

# First Energy (Penelec) Local Plan Submission for the 2021 RTEP

**Need Number:** PN-2020-011

**Process Stage:** Submission of Supplemental Project for Inclusion in the Local Plan 9/20/2021

**Previously Presented:**

Need Meeting 5/21/2020

Solution Meeting 11/18/2020

**Project Driver:**

*Equipment Material Condition, Performance and Risk*

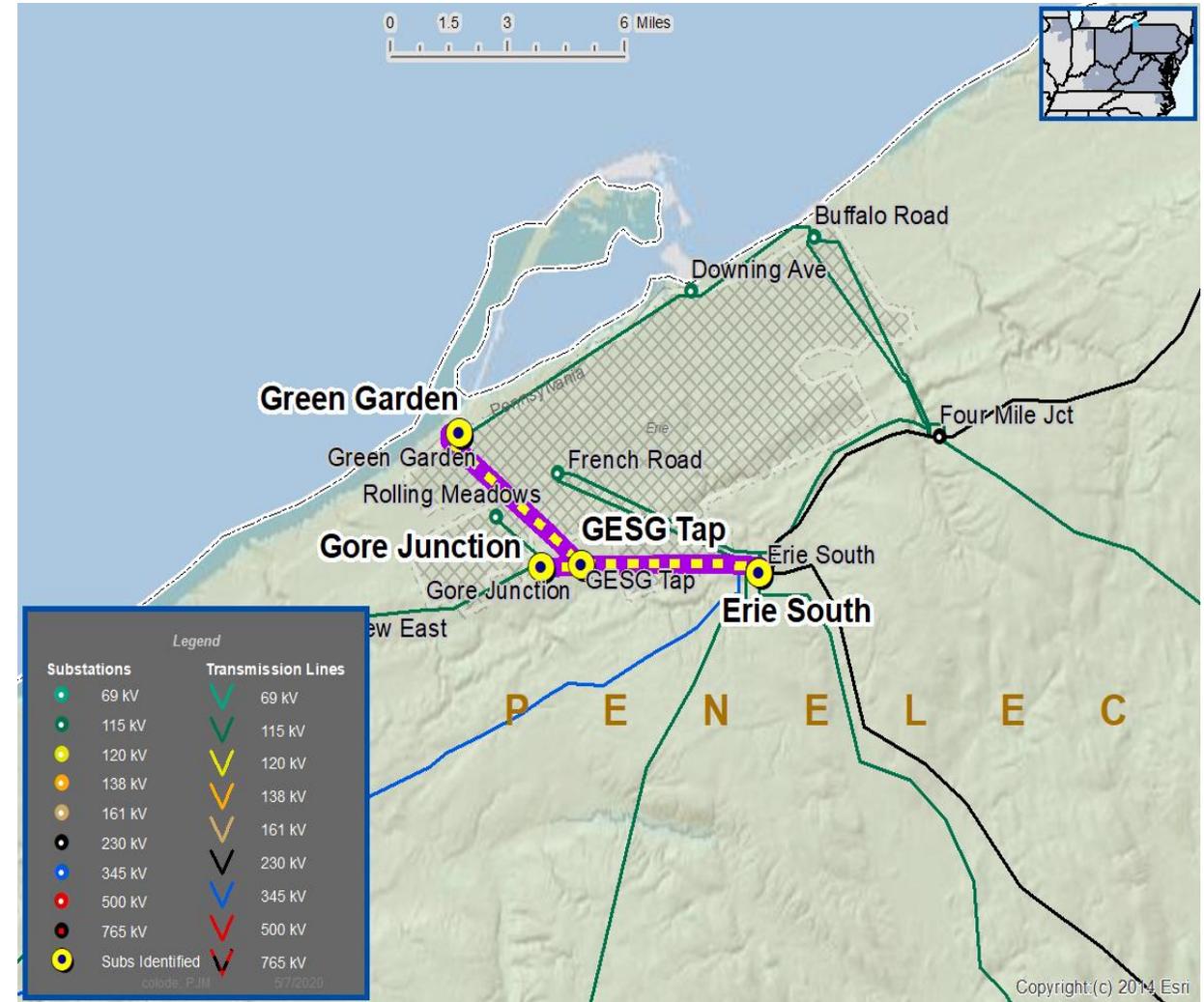
*Operational Flexibility and Efficiency*

**Specific Assumption Reference:**

System Performance Projects Global Factors

- System reliability and performance
- Substation/line equipment limits
- Upgrade Relay Schemes
- Relay schemes that have a history of misoperation
- Obsolete and difficult to repair communication equipment (DTT, Blocking, etc.)
- Communication technology upgrades
- Bus protection schemes

**Continued on next slide...**



**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many cases the protection equipment cannot be repaired due to a lack of replacement part and available expertise in the outdated technology.
- Transmission line ratings are limited by terminal equipment.

