

# Subregional RTEP Committee – Western FirstEnergy Supplemental Projects

June 16, 2023

# Needs

Stakeholders must submit any comments within 10 days of this meeting in order to provide time necessary to consider these comments prior to the next phase of the M-3 process

**Need Numbers:** APS-2023-018, APS-2023-019, APS-2023-020

**Process State:** Need Meeting 6/16/2023

**Project Driver:**

*Equipment Material Condition, Performance and Risk*

**Specific Assumption Reference:**

System Performance Projects Global Factors

- System reliability and performance
- Substation/line equipment limits

System Condition Projects

- Substation Condition Rebuild/Replacement

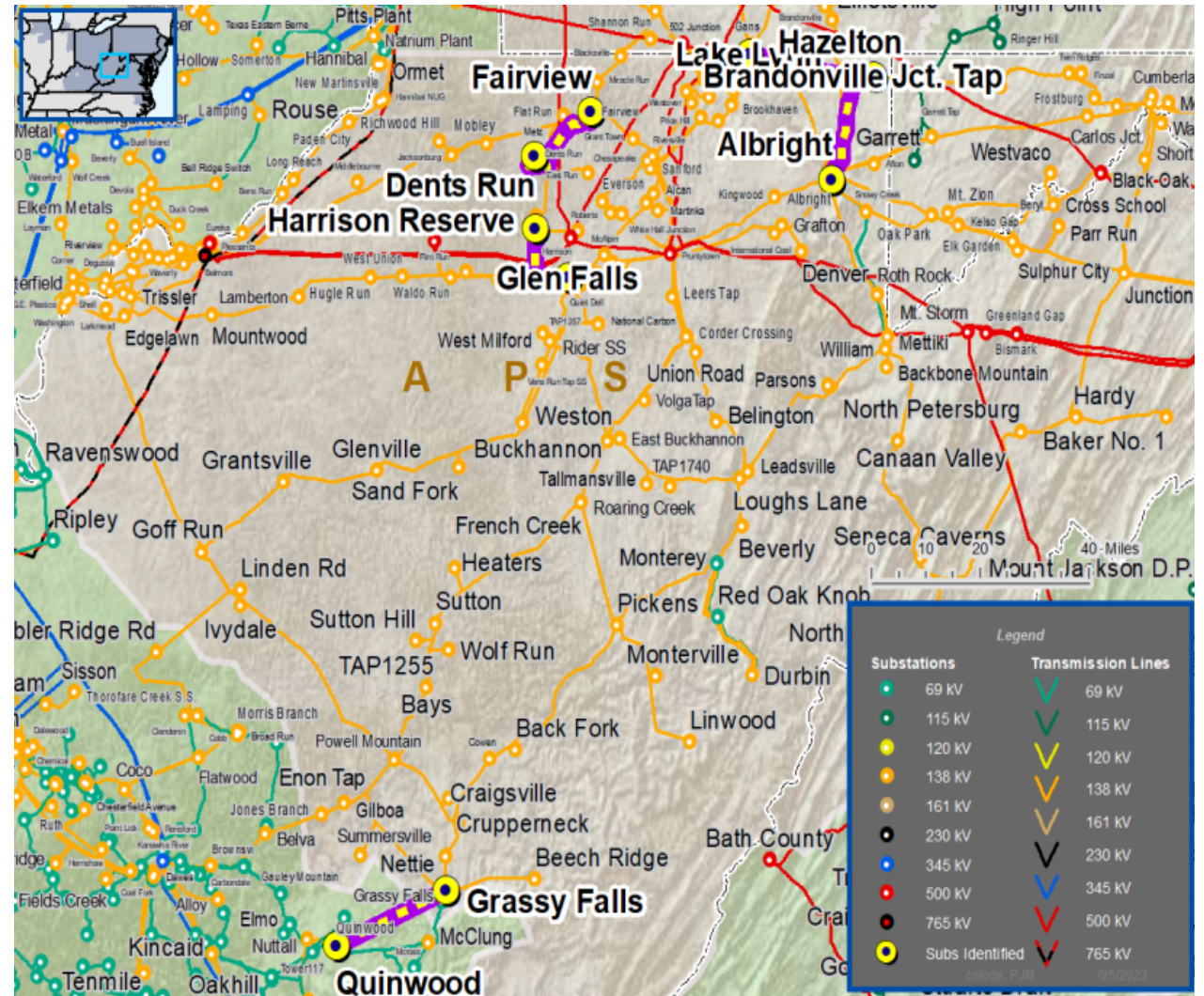
Upgrade Relay Schemes

- Obsolete and difficult to repair communication equipment (DTT, Blocking, etc.)
- Communication technology upgrades

