First Energy (MetEd)
Local Plan Submission for the 2022 RTEP

Met-Ed Transmission Zone M-3 Process

Need Number: ME-2019-049

Process Stage: Submission of Supplemental Project for Inclusion in the Local Plan 8/12/2022

Previously Presented:
Need Meeting 7/31/2019
Solution Meeting 1/20/2022

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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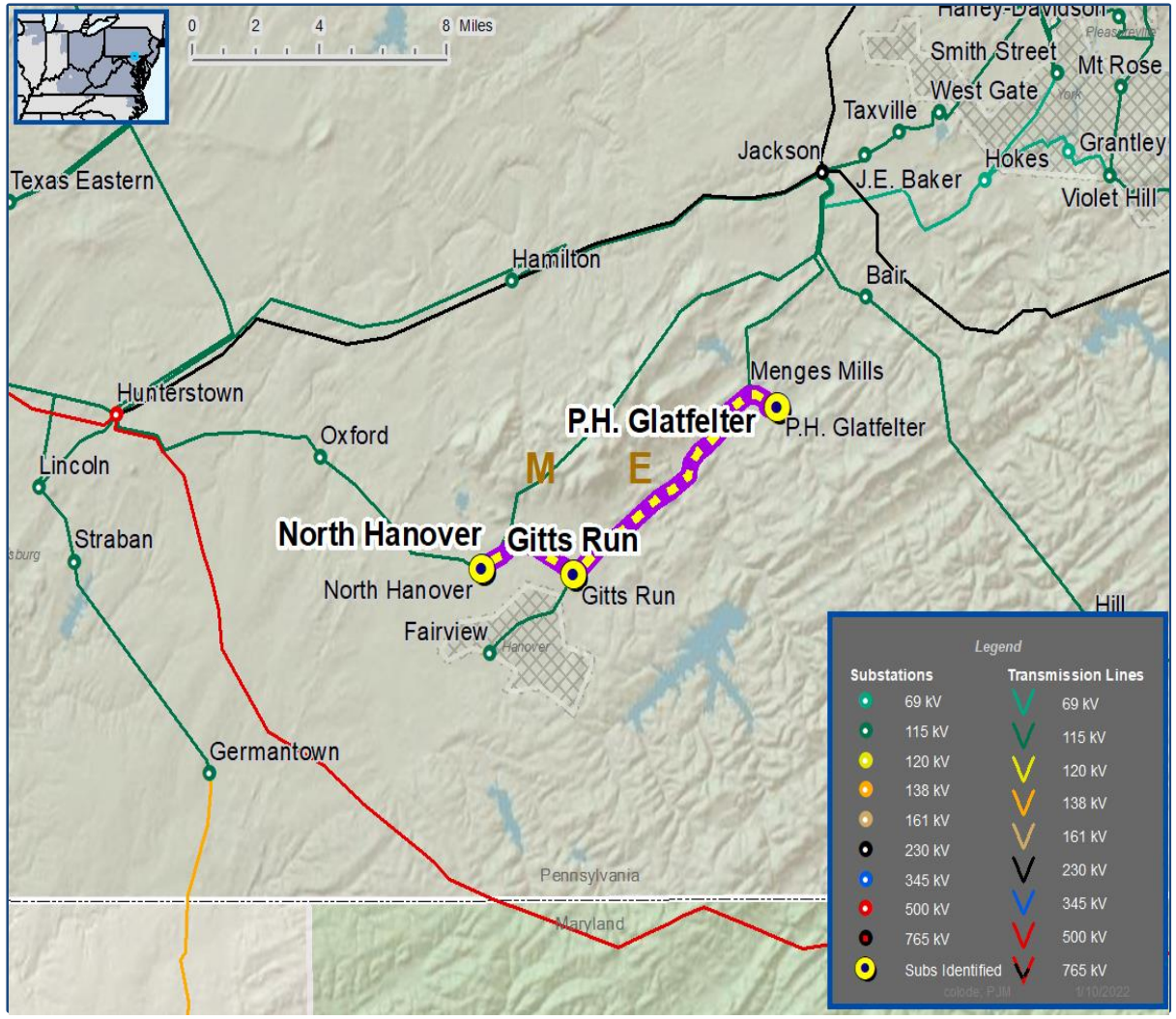


Problem Statement:

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cases the protection equipment cannot be repaired due to a lack of replacement part and available expertise in the outdated technology.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

ME-2019-	Transmission Line / Substation Locations	Existing Line Rating (SN / SE)	Existing Conductor Rating (SN / SE)	Limiting Terminal Equipment
049	North Hanover – Gitts Run 115 kV Line Gitts Run – PH Glatfelter 115 kV Line	232/282 221/263	232/282 232/282	- Substation Conductor

Met-Ed Transmission Zone M-3 Process
Misoperation Relay Projects

Selected Solution:

ME-2019-	Transmission Line / Substation Locations	New MVA Line Rating (SN / SE)	Scope of Work	Estimate Costs ($ M)	Target ISD
049	North Hanover – Gitts Run 115 kV Line Gitts Run – PH Glatfelter 115 kV Line	232/282 232/282	• North Hanover 115 kV Substation – Replace line relaying, disconnect switches, substation conductor, line trap, and circuit breaker • PH Glatfelter 115 kV Substation – Replace line relaying, disconnect switches, substation conductor, line trap, and circuit breaker	$2.7M	12/21/2022

Supplemental Project ID: s2708.1, s2708.2

Need Number: ME-2021-004

Process Stage: Submission of Supplemental Project for Inclusion in the Local Plan 8/12/2022

Previously Presented:
Need Meeting 10/14/2021
Solution Meeting 1/20/2022

Project Driver:

Customer Service

