

Subregional RTEP Committee - Mid-Atlantic FirstEnergy Supplemental Projects

Submission of Supplemental Projects for Inclusion in the Local Plan

Need Number: PN-2023-013
Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan 6/24/2024
Previously Presented: Need Meeting 10/19/2023
 Solution Meeting 12/13/2023

Project Driver:
Equipment Material Condition, Performance and Risk

Specific Assumption Reference:

System Performance Projects

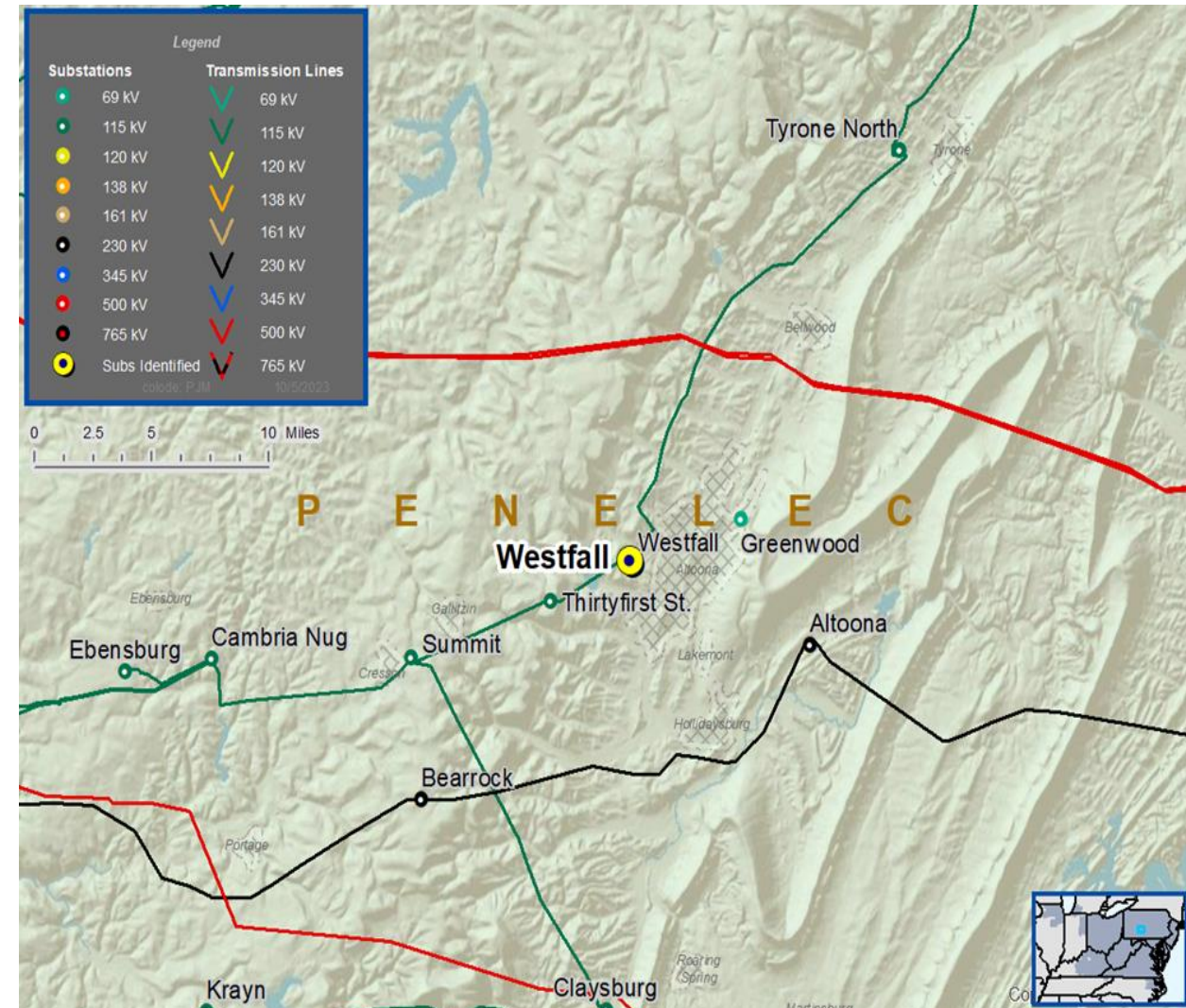
- System reliability and performance
- Substation and line equipment limits
- Reliability of Non-Bulk Electric System (Non-BES) Facilities

Problem Statement:

- The Westfall Substation control building is small and congested. The condition of the control building is deteriorating.
- Transmission line ratings are limited by terminal equipment

Thirty-First Street – Westfall 115 kV Line

- Existing line rating: 232/282 MVA SN/SE and 263/307 MVA WN/WE
- Existing transmission conductor rating: 232 / 282 MVA (SN / SE) and 263/334 MVA WN/WE





Penelec Transmission Zone M-3 Process Westfall Substation

Need Number: PN-2023-013
Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan 6/24/2024

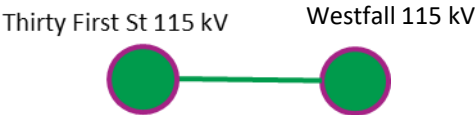
Selected Solution:
Westfall 115 kV Substation

- Replace the existing control building with a new Package Control Enclosure that can accommodate all relaying and equipment.

Transmission Line Ratings:

- **Thirty First St –Westfall 115 kV Line**
 - Existing line rating: 232/282/263/307 MVA SN/SE/WN/WE
 - Existing transmission conductor rating: 232/282/263/334 MVA SN/SE/WN/WE

Estimated Project Cost: \$6.7 M
Projected In-Service: 6/1/2025
Supplemental Project ID: s3268.1



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

Penelec Transmission Zone M-3 Process Yeagertown No. 1 230-46 kV Transformer

Need Number: PN-2023-019

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan 6/24/2024

Previously Presented: Need Meeting 12/05/2023
Solution Meeting 03/05/2024

Project Driver:

Equipment Material Condition, Performance and Risk
Operational Flexibility and Efficiency

Specific Assumption Reference:

System Performance Projects Global Factors

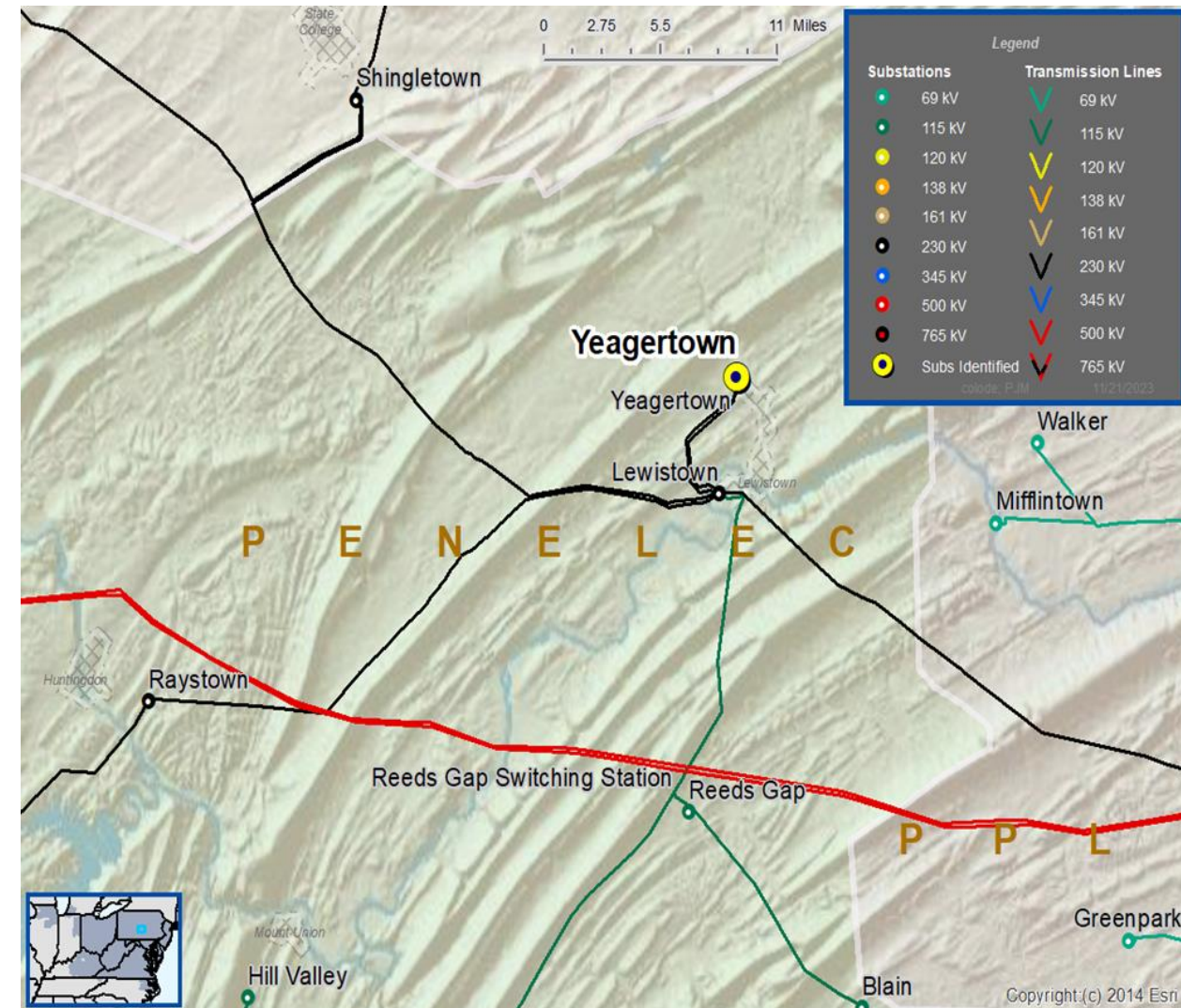
- System reliability and performance
- Reliability of Non-Bulk Electric System (Non-BES) Facilities

Add/Replace Transformers

Past System Reliability/Performance

Problem Statement:

- The existing Yeagertown No. 1 230-46 kV Transformer is approximately 51 years old and is reaching end of life.
- The transformer is constructed with Type U bushings.
 - Type U bushing designs have been documented to dramatically increase the risk of bushing failures.
- Existing transformer ratings:
 - 83/83/83/83 MVA (SN/SLTE/WN/WLTE)



Need Number: PN-2023-019

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan 6/24/2024

Selected Solution:

At Yeagertown Substation:

- Replace the Yeagertown No. 1 230-46 kV Transformer.
- Replace transformer relaying.

Transformer Ratings:

Yeagertown No. 1 230-46 kV Transformer:

- Before Proposed Solution: 83 / 83 / 83 / 83 MVA (SN/SSTE/WN/WSTE)
- After Proposed Solution: 91 / 109 / 112 / 134 (SN/SSTE/WN/WSTE)

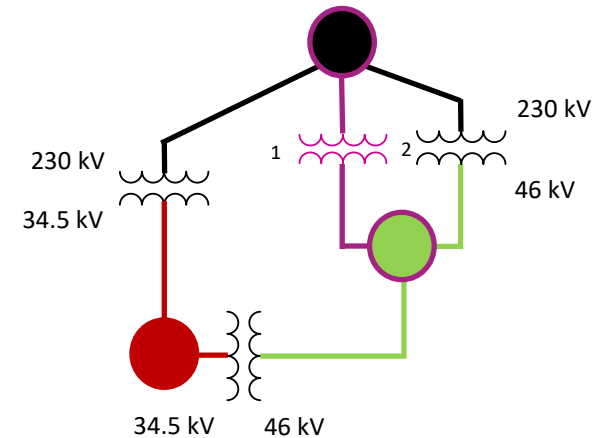
Estimated Project Cost: \$3.50M











Projected In-Service: 10/17/2025

Supplemental Project ID: s3269.1

Penelec Transmission Zone M-3 Process Yeagertown No. 1 230-46 kV Transformer

Yeagertown Substation



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

Penelec Transmission Zone M-3 Process Yeagertown No. 2 230-46 kV Transformer

Need Number: PN-2023-020

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan 6/24/2024

Previously Presented: Need Meeting 12/05/2023
Solution Meeting 03/05/2024

Project Driver:

Equipment Material Condition, Performance and Risk

Operational Flexibility and Efficiency

Specific Assumption Reference:

System Performance Projects Global Factors

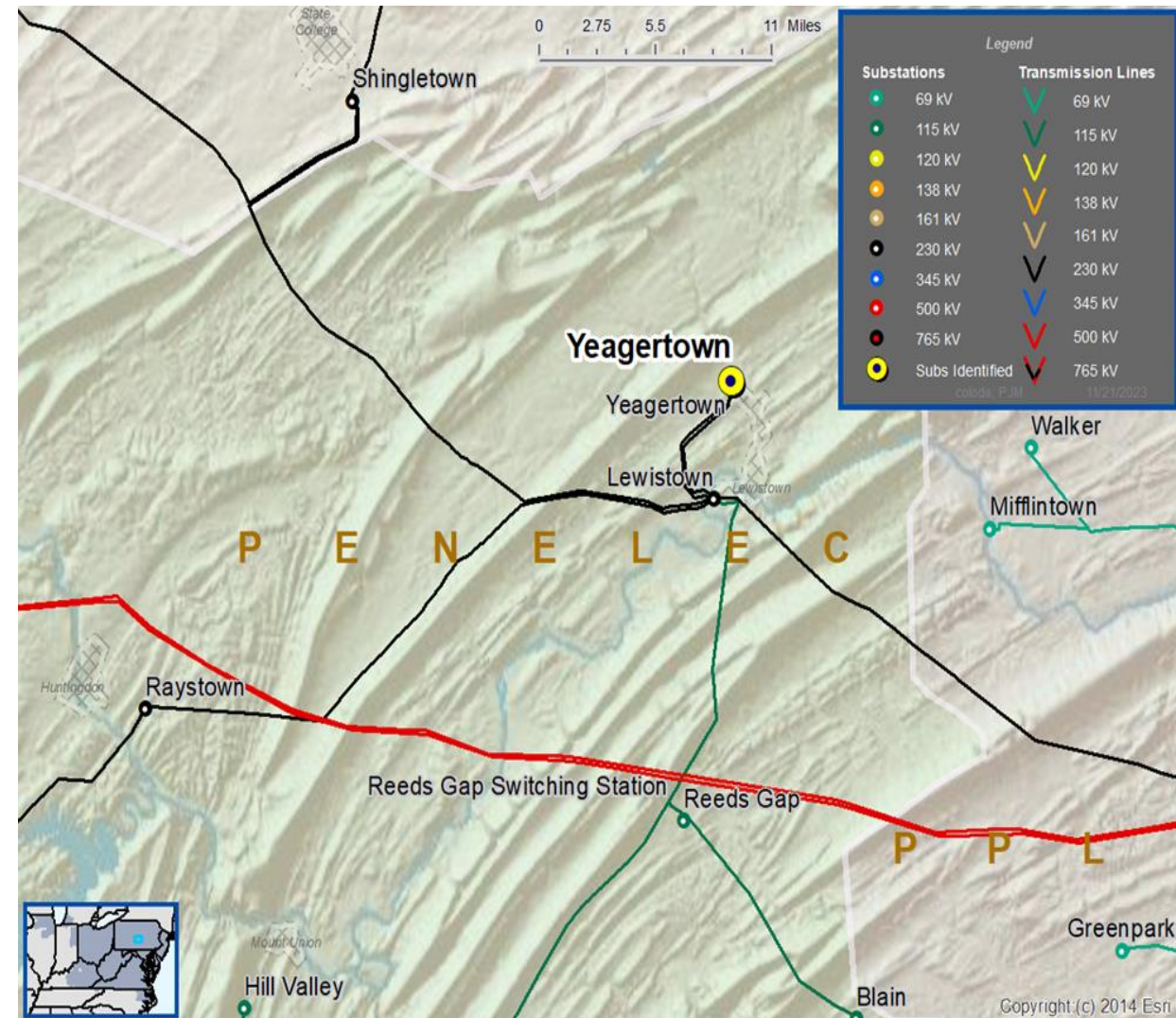
- System reliability and performance
- Reliability of Non-Bulk Electric System (Non-BES) Facilities

