Transmission Expansion Advisory Committee
FirstEnergy Supplemental Projects

JCPL 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

JCPL Transmission Zone M-3 Process
Glen Gardner No. 1 230-34.5 kV Transformer

Need Number: JCPL-2024-022

Process Stage: Solution Meeting – TEAC – 12/08/2025

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

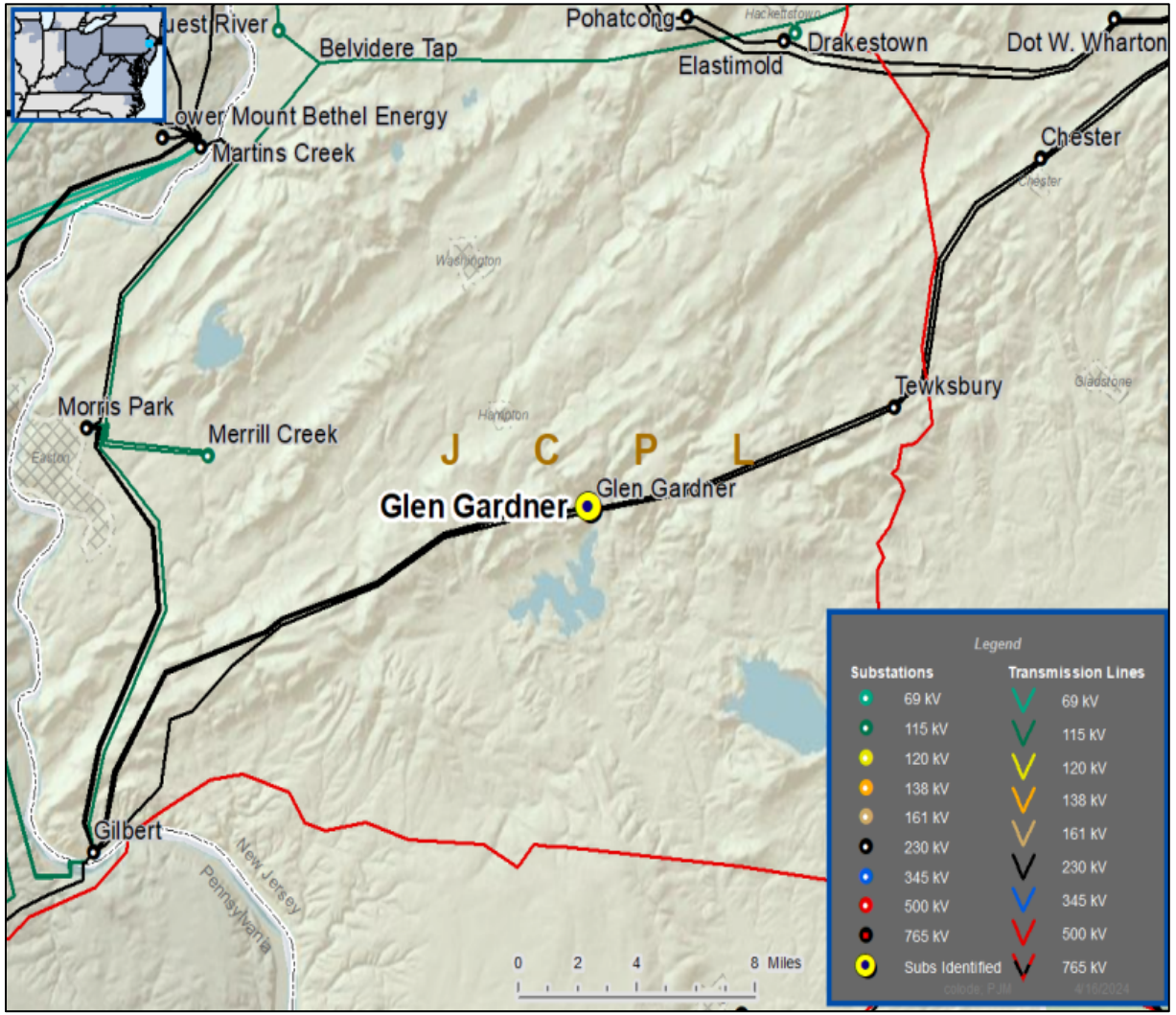
Project Driver:
Equipment Condition, Performance and Risk

