



Transmission Expansion Advisory Committee

FirstEnergy Supplemental Projects

APS Transmission Zone

October 6, 2026

Need

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: APS-2026-054

Process Stage: Need Meeting 10/06/2026

Project Driver: Equipment Condition/Performance/Risk

Specific Assumption References:

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.

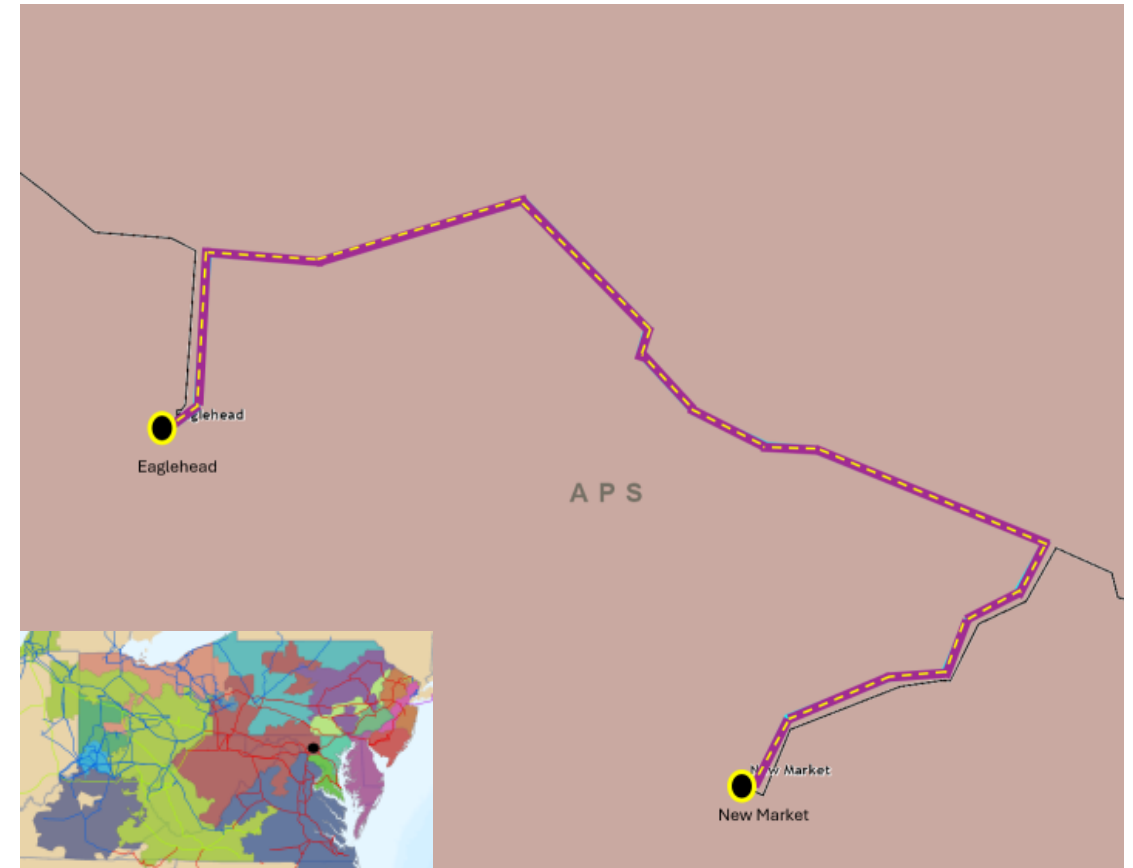
In many cases the protection equipment cannot be repaired due to a lack of replacement parts and available expertise in the outdated technology.

Transmission line ratings are limited by terminal equipment.

Eaglehead - New Market 230 kV Line:

Existing Line Rating: 548 / 688 / 699 / 797 MVA (SN/SE/WN/WE)

Existing Conductor Rating: 617 / 754 / 699 / 894 MVA (SN/SE/WN/WE)



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: APS-2024-037, PN-2024-015

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

Previously Presented: Need Meeting – 04/30/2024

Project Driver:

System Performance and Operational Flexibility

Specific Assumption Reference:

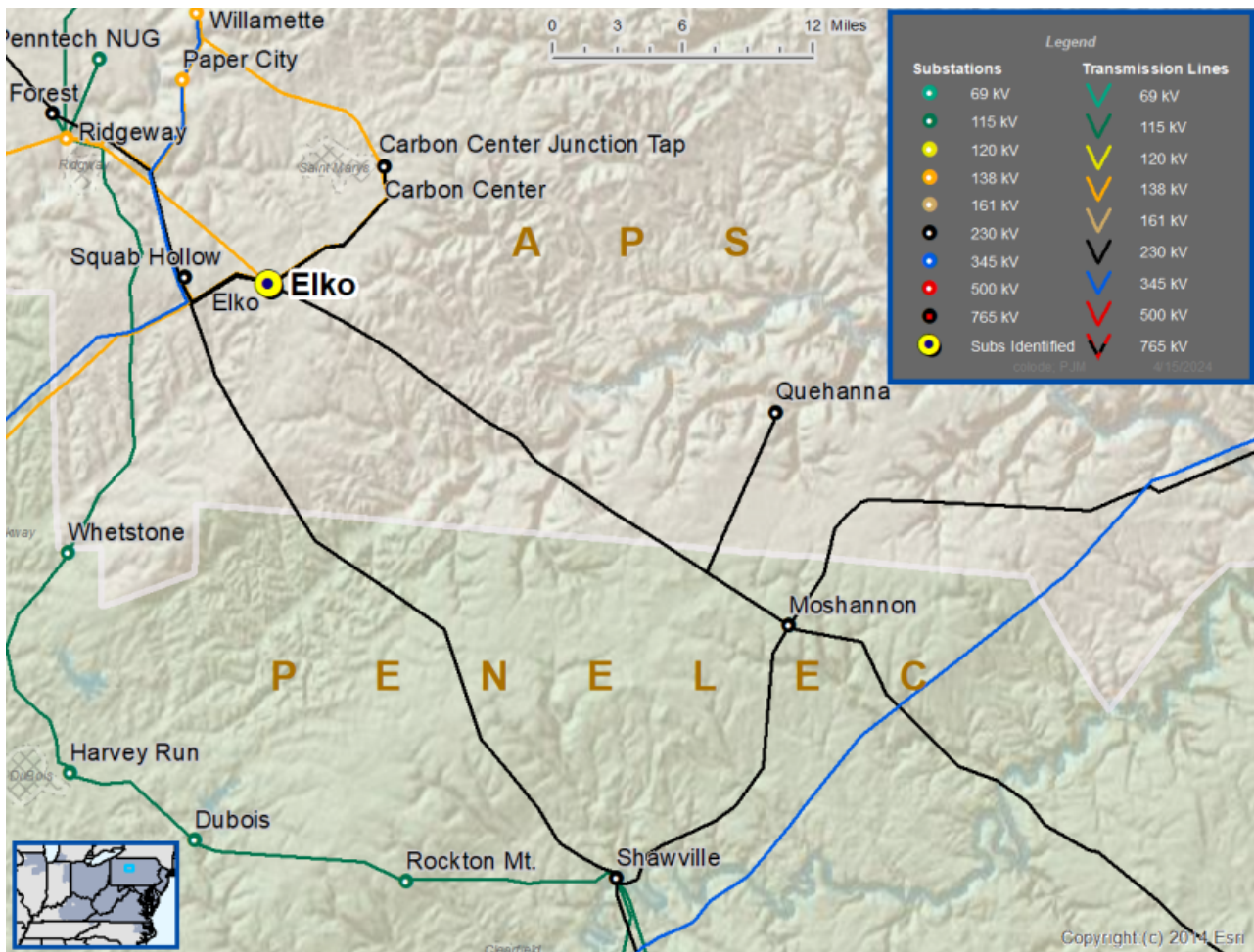
System Performance Global Factors

- System reliability and 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 230/138 kV transformer, and a 138 kV capacitor. 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.
- Transmission lines served from Elko Substation are limited by terminal equipment.

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Transmission Line	Existing Line Rating MVA (SN / SE / WN / WE)	Existing Conductor Rating 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

Need Number: APS-2024-037, PN-2024-015

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

Proposed Solution:

At Elko Substation: Rebuild the 230 kV and 138 kV yards to ring bus configurations. Install five new 230 kV circuit breakers, disconnect switches, wave traps, and associated relaying. Install five new 138 kV circuit breakers, disconnect switches, wave traps, and associated relaying.

At Carbon Center Substation: Replace 230 kV circuit breaker, disconnect switches, wave trap, substation conductor, and associated relaying.

At Quehanna Substation: Replace 230 kV disconnect switches and substation conductor.

At Squab Hollow Substation: Replace 230 kV relaying.

At Moshannon Substation: Replace 230 kV relaying

At Paper City Substation: Replace 138 kV circuit breaker, disconnect switches, wave trap, substation conductor, and associated relaying.

At Ridgway Substation: Replace 138 kV circuit breaker, disconnect switches, substation conductor, and associated relaying.

