FirstEnergy – Penelec – 2026
Submission of Supplemental Projects for Inclusion in the Local Plan

Penelec Transmission Zone M-3 Process
Carlisle Pike – Gardners 115 kV 976 Line

Need Number: PN-2024-017

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan

Previously Presented: Solution Meeting - 8/14/2025
Need Meeting - 5/16/2024

Project Driver:

Equipment Material Condition, Performance and Risk

Specific Assumption Reference:

System Performance Global Factors

- System reliability/performance
- Substation/Line equipment limits

Line Condition Rebuild/Replacement

- Age/condition of wood pole transmission line structures

Problem Statement:

The Carlisle Pike – Gardners 115 kV 976 Line was constructed approximately 69 years ago. The original poles were replaced in 1970. The conductor is original to the 1955 construction. The Penelec portion of this line is approximately 7.55 miles long with 71 wood H-frame transmission line structures.

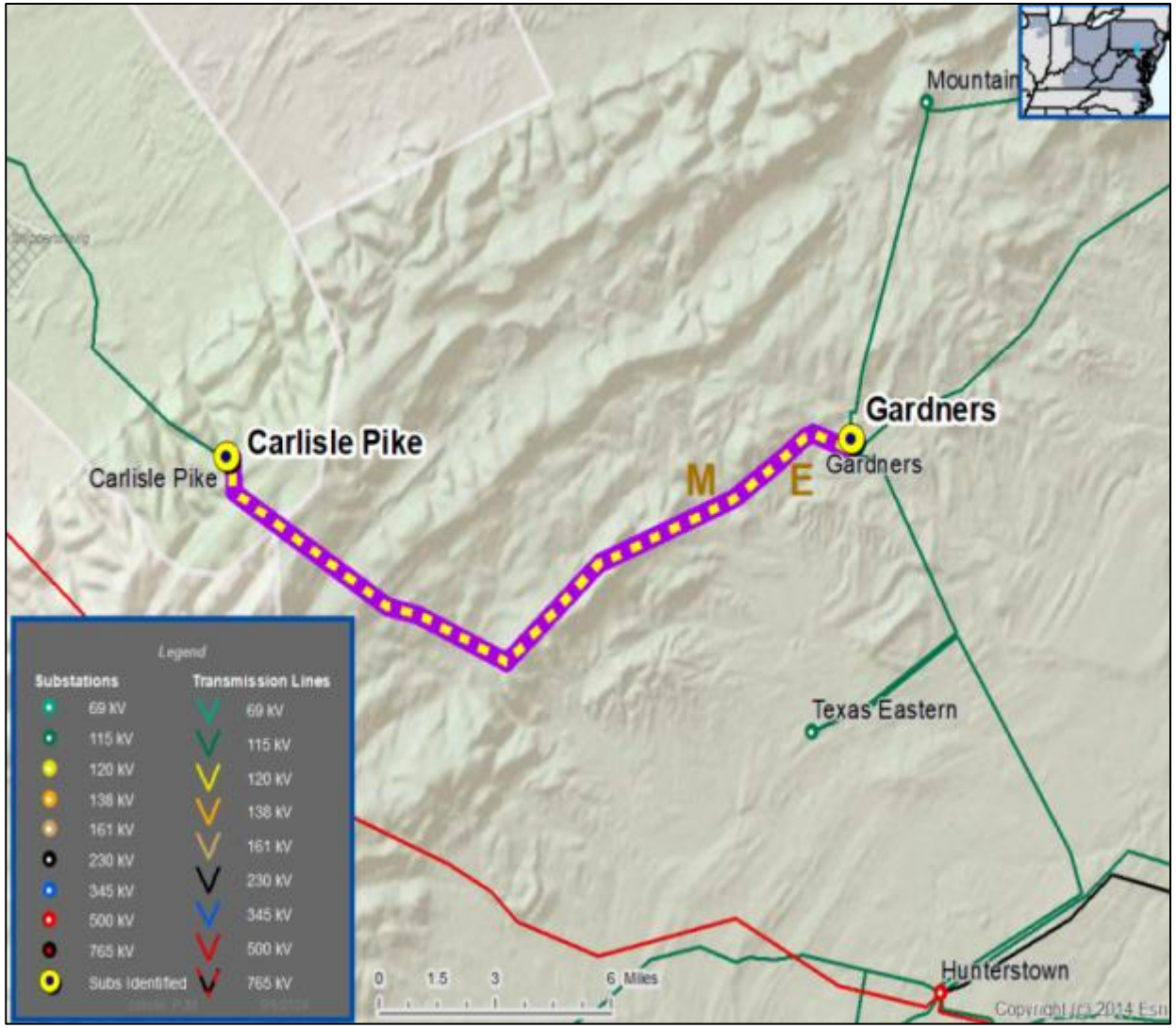
The Penelec portion of this line is exhibiting deterioration. Inspection findings include:

- 16 structures are Phase-Raised.
- 18 structures failed sound test.
- 54 structures are 54 years old.

