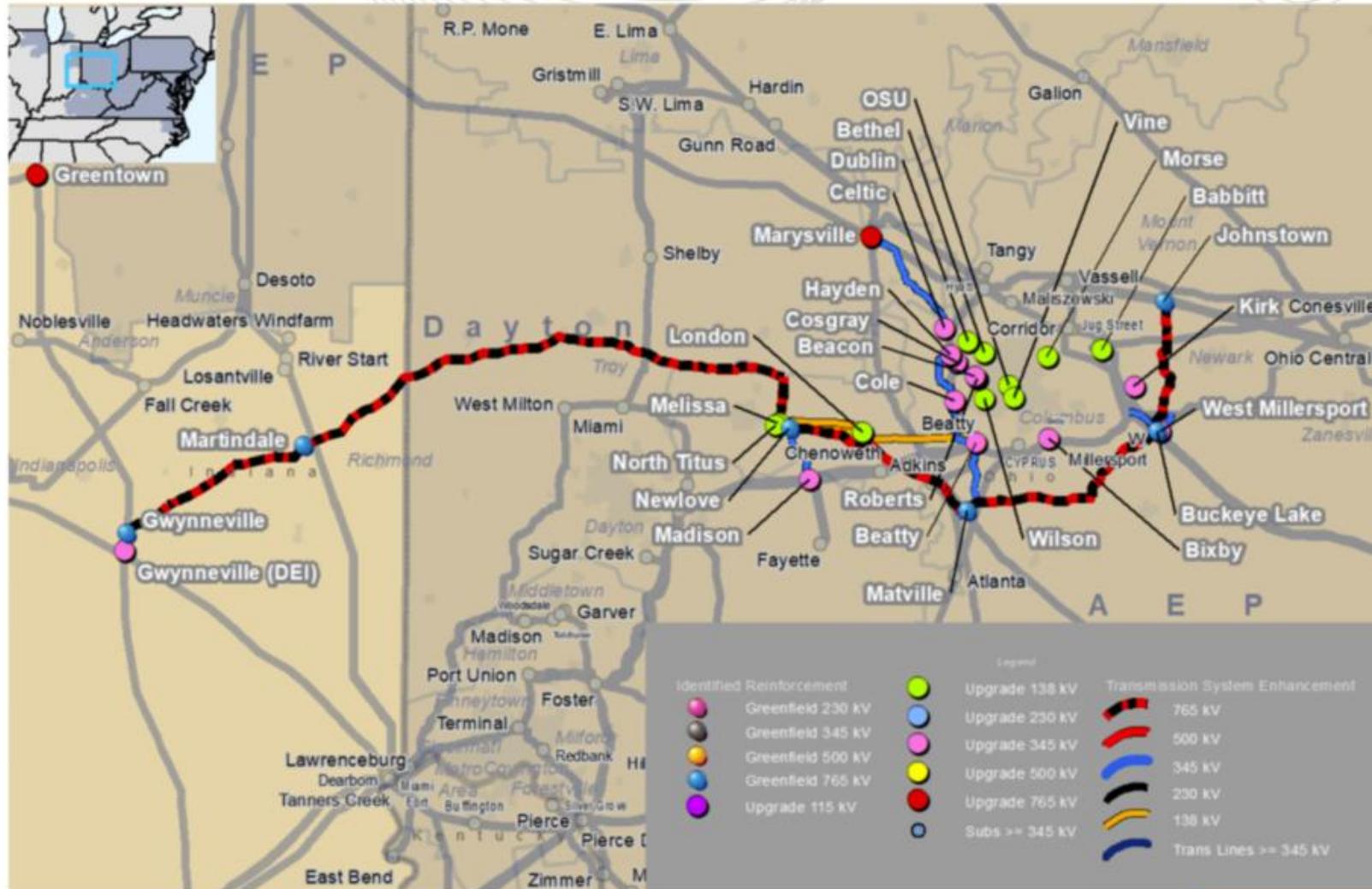
- Proposals: 570,152,109 show better performance
- Proposals: 239 and 334 are next
- Proposal 109 has the highest submitted cost and longest mileage of greenfield transmission lines. But without performance edge compared to proposals 570 or 152.

