

# Transmission Expansion Advisory Committee

## FirstEnergy Supplemental Projects

Penelec Transmission Zone

# **Solutions**

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 Number:** PN-2024-015 (Also refer to APS-2024-037)

**Process Stage:** Solution Meeting – TEAC – 10/06/2026

**Previously Presented:** Need Meeting – TEAC – 04/30/2024

**Project Driver:**

*Customer Service*

**Specific Assumption References:**

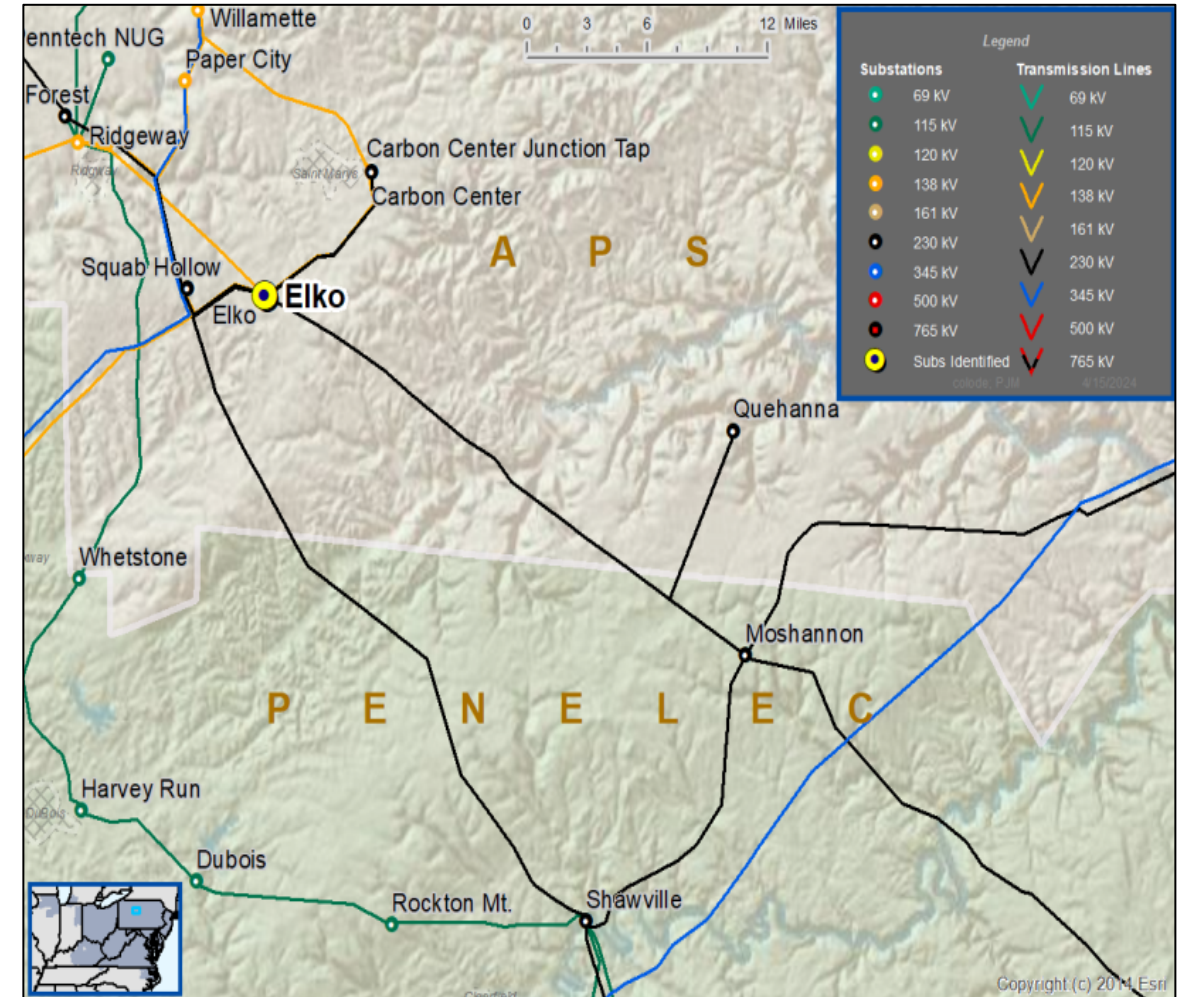
System Performance Global Factors

- System reliability/performance
- Substation and line equipment limits
- Add/Expand Bus Configuration

**Problem Statement:**

The existing 230 kV and 138 kV yards at Elko Substation are configured as straight buses. Elko Substation contains four 230 kV lines, three 138 kV lines, a 138 kV capacitor, and one 230/138 kV transformer. There are multiple common mode contingencies that cause outages on multiple 230 kV or 138 kV elements including a complete loss of the 230 kV or 138 kV bus at Elko Substation.