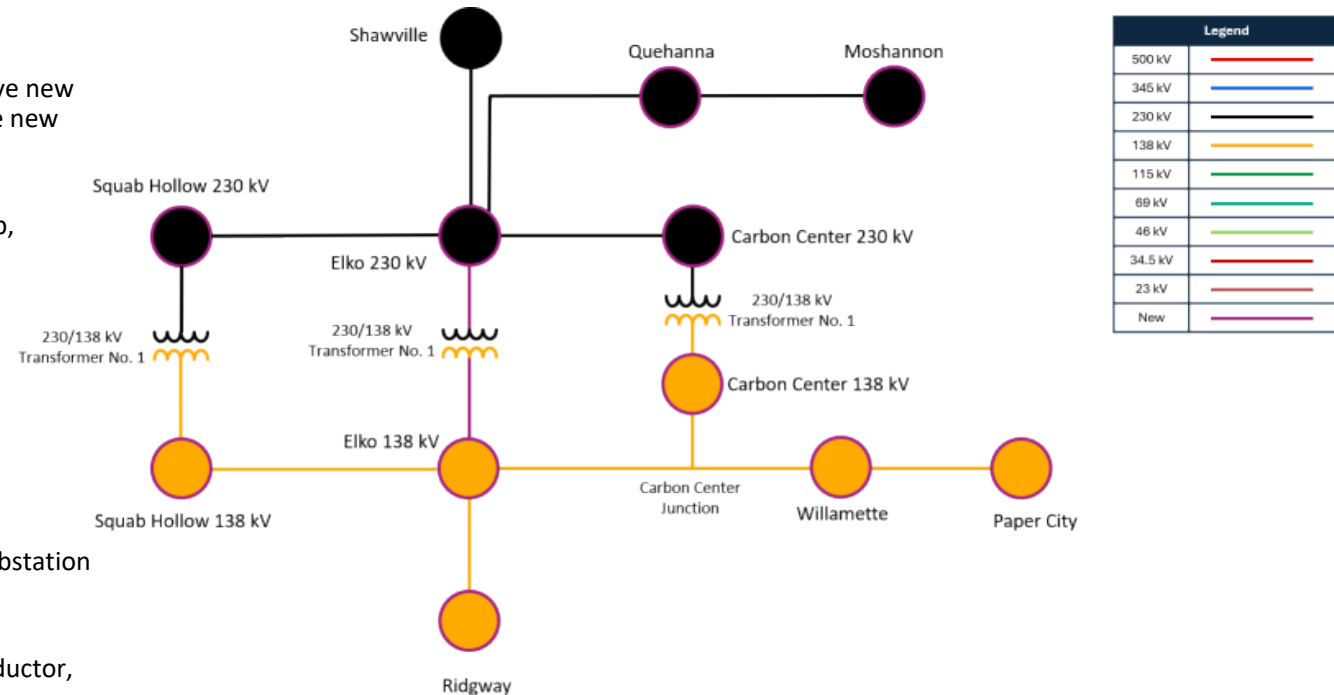
At Willamette Substation: Replace 138 kV disconnect switches and substation conductor.

Elko - Carbon Center 230 kV Line Ratings:

Before Proposed Solution: 442 / 442 / 442 / 442 MVA (SN/SE/WN/WE)

After Proposed Solution: 610 / 754 / 699 / 894 MVA (SN/SE/WN/WE)

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Need Number: APS-2024-037, PN-2024-015
Process Stage: Solution Meeting TEAC – 10/06/2026

Proposed Solution:

Elko - Squab Hollow 230 kV Line Ratings:

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

After Proposed Solution: 546 / 666 / 619 / 790 MVA (SN/SE/WN/WE)

Elko - Quehanna 230 kV Line Ratings:

Before Proposed Solution: 548 / 688 / 699 / 804 MVA (SN/SE/WN/WE)

After Proposed Solution: 617 / 754 / 699 / 894 MVA (SN/SE/WN/WE)

Quehanna - Moshannon 230 kV Line Ratings:

Before Proposed Solution: 548 / 688 / 699 / 804 MVA (SN/SE/WN/WE)

After Proposed Solution: 617 / 754 / 699 / 894 MVA (SN/SE/WN/WE)

Elko - Shawville 230 kV Line Ratings:

Before Proposed Solution: 442 / 582 / 619 / 725 MVA (SN/SE/WN/WE)

After Proposed Solution: 546 / 666 / 619 / 790 MVA (SN/SE/WN/WE)

Carbon Center - Carbon Center Junction 138 kV Line Ratings:

Before Proposed Solution: 292 / 299 / 299 / 299 MVA (SN/SE/WN/WE)

After Proposed Solution: 297 / 365 / 345 / 441 MVA (SN/SE/WN/WE)

Willamette - Paper City 138 kV Line Ratings:

Before Proposed Solution: 229 / 229 / 229 / 229 MVA (SN/SE/WN/WE)

After Proposed Solution: 285 / 351 / 333 / 427 MVA (SN/SE/WN/WE)