There have been three unscheduled sustained outages in the last five years, two attributed to line equipment.

The line is limited by terminal equipment.

- Existing Transmission Line Ratings:
  - 86 / 110 / 122 / 137 MVA (SN/SE/WN/WE)



Penelec Transmission Zone M-3 Process
Carlisle Pike – Gardners 115 kV 976 Line

Need Number: PN-2024-017

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan

Selected Solution:

Carlisle Pike-Gardners 115 kV 976 Line Rebuild

- Rebuild 7.55 miles of transmission with new conductor

Transmission Line Ratings:

Carlisle Pike – Gardners 115 kV 976 Line

- Before Proposed Solution: 86 / 110 / 122 / 137 MVA (SN/SE/WN/WE)
- After Proposed Solution: 232 / 282 / 263 / 334 MVA (SN/SE/WN/WE)

Estimated Project Cost: $20.5M

Projected In-Service: 12/21/2029

Supplemental Project ID: s3743.2

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
Warrior Ridge - Huntingdon - Owens Corning 46 kV Lines

Need Number: PN-2025-003

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan

Previously Presented: Solution Meeting 8/14/2025
Need Meeting 06/12/2025

Project Driver: Equipment Condition/Performance/Risk

Specific Assumption References:

Line Condition Rebuild/Replacement

Age/condition of wood pole transmission line structures

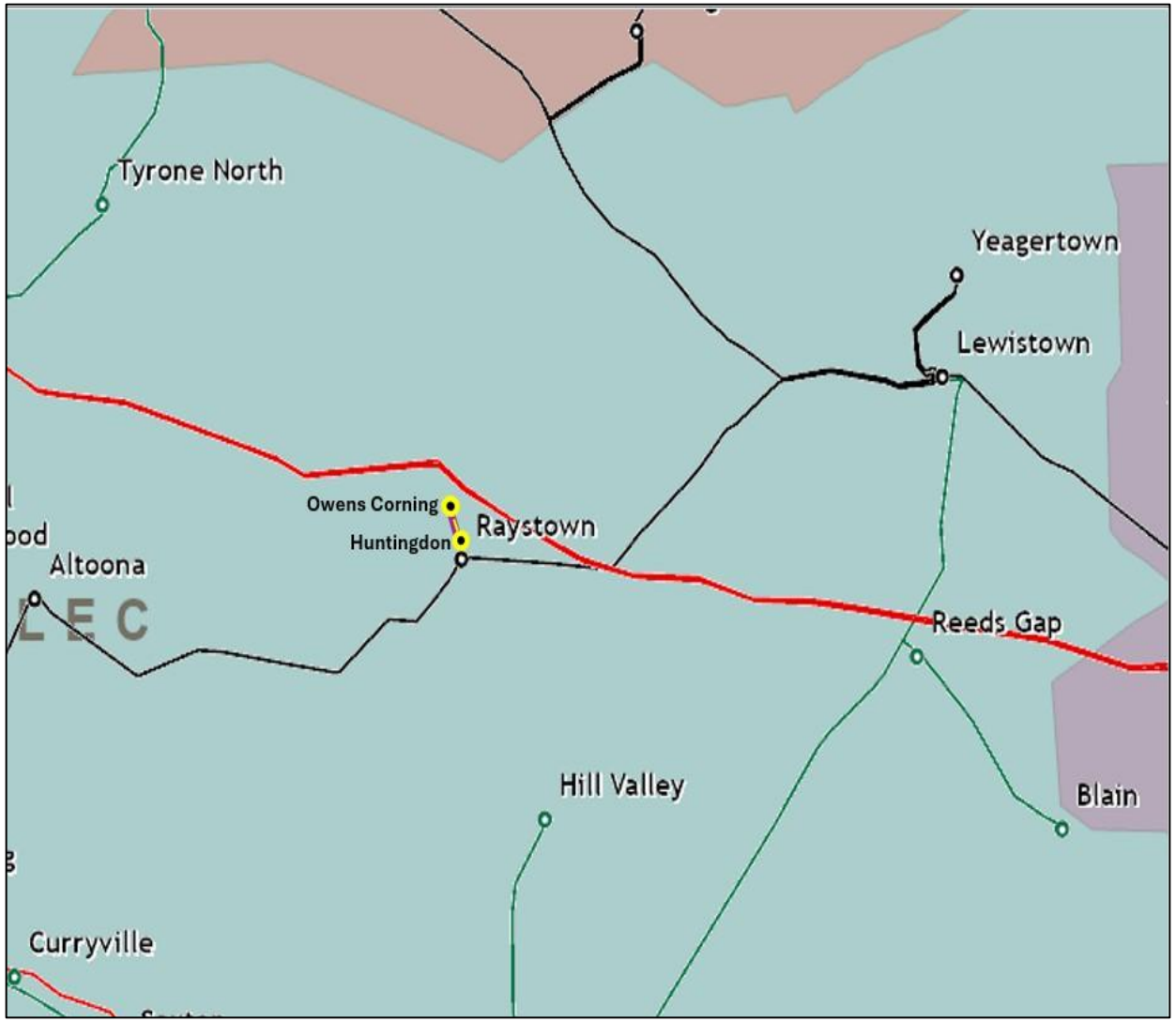
Problem Statement:

The Owens Corning (Huntingdon) 46 kV OC Line was constructed approximately 70 years ago and is approaching end of life. The radial line is 0.39 miles in length and serves 3 substations.

Per recent inspection, safety concerns were identified in seven spans as this circuit passes above and adjacent to several buildings.

Existing Transmission Line Ratings:

- 24 / 24 / 26 / 26 MVA (SN/SE/WN/WE)



Penelec Transmission Zone M-3 Process
Warrior Ridge - Huntingdon - Owens Corning 46 kV Lines

Need Number: PN-2025-003

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan

Selected Solution:

- Remove the existing back up feed and tap switches to Owens Corning
- Install four new 46 kV switches
- Rebuild the line from the new tap to Owens Corning No. 1 (~0.09 miles)
- Rebuild the Huntingdon – Owens Corning No. 3 46 kV line (~0.3 miles)
- Build a new line from Owens Corning No. 3 to the Huntingdon-Warrior Ridge 46 kV Line (~0.2 miles) and operate as normally open

Transmission Line Ratings:

Huntingdon – Owen Tap 46 kV Line:

- After Proposed Solution: 50 / 50 / 50 / 50 MVA (SN/SE/WN/WE)

Owen Tap – WRH Tap 46 kV Line:

- After Proposed Solution: 93 / 113 / 105 / 134 MVA (SN/SE/WN/WE)

Huntingdon – Owen Corning No. 1 46 kV Line:

- After Proposed Solution: 93 / 113 / 105 / 134 MVA (SN/SE/WN/WE)

Owen Corning No. 1 – Owen Corning No. 2 and No. 3 46 kV Line:

- After Proposed Solution: 93 / 113 / 105 / 134 MVA (SN/SE/WN/WE)

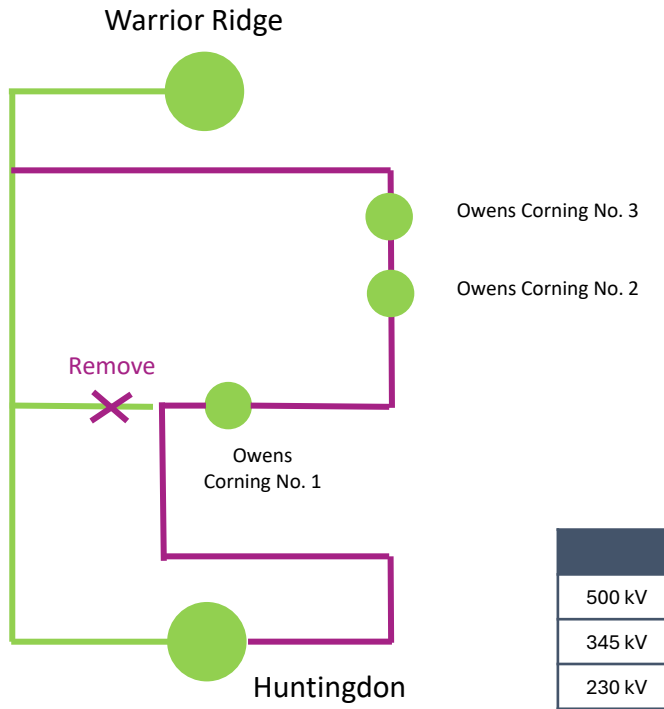
Owen Corning No. 2 and No. 3 – Warrior Ridge 46 kV Line:

- After Proposed Solution: 93 / 113 / 105 / 134 MVA (SN/SE/WN/WE)

Estimated Project Cost: $5.1M

Projected In-Service: 3/26/2026

Supplemental Project ID: s3744.1



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
Edinboro South Substation

Need Number: PN-2023-006

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan

Previously Presented: Solution Meeting – 09/18/2025
Need Meeting – 07/20/2023

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

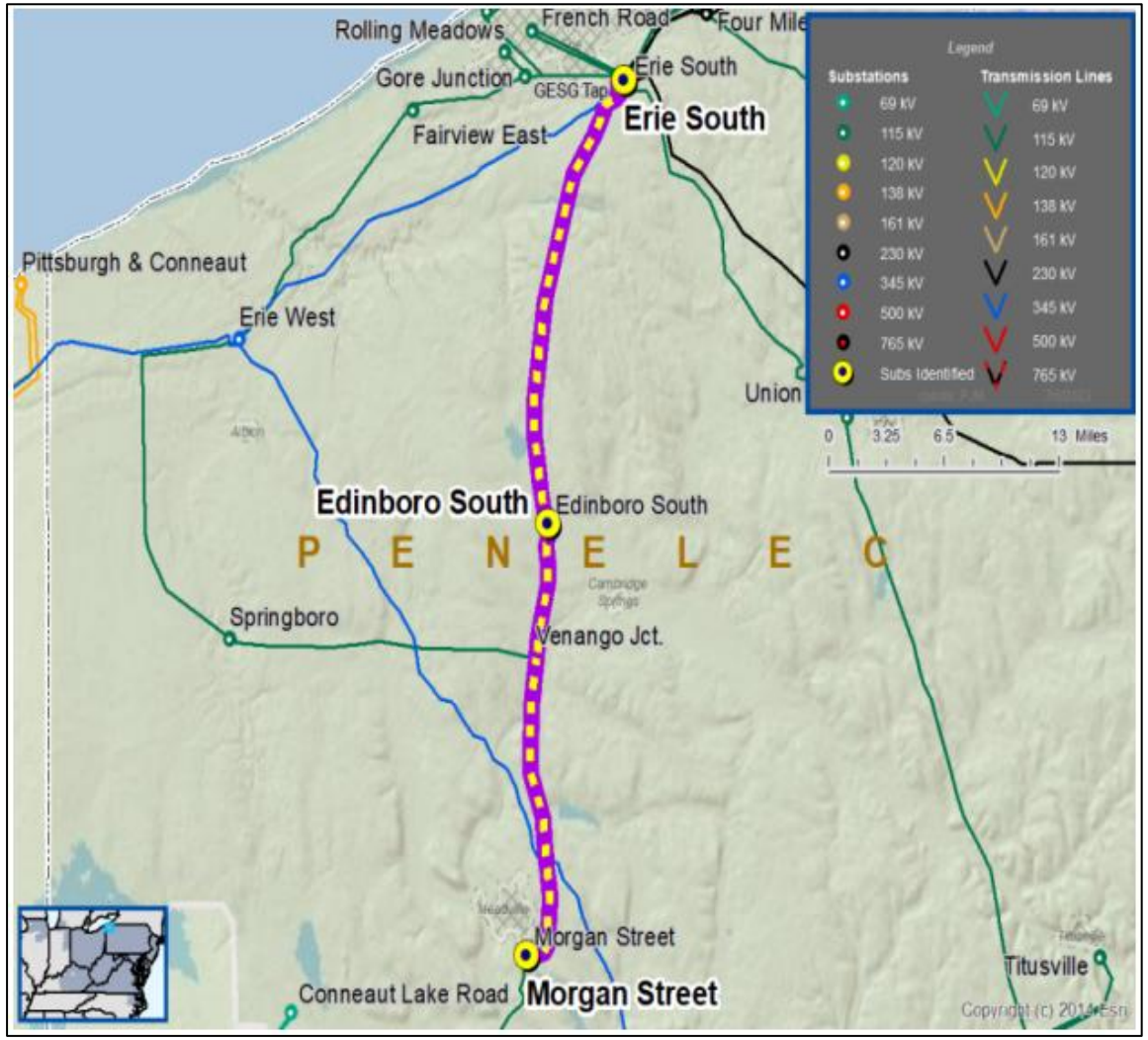
- Load and/or customers at risk on single transmission line