Add/Replace Transformers

Past System Reliability/Performance

Problem Statement:

- The existing Yeagertown No. 2 230-46 kV Transformer is approximately 51 years old and is reaching end of life.
- The transformer is constructed with Type U bushings.
 - Type U bushing designs have been documented to dramatically increase the risk of bushing failures.
- Existing transformer ratings:
 - 69/75/83/83 MVA (SN/SLTE/WN/WLTE)



Penelec Transmission Zone M-3 Process Yeagertown No. 2 230-46 kV Transformer

Need Number: PN-2023-020

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan 6/24/2024

Selected Solution:

At Yeagertown Substation:

- Replace the Yeagertown No. 2 230-46 kV Transformer.
- Replace transformer relaying.

Transformer Ratings:

Yeagertown No. 2 230-46 kV Transformer:

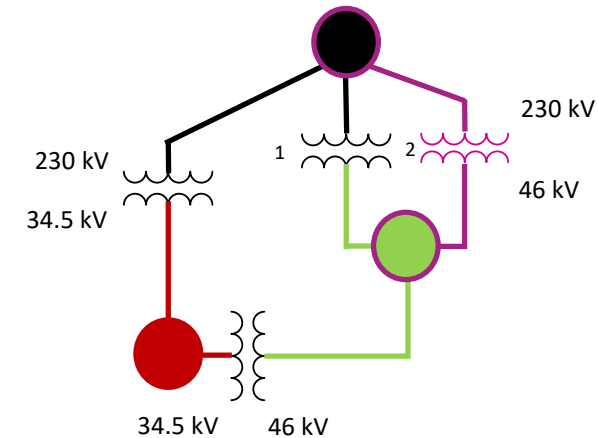
- Before Proposed Solution: 69 / 75 / 83 / 83 MVA (SN/SSTE/WN/WSTE)
- After Proposed Solution: 91 / 109 / 112 / 134 (SN/SSTE/WN/WSTE)











Estimated Project Cost: \$4.00M

Projected In-Service: 05/16/2025

Supplemental Project ID: s3270.1

Yeagertown Substation



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

Penelec Transmission Zone M-3 Process Altoona — Hollidaysburg 46 kV ALH Line

Need Number: PN-2023-034

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan 6/24/2024

Previously Presented: Need Meeting 12/13/2023
Solution Meeting 03/14/2024

Project Driver:
Equipment Material Condition, Performance and Risk

Specific Assumption Reference:

System Performance Projects Global Factors

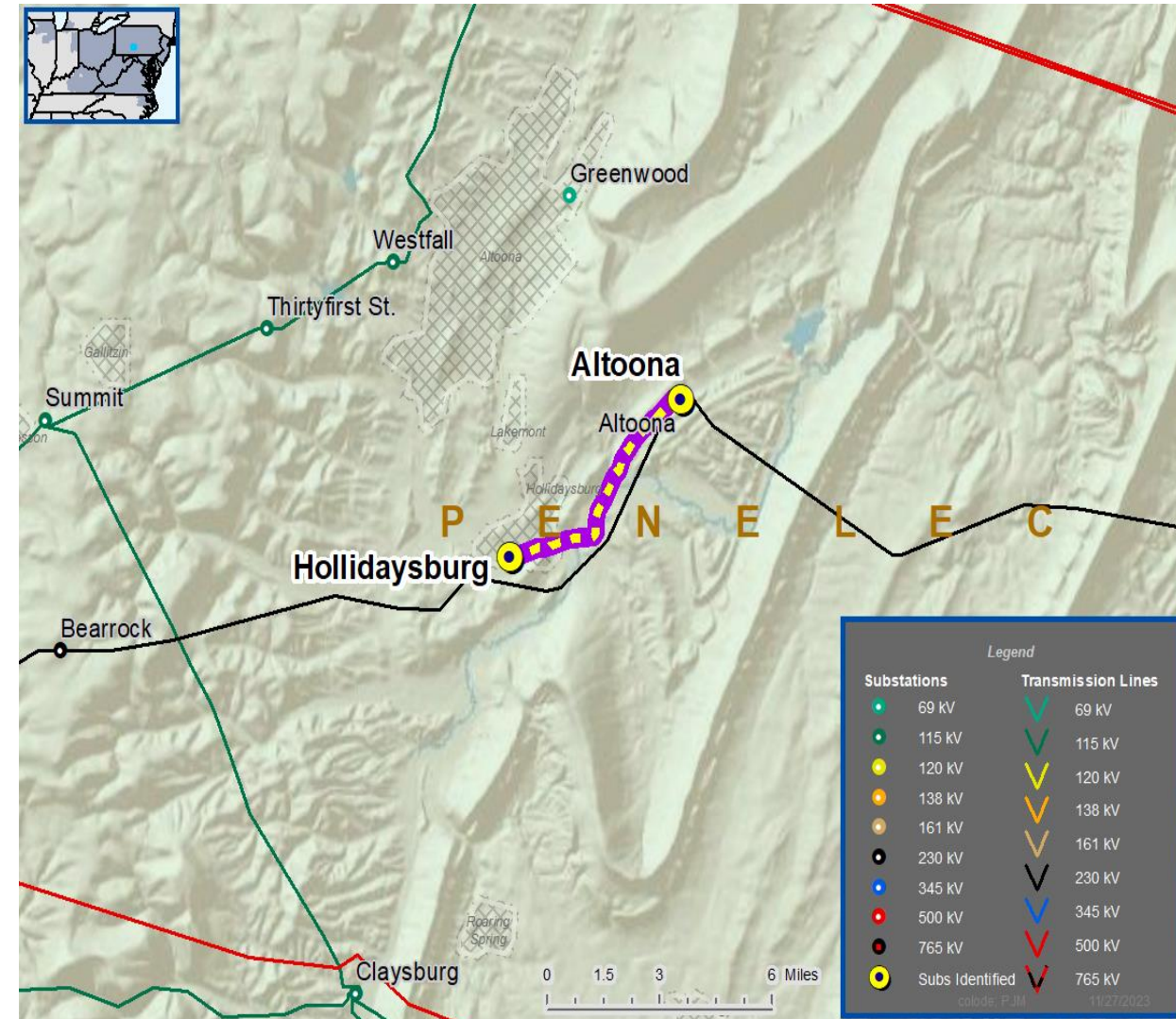
- System reliability and performance
- Substation/line equipment limit

Upgrade Relay Schemes

- Obsolete and difficult to repair communication equipment
- Communication technology upgrades

Problem Statement:

- The Altoona - Hollidaysburg 46 kV Line has old electromechanical relays for overcurrent protection that have directional tripping.
- The relays limit the line and cause an operation monitoring issue.
- Existing line rating 40/40/40/40 MVA (SN/SE/WN/WE)



Need Number: PN-2023-034

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan 6/24/2024

Selected Solution:

- Replace relaying at Altoona and Hollidaysburg substations
- Replace disconnect switches and substation conductor at Altoona and Hollidaysburg substations

Transmission Line Ratings:

Altoona – Hollidaysburg 46 kV ALH Line











- Before Proposed Solution:
 - 40 / 40 / 40 / 40 MVA (SN/SE/WN/WE)
- After Proposed Solution:
 - 81 / 98 / 91 / 116 MVA (SN/SE/WN/WE)

Estimated Project Cost: \$1.5M

Projected In-Service: 12/31/2026

Supplemental Project ID: s3271.1



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

Penelec Transmission Zone M-3 Process Niles Valley 115 kV Ring Bus

Need Number: PN-2023-005
Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan 6/24/2024
Previously Presented: Need Meeting 07/20/2023
 Solution Meeting 02/15/2024

Project Driver:
Operational Flexibility and Efficiency

Specific Assumption Reference:

Add/Expand Bus Configuration

- Eliminate simultaneous outages to multiple network elements

System Performance Projects

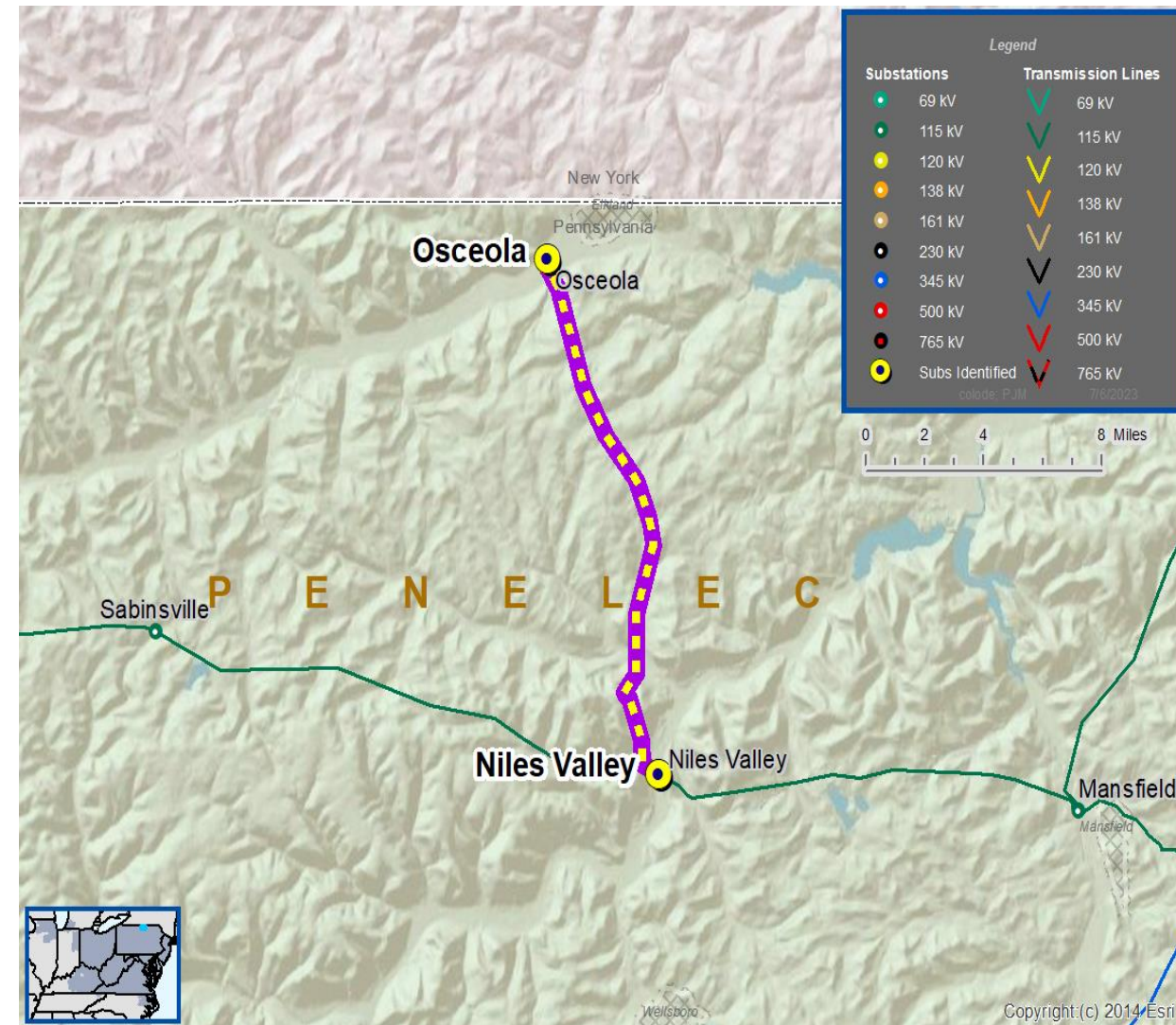
- Substation/line equipment limits

System Performance Projects Global Factors

- Load and/or customers at risk on single transmission line

Problem Statement:

- Niles Valley Substation serves approximately 30 MW of load and 331 customers, including one large electric distribution company (Wellsboro).
- An additional 12 MW of load and 2,746 customers are served radially from Niles Valley at Osceola Substation.
- The existing Niles Valley Substation contains two networked 115 kV lines, two radial 115 kV lines, two 115-34.5 kV transformers, and one 115 kV capacitor bank.
- There are straight busses separated by a bus tie breaker. The distribution transformers do not have high side protection devices. During breaker maintenance (a potential two day outage), the Wellsboro 115 kV service point would be interrupted with no backup service (26 MVA of load).