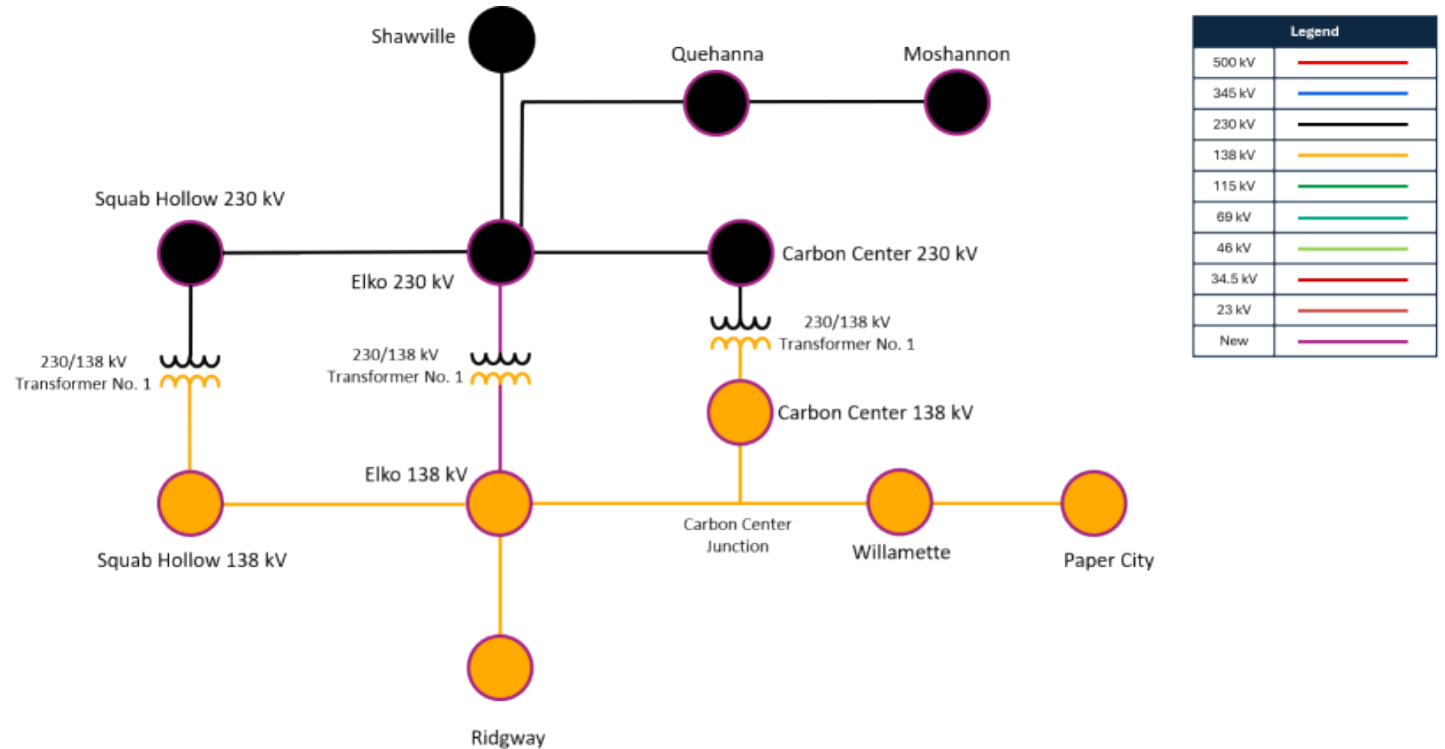
Elko - Squab Hollow 138 kV Line Ratings:

Before Proposed Solution: 294 / 350 / 349 / 401 MVA (SN/SE/WN/WE)

After Proposed Solution: 308 / 376 / 349 / 445 MVA (SN/SE/WN/WE)

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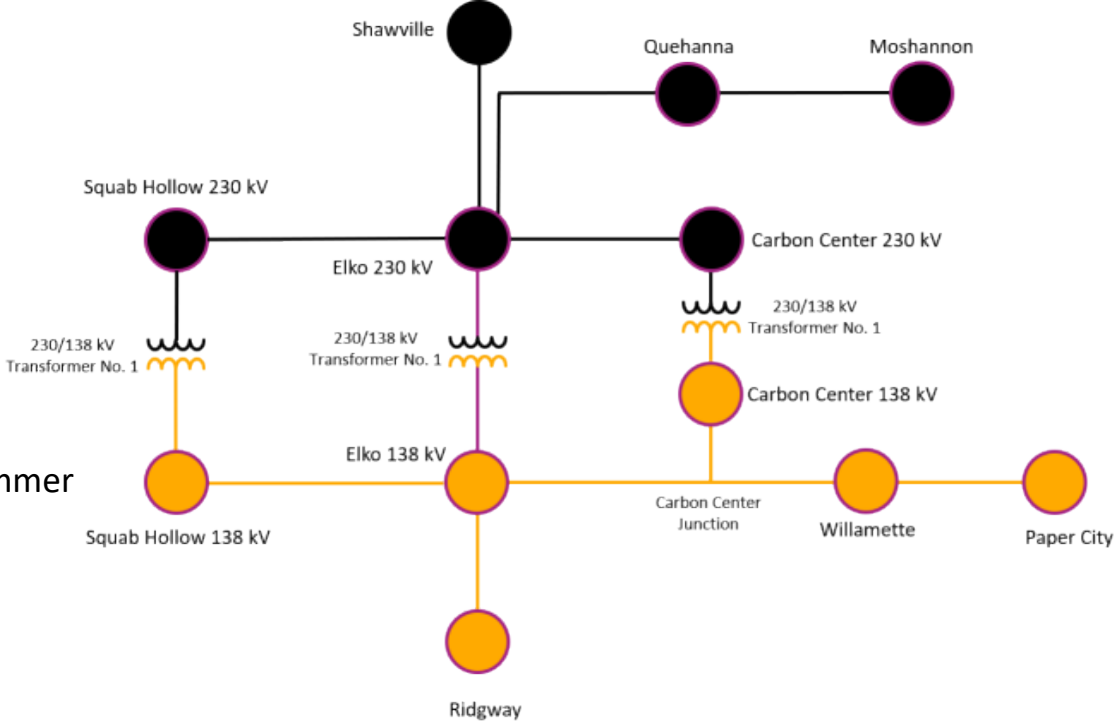
TEAC - FirstEnergy Supplemental - APS – 10/06/2026