**Shortlist:** Considering both 2030 and 2032 performance, current proposal performance ranking (pending further evaluation) is as follows;

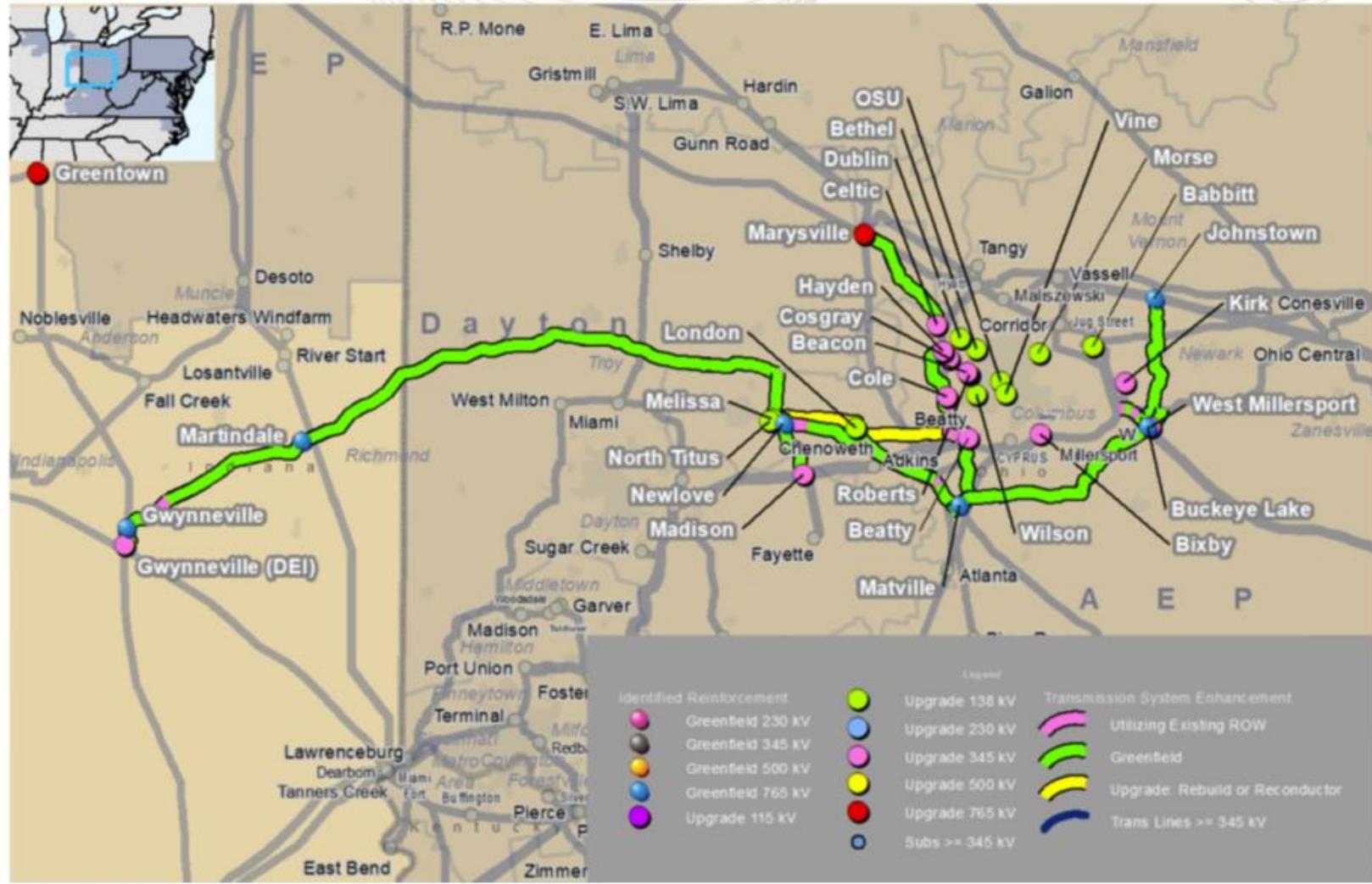
1. Proposal #570
2. Proposal #152
3. Proposal #239