Penelec Transmission Zone M-3 Process Niles Valley 115 kV Ring Bus

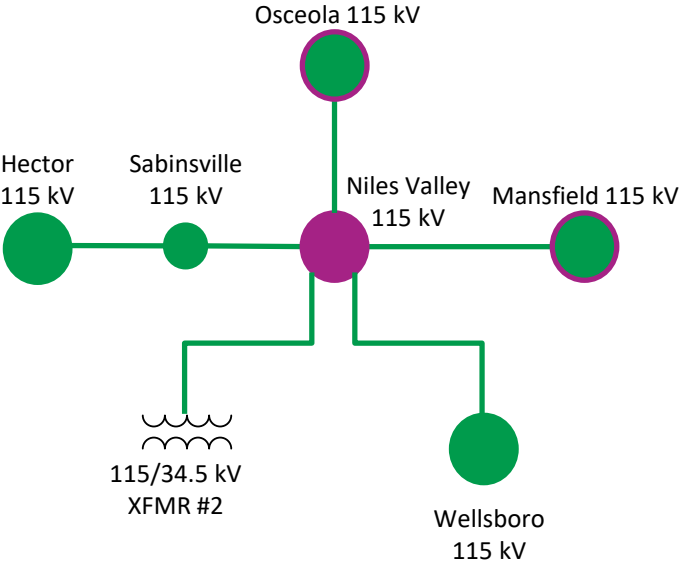
Need Number: PN-2023-005
Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan 6/24/2024











Selected Solution:

- At Niles Valley Substation:
- Construct a 115 kV, six breaker ring bus
 - Remove Niles Valley No. 1 115-34.5 kV Transformer
 - Remove the 115 kV bypass switch between the Wellsboro and Mansfield line exits (s2835) upon ring bus completion
 - Adjust relay settings

Transmission Line Ratings:

- Niles Valley – Sabinsville/Hector 115 kV Line:
 - Before Proposed Solution 147/191 MVA SN/SE
 - After Proposed Solution 202/245 MVA SN/SE
- Niles Valley – Mansfield 115 kV Line:
 - Before Proposed Solution 147/185 MVA SN/SE
 - After Proposed Solution 202/245 MVA SN/SE
- Niles Valley – Wellsboro 115 kV Line:
 - Before Proposed Solution 147/191 MVA SN/SE
 - After Proposed Solution 232/ 282 MVA SN/SE
- Niles Valley – Osceola 115 kV Line:
 - Before Proposed Solution 147/191 MVA SN/SE
 - After Proposed Solution 232/282 MVA SN/SE



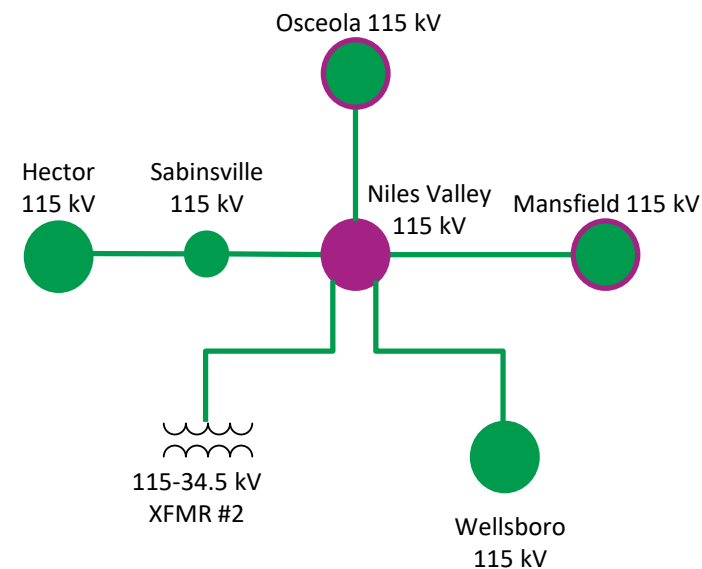
Legend	
500 kV	
345 kV	
230 kV	
138 kV	
115 kV	
69 kV	
46 kV	
34.5 kV	
23 kV	
New	



Need Number: PN-2023-005
Process Stage: Submission of Supplemental Projects for
Inclusion in the Local Plan 6/24/2024

Estimated Project Cost: \$16.0M
Projected In-Service: 11/04/2028
Supplemental Project ID: s3290.1

Penelec Transmission Zone M-3 Process Niles Valley 115 kV Ring Bus



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

Penelec Transmission Zone M-3 Process Warren – Falconer 115 kV Line: New Customer

Need Number: PN-2023-007

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan 6/24/2024

Previously Presented: Need Meeting – 07/20/2023
Solution Meeting – 02/15/2024

Project Driver:

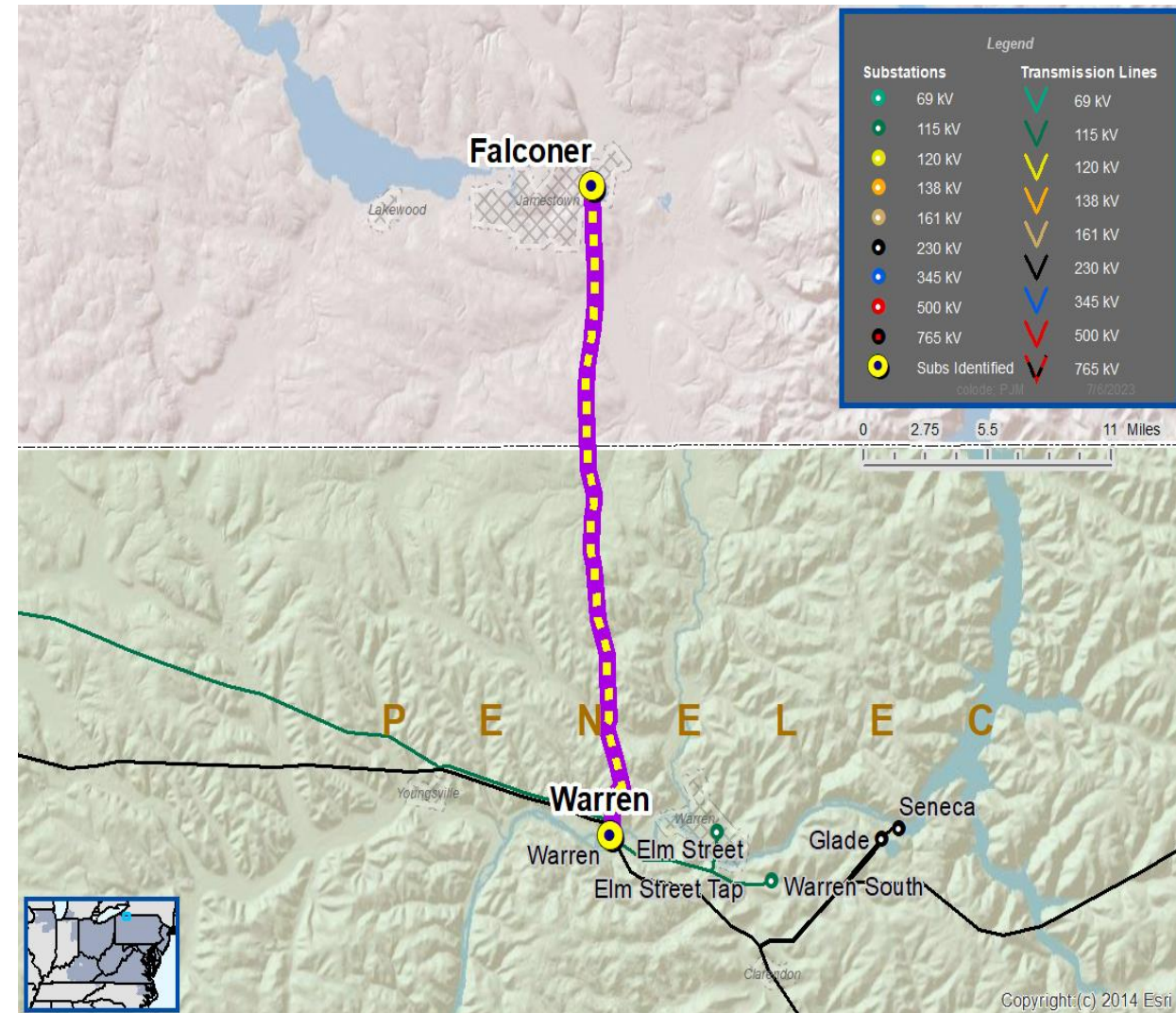
Customer Service

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 115 kV service with an anticipated load of 22.4 MVA near the Warren – Falconer 115 kV Line.

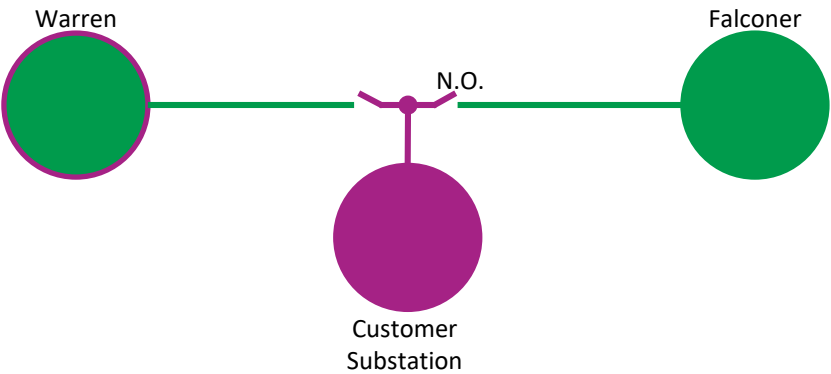












Penelec Transmission Zone M-3 Process Warren – Falconer 115 kV Line: New Customer

Need Number: PN-2023-007
Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan 6/24/2024

- Selected Solution:**
 Provide 115 kV service from the Warren – Falconer 115 kV Line:
- Tap the Warren – Falconer 115 kV Line and build approximately 190 ft of transmission line from the tap point to customer substation
 - Install one 115 kV revenue metering package at customer substation
 - Adjust relay settings at Warren Substation
 - Operate disconnect switch towards Falconer normally open

Estimated Project Cost: \$1.5M
Projected In-Service: 04/28/2027
Supplemental Project ID: s3291.1



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

Penelec Transmission Zone M-3 Process East Sayre – East Towanda 115 kV Line: New Customer

Need Number: PN-2023-012

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan 6/24/2024

Previously Presented: Need Meeting – 10/19/2023
Solution Meeting – 02/15/2024

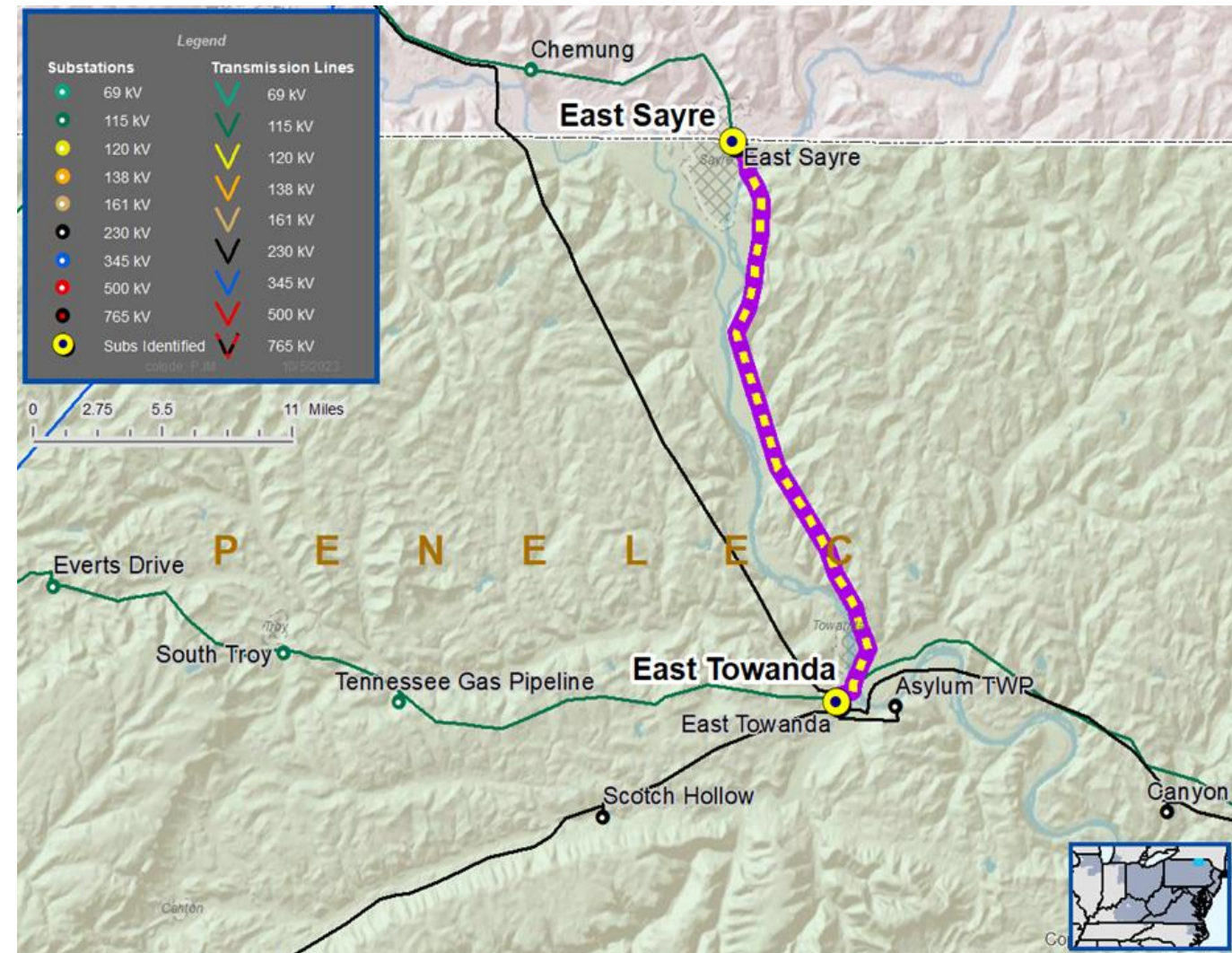
Project Driver(s):
Customer Service

Specific Assumption Reference(s)

New customer connection request 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 a new 115 kV delivery point near the East Sayre-East Towanda 115 kV Line. The anticipated load of the new customer connection is 20 MVA.