Need Number	Transmission Line / Substation Locations	Existing Line Rating (SN / SE)	Existing Conductor Rating (SN / SE)	Limiting Terminal Equipment
PN-2020-011	Erie South – GESG Tap 115 kV Line	202 / 245	202 / 245	N/A
	GESG Tap – Gore Junction 115 kV Line	274 / 344	354 / 406	Disconnect Switch
	GESG Tap – Green Garden 115 kV Line	232 / 282	232 / 282	N/A

**Selected Solution:**

Need Number	Transmission Line / Substation Locations	Supplemental Project ID	New MVA Line Rating (SN / SE)	Scope of Work	Estimated Cost (\$ M)	Target ISD
PN-2020-011	Erie South – GESG Tap 115 kV Line	s2411.1	202 / 245	<ul style="list-style-type: none"> <li>Erie South 115 kV Substation – Replace line relaying</li> </ul>	\$2.1M	06/01/2022
	GESG Tap – Gore Junction 115 kV Line	s2411.2	354 / 406	<ul style="list-style-type: none"> <li>Gore Junction 115 kV Substation – Replace line relaying and disconnect switch</li> </ul>		
	GESG Tap – Green Garden 115 kV Line	s2411.3	232 / 282	<ul style="list-style-type: none"> <li>Green Garden 115 kV Substation – Replace line relaying</li> </ul>		

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

**Need Number:** PN-2020-017

**Process Stage:** Submission of Supplemental Project for Inclusion in the Local Plan 9/20/2021

**Previously Presented:**

Need Meeting 8/13/2020

Solution Meeting 11/18/2020

**Project Driver:**

*Operational Flexibility and Efficiency*

**Specific Assumption Reference:**

Add/Expand Bus Configuration

- Eliminate simultaneous outages to multiple network elements
- System Performance Projects
- Substation/line equipment limits

**Problem Statement:**

The loss of Nanty Glo substation results in loss of approximately 6.6 MW of load and approximately 1,600 customers. Substation consists of:

- Four networked 46 kV lines
  - Two distribution transformers connected with switches
- Transmission line ratings are limited by terminal equipment.

Nanty Glo – Revloc 46 kV Line (line relaying, substation conductor)