System Conversion Methodology

- Customer feedback

Problem Statement:

- Edinboro South Substation serves approximately 43 MW of load to 4,044 customers. A fault on the Erie South - Edinboro South 115 kV Line results in interruption of service to the No. 1 115-34.5 kV transformer with limited network transfer capability during peak conditions.
- The Erie South - Edinboro South 115 kV Line is approximately 16.9 miles long. Over the past five years, the Erie South - Edinboro South 115 kV Line has experienced two sustained outages.
- Edinboro South – Morgan Street – Springboro 115 kV Line has experienced a total of ten outages and there are five sustained outages over the past five years.



Penelec Transmission Zone M-3 Process
Edinboro South Substation

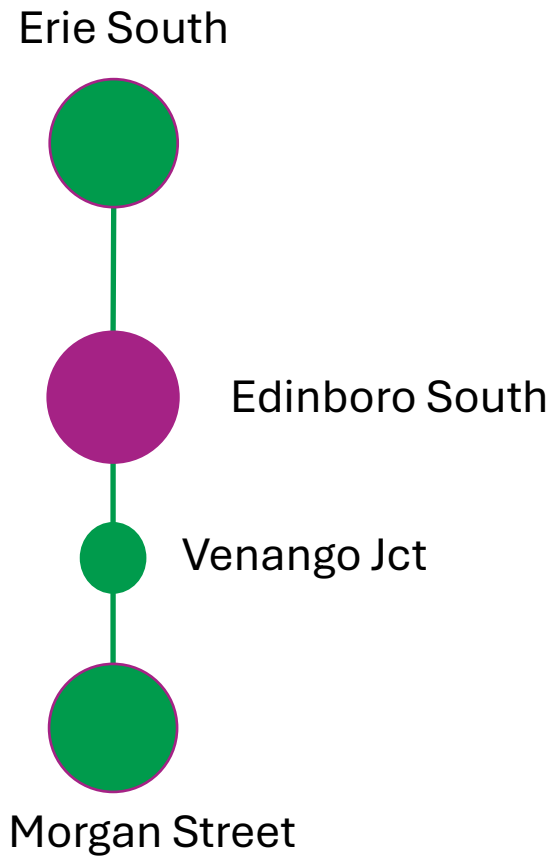
Need Number: PN-2023-006

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan

Selected Solution:

- Convert the Edinboro South Substation into a four-breaker ring bus.
- Adjust relay settings at Erie South and Morgan Street substations.

Estimated Project Cost: $13.57M
Projected In-Service: 6/18/2027
Supplemental Project ID: s3745.1



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
Morgan Street Substation

Need Number: PN-2023-008

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan

Previously Presented: Solution Meeting – 09/18/2025
Need Meeting – 08/17/2023

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

Problem Statement:

- Morgan Street Substation serves 7,100 customers and 67 MW of load in the Meadville, Pennsylvania area.
- The current substation configuration of Morgan Street Substation is a straight bus with a bus tie breaker. In the event of a tie breaker failure, the entire Morgan Street Substation 115 kV bus is interrupted.
- In addition to a tie breaker failure at Morgan Street Substation, the consequential N-1-1 loss of the Geneva – Morgan Street 115 kV Line and the Edinboro South – Morgan Street – Springboro 115 kV Line eliminates the 115 kV source to the 34.5 kV system fed from Morgan Street Substation.

Penelec Transmission Zone M-3 Process
Morgan Street Substation

Need Number: PN-2023-008

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan

Selected Solution:

- Convert the Morgan Street Substation into a nine-breaker, breaker-and-a-half substation.
- Adjust relay settings at Geneva and Edinboro South substations.