Penelec Transmission Zone M-3 Process

East Sayre – East Towanda 115 kV Line: New Customer

Need Number: PN-2023-012

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan 6/24/2024

Selected Solution:

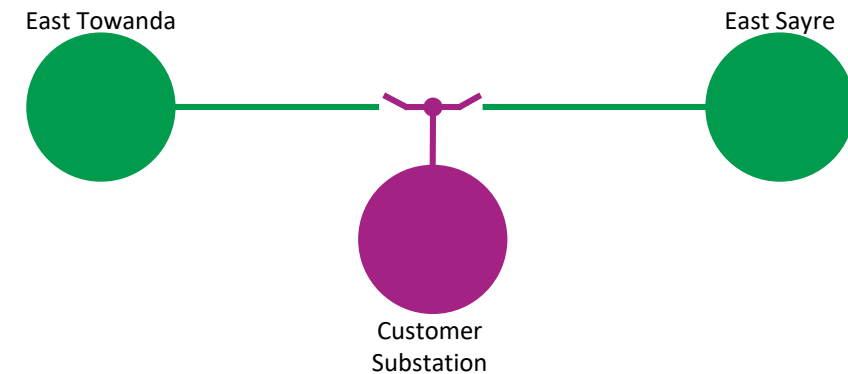
Provide 115 kV service from the East Sayre – East Towanda 115 kV Line:











- Tap the East Sayre – East Towanda 115 kV Line and build approximately 250 feet of transmission line to the customer substation
- Install three 115 kV motor-operated disconnects with SCADA
- Install one wave trap

Estimated Project Cost: \$1.67M

Projected In-Service: 09/30/2025

Supplemental Project ID: s3292.1



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

Penelec Transmission Zone M-3 Process Carlisle Pike – Roxbury 115 kV Line: New Customer

Need Number: PN-2023-017

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan 6/24/2024

Previously Presented: Need Meeting 10/19/2023
Solution Meeting 02/15/2024

Project Driver:

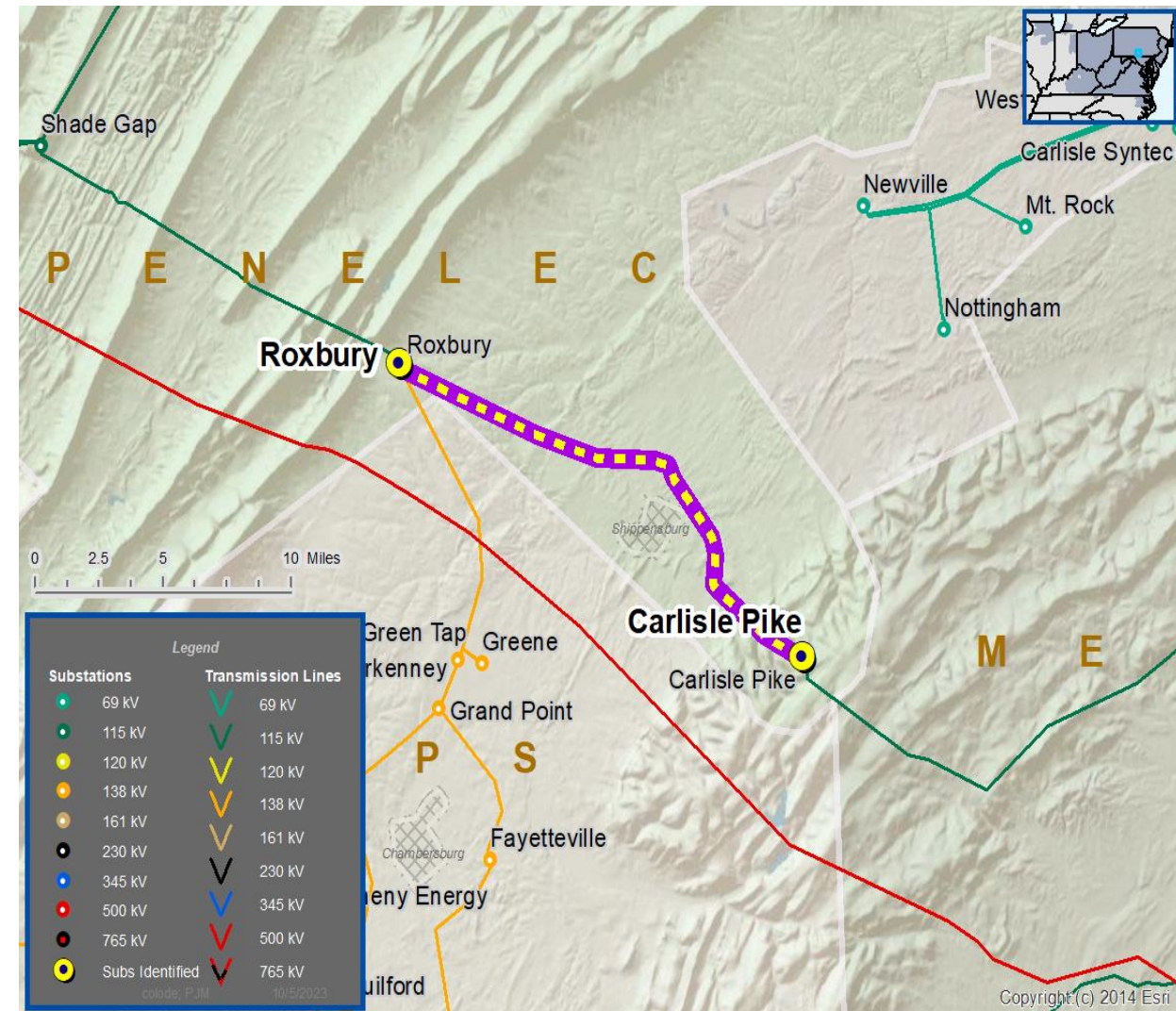
Customer Service

Specific Assumption Reference:

Customer request 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 a new 115 kV delivery point near the Roxbury – Carlisle Pike 115 kV Line. The anticipated load of the new customer is 33 MVA.



Penelec Transmission Zone M-3 Process Carlisle Pike – Roxbury 115 kV Line: New Customer

Need Number: PN-2023-017
Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan 6/24/2024

Selected Solution:

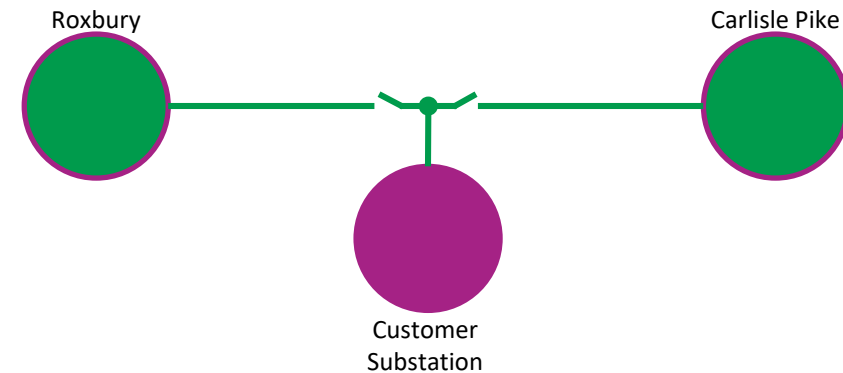
Provide 115 kV service from the Carlisle Pike – Roxbury 115 kV Line:











- Tap the Carlisle Pike – Roxbury 115 kV Line and build approximately 1.76 miles of transmission line to the customer substation
- Install one new 115 kV breaker at Carlisle Pike Substation
- Install one new 115 kV revenue metering package at the customer substation
- Adjust relaying at Carlisle Pike and Roxbury Substations

Estimated Project Cost: \$8.0M

Projected In-Service: 12/31/2027

Supplemental Project ID: s3293.1



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

Need Numbers: PN-2023-030

Previously Presented: Submission of Supplemental Projects for
Inclusion in the Local Plan 9/17/2024

Process Stage: Need Meeting 12/05/2023

Solution Meeting 04/30/2024

Project Driver:

Equipment Material Condition, Performance and Risk

Operational Flexibility and Efficiency

Specific Assumption Reference:

System Performance Projects Global Factors

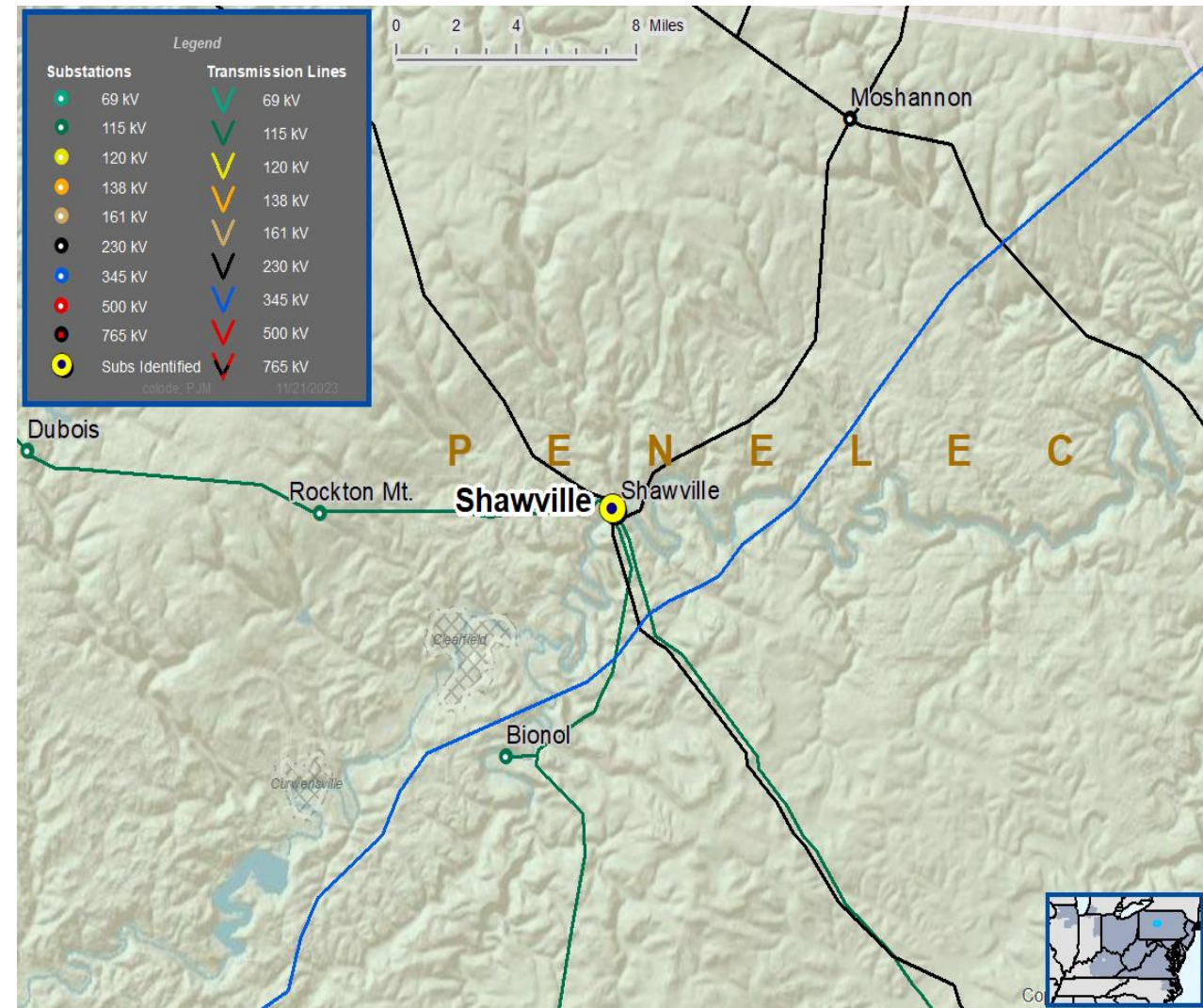
- System reliability and performance

Add/Replace Transformers

Past System Reliability/Performance

Problem Statement:

- The existing Shawville 230/115-17 kV Bank 1A Transformer is approaching its end-of-life criteria
- The transformer is 69 years old and serves as both as GSU and power transformer
- In the current configuration, the 230-115 kV winding must be taken out of service when generator requires maintenance
- The transformer has exhibited issues of low breakdown kV and has required several nitrogen additions



Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan 9/17/2024

- Replace the existing Shawville 1A Transformer with a three-winding, 230/115-17.2 kV, 180/240/300 MVA Transformer.
- Install a 17.2 kV circuit breaker
- Replace disconnect switches, bus conductor, insulators, surge arresters, and the 230 kV breaker
- Transformer will be limited by relay panels owned by FE and the Plant

230 kV Winding

- 222 / 222 / 229 MVA SN/SE/SLD
- 222 / 222 / 229 MVA WN/WE/WLD

115 kV Winding

- 147 / 191 / 214 MVA SN/SE/SLD
- 211 / 237 / 254 MVA WN/WE/WLD

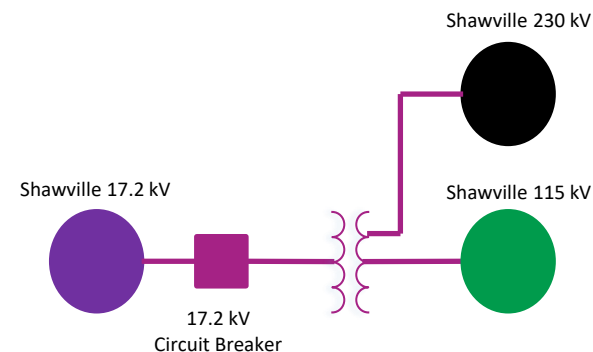
17.2 kV Winding












- 119 / 119 / 131 MVA SN/SE/SLD
- 119 / 119 / 137 MVA WN/WE/WLD

Estimated Project Cost: \$8.8M

Projected In-Service: 06/05/2026

Supplemental Project ID: s3334.1



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

Penelec Transmission Zone M-3 Process Homer City South 345-230 kV Transformer

Need Number: PN-2024-007

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan 9/17/2024

Previously Presented: Solution Meeting 04/30/2024

Need Meeting 02/06/2024

Project Driver:

Operational Flexibility and Efficiency

Equipment Material Condition, Performance, and Risk

Specific Assumption Reference:

FE Global Factors

- System reliability and performance
- Failure risk, age and condition, obsolescence, operational or design limitations