Need Number: APS-2024-037, PN-2024-015
Process Stage: Solution Meeting TEAC – 10/06/2026

Alternatives Considered:
 Convert the substation to double breaker double bus.

Transmission Cost Estimate: \$44.66 M
Projected In-Service: 12/13/2030
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	—
48 kV	—
34.5 kV	—
23 kV	—
New	—

Need Number: APS-2024-091

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

Previously Presented: Need Meeting – 11/06/2024

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 transmission line structures

Problem Statement:

The Lime Kiln – Montgomery 230 kV Line was constructed approximately 45 years ago and is approaching end of life. It is approximately 13 miles long with 98 wooden H-frame structures.

Per recent inspections, the line is exhibiting deterioration.

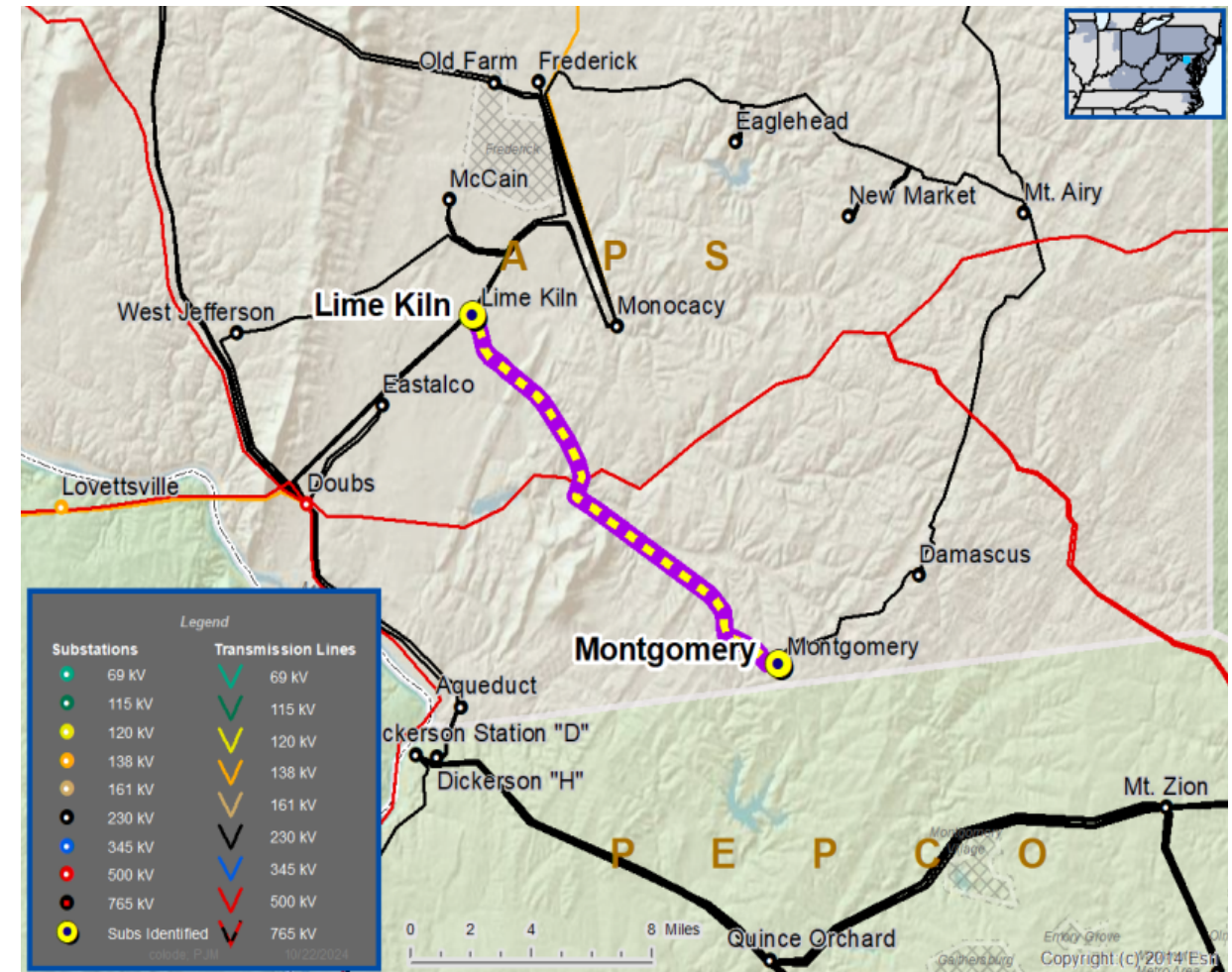
- Inspection findings include 54 structures failed inspection due to woodpecker damage and rot.