**Problem Statement:**

- FirstEnergy has identified protection schemes using a certain vintage of relays and communication equipment that have a history of misoperation.
- Proper operation of the protection scheme requires all the separate components perform adequately during a fault.
- In many cases the protection equipment cannot be repaired due to a lack of replacement parts and available expertise in the outdated technology.
- Transmission line ratings are limited by terminal equipment.

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Need #	Transmission Line / Substation Locations	Existing Line Rating (SN / SE)	Existing Conductor Rating (SN / SE)	Limiting Terminal Equipment
APS-2023-018	Albright – Brandonville Junction 138 kV	141/182	181/225	SS Conductor, Line Trap, Relaying
	Brandonville Junction – Hazelton 138 kV	261/311	308/376	SS Conductor, Relaying
	Brandonville Junction – Lake Lynn 138 kV	219/271	308/376	SS Conductor, Line Trap, Relaying
APS-2023-019	Grassy Falls – Quinwood 138 kV	282/314	282/377	SS Conductor, Line Trap, Circuit Breaker, Relaying
APS-2023-020	Fairview – Dents Run Tap 138 kV	175/191	221/268	SS Conductor, Line Trap, Relaying
	Harrison Reserve Tap – Glen Falls 138 kV	191/191	221/268	Line Trap, Relaying

# Solution

Stakeholders must submit any comments within 10 days of this meeting in order to provide time necessary to consider these comments prior to the next phase of the M-3 process