System Performance

- Add / Replace Transformers

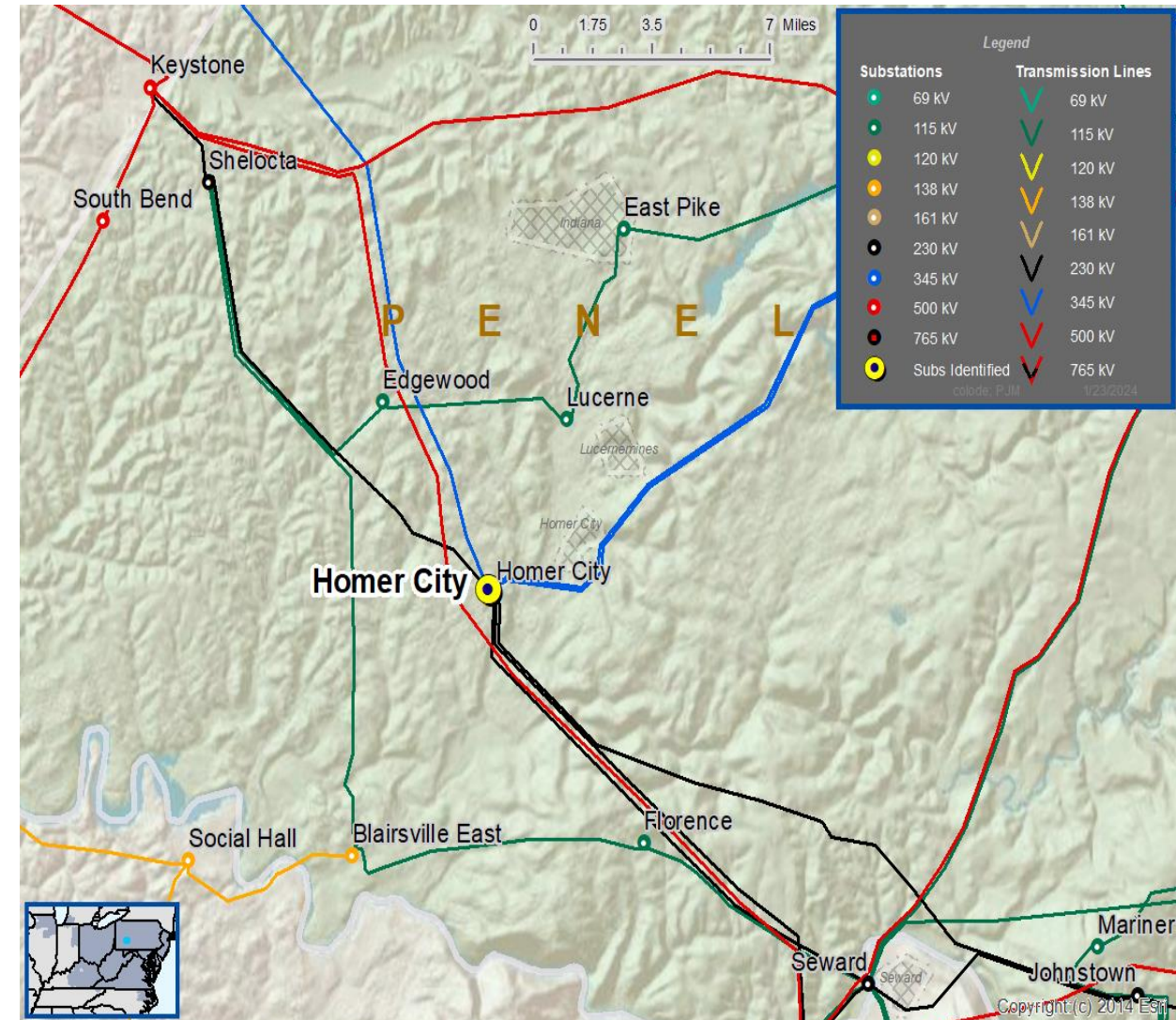
Problem Statement:

The Homer City 345/230-20 kV South Bank Transformer is 48 years old and is approaching its end of life. Transformer parts are obsolete, as the original equipment manufacturer (OEM) has discontinued support for troubleshooting and maintenance. Oil samples in recent years have indicated that the transformer is leaking. Moisture concentration has increased due to aging paper breakdown.

Transformer protection relaying is composed of obsolete, electromechanical equipment that is over 40 years old.

Transformer Ratings:

649/836/ 986 MVA SN/SSTE/SLD; 793/984/1120 MVA WN/WSTE/WLD



Penelec Transmission Zone M-3 Process Homer City South 345-230 kV Transformer

Need Number: PN-2024-007

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan 9/17/2024

Previously Presented: Solution Meeting 04/30/2024
Need Meeting 02/06/2024

Selected Solution:

Replace Homer City South 345/230-23 kV Transformer

- Replace the South 345/230-23kV transformer and associated equipment with:
 - One (1) 345/230 kV Transformer rated 450/600/750 MVA SN/SE/LD using three (3) single-phase 150/200/250 MVA units
- Replace HS circuit switcher, disconnects, LS circuit breaker and associated conductor to achieve proposed ratings

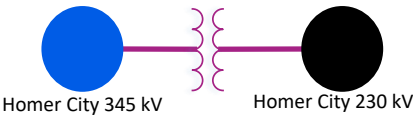
Transformer Ratings:











- Before Proposed Solution: 649/836/986 MVA SN/SSTE/SLD; 793/984/1120 WN/WSTE/WLD
- After Proposed Solution: 913/1147/1318 MVA SN/SSTE/SLD; 1201/1376/1505 WN/WSTE/WLD

Estimated Project Cost: \$8.8M

Projected In-Service: 06/01/2027

Supplemental Project ID: s3335.1



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

Penelec Transmission Zone M-3 Process Blairsville East – Seward 115 kV New Customer

Need Number: PN-2023-003

Process State: Submission of Supplemental Projects for
Inclusion in the Local Plan – 9/23/2024

Previously Presented: Solution Meeting – 09/15/2023
Need Meeting – 05/18/2023

Project Driver:

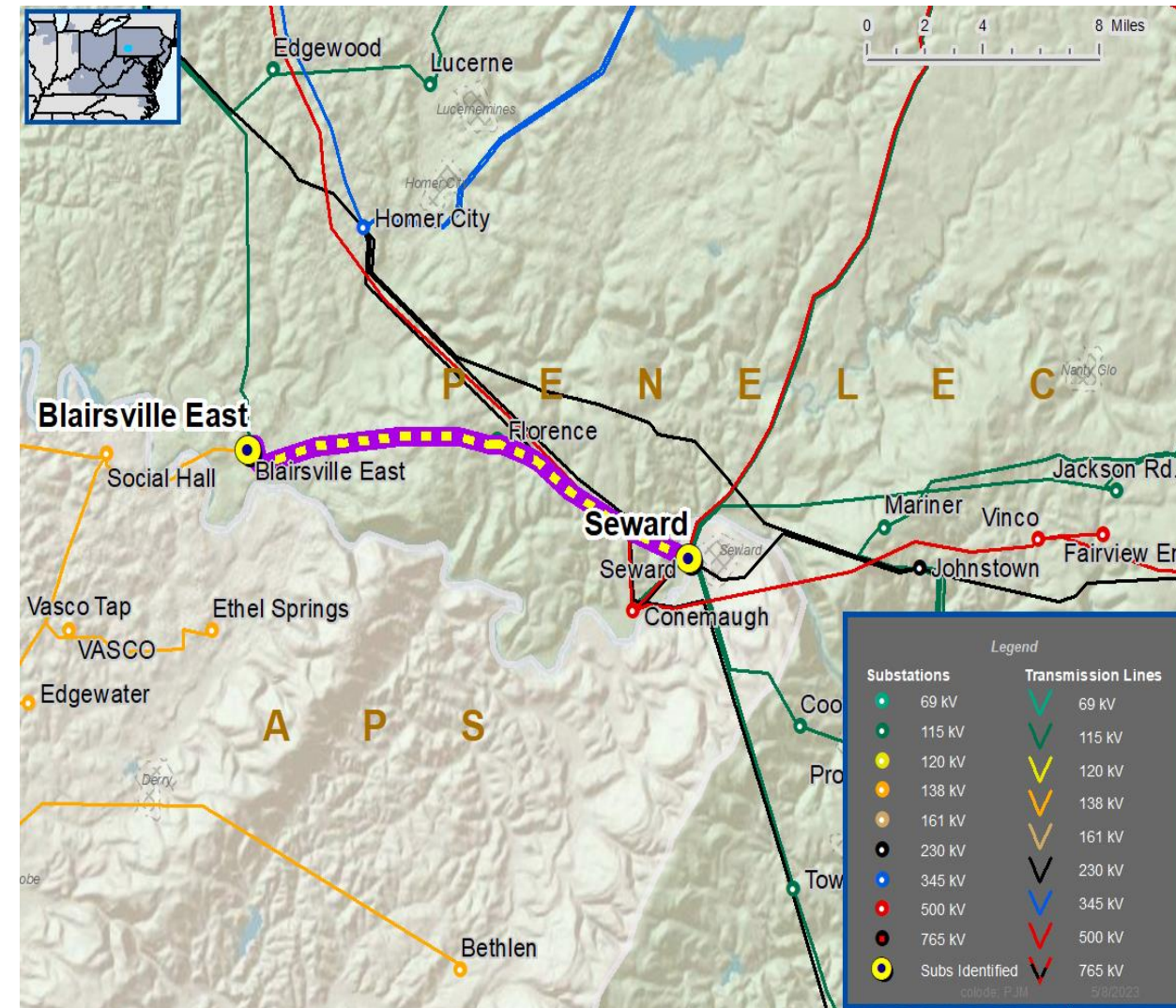
Customer Service

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 115 kV service for load of approximately 22 MW near the Blairsville East-Seward 115 kV line. Requested in-service date is 09/30/2024.



Penelec Transmission Zone M-3 Process Blairsville East – Seward 115 kV New Customer

Need Number: PN-2023-003

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan – 9/23/2024

Selected Solution:

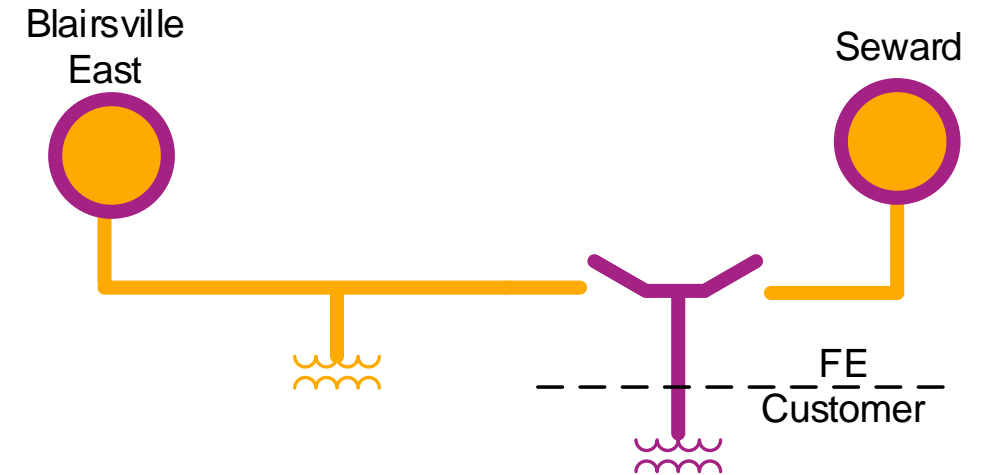
115 kV Transmission Line Tap








- Install three SCADA controlled transmission line switches
- Construct approximately 2000 ft of transmission line from tap point to customer substation
- Install one 115 kV revenue metering package at customer substation

Estimated Project Cost: \$3.5M

Projected In-Service: 03/14/2025

Supplemental Project ID: s3395.1



Legend	
500 kV	
345 kV	
115 kV	
69 kV	
34.5 kV	
23 kV	
New	

Need Number: PN-2023-004

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan – 9/23/2024

Previously Presented: Solution Meeting – 10/03/2023

Need Meeting – 06/06/2023

Project Driver:

Equipment Material Condition, Performance and Risk

Specific Assumption Reference:

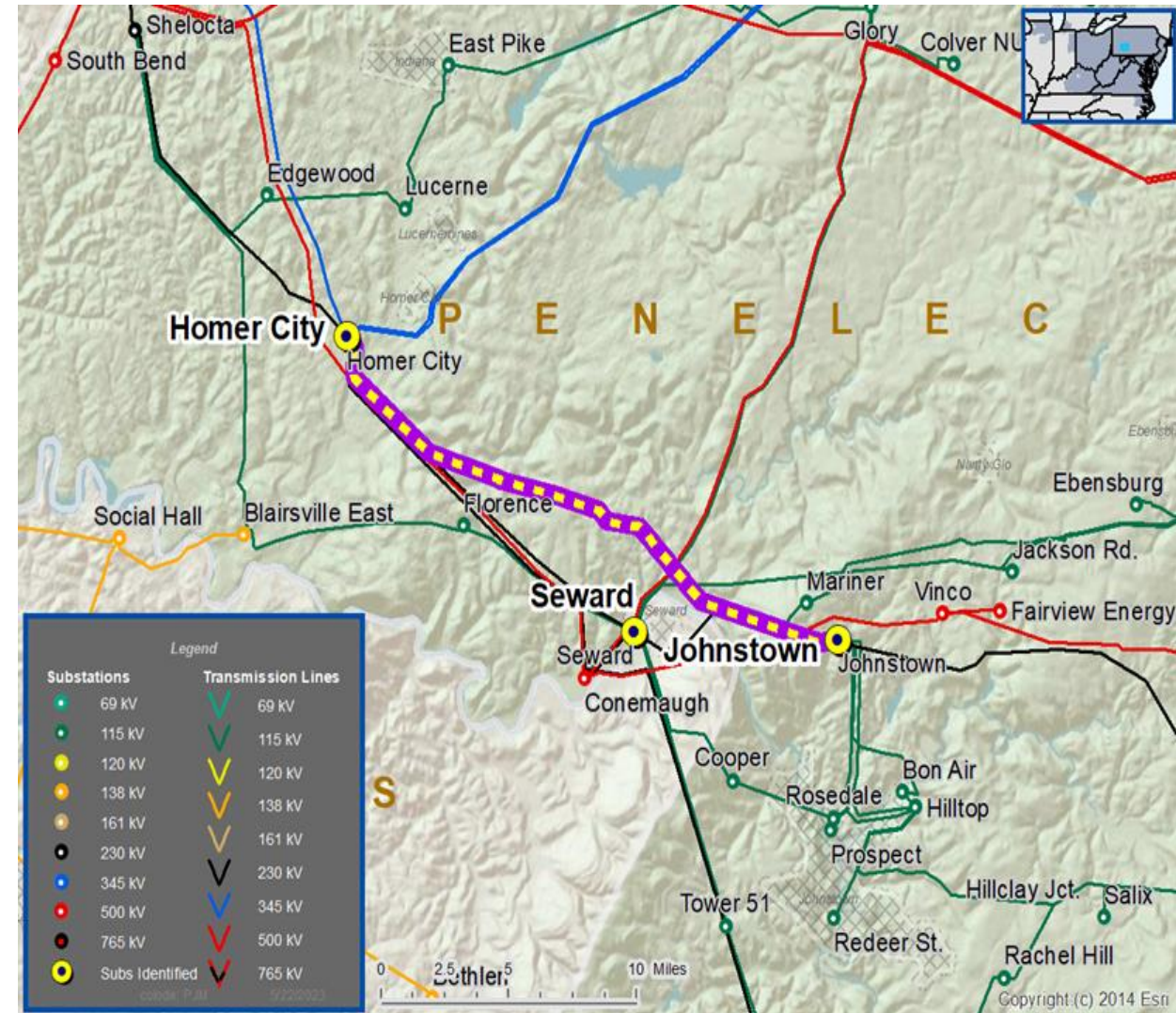
Substation Condition Rebuild/Replacement