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**Need Number:** PN-2024-015 (Also refer to APS-2024-037)

**Problem Statement:** *(Cont'd from previous page)*

Transmission lines served from Elko Substation are limited by terminal equipment.

| Transmission Line                | Existing Line Rating<br>MVA (SN / SE / WN / WE) | Existing Conductor Rating<br>MVA (SN / SE / WN / WE) |
|----------------------------------|-------------------------------------------------|------------------------------------------------------|
| Elko – Shawville 230 kV Line     | 442 / 582 / 619 / 725                           | 546 / 666 / 619 / 790                                |
| Elko – Carbon Center 230 kV Line | 442 / 442 / 442 / 442                           | 617 / 754 / 699 / 894                                |
| Elko – Squab Hollow 230 kV Line  | 512 / 612 / 619 / 700                           | 546 / 666 / 619 / 790                                |
| Elko – Quehanna 230 kV Line      | 548 / 688 / 699 / 804                           | 617 / 754 / 699 / 894                                |
| Elko – Squab Hollow 138 kV Line  | 294 / 350 / 349 / 401                           | 309 / 376 / 349 / 445                                |



## Penelec Transmission Zone M-3 Process Shawville and Elko 230 kV Terminal Upgrades

**Need Number:** PN-2024-015 (Also refer to APS-2024-037)

**Process Stage:** Solution Meeting – TEAC – 10/06/2026

**Proposed Solution:**

- Re-terminate the Elko - Squab Hollow 230 kV Line and Elko - Shawville 230 kV Line in Elko 230 kV Substation.
- At Shawville substation, replace the 1000 CU substation conductor and install/upgrade PMU equipment.

**Ratings:**

Elko - Shawville (SR) 230 kV Line:

- Before Proposed Solution: 445 / 587 / 619 / 730 MVA (SN/SE/WN/WE)
- After Proposed Solution: 546 / 666 / 619 / 790 MVA (SN/SE/WN/WE)

Elko - Squab Hollow (E\_SH) 230 kV Line:

- Before Proposed Solution: 512 / 612 / 619 / 700 MVA (SN/SE/WN/WE)
- After Proposed Solution: 512 / 612 / 619 / 700 MVA (SN/SE/WN/WE)

**Alternatives Considered:**

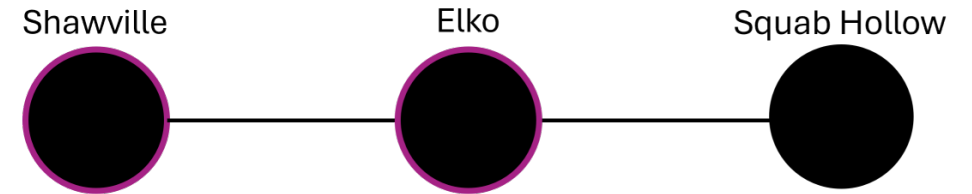
Maintain existing condition with elevated risk of failure..

**Estimated Project Cost:** \$1.14 M

**Projected In-Service:** 12/14/2029

**Project Status:** Conceptual

**Model:** 2024 RTEP model for 2029 Summer (50/50)



| 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 Raystown 230-46 kV Transformer #1 Replacement