The line is currently limited by terminal equipment.

Since 2022, there have been two unscheduled, sustained outages on the line.

Existing Transmission Line Ratings:

- 548 / 688 / 699 / 804 MVA (SN/SE/WN/WE)



Need Number: APS-2024-091
Process Stage: Solution Meeting TEAC – 10/06/2026

Proposed Solution:
 Rebuild approximately 12.3 miles of the Lime Kiln - Montgomery 230 kV Line with double circuit steel pole structures and install OPGW.

At Lime Kiln and Montgomery substations: remove wave trap, upgrade circuit breakers, disconnect switches, substation conductor, metering, and relaying.

Lime Kiln - Montgomery 230 kV Line Ratings:
 Before Proposed Solution: 548 / 688 / 699 / 804 MVA (SN/SE/WN/WE)
 After Proposed Solution: 1156 / 1335 / 1159 / 1404 MVA (SN/SE/WN/WE)

Alternatives Considered:
 Continue to maintain with increased risk of unplanned outages and expected increase of maintenance cost due to structures and equipment age.

Transmission Cost Estimate: \$73.5 M
Projected In-Service: 12/13/2030
Project Status: Conceptual
Model: 2025 RTEP model for 2030 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: APS-2026-044

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

Previously Presented: Need Meeting – 09/08/2026

Project Driver: Customer Service

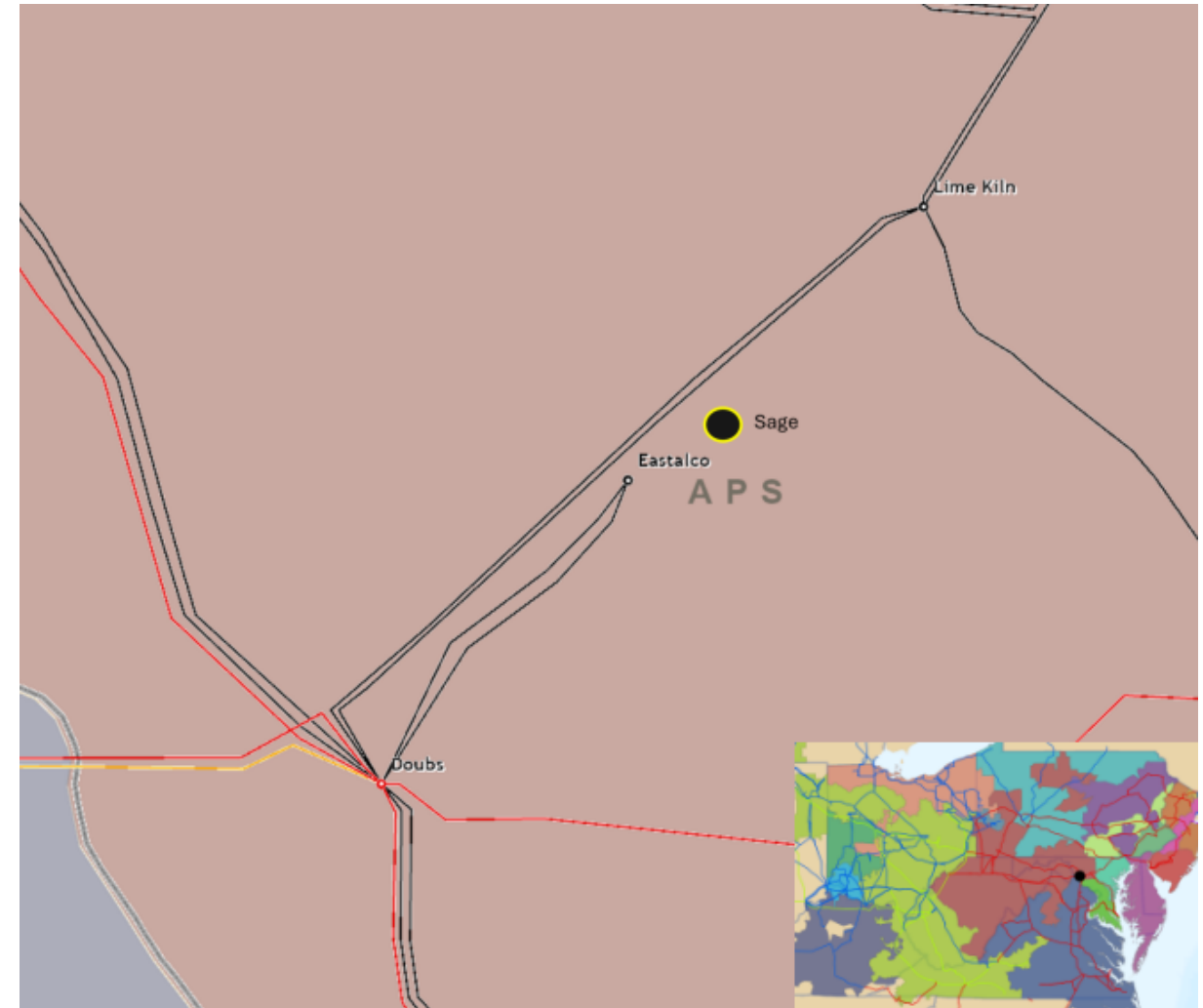
Specific Assumption References:

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 230 kV service for load of approximately 165 MW near the Sage Substation. The request is approximately a single span from Sage 230 kV Substation.

Requested in-service date is September 14, 2031.



Need Number: APS-2026-044

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

Proposed Solution:

Sage Substation:

Install two 230 kV breakers, extend 230 kV line to wholesale Customer station. Wholesale Customer to install a fifth 230-34.5 kV transformer.

Alternatives Considered:

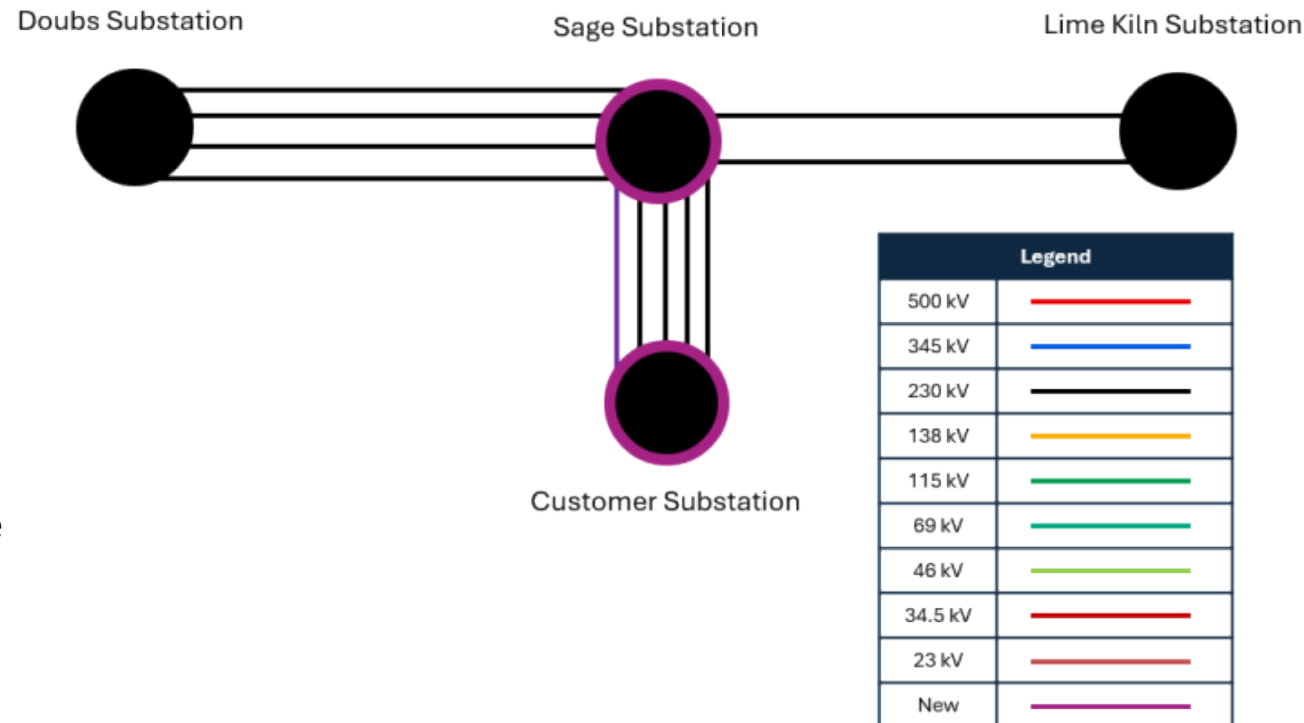
No reasonable alternatives due to the customer's proximity to the Sage Substation.