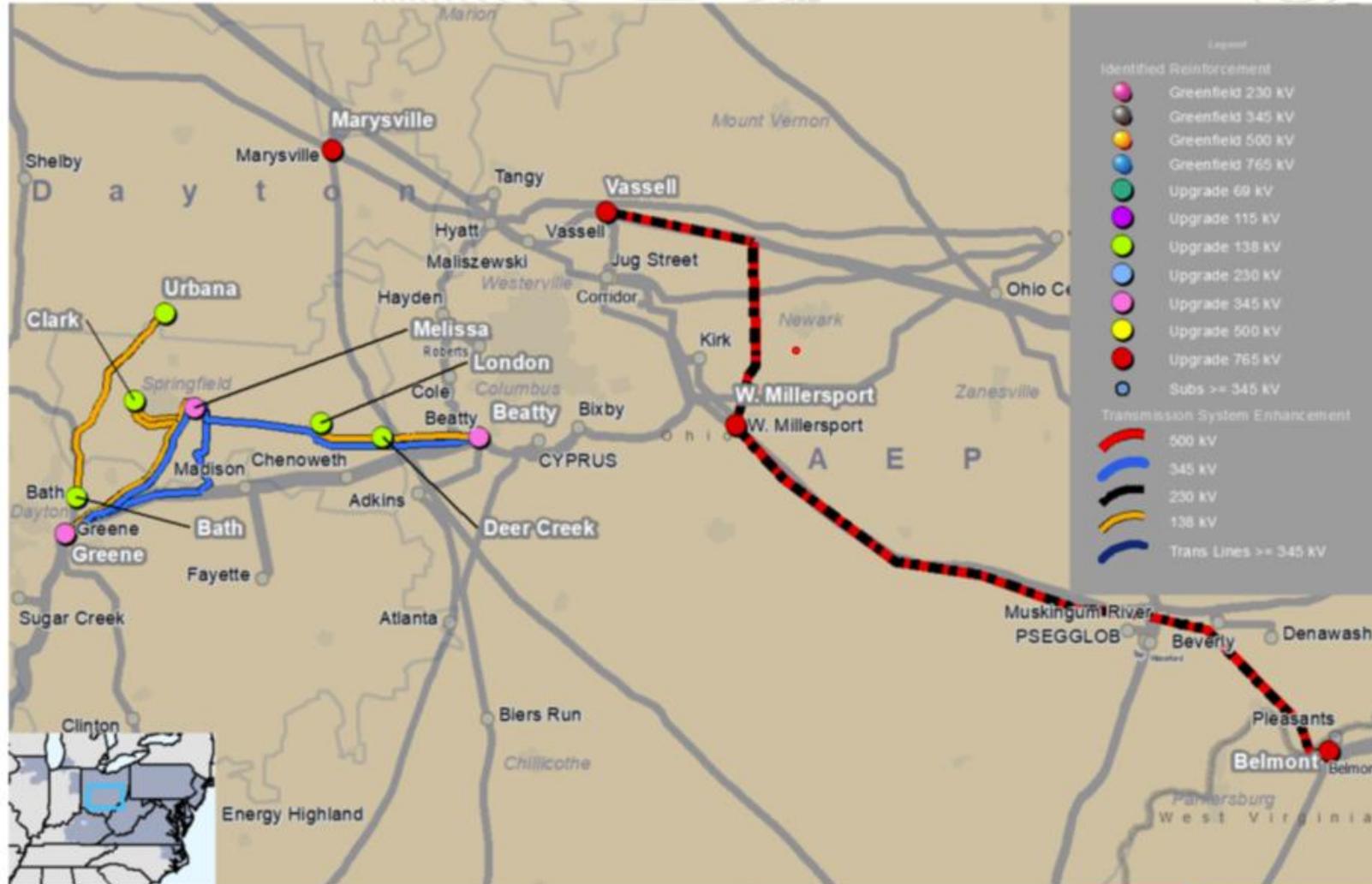




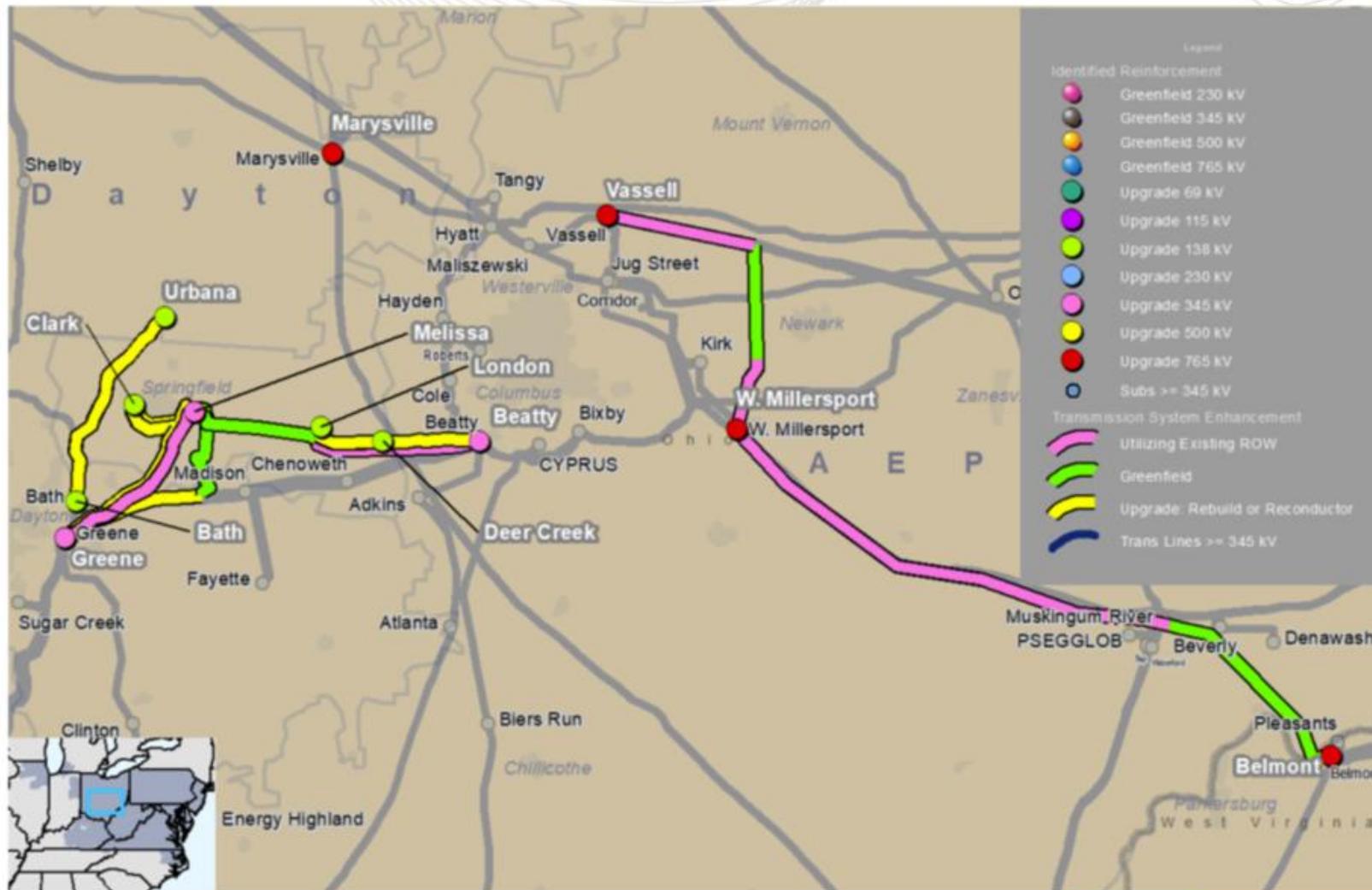
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