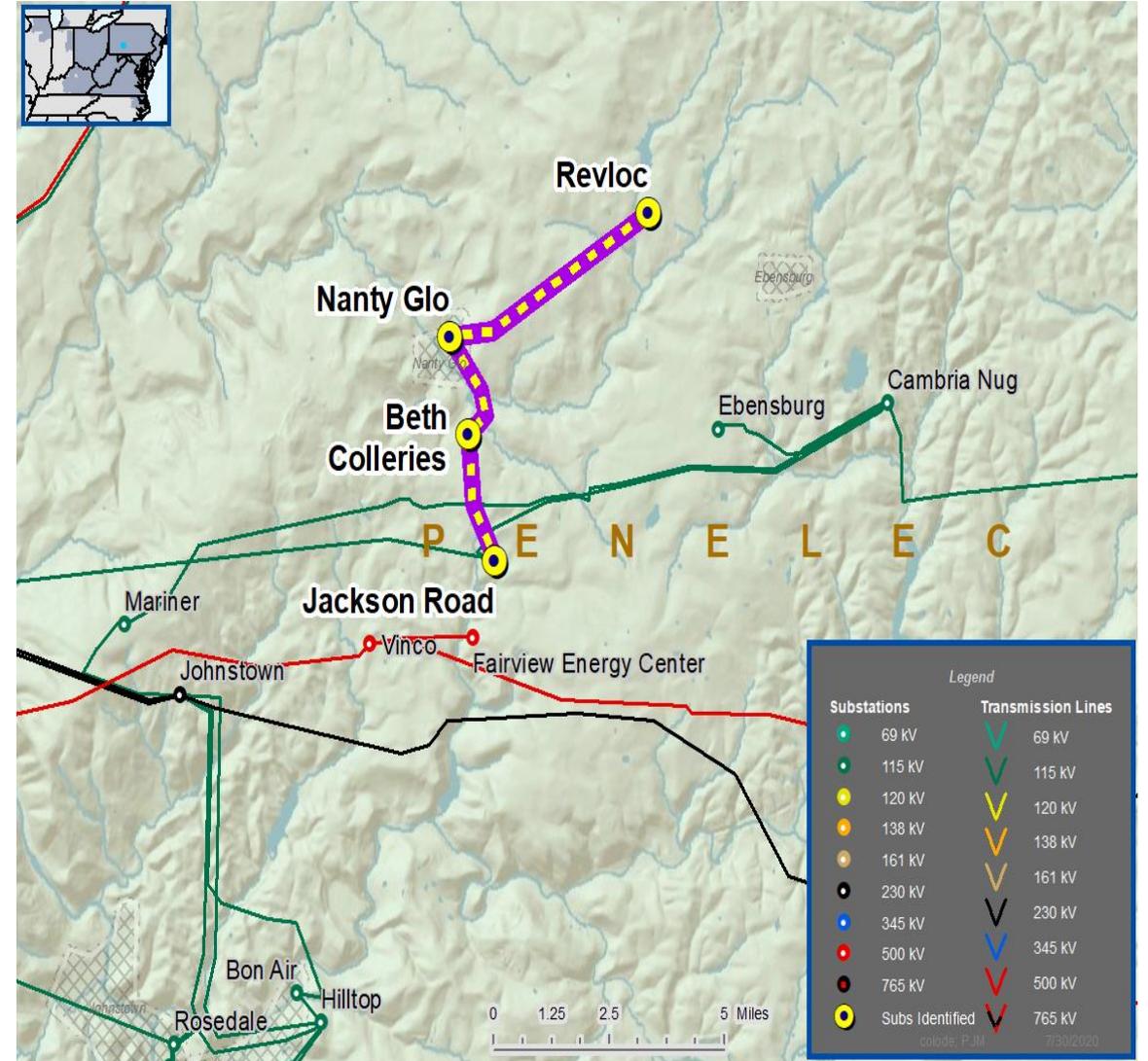
- Existing line rating: 26 / 26 MVA (SN / SE)
- Existing conductor rating: 37 / 37 MVA (SN / SE)

Nanty Glo – Beth Colleries S 46 kV Line (line relaying)

- Existing line rating: 25 / 25 MVA (SN / SE)
- Existing conductor rating: 32 / 32 MVA (SN / SE)

Beth Colleries – Jackson Road S 46 kV Line (line relaying, substation conductor)

- Existing line rating: 33 / 33 MVA (SN / SE)
- Existing conductor rating: 49 / 50 MVA (SN / SE)



**Need Number:** PN-2020-017

**Process Stage:** Submission of Supplemental Project for Inclusion in the Local Plan 9/20/2021

**Selected Solution:**

Nanty Glo 46 kV Substation:

- Construct six breaker ring bus
- Cancel existing supplemental project s1781

Bethlehem 33 46 kV Substation:

- Replace line relaying

Jackson Road 46 kV Substation:

- Replace line relaying

Spangler 46 kV Substation:

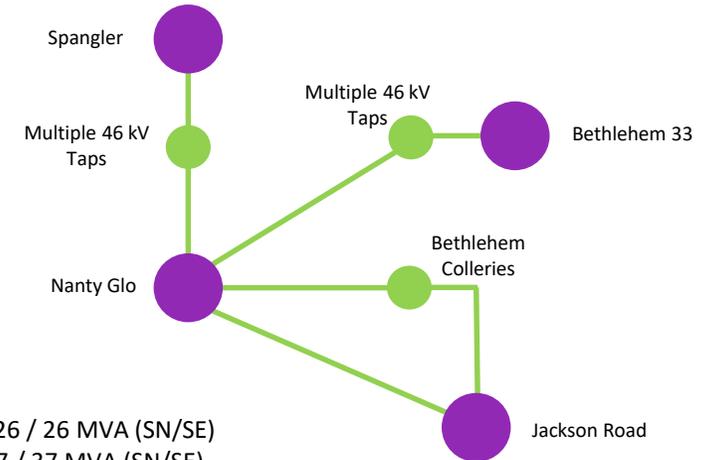
- Adjust line relaying

**Estimated Project Cost:** \$7.9M

**Projected In-Service:** 6/1/2024

**Supplemental Project ID:** s2412, s2412.1, s2412.2, s2412.3, s2412.4

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



**Transmission Line Ratings:**

Nanty Glo – Revloc 46 kV Line

- Before Proposed Solution: 26 / 26 MVA (SN/SE)
- After Proposed Solution: 37 / 37 MVA (SN/SE)