**Need Number:** PN-2025-010

**Process Stage:** Solution Meeting – TEAC – 10/06/2026

**Previously Presented:** Need Meeting – TEAC – 11/04/2025

**Project Driver:**

*Equipment Condition/Performance/Risk*

**Specific Assumption References:**

System Performance Global Factors

- System reliability/performance
- Substation/Line equipment limits

Add/Replace Transformers

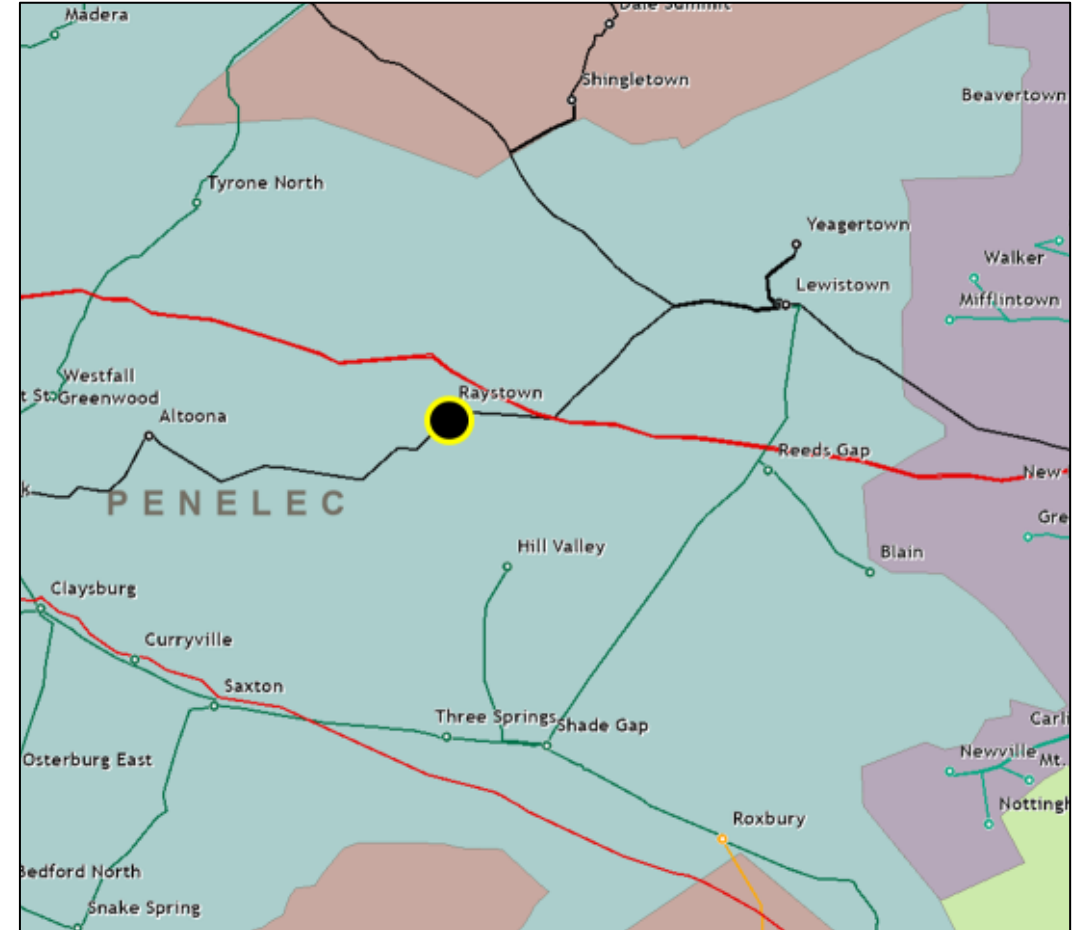
Past System Reliability/Performance

Substation Condition Rebuild/Replacement

- Age/condition of substation equipment
- Circuit breakers and other fault interrupting device

**Problem Statement:**

- The Raystown No. 1 230-46 kV Transformer is approximately 33 years old and is approaching end of life. Most recent DGA results have shown increase in moisture, high ethylene, acetylene, and carbon monoxide. The transformer has low breakdown voltage, indicating polar contaminants or excessive moisture. Replacement components are difficult to source due to obsolescence.
- 230 kV switch A4 and 46 kV switches D5 and D6 are heavily worn. The ages of the existing switches are unknown.
- The Raystown 46 kV breaker B2 is approximately 49 years old and is approaching end of life. Replacement components are difficult to source due to obsolescence.
- Existing Transformer Ratings: 59 / 76 / 84 / 95 MVA (SN/SLTE/WN/WLTE)





# Penelec Transmission Zone M-3 Process Raystown 230-46 kV Transformer #1 Replacement

**Need Number:** PN-2025-010

**Process Stage:** Solution Meeting – TEAC – 10/06/2026

**Proposed Solution:**

Replace the Raystown 230-46 kV #1 transformer.

**Ratings:**

Raystown 230-46 kV Transformer #1

- Before Proposed Solution: 59 / 76 / 84 / 95 MVA (SN/SE/WN/WE)
- After Proposed Solution: 100 / 105 / 120 / 130 MVA (SN/SE/WN/WE)

**Alternatives Considered:**

Maintain existing condition with elevated risk of failure.

**Estimated Project Cost:** \$7.60 M

**Projected In-Service:** 06/25/2031

**Project Status:** Conceptual

**Model:** 2024 RTEP model for 2029 Summer (50/50)

# 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

09/25/2026 – V1 – Original version posted to pjm.com