**Need Numbers:** APS-2022-006, 007, 008, 009, 010, 011, 012, and 013

**Process State:** Solution Meeting 06/16/23

**Previously Presented:** Need Meeting 11/18/2022

**Project Driver:**

*Equipment Material Condition, Performance and Risk*

**Specific Assumption Reference:**

System Performance Projects Global Factors

- System reliability and performance
- Substation/line equipment limits

System Condition Projects

- Substation Condition Rebuild/Replacement

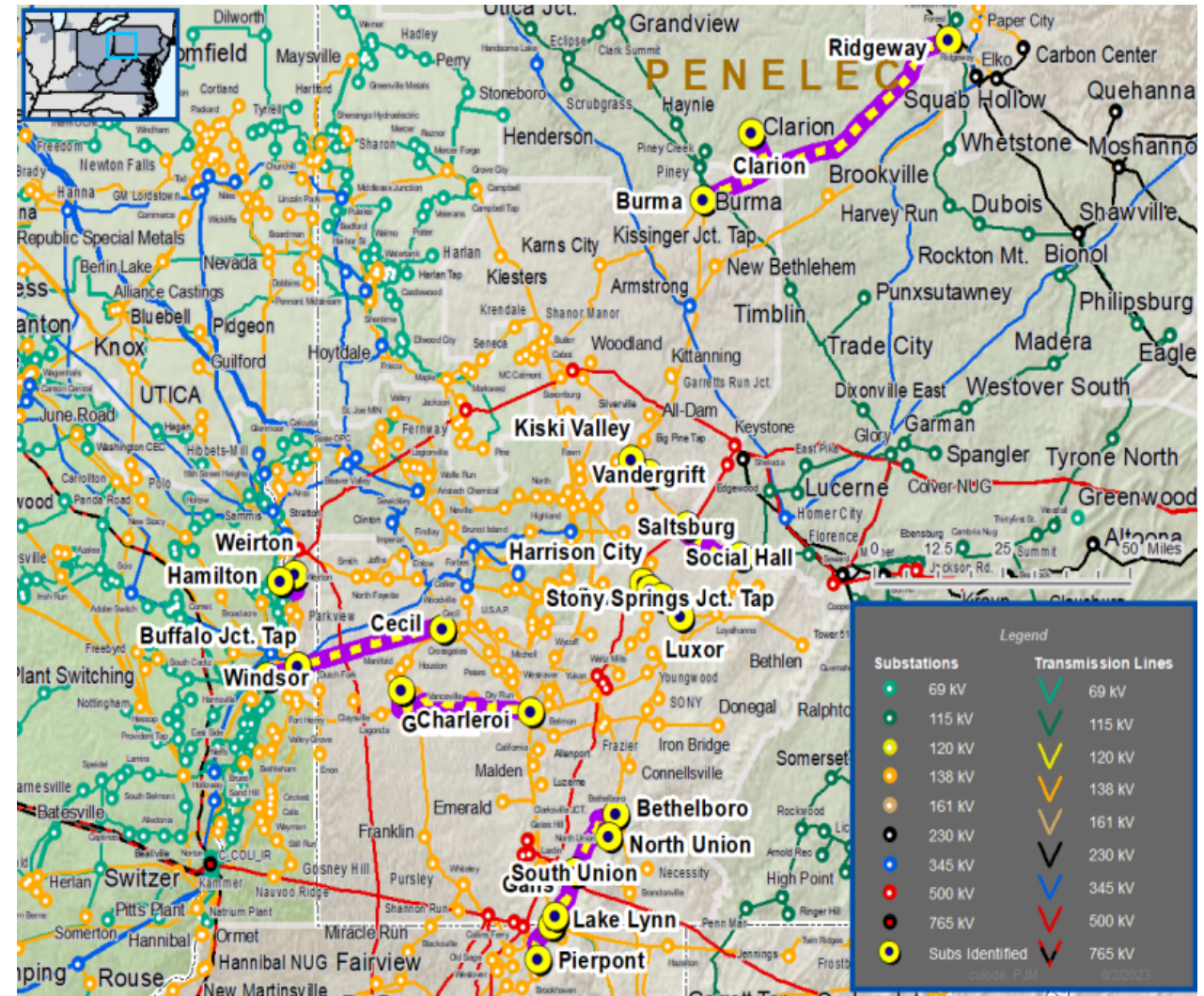
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Need #	Transmission Line / Substation Locations	Existing Line Rating (SN / SE)	Existing Conductor Rating (SN / SE)	Limiting Terminal Equipment
APS-2022-006	Cecil – Buffalo JCT 138 kV	224/229	297/365	SS Conductor, Line Trap, Relaying
	Windsor – Buffalo JCT 138 kV	225/256	297/365	SS Conductor, Line Trap
APS-2022-007	Kiski Valley – Vandergrift 138 kV Line	225/229	297/365	SS Conductor, Line Trap, and Relaying
APS-2022-008	Charleroi – Gordon 138 kV Line	206/229	308/376	SS Conductor, Wave Trap, Relaying, and CT
APS-2022-009	Lake Lynn – Pierpoint 138 kV Line	292/314	308/376	Wave Trap, SS conductor, and Circuit Breaker
APS-2022-010	Burma – Clarion 138 kV Line	292/314	308/376	Wave Trap, SS conductor
	Clarion – Ridgway 138 kV Line	292/314	308/376	Circuit Breaker. Wave Trap, SS Conductor
APS-2022-011	Saltsburg – Social Hall 138 kV	172/172	283/349	Relay, SS Conductor, CT
APS-2022-012	Harrison City – Penn 138 kV Line	242/297	308/376	Substation Conductor
	Stony Springs – Luxor 138 kV Line	225/287	296/302	Substation Conductor and Relaying
APS-2022-013	Bethelboro North Union 2 138 kV Line	292/314	297/365	Wave Trap
	Gans – Lake Lynn 138 kV Line	292/314	300/358	Wave Trap SS conductor
	North Union 2 T – North Union 138 kV Line	295/365	297/365	Substation Conductor
	North Union 2 T – South Union 138 kV Line	308/376	309/376	Substation Conductor
	South Union – Gans 138 kV Line	287/342	309/376	Line Switcher