Specific Assumption Reference:

- System Performance Projects Global Factors
  - System reliability and performance
  - Substation/line equipment limit
- Add/Replace Transformers
- Past System Reliability/Performance

Problem Statement:

- The Glen Gardner No. 1 230-34.5 kV Transformer is approximately 51 years old and is approaching end of life.
- The transformer is experiencing issues with cooling capacity, heat exchangers, inoperable fans, bushing failures and oil drain valve failure.
- The transformer is limited by terminal equipment.
- Existing Transformer Ratings:
  - 111 / 140 MVA (SN/SSTE)
  - 141 / 155 MVA (WN/WSTE)



JCPL Transmission Zone M-3 Process
Glen Gardner No. 1 230-34.5 kV Transformer

Need Number: JCPL-2024-022
Process Stage: Solution Meeting – TEAC – 12/08/2025

Proposed Solution:

- Replace the Glen Gardner No. 1 230-34.5 kV Transformer with a 168 MVA unit
- Replace one 230 kV circuit switcher with one 230 kV full-load break MOAB switch with SCADA control
- Replace one 34.5 kV circuit breaker
- Replace the limiting terminal equipment and relays

Rating:

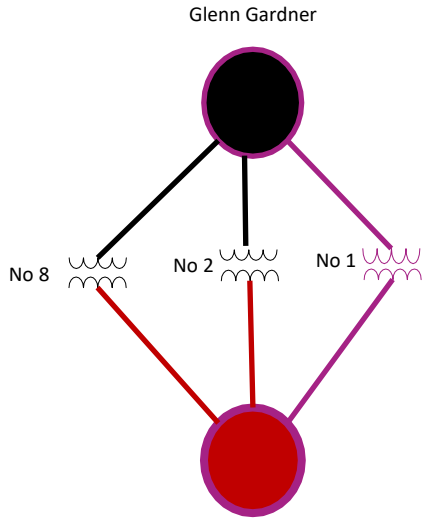
Glen Gardner No. 1 230-34.5 kV Transformer

- Before Proposed Solution: 93 / 116 / 118 / 129 MVA (SN/STE/WN/WTE)
- After Proposed Solution: 168 / 176 / 202 / 218 MVA (SN/STE/WN/WTE)

Alternatives Considered:

Maintain transformer in existing condition with elevated risk of failure.

Estimated Project Cost:	$ 7.35M
Projected In-Service:	11/17/2028
Project Status:	Conceptual
Model:	2024 RTEP - 2029 Summer 50/50