- Age/condition of substation breakers and disconnect switches
- System Performance Project Global Factors
- Failure risk, age and condition, obsolescence, operational or design limitations
- System reliability and performance

Problem Statement:

- FirstEnergy identified degraded bus disconnect switches to the Seward breaker at Johnstown 230 kV Substation. The disconnect switches to the Seward breaker do not completely close and are difficult to operate.
- FirstEnergy also identified other degraded equipment at Johnstown Substation, including:
 - 230 kV bus tie breaker disconnect switches
 - Fiddler's Green 230 kV Breaker and disconnect switches
 - 115 kV bus tie breaker disconnect switches
- An outage to the entire bus is required to replace degraded equipment.
- Transmission line ratings are limited by terminal equipment.
- Homer City – Johnstown 230 kV Line
 - Existing line rating: 627 / 698 MVA (SN / SE)
 - Existing Transmission Conductor Rating: 709 / 869 MVA (SN / SE)

Penelec Transmission Zone M-3 Process Johnstown 230 kV Substation





Need Number: PN-2023-004
Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan – 9/23/2024

Selected Solution:

- At Johnstown Substation, replace the following:**
- 230 kV bus tie breaker #1 and #2 disconnect switches
 - 230 kV Johnstown line switches on the Fiddler’s Green terminal
 - 115 kV bus tie switches and bus
 - Line trap on the Homer City terminal
 - Substation conductor on the Homer City terminal
 - Substation conductor on the Fiddler’s Green terminal

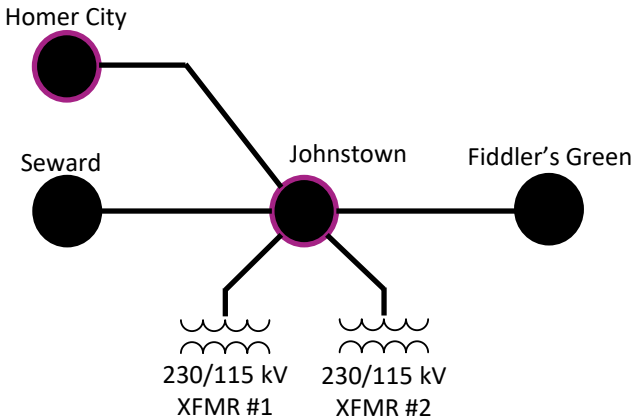
- At Homer City Substation, replace the following:**
- CCVT on the Johnstown terminal

Transmission Line Ratings:

- **Homer City – Johnstown 230 kV Line**
 - Before Proposed Solution: 627 / 698 MVA SN/SE
 - After Proposed Solution: 666 / 800 MVA SN/SE
- **Fiddler’s Green – Johnstown 230 kV Line**
 - Before Proposed Solution: 520 / 621 MVA SN/SE
 - After Proposed Solution: 546 / 666 MVA SN/SE

Estimated Project Cost: \$1.12M
Projected In-Service: 12/30/2023
Supplemental Project ID: s3396.1

Penelec Transmission Zone M-3 Process Johnstown 230 kV Substation



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

Need Number: PN-2023-010

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan – 9/23/2024

Previously Presented: Solutions Meeting 10/19/2023
Needs Meeting 09/14/2023

Project Driver:

Equipment Material Condition, Performance, and Risk

Infrastructure Resilience

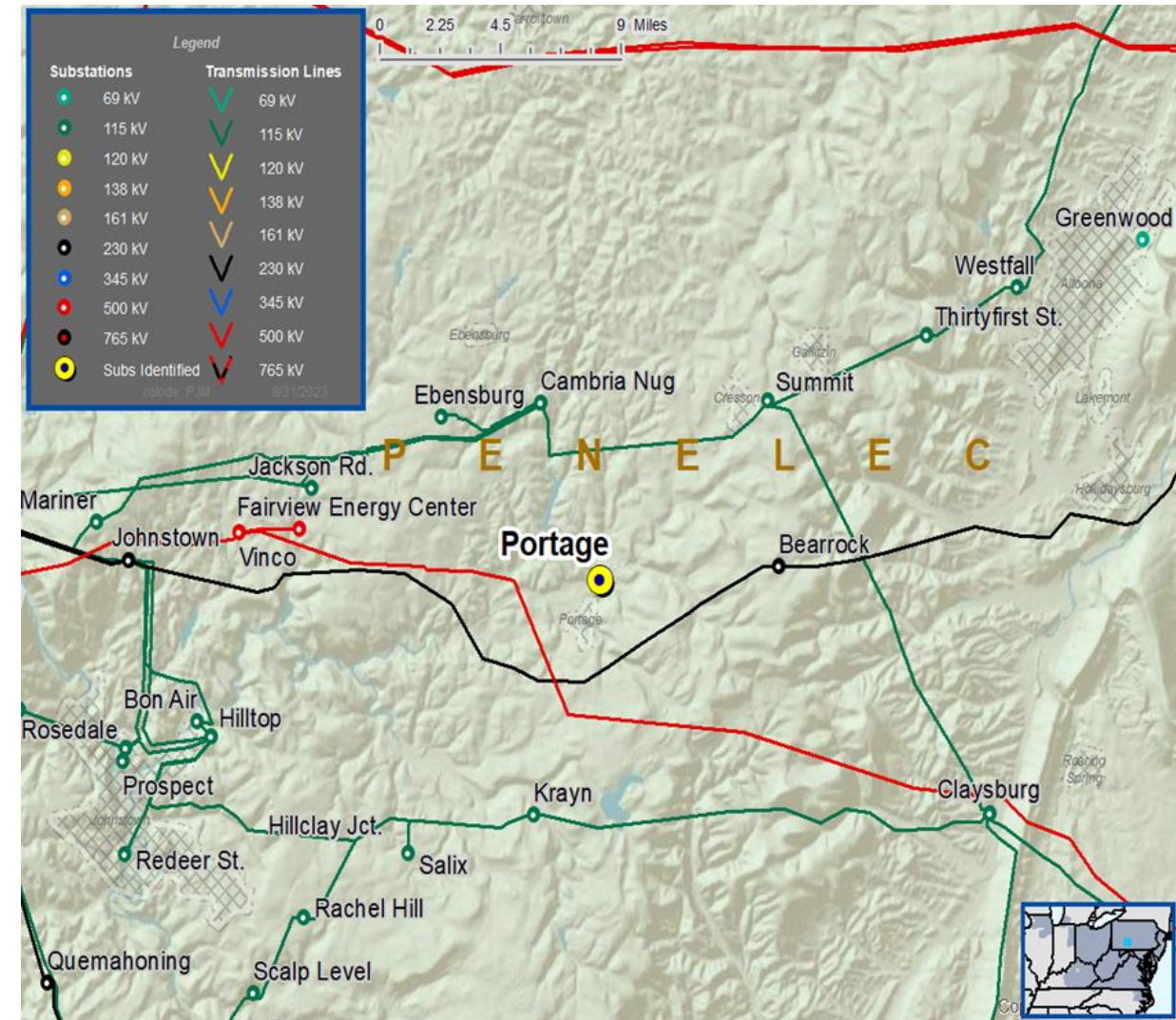
Specific Assumption Reference:

Substation Condition Rebuild/Replacement

- Increasing negative trend in maintenance findings and/or costs
- Failure risk, to the extent caused by asset design characteristics, or historical industry/company performance data, or application design error
- Expected service life (at or beyond) or obsolescence

Problem Statement:

- The 46 kV bus, insulators, and wood structures at Portage Substation are old and deteriorated.
- The Lilly, Bus Section, and Wilmore Jct. MOABs at Portage Substation have increasing maintenance concerns, deteriorated operating mechanisms, and increasing maintenance trends. The Lilly MOAB is currently inoperable.
 - The substation is about 70 years old.



Need Number: PN-2023-010

Process Stage: Submission of Supplemental Projects for
Inclusion in the Local Plan – 9/23/2024

Selected Solution:

- At Portage Substation, replace the 46 kV structure, including 46 kV line switches.

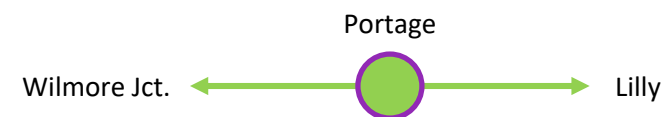
Transmission Line Ratings:











- Portage – Wilmore Dam 46 kV Line
 - Before Proposed Solution: 55 / 69 MVA (SN/SE)
 - After Proposed Solution: 59 / 71 MVA (SN/SE)

Estimated Project Cost: \$3.7M

Projected In-Service: 03/28/2025

Supplemental Project ID: s3408.1



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

Process State: Submission of Supplemental Projects for Inclusion in the Local Plan
– 9/23/2024

Project Driver:

Equipment Material Condition, Performance and Risk

Specific Assumption Reference:

System Performance Projects Global Factors

- System reliability and performance
- Substation/line equipment limits

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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Penelec Transmission Zone M-3 Process
Dubois – Whetstone 115 kV Misoperation Relays

Need #	Transmission Line / Substation Locations	Existing Line Rating (SN / SE)	Existing Conductor Rating (SN / SE)
PN-2023-014	Tiffany – Thompson 115 kV	125 /145	132 / 159
PN-2023-015	Dubois – Whetstone 115 kV	147 / 179	202 / 245

Need Number: PN-2023-014

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan – 9/23/2024

Selected Solution:

- Replace relays, breakers, disconnect switches, and substation conductor at Tiffany 115 kV Substation

Need #	Transmission Line	Existing Line Rating (SN / SE)	Post Project Line Rating (SN / SE)
PN-2023-014	Tiffany – Thompson 115 kV Line	125 /145	132 / 159











Estimated Project Cost: \$ 0.47M

Projected In-Service: 11/07/2022

Supplemental Project ID: s3409.1

Penelec Transmission Zone M-3 Process Tiffany – Thompson 115 kV Misoperation Relays



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

Penelec Transmission Zone M-3 Process Dubois – Whetstone 115 kV Misoperation Relays

Need Number: PN-2023-015

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan – 9/23/2024

Selected Solution:

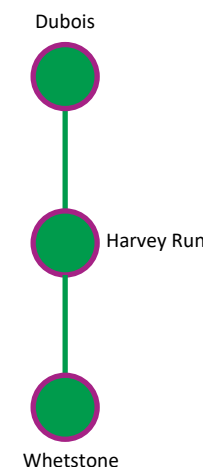
- Replace substation conductor, wave trap, line tuners, disconnect switch, breaker, and relaying at Dubois 115 kV substation
- Replace substation conductor at Harvey Run 115 kV Substation
- Replace wave trap, CCVT, line tuners, arresters, and relaying at Whetstone











Need #	Transmission Line	Existing Line Rating (SN / SE)	Post Project Line Rating (SN / SE)
PN-2023-015	Dubois – Whetstone 115 kV Line	147 / 179	202 / 245

Estimated Project Cost: \$2.1M

Projected In-Service: 11/29/2023

Supplemental Project ID: s3410.1



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

Need Number: PN-2020-005

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan – 9/23/2024

Previously Presented: Solution Meeting 12/05/2023
Needs Meeting 5/12/2020

Project Driver:

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

Specific Assumption Reference:

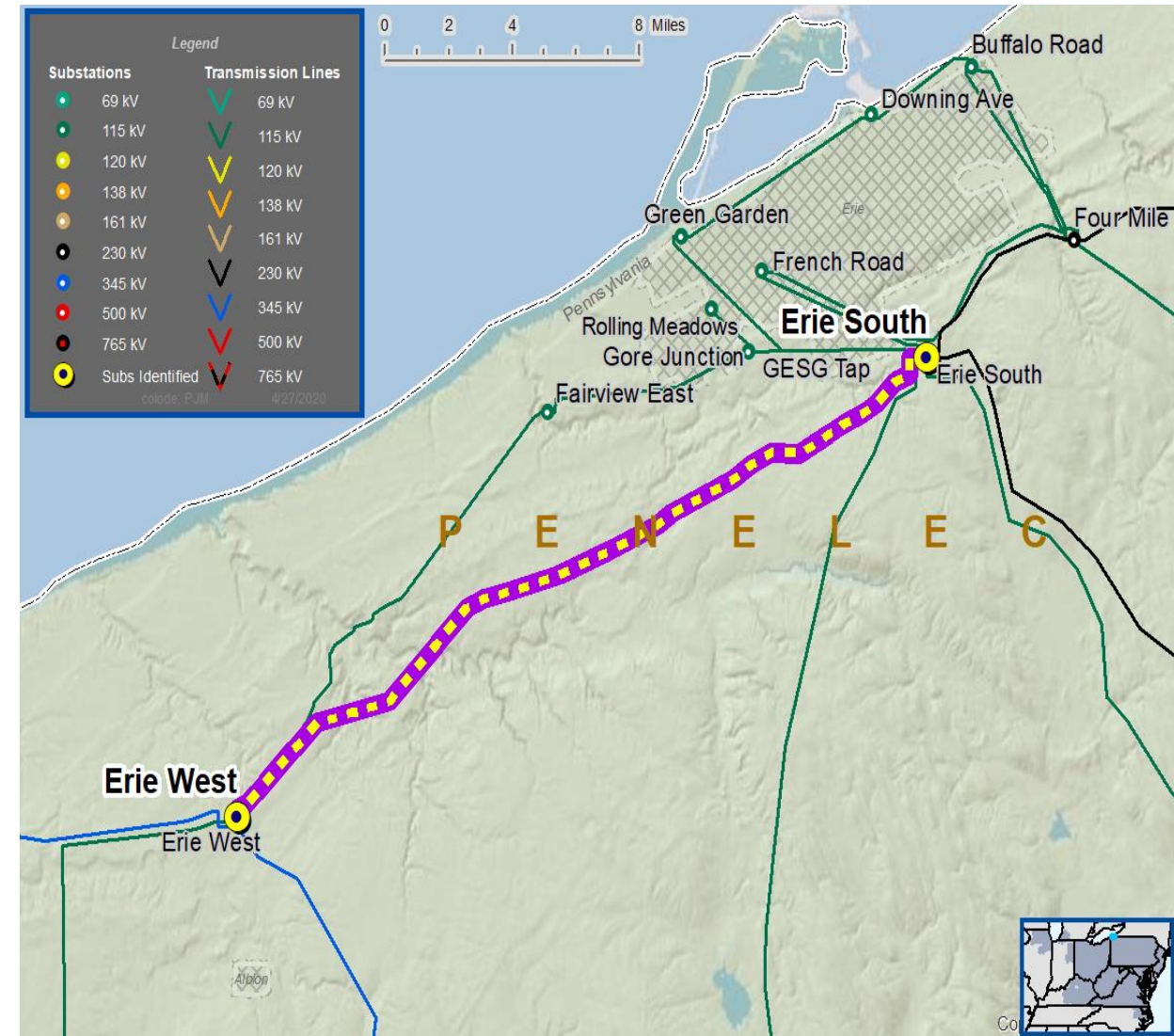
System Performance Projects Global Factors