Need Number	Transmission Line / Substation Locations	New MVA Line Rating (SN / SE)	Scope of Work	Estimated Cost (\$ M)	Target ISD
APS-2022-006	Cecil – Buffalo JcT 138 kV	297/365	<ul style="list-style-type: none"> <li>Cecil - Replace line relaying, breaker, switches, substation conductor, line trap, current transformer</li> </ul>	\$4.11 M	11/17/2023
	Windsor – Buffalo JcT 138 kV	297/365	<ul style="list-style-type: none"> <li>Windsor - Replace line relaying, breaker, switches, substation conductor, line trap</li> </ul>		10/20/2023
	Weirton – Hamilton JcT 138 kV	308/376	<ul style="list-style-type: none"> <li>Weirton - Replace line relaying, breaker, switches, substation conductor, line trap, current transformer</li> </ul>		
APS-2022-007	Kiski Valley – Vandergrift 138 kV	297/365	<ul style="list-style-type: none"> <li>Kiski - Replace line relaying, substation conductor, line trap</li> <li>Vandergrift - Replace line relaying, breaker, switches, substation conductor, line trap, current transformers</li> </ul>	\$2.99 M	12/15/2023
APS-2022-008	Charleroi – Gordon 138 kV	308/376	<ul style="list-style-type: none"> <li>Charleroi - Replace line relaying, line trap, current transformer</li> <li>Gordon - Replace line relaying, breaker, switch, line trap, current transformer</li> </ul>	\$1.57 M	12/15/2023
APS-2022-009	Lake Lynn – Pierpont 138 kV	308/376	<ul style="list-style-type: none"> <li>Lake Lynn - Replace line relaying, substation conductor, current transformers</li> <li>Pierpont - Replace line relaying, breakers, switch, substation conductor, line trap, current transformers</li> </ul>	\$2.33 M	11/15/2023
APS -2022-010	Burma – Clarion 138 kV	308/376	<ul style="list-style-type: none"> <li>Burma - Replace line relay, breaker, switches, substation conductor, line trap, current transformer</li> <li>Clarion - Replace substation conductor</li> </ul>	\$2.64 M	11/17/2023
	Clarion – Ridgway 138 kV	308/376	<ul style="list-style-type: none"> <li>Ridgway - Replace line relaying, breaker, switches, substation conductor, line trap, current transformer</li> </ul>		



Need Number	Transmission Line / Substation Locations	New MVA Line Rating (SN / SE)	Scope of Work	Estimated Cost (\$ M)	Target ISD
APS-2022-011	Saltsburg – Social Hall 138 kV	283/349	<ul style="list-style-type: none"> <li>Saltsburg - Replace line relaying, breakers, switches, line trap, current transformers</li> <li>Social Hall - Replace line relaying, breaker, switches, substation conductor, line trap, current transformer</li> </ul>	\$2.98 M	11/4/2023
APS-2022-012	Harrison City – Penn 138 kV	308/376	<ul style="list-style-type: none"> <li>Harrison City - Replace line relaying, substation conductor, current transformer</li> </ul>	\$4.90 M	12/29/2023
	North Greensburg – Hempfield 138 kV	308/376	<ul style="list-style-type: none"> <li>Hempfield - Replace line relaying, breaker, switch, substation conductor, current transformer</li> </ul>		
	Stony Springs JcT – Luxor 138 kV	296/302	<ul style="list-style-type: none"> <li>Luxor - Replace line relaying, breaker, switch, substation conductor, current transformer</li> </ul>		
APS-2022-013	Bethelboro – North Union 2 T 138 kV	308/376	<ul style="list-style-type: none"> <li>Bethelboro - Replace line relaying, breaker, switch, substation conductor, line trap, current transformer</li> </ul>	\$3.32 M	12/15/2023
	Gans – Lake Lynn 138 kV	308/376	<ul style="list-style-type: none"> <li>Lake Lynn - Replace line relaying, breaker, switch, substation conductor, line trap, current transformer</li> </ul>		

**Alternatives Considered:** Maintain existing condition

**Project Status:** Engineering

**Model:** 2022 RTEP model for 2027 Summer (50/50)

**Need Number:** APS-2023-001

**Process Stage:** Solution Meeting 6/16/2023

**Previously Presented:** Need Meeting 2/17/2023

**Project Driver:**

*Operational Flexibility and Efficiency*

**Specific Assumption Reference:**

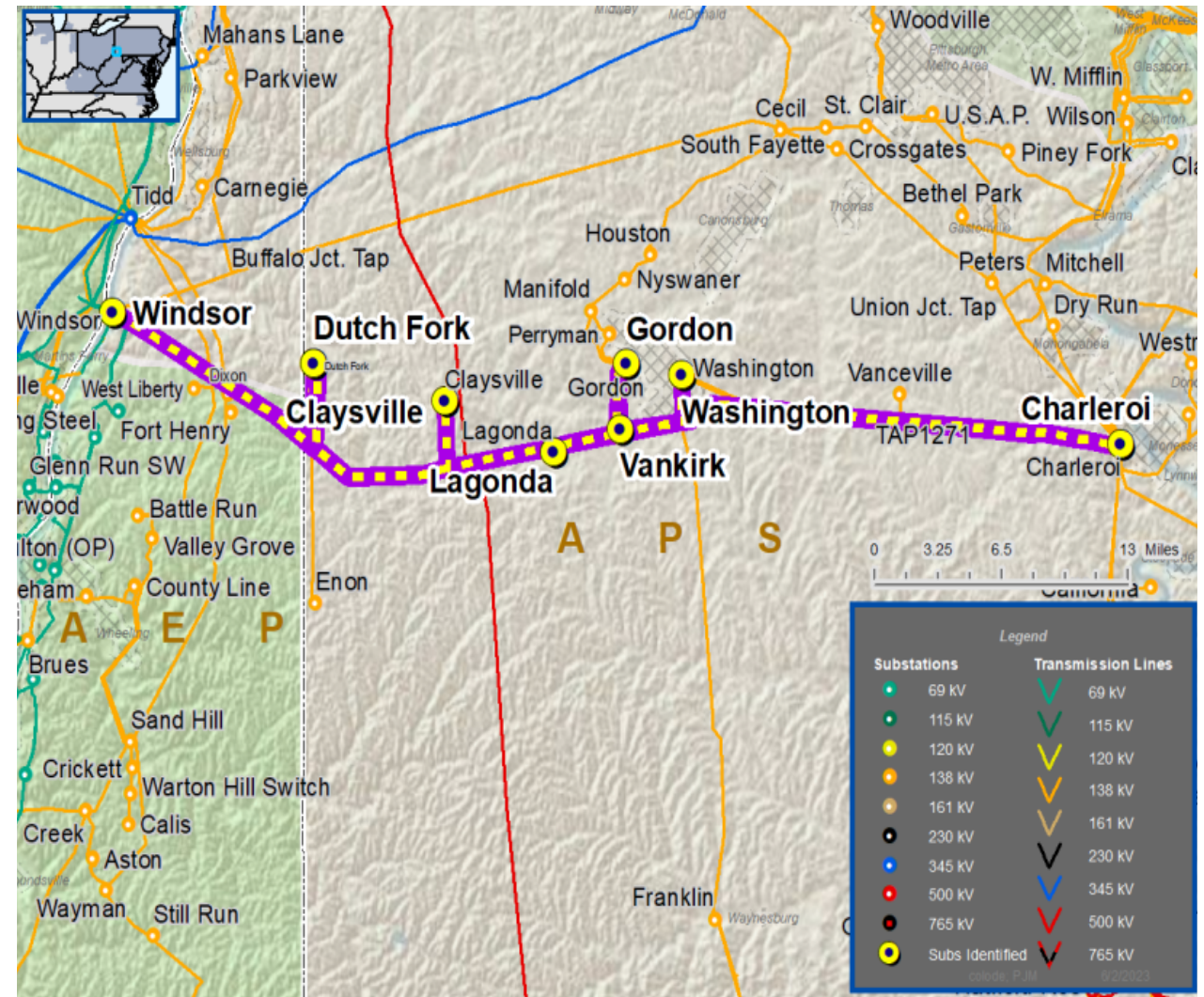
- Global
- System reliability and performance
- Load at risk in planning and operational scenarios
- System losses
- Add/Expand Bus Configuration
- Capability to perform substation maintenance

**Problem Statement:**

An N-1 loss of the Dutch Fork - Windsor 138 kV Line results in Enon, Dutch Fork, and Claysville substations being fed radially out of Washington Substation. The radial line serves approximately 110 MW of load at peak conditions and over 4,539 customers.

A subsequent N-1 loss of the Whitely - Pursley 138 kV Line adds Washington, Vanceville, Franklin, and Pursley substations to the radial line now served out of Charleroi Substation. This adds an additional 67 MW of load and 13,379 customers served from the radial line.

This radial line has approximately 177 MW and 17,918 customers. In this configuration Enon Substation has 73 miles of line exposure.



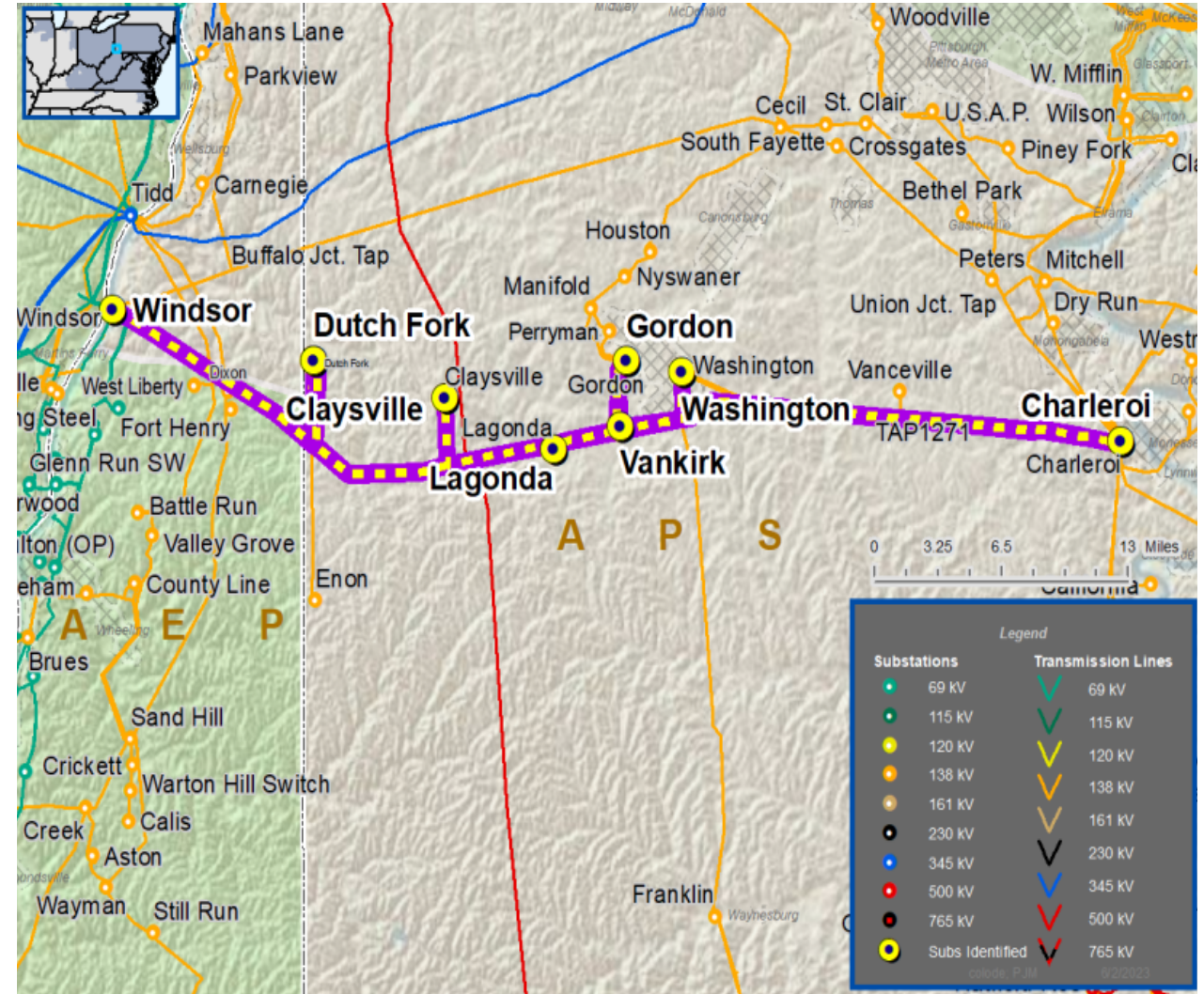
**Need Number:** APS-2023-001

**Process Stage:** Solution Meeting 6/16/2023

**Previously Presented:** Need Meeting 2/17/2023

**Proposed Solution:**

- Create the Vankirk Substation:
  - Construct a new 10 breaker 138 kV breaker-and-a-half substation
  - Loop in the Dutch Fork – Washington 138 kV Line
  - Loop in the Gordon – Lagonda 138 kV Line
  - Loop in the Gordon – Charleroi 138 kV Line
- At Washington:
  - Replace limiting substation conductor and wave trap
- At Dutch Fork:
  - Replace limiting substation conductor
- At Gordon:
  - Replace limiting substation conductor, relaying, and wave trap
- At Claysville:
  - Replace limiting substation conductor
- At Charleroi:
  - Replace limiting substation conductor and wave trap



### Transmission Line Ratings:

#### Vankirk – Gordon East 138 kV (New line)

- Before Proposed Solution: N/A
- After Proposed Solution: 308/376 MVA (SN/SE)

#### Vankirk – Gordon West 138 kV (New line)

- Before Proposed Solution: N/A
- After Proposed Solution: 308/376 MVA (SN/SE)

#### Lagonda – Vankirk 138 kV (New line)

- Before Proposed Solution: N/A
- After Proposed Solution: 308/376 MVA (SN/SE)

#### Dutch Fork – Claysville 138 kV

- Before Proposed Solution: 216/270 MVA (SN/SE)
- After Proposed Solution: 297/365 MVA (SN/SE)

#### Claysville – Vankirk 138 kV (New line)

- Before Proposed Solution: N/A
- After Proposed Solution: 297/365 MVA (SN/SE)

#### Vankirk – Washington 138 kV (New line)

- Before Proposed Solution: N/A
- After Proposed Solution: 297/365 MVA (SN/SE)

#### Charleroi – Vankirk 138 kV (New line)

- Before Proposed Solution: N/A
- After Proposed Solution: 308/376 MVA (SN/SE)

### Alternatives Considered

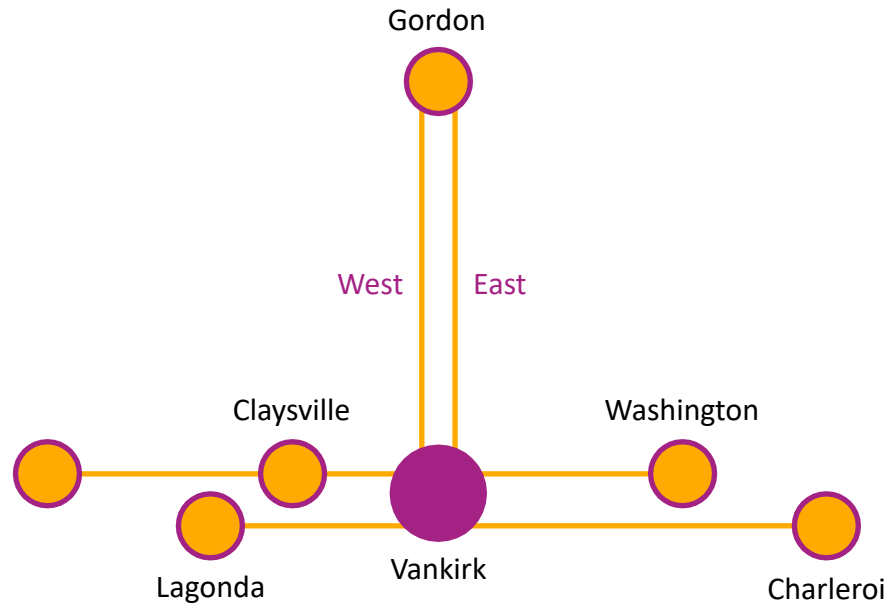
- Build a new 138 kV line from Enon – Whiteley, which requires 21 miles of new RoW.

**Estimated Project Cost:** \$31.7M

**Projected In-Service:** 12/31/2025

**Project Status:** Conceptual

**Model:** 2020 RTEP model for 2025 Summer (50/50)



Legend	
500 kV	
345 kV	
230 kV	
138 kV	
115 kV	
69 kV	
46 kV	
34.5 kV	
23 kV	
New	

# Appendix

# High Level M-3 Meeting Schedule

Assumptions	Activity	Timing
	Posting of TO Assumptions Meeting information	20 days before Assumptions Meeting
	Stakeholder comments	10 days after Assumptions Meeting
Needs	Activity	Timing
	TOs and Stakeholders Post Needs Meeting slides	10 days before Needs Meeting
	Stakeholder comments	10 days after Needs Meeting
Solutions	Activity	Timing
	TOs and Stakeholders Post Solutions Meeting slides	10 days before Solutions Meeting
	Stakeholder comments	10 days after Solutions Meeting
Submission of Supplemental Projects & Local Plan	Activity	Timing
	Do No Harm (DNH) analysis for selected solution	Prior to posting selected solution
	Post selected solution(s)	Following completion of DNH analysis
	Stakeholder comments	10 days prior to Local Plan Submission for integration into RTEP
	Local Plan submitted to PJM for integration into RTEP	Following review and consideration of comments received after posting of selected solutions

# Revision History

6/xx/2023– V1 – Original version posted to pjm.com