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

JCPL Transmission Zone M-3 Process
Glen Gardner No. 8 230-34.5 kV Transformer

Need Number: JCPL-2024-031

Process Stage: Solution Meeting – TEAC – 12/08/2025

Previously Presented: Need Meeting – TEAC – 06/04/2024

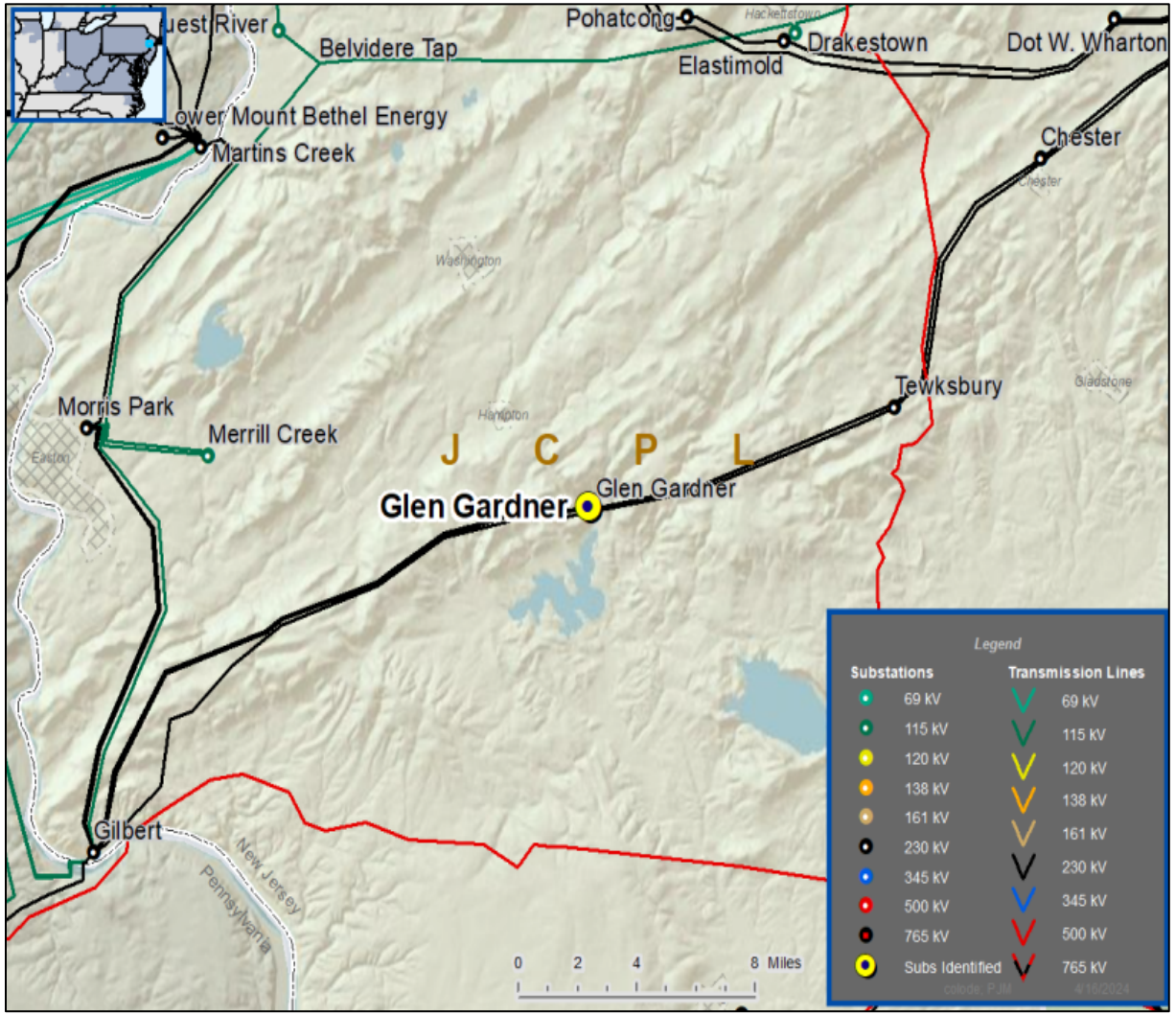
Project Driver:
Equipment Condition, Performance and Risk

Specific Assumption Reference:

- System Performance Projects Global Factors
  - System reliability and performance
- Add/Replace Transformers
- Past System Reliability/Performance

Problem Statement:

- The Glen Gardner No. 8 230-34.5 kV Transformer is approximately 54 years old and is approaching end of life.
- Most recent DGA results show elevated ethane gas levels above IEEE limits and dielectric strength is low.
- The transformer has experienced issues with cooling components due to pump and fan failures.
- Existing Transformer Ratings:
  - 108 / 136 MVA (SN/SSTE)
  - 137 / 152 MVA (WN/WSTE)