Cambria County Prison – Bethlehem 33 46 kV Line

- Before Proposed Solution: 22 / 22 MVA (SN/SE)
- After Proposed Solution: 32 / 32 MVA (SN/SE)

Nanty Glo – Bethlehem Colleries 46 kV Line

- Before Proposed Solution: 25 / 25 MVA (SN/SE)
- After Proposed Solution: 32 / 32 MVA (SN/SE)

Bethlehem Colleries – Jackson Road 46 kV Line

- Before Proposed Solution: 33 / 33 MVA (SN/SE)
- After Proposed Solution: 49 / 50 MVA (SN/SE)

Nanty Glo – Jackson Road SJN 46 kV Line (b3144.1-2)

- Before Proposed Solution: 25 / 25 MVA (SN/SE)
- After Proposed Solution: 53 / 64 MVA (SN/SE)

Nanty Glo – Twin Rocks 46 kV Line (previously s1781)

- Before Proposed Solution: 34 / 44 MVA (SN/SE)
- After Proposed Solution: 67 / 81 MVA (SN/SE)

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

**Need Number:** PN-2020-014

**Process Stage:** Submission of Supplemental Project for Inclusion in the Local Plan 9/20/2021

**Previously Presented:**

Need Meeting 05/22/2020

Solution Meeting 04/14/2021

**Project Driver:**

*Equipment Material Condition, Performance and Risk  
Operational Flexibility and Efficiency*

**Specific Assumption Reference:**

System Condition Projects

- Line Condition Rebuild/Replacement
  - Transmission Line Switches

System Performance Projects

- Substation/line equipment limits
- Load at risk in planning and operational scenarios