Transmission Cost Estimate: \$5 M

Projected In-Service: 09/14/2031

Project Status: Conceptual

Model: PJM 2024 Series RTEP 2029
Summer



Cancellations

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: APS-2024-081

Process Stage: Cancellation meeting -10/06/2026

Previously Presented: Need Meeting 12/03/2024

Reason for cancellation: Duplication of work for b2743.6, b2743.6.1, b2970.1, b2970.2

Project Driver:

Equipment Material Condition, Performance and Risk

Specific Assumption Reference:

System Performance Projects Global Factors

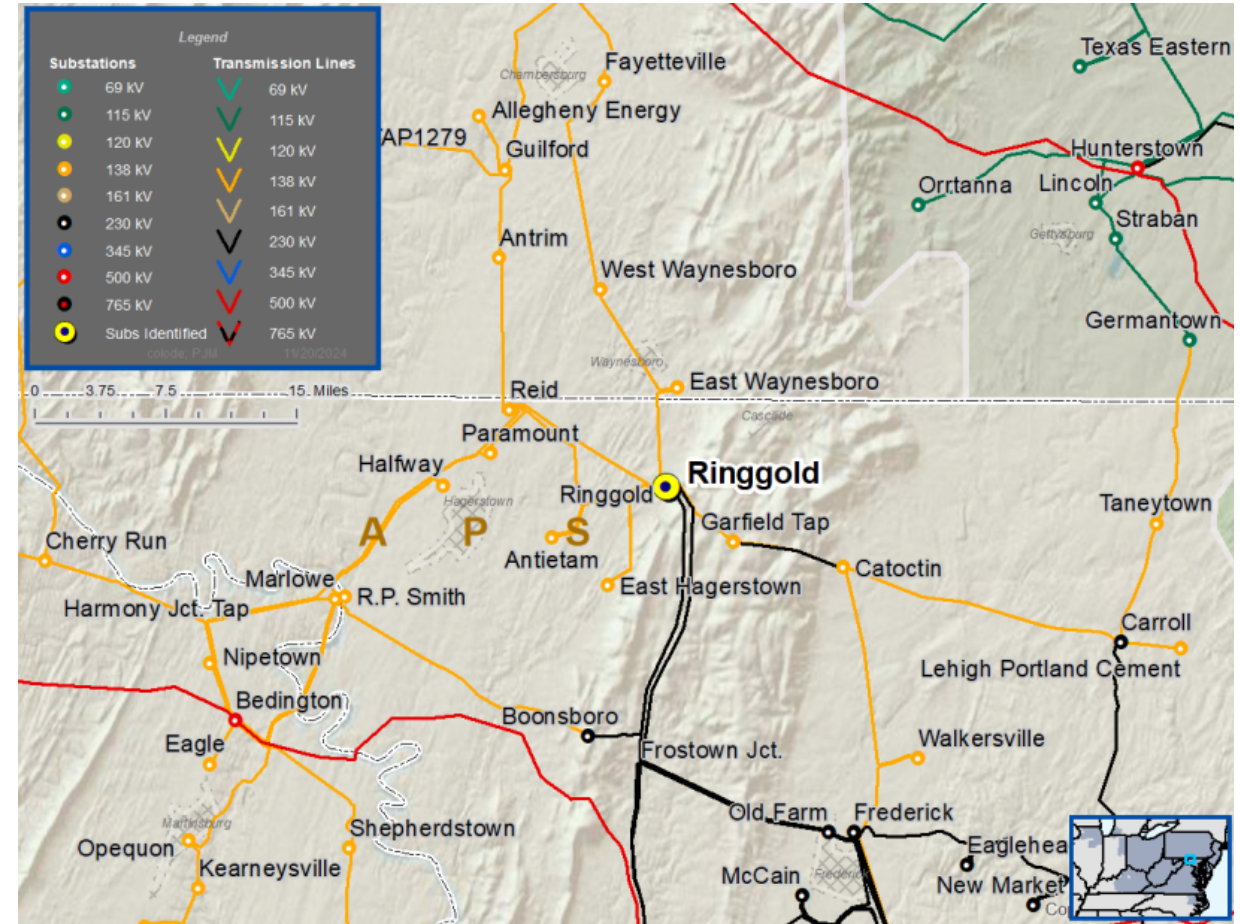
- System reliability and performance
- Substation/line equipment limits

Add/Replace Transformers

Past System Reliability/Performance

Problem Statement:

- The Ringgold No. 4 230/138 kV Transformer is approximately 45 years old and is approaching end of life.
- The transformer has experienced an increase in the level of methane and ethane.
- The transformer is limited by terminal equipment.
- Existing transformer ratings:
 - 164 / 206 MVA (SN/SSTE)
 - 216 / 248 MVA (WN/WSTE)



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