JCPL Transmission Zone M-3 Process
Glen Gardner No. 8 230-34.5 kV Transformer

Need Number: JCPL-2024-031
Process Stage: Solution Meeting – TEAC – 12/08/2025

Proposed Solution:

- Replace the Glen Gardner No. 1 230-34.5 kV Transformer with a 168 MVA unit
- Replace 230 kV MOAB switch with one full load break MOAB switch with SCADA control
- Replace the limiting terminal equipment and relays

Rating:

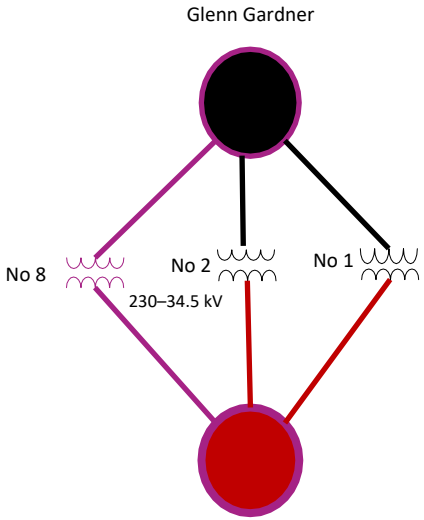
Glen Gardner No. 8 230-34.5 kV Transformer

- Before Proposed Solution: 108 / 136 / 137 / 152 MVA (SN/STE/WN/WTE)
- After Proposed Solution: 168 / 176 / 202 / 218 MVA (SN/STE/WN/WTE)

Alternatives Considered:

Maintain transformer in existing condition with elevated risk of failure.

Estimated Project Cost:	$ 7.35M
Projected In-Service:	06/07/2028
Project Status:	Conceptual
Model:	2024 RTEP - 2029 Summer 50/50



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

JCPL Transmission Zone M-3 Process
Englishtown No. 6 230-34.5 kV Transformer

Need Number: JCPL-2025-005
Process Stage: Solution Meeting – TEAC – 12/08/2025
Previously Presented: Need Meeting – TEAC – 11/04/2025

Project Driver:

Operational Flexibility and Efficiency

Specific Assumption Reference:

System Performance Global Factors

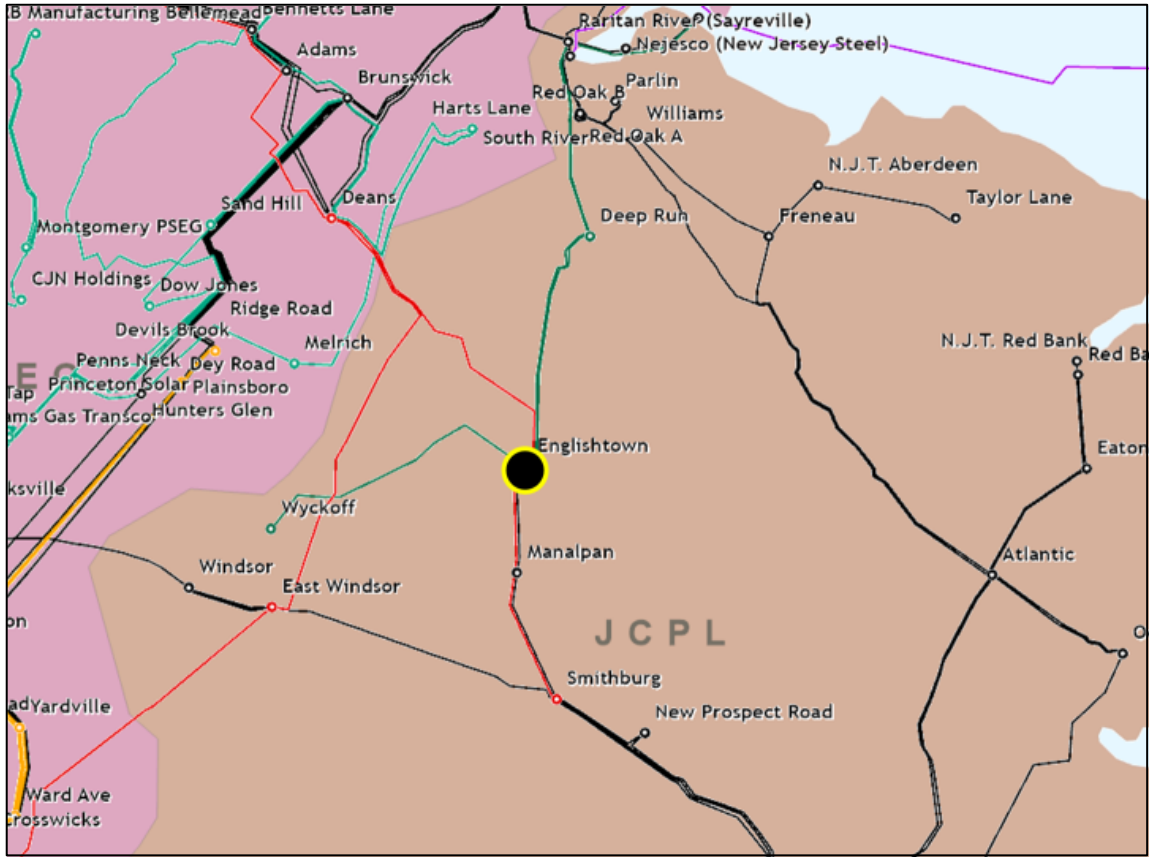
- System reliability and performance
- Substation/line equipment limits