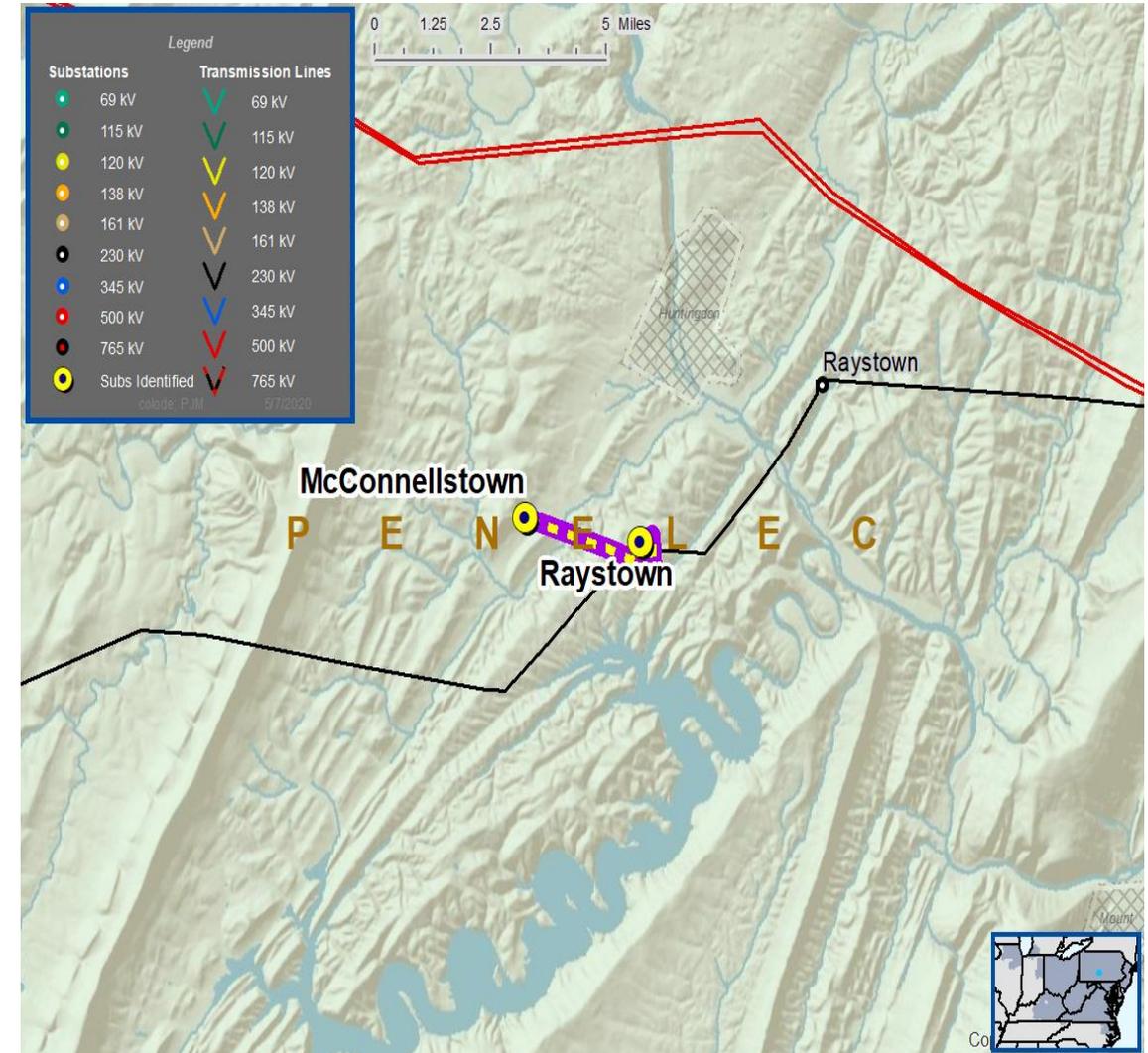
**Problem Statement:**

The Raystown – McConnellstown 46 kV line has three in-line switches (A-136, A-137, and A-139) that are in degraded condition and have limited availability of spare parts. The existing switches have operational limitations. The motor control units are no longer supported by the manufacturer. Inability to sectionalize this line results in loss of approximately 9 MW of load and approximately 1,136 customers, including a REA.

Transmission line ratings are limited by terminal equipment.

- Allegheny Hydro Tap – Allegheny Hydro 46 kV line rating is limited by the transmission line conductor 52 / 62 MVA (SN/SE).
- Allegheny Hydro Tap – RAM Junction 46 kV line rating is 55 / 69 MVA (SN/SE) and the transmission line conductor rating is 59 / 71 MVA (SN/SE). (disconnect switch)
- RAM Junction – Piney Ridge 46 kV line rating is 55 / 69 MVA (SN/SE) and the transmission line conductor rating is 59 / 71 MVA (SN/SE). (disconnect switch)

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



**Need Number:** PN-2020-014

**Process Stage:** Submission of Supplemental Project for Inclusion in the Local Plan 9/20/2021

**Selected Solution:**

***Raystown – McConnellstown 46 kV Switch Replacements***

- Replace in-line switches A-136, A-137, and A-139

**Transmission Line Ratings:**

Allegheny Hydro Tap – Allegheny Hydro 46 kV Line

- Before Proposed Solution: 52 / 62 MVA (SN/SE)
- After Proposed Solution: 52 / 62 MVA (SN/SE)

Allegheny Hydro Tap – RAM Junction 46 kV Line

- Before Proposed Solution: 55 / 69 MVA (SN/SE)
- After Proposed Solution: 59 / 71 MVA (SN/SE)

RAM Junction – Piney Ridge 46 kV Line

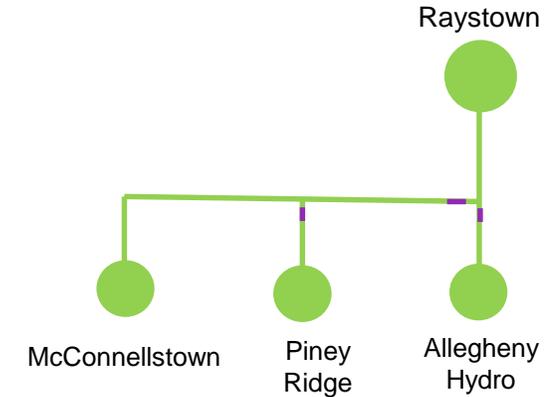
- Before Proposed Solution: 55 / 69 MVA (SN/SE)
- After Proposed Solution: 59 / 71 MVA (SN/SE)