- 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

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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-2020-005	Erie South – Erie West 345 kV Line	1216 / 1308	1631 / 1989	

Need Numbers: PN-2023-018

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan – 9/23/2024

Previously Presented: Solution Meeting 12/05/2023

Need Meeting 10/31/2023

Project Driver:

Equipment Material Condition, Performance and Risk

Specific Assumption Reference:

System Performance Projects Global Factors

- System reliability and performance
- Substation/line equipment limits

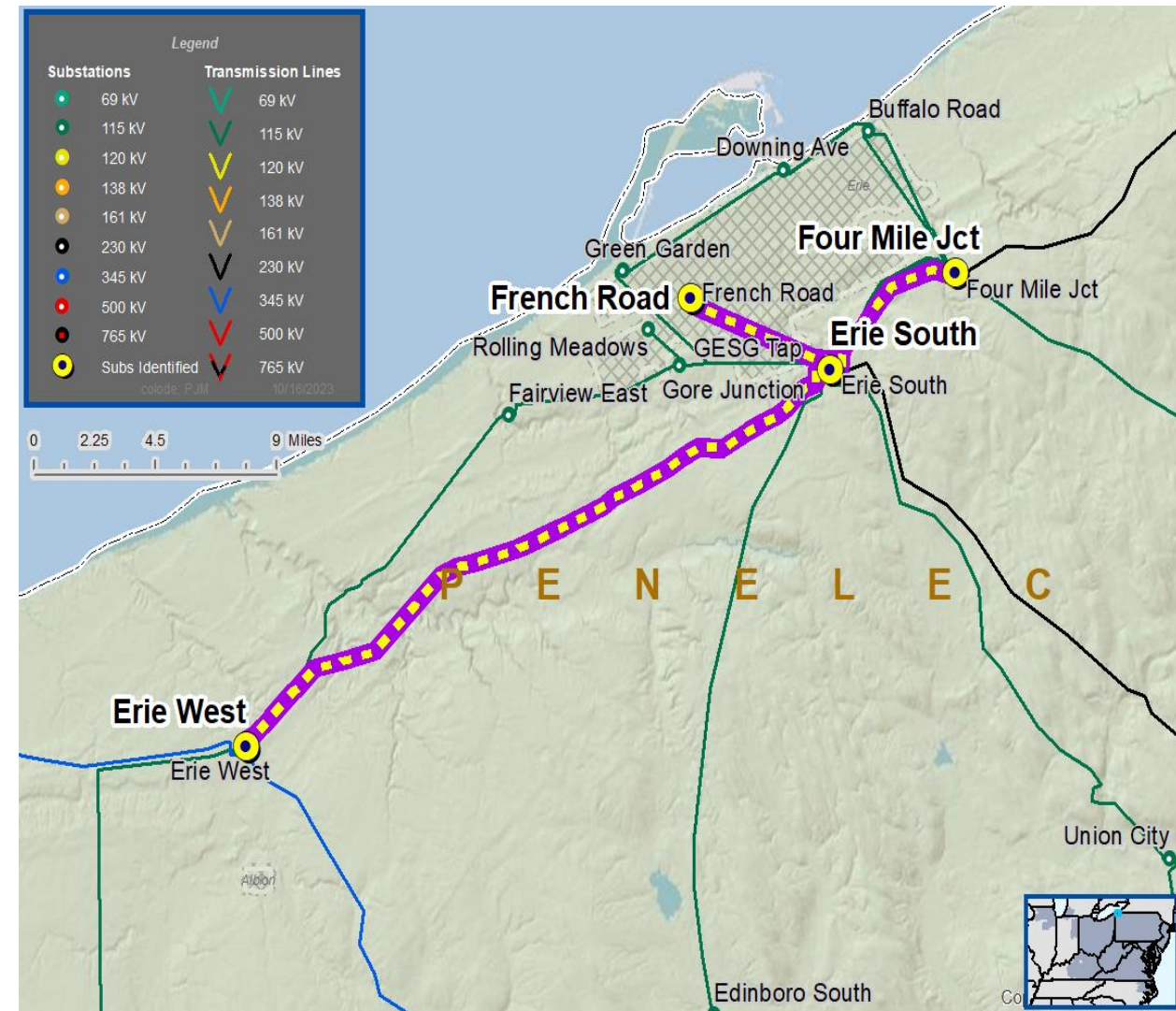
Upgrade Relay Schemes

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

Problem Statement:

- The existing control building at Erie South is congested. There is not sufficient space for relay panel upgrades.
- 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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Penelec Transmission Zone M-3 Process Erie South Substation

Need #	Transmission Line	Existing Line Rating (SN / SE / WN / WE)	Existing Conductor Rating (SN / SE / WN / WE)
PN-2023-018	Erie South – Erie West 345 kV	1216 / 1308 / 1355 / 1428	1631 / 1989 / 1848 / 2358
	Erie South – Warren 230 kV	546 / 666 / 619 / 762	546 / 666 / 619 / 790
	Erie South – Four Mile Junction 230 kV	506 / 621 / 586 / 717	546 / 666 / 619 / 790
	Erie South – French Road No. 2 115 kV	137 / 174 / 171 / 199	137 / 174 / 171 / 201

Selected Solution:

Need #	Transmission Line	New MVA Line Rating (SN / SE / WN / WE)	Scope of Work	Estimated Cost	Target ISD	Supplemental Numbers
PN-2020-005 and PN-2023-018	Erie South – Erie West 345 kV	1631 / 1989 / 1848 / 2358	<ul style="list-style-type: none"> At Erie South, replace relaying & line trap At Erie West, replace relaying & line trap 	\$2.55 M \$0.5 M	6/3/2028	s3422.1 s3422.2
	Erie South – Warren 230 kV	546 / 666 / 619 / 790	<ul style="list-style-type: none"> At Erie South, replace relaying & line trap 	\$2.55 M		s3423.1
	Erie South – Four Mile Junction 230 kV	546 / 666 / 619 / 790	<ul style="list-style-type: none"> At Erie South, replace relaying & substation conductor 	\$2.55 M		s3423.1
	Erie South – French Road No. 2 115 kV	137 / 174 / 171 / 201	<ul style="list-style-type: none"> At Erie South, replace relaying 	\$2.55 M		s3423.1

Penelec Transmission Zone M-3 Process Geneva – Morgan Street 115 kV Line Customer Connection

Need Number: PN-2024-020

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan – 9/23/2024

Previously Presented: Solution Meeting – 06/13/2024
Need Meeting – 05/16/2024

Project Driver(s):

Customer Service

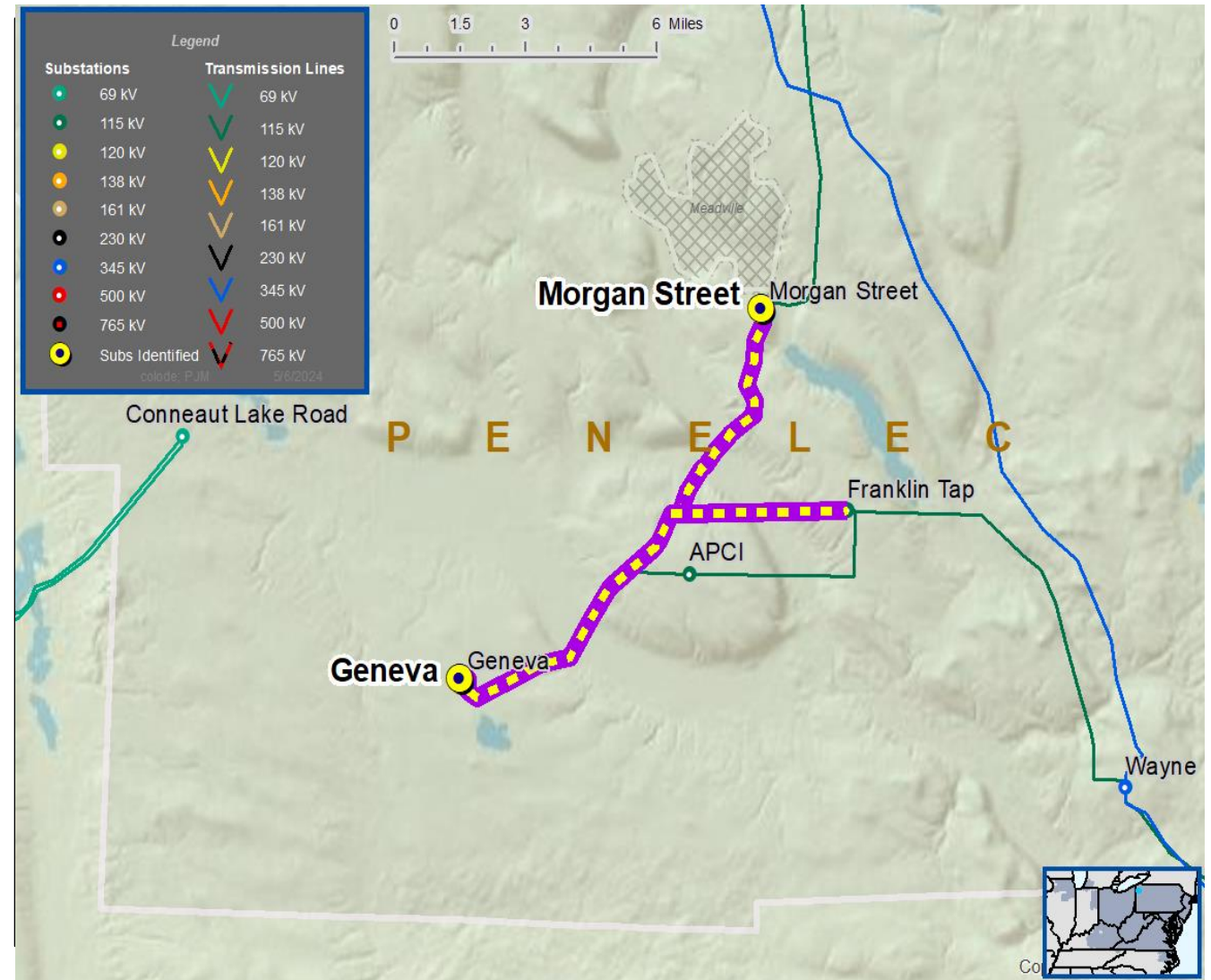
Specific Assumption Reference(s)

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

Problem Statement

New Customer Connection – A retail customer requested 115 kV service for load of approximately 31 MVA near the Geneva – Morgan Street 115 kV Line. The service request location is approximately one mile from Geneva Substation.

Requested in-service date is 05/31/2025





Penelec Transmission Zone M-3 Process Geneva – Morgan Street 115 kV Line Customer Connection

Need Number: PN-2024-020

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan – 9/23/2024

Selected Solution:

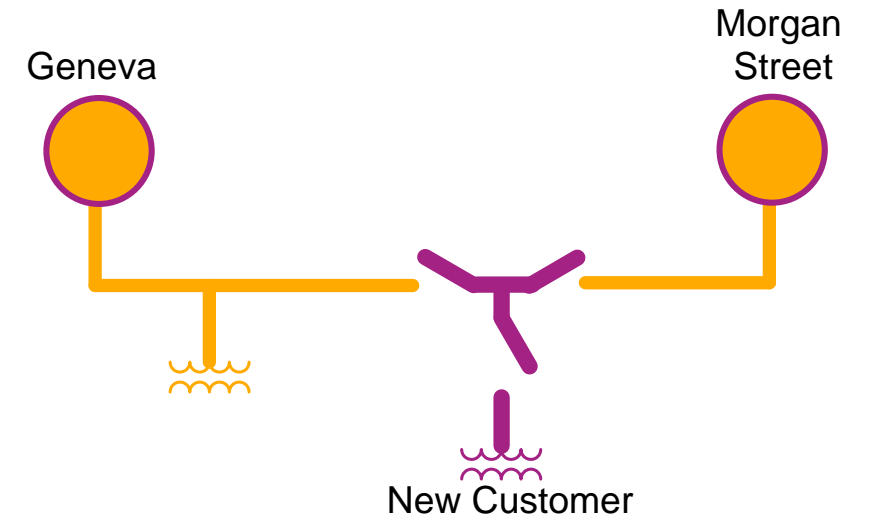
115 kV Transmission Line Tap

- Install three SCADA controlled transmission line switches
- Construct approximately 1-2 spans of transmission line from tap point to customer substation
- Install one 115 kV revenue metering package at customer substation
- Modify relay settings at Geneva and Morgan Street substations