Transmission Line Ratings:

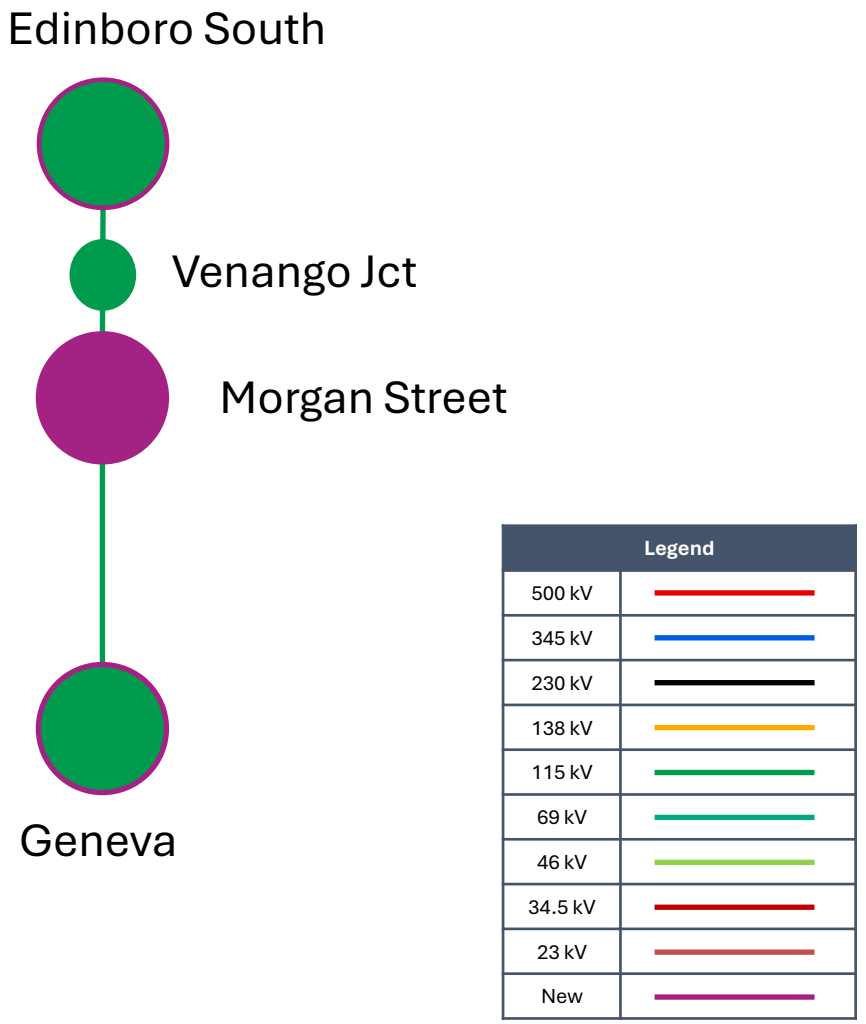
Morgan Street - Venango Jct 115 kV Line:

- Before Proposed Solution: 147 / 191 / 201 / 201 MVA (SN/SE/WN/WE)
- After Proposed Solution: 232 / 282 / 263 / 334 MVA (SN/SE/WN/WE)

Estimated Project Cost: $26.91M

Projected In-Service: 12/3/2027

Supplemental Project ID: s3746.1



Penelec Transmission Zone M-3 Process
Spangler Substation

Need Number: PN-2024-003

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan

Previously Presented: Solution Meeting – 09/18/2025
Need Meeting – 03/14/2024

Project Driver:

Operational Flexibility and Efficiency

Equipment Material Condition, Performance, and Risk

Specific Assumption Reference:

System Performance Projects Global Factors

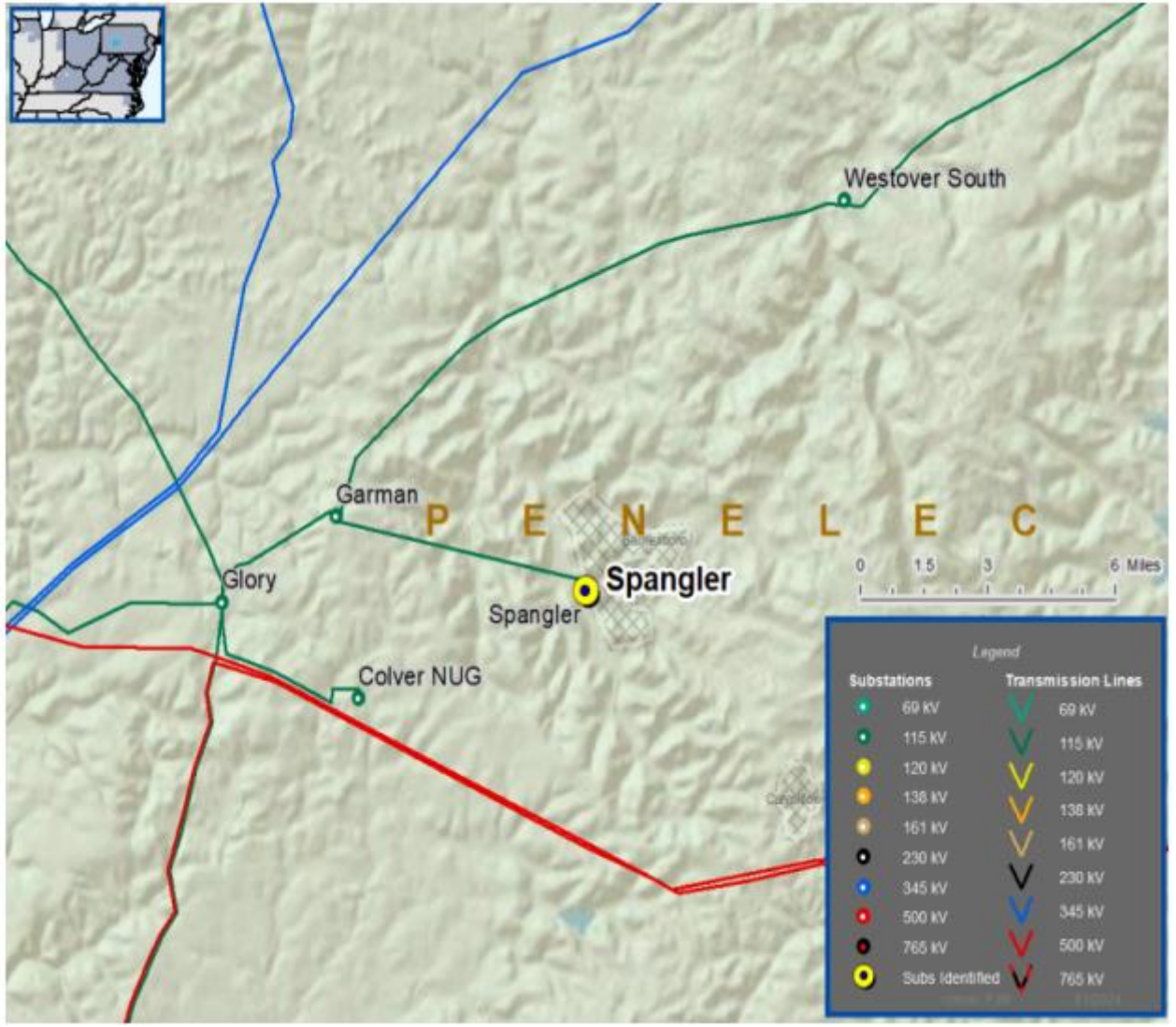
- System reliability and performance
- Substation and line equipment limits

System Performance

- Criticality, impact on reliability, customer outages
- Reliability of non-bulk electric system (Non-BES) Facilities
- Load at risk and customers impacted

Problem Statement:

- Spangler Substation is currently configured as a 46 kV straight bus where bus faults and/or breaker failures result in the interruption of the entire substation.
- Spangler Substation serves approximately 27 MW of load and 2,600 customers.
- The existing Spangler No. 2 115-46 kV Transformer is 48 years old. The transformer has required corrective maintenance for moisture due to leaks, consists of obsolete parts not supported by the OEM, and is limited by terminal equipment.
- Existing Ratings
  - 34 / 44 / 49 / 55 (SN/SE/WN/WE)



Penelec Transmission Zone M-3 Process
Spangler Substation

Need Number: PN-2024-003

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan

Selected Solution:

At Spangler:

- Convert the 46 kV yard into a five-breaker ring bus.
- Replace No. 2 115/46 kV transformer and install high side circuit breaker.

At Garman:

- Replace line relaying and substation conductor

At Carrolltown and Nanty Glo substations:

- Adjust remote end relaying

Transmission Line Ratings:

Spangler – St. Benedict 46 kV Line:

- Before Proposed Solution: 33 / 38 / 40 / 44 MVA (SN/SE/WN/WE)
- After Proposed Solution: 36 / 43 / 40 / 51 MVA (SN/SE/WN/WE)

Spangler No. 2 115/46 kV Transformer:

- Before Proposed Solution: 34 / 44 / 49 / 55 MVA (SN/SLTE/WN/WLTE)
- After Proposed Solution: 58 / 70 / 71 / 81 MVA (SN/SE/WN/WE)