**Estimated Project Cost:** \$1.5M

**Projected In-Service:** 12/31/2022

**Supplemental Project ID:** s2535, s2535.1, s2535.2, s2535.3

**Model:** 2020 Series 2025 Summer RTEP 50/50



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

**Need Number:** PN-2021-002

**Process State:** Submission of Supplemental Project for Inclusion in the Local Plan 9/20/2021

**Previously Presented:**

Need Meeting 3/18/2021

Solution Meeting 4/14/2021

**Project Driver:**

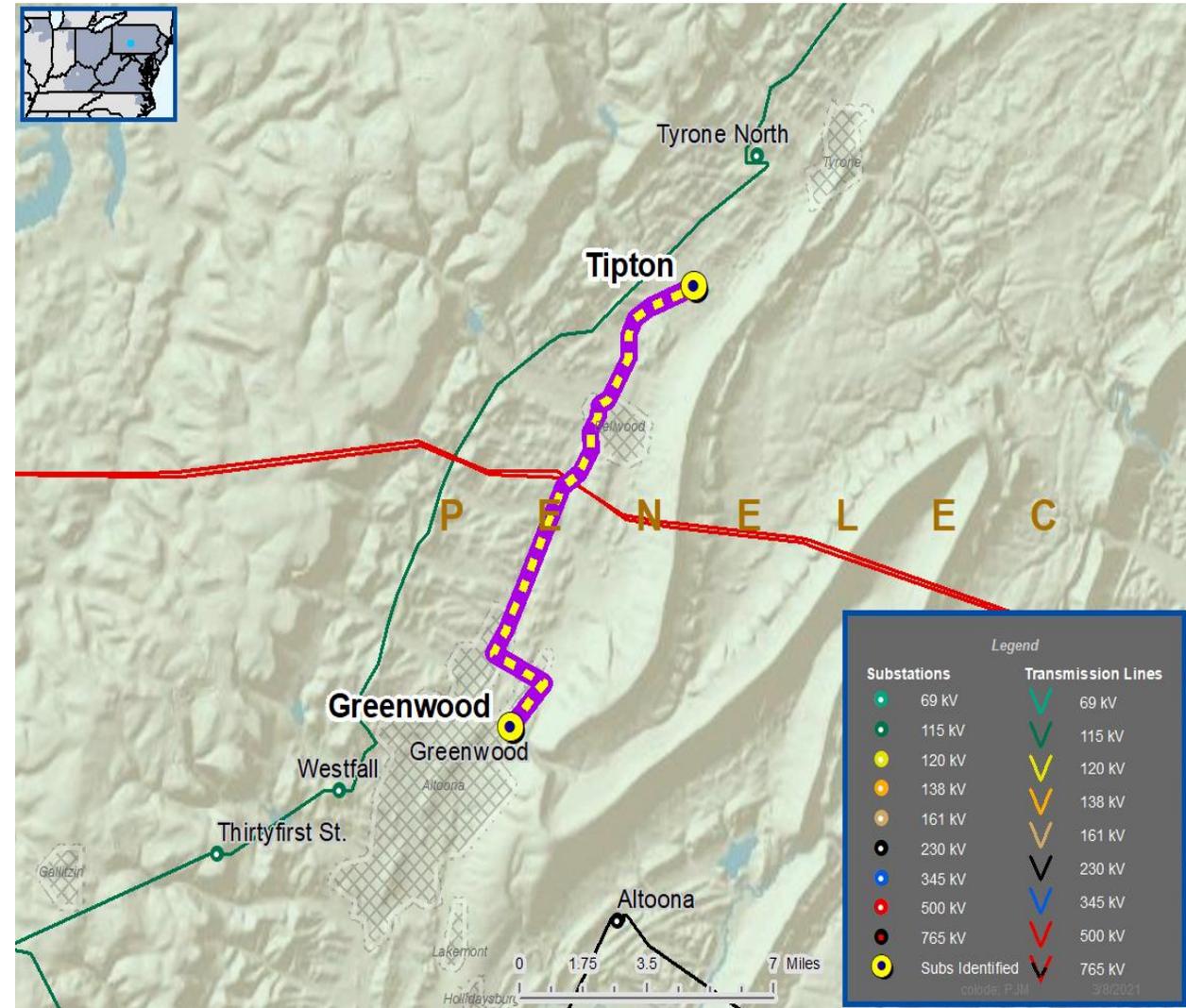
*Customer Service*

**Specific Assumption Reference:**

New customer connection requests will be evaluated per FirstEnergy's "Requirements for Transmission Connected Facilities" document and "Transmission Planning Criteria" document.