Estimated Project Cost: \$1.6M

Projected In-Service: 5/31/2025

Supplemental Project ID: s3436.1



Legend	
500 kV	
345 kV	
115 kV	
69 kV	
34.5 kV	
23 kV	
New	

Penelec Transmission Zone M-3 Process Niles Valley – Wellsboro 115 kV

Need Number: PN-2022-002

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan 12/19/2024

Previously Presented: Solution Meeting 9/15/2022

Need Meeting 2/17/2022

Project Driver:

- Equipment material condition, performance and risk
- Operational Flexibility and Efficiency

Specific Assumption Reference:

- System Performance
- Network radial lines
- Operational Flexibility

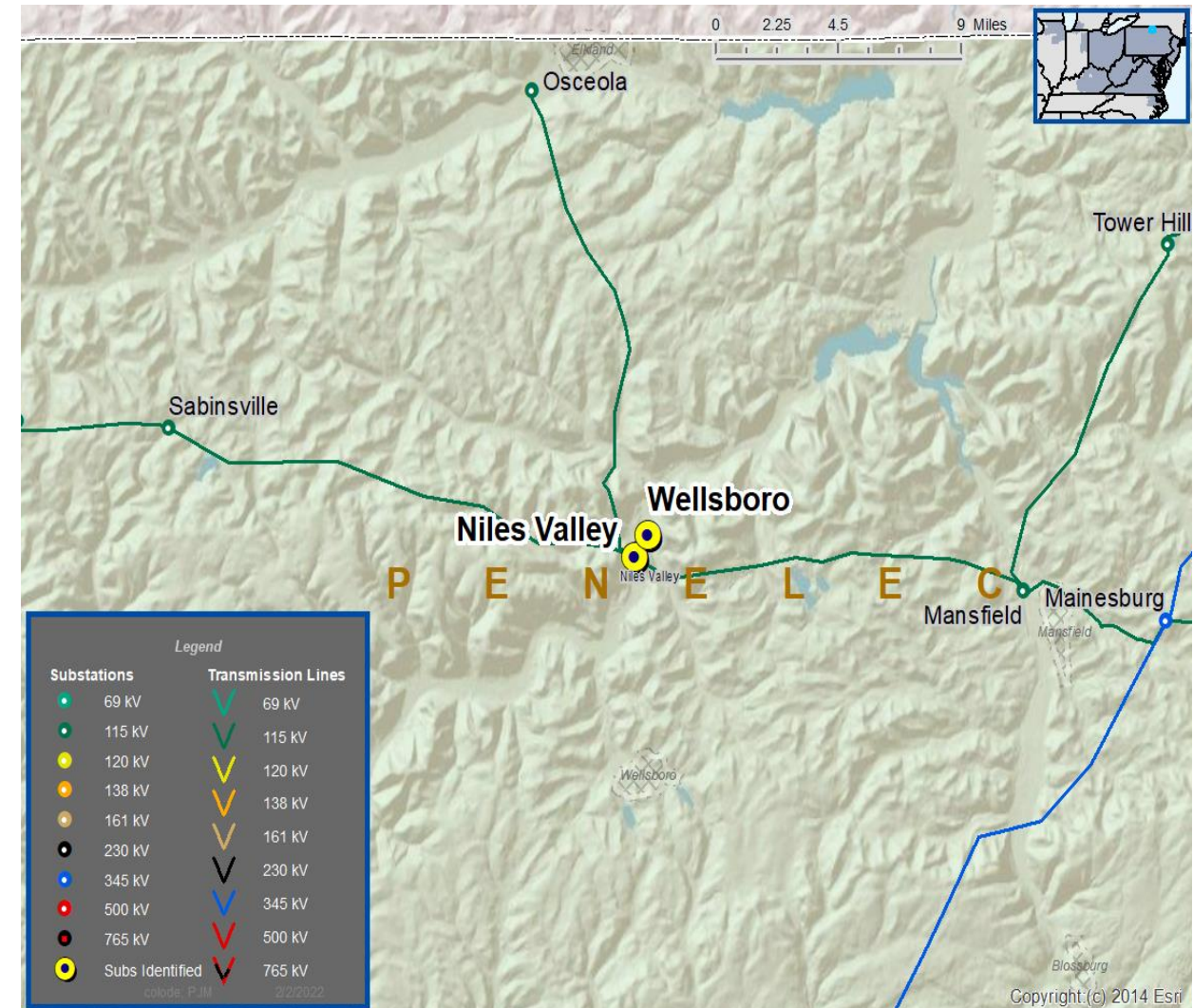
Problem Statement:

The Niles Valley - Wellsboro 115 kV line serves 23 MW of customer load via an approximate 6.3 mile radial line extension. The delivery point on the radial 115 kV line serves approximately 6,300 customer with no transfer capability. The line is expected to experience long duration outages for breaker and bus maintenance. Furthermore, a transformer fault, stuck bus tie breaker, or bus outage of the East most 115 kV bus at Niles Valley would outage all load and customers served via the Niles Valley – Wellsboro 115 kV line for the outage duration or minimally until switching, isolations, and restorations can be executed. The transmission line is terminal limited but does have adequate capacity for serving the radial load.

Transmission line rating is limited by terminal equipment.

Niles Valley – Wellsboro 115 kV (substation conductor)

- Existing line rating: 147 / 191 MVA (SN / SE)
- Existing conductor rating: 232 / 282 MVA (SN / SE)



Need Number: PN-2022-002

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan 12/19/2024

Selected Solution:

Niles Valley - Wellsboro 115 kV line and Niles Valley – Mansfield 115 kV line.
- Install a 115 kV bypass via a 1200 A full load break disconnect with SCADA

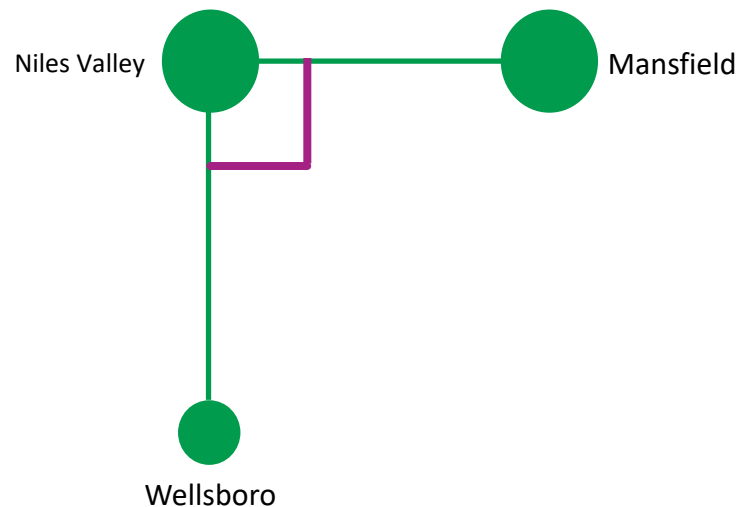
Transmission Line Ratings:











- Niles Valley - Wellsboro 115 kV Line
 - Before Proposed Solution: 147 / 191 MVA (SN / SE)
 - After Proposed Solution: 147 / 191 MVA (SN / SE)
- Niles Valley - Mansfield 115 kV Line
 - Before Proposed Solution: 147 / 174 MVA (SN/SE)
 - After Proposed Solution: 147 / 174 MVA (SN/SE)

Estimated Project Cost: \$1.0 M

Projected In-Service: 6/1/2024

Supplemental Project ID: s2835



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

Penelec Transmission Zone M-3 Process Belleville (Warrior Ridge) 46 kV Line

Need Number: PN-2022-003

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan 12/19/2024

Previously Presented: Solution Meeting 9/15/2022

Need Meeting 6/13/2022

Project Driver:

- Equipment material condition, performance and risk
- Operational Flexibility and Efficiency

Specific Assumption Reference:

System Reliability and Performance

- Line Condition Rebuild/Replacement
 - Failure risk, age and condition, obsolescence, operational or design limitations
- Operational Flexibility

Problem Statement:

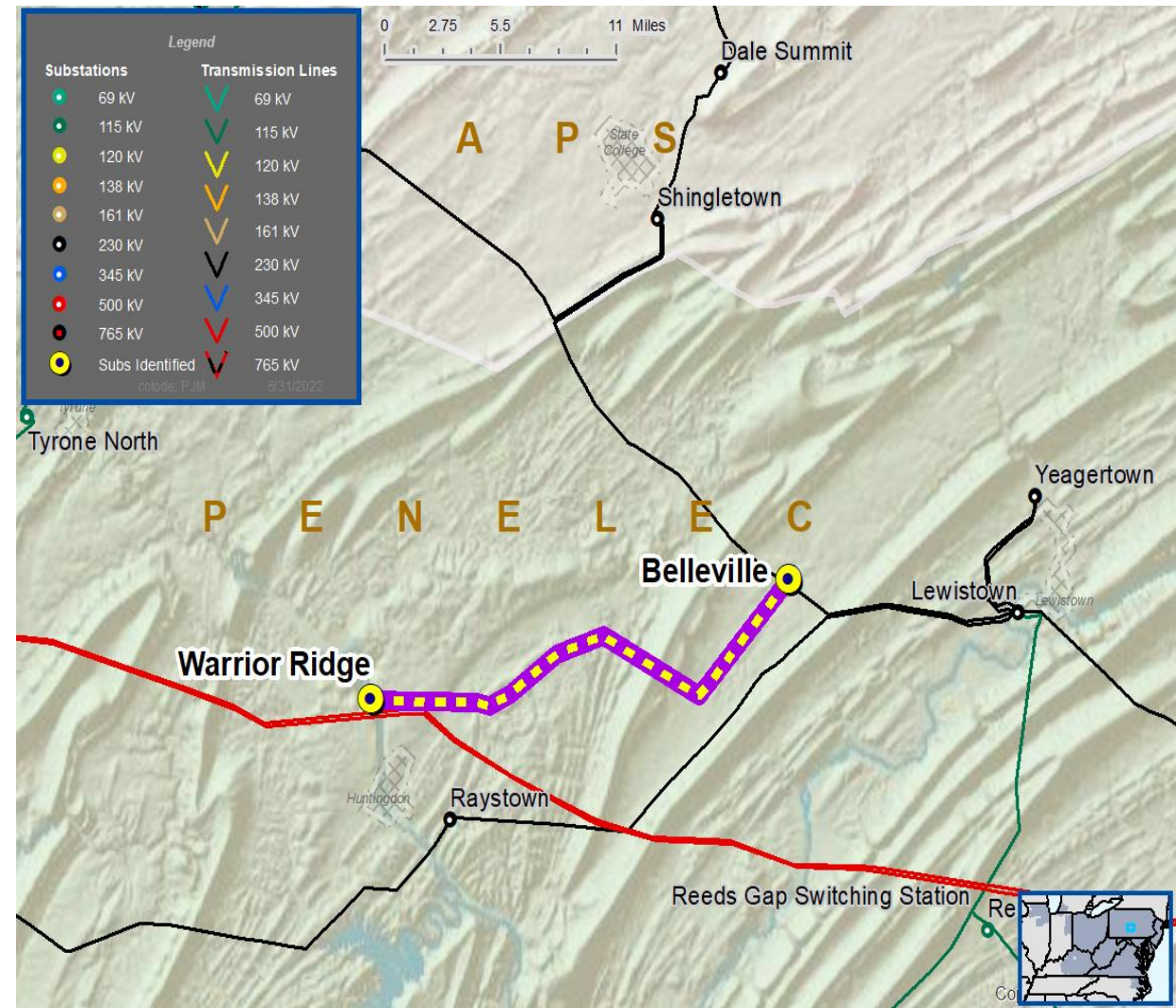
The Belleville – MacLane Tap 46 kV line conductor has been confirmed to be annealed after experiencing a substantial fault condition.

Upon inspection after the fault condition, most of the poles have been found to be in deteriorated condition with broken cross arms, animal damage, and failed sound testing.

FirstEnergy has replaced failed poles on this line section and has executed several emergency repairs of breaks in the annealed conductor.

The line is currently limited by the conductor.

- Existing line rating: 27 / 28 MVA (SN / SE)



Need Number: PN-2022-003

Process State: Submission of Supplemental Projects for Inclusion in the Local Plan 12/19/2024

Selected Solution:

Belleville – MacLane Tap 46 kV line

- Reconductor line from Belleville to Belleville New Holland
- Reconductor line from Belleville New Holland to structure D-800A81
- Replace switches at Belleville and Belleville New Holland
- Reconductor the Belleville New Holland Tap

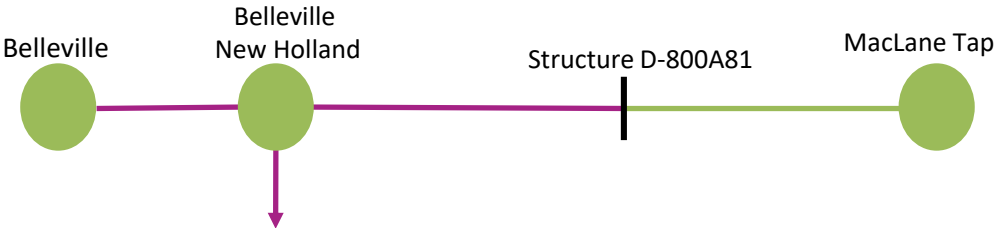
Transmission Line Ratings:











- Belleville – Bellville New Holland 46 kV Line
 - Before Proposed Solution: 27 / 28 MVA (SN / SE)
 - After Proposed Solution: 93 / 113 MVA (SN / SE)
- Belleville New Holland – MacLane 46 kV Line
 - Before Proposed Solution: 27 / 28 MVA (SN/SE)
 - After Proposed Solution: 55 / 69 MVA (SN/SE)
- Belleville New Holland – Belleville New Holland 46 kV Tap
 - Before Proposed Solution: 19 / 23 MVA (SN/SE)
 - After Proposed Solution: 55 / 69 MVA (SN /SE)

Estimated Project Cost: \$13.4M

Projected In-Service: 12/31/2024

Supplemental ID: s2836, s2836.1, s2836.2, s2836.3, s2836.4



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

Questions?



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

6/24/2024 – V1 – Local Plan for s3268.1, s3269.1, s3270.1, s3271.1, s3290.1, s3291.1, s3292.1, s3293.1

9/17/2024 – V2 – s3334.1 and s3335.1 added to local plan

9/23/2024 – V3 – s3395.1, s3396.1, s3408.1, s33409.1, s3410.1, s3422.1-.2, s3423.1, s3436.1 added to Local Plan

12/19/2024 – V4 – s2835, s2836, s2836.1, s2836.2, s2836.3, s2836.4