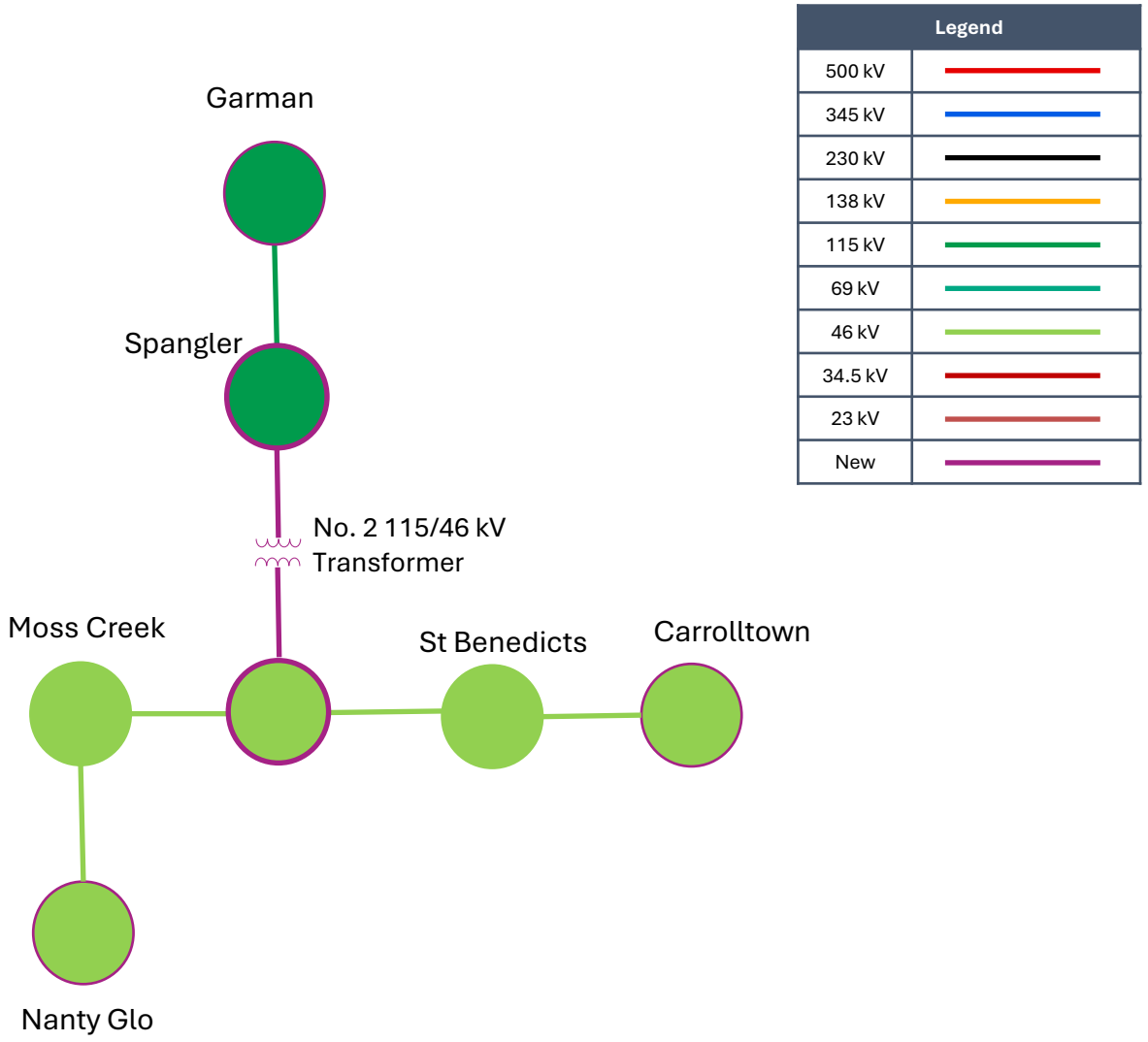
Spangler – Garman 115 kV Line:

- Before Proposed Solution: 120 / 120 / 120 / 120 MVA (SN/SE/WN/WE)
- After Proposed Solution: 232 / 282 / 263 / 334 MVA (SN/SE/WN/WE)

Estimated Project Cost: $14.2M

Projected In-Service: 7/12/2027

Supplemental Project ID: s3747.1



Revision History

01/05/2026 – V1
s3743
s3744
s3745
s3746
s3747