**Problem Statement:**

New Customer Connection - A customer requested 46 kV service for load of approximately 12 MW near the Greenwood – Tipton 46 kV line. Requested in-service date is 7/2021.



**Need Number:** PN-2021-002

**Process State:** Submission of Supplemental Project for Inclusion in the Local Plan 9/20/2021

**Selected Solution:**

Provide 46 kV Service:

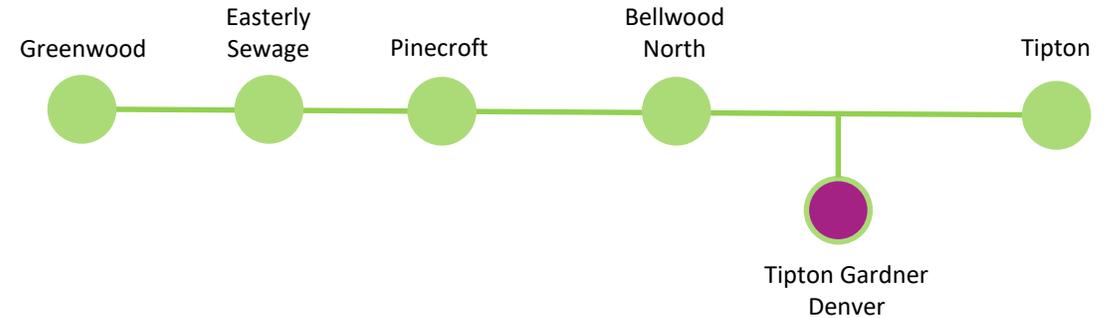
- Tap the Greenwood – Tipton 46 kV line (Gardner Denver Tap – Gardner Denver 46 kV line segment)
- Construct one span of 46 kV line
- Install one 46 kV revenue metering package
- Install two 1200 A SCADA controlled disconnect switches
- Add SCADA to one existing switch