Problem Statement:

FirstEnergy has identified operational constraints when a single breaker is out of service for maintenance at Englishtown on the Englishtown No. 6 230-34.5 kV Transformer.

The Englishtown No. 6 230-34.5 kV Transformer is limited by terminal equipment:

- Normal Ratings: 144 / 151 / 144 / 187 MVA (SN/SE/WN/WE)
- Single Breaker Outage #1: 72 / 94 / 72 / 94 MVA (SN/SE/WN/WE)
- Single Breaker Outage #2: 125 / 150 / 156 / 176 MVA (SN/SE/WN/WE)



JCPL Transmission Zone M-3 Process
Englishtown No. 6 230-34.5 kV Transformer

Need Number: JCPL-2025-005
Process Stage: Solution Meeting – TEAC – 12/08/2025

Proposed Solution:

- Replace limiting substation equipment of transformer leads to exceed the Englishtown No. 6 Transformer ratings.

Rating:

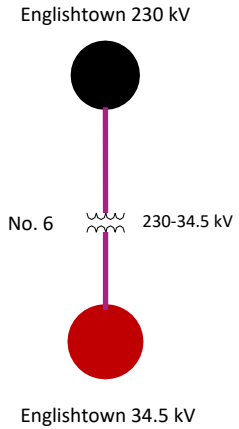
Englishtown No. 6 230-34.5 kV Transformer

- Before Proposed Solution:
  - Single Breaker Outage #1: 72 / 94 / 72 / 94 MVA (SN/SSTE/WN/WSTE)
  - Single Breaker Outage #2: 125 / 150 / 156 / 176 MVA (SN/SSTE/WN/WSTE)
- After Proposed Solution: 151 / 151 / 194 / 194 MVA (SN/SSTE/WN/WSTE)

Alternatives Considered:

Maintain existing operational constraints when a single breaker is out of service for maintenance.

Estimated Project Cost:	$ 2.06M
Projected In-Service:	12/17/2026
Project Status:	Conceptual
Model:	2024 RTEP - 2029 Summer 50/50



Legend	
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115 kV	
69 kV	
46 kV	
34.5 kV	
23 kV	
13.2 kV	
New	

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

11/26/2025 – V1 – Original version posted to pjm.com
12/02/2025 – V2 – Corrected Need Date on Slide 7