**Estimated Project Cost:** \$1.4M

**Projected In-Service:** 7/1/2021

**Supplemental Project ID:** s2536

**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	

**Need Number:** PN-2021-001

**Process Stage:** Submission of Supplemental Project for Inclusion in the Local Plan 9/20/2021

**Previously Presented:**

Need Meeting 1/14/2021

Solutions Meeting 2/16/2021

**Project Driver:**

*Operational Flexibility and Efficiency*

**Specific Assumption Reference:**

Upgrade Relay Schemes

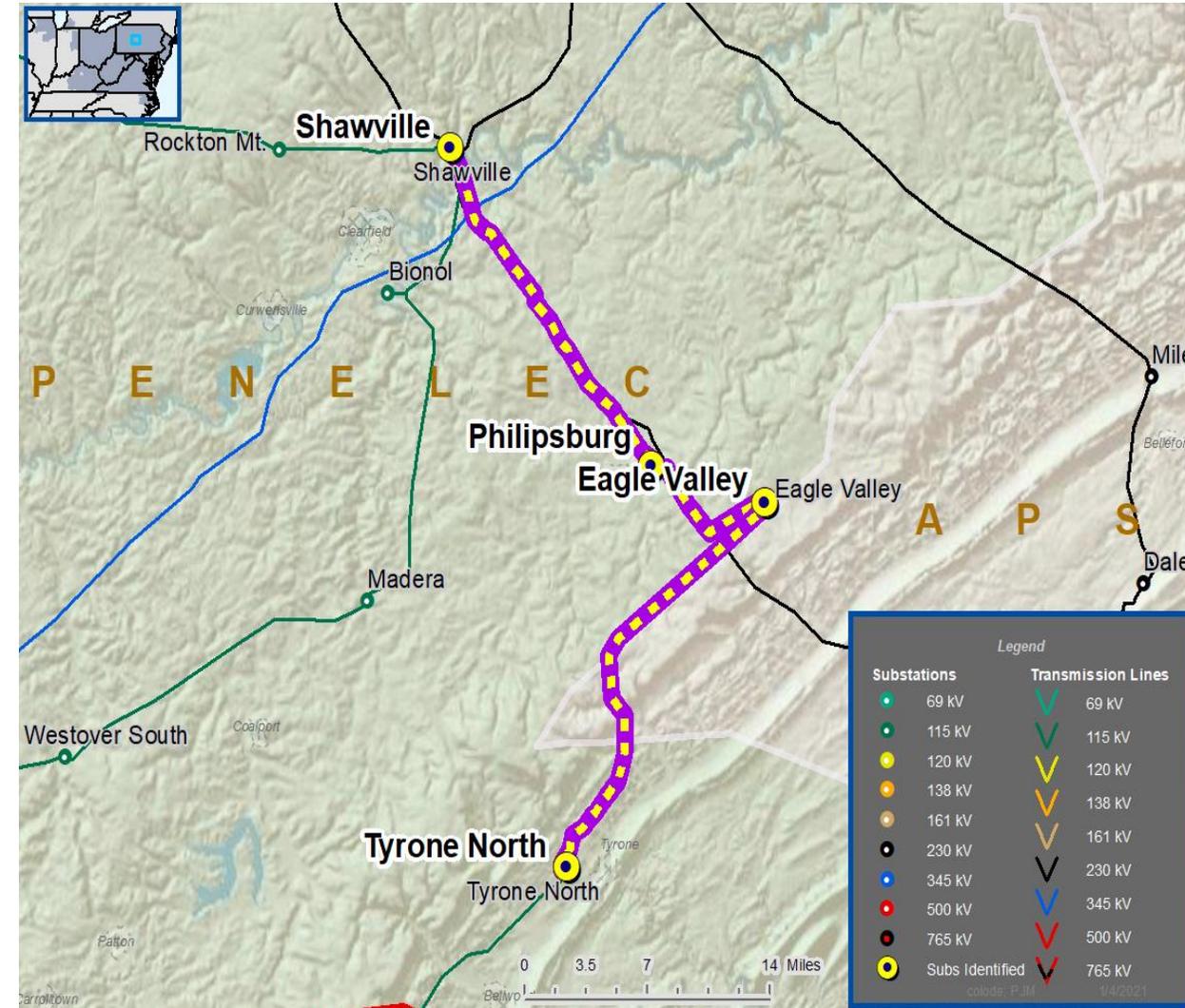
- Ancillary benefits (i.e., automated fault location or increased oscillography)
- System Performance Projects
- Substation/line equipment limits

**Problem Statement:**

The Chestnut Flats and Sandy Ridge 115 kV wind generators can island with 34.5 kV load at Philipsburg, and 46 kV load at Tyrone North and Westfall under certain N-1-1 conditions.

Transmission line ratings are limited by terminal equipment.  
Philipsburg – Shawville 115 kV Line (line trap, circuit breaker)

- Existing line rating: 163 / 185 MVA (SN / SE)
- Existing conductor rating: 167 / 202 MVA (SN / SE)



**Need Number:** PN-2021-001

**Process State:** Submission of Supplemental Project for Inclusion in the Local Plan  
9/20/2021

**Selected Solution:**

Shawville 115 kV Substation:

- Replace line side breaker disconnect, line trap, CCVT, and line arresters.
- Install new PLC transmitter/receiver.

Philipsburg 115 kV Substation:

- Replace bus section breaker.
- Replace breaker disconnects, line arresters, CCVT, and line trap.

Eagle Valley 115 kV Substation:

- Install PLC transmitter/receive and adjust existing PLC settings

Westfall 115 kV Substation:

- Adjust PLC settings

Thirty-First Street 115 kV Substation:

- Adjust PLC settings.

**Transmission Line Ratings:**

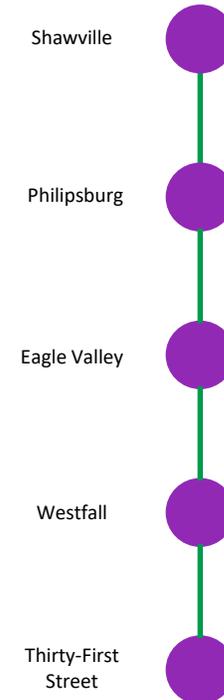
- Philipsburg – Shawville 115 kV Line
  - Before Proposed Solution: 163 / 185 MVA (SN/SE)
  - After Proposed Solution: 167 / 202 MVA (SN/SE)

**Estimated Project Cost:** \$1.3M

**Projected In-Service:** 6/1/2021

**Supplemental Project ID:** s2493, s2493.1, s2493.2, s2493.3, s2493.4, s2493.5

**Model:** 2016 RTEP model for 2021 Summer (50/50)



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

# Questions?



# Revision History

9/20/2021 – V1 – Original version posted to pjm.com. Included s2411, s2412, s2435, s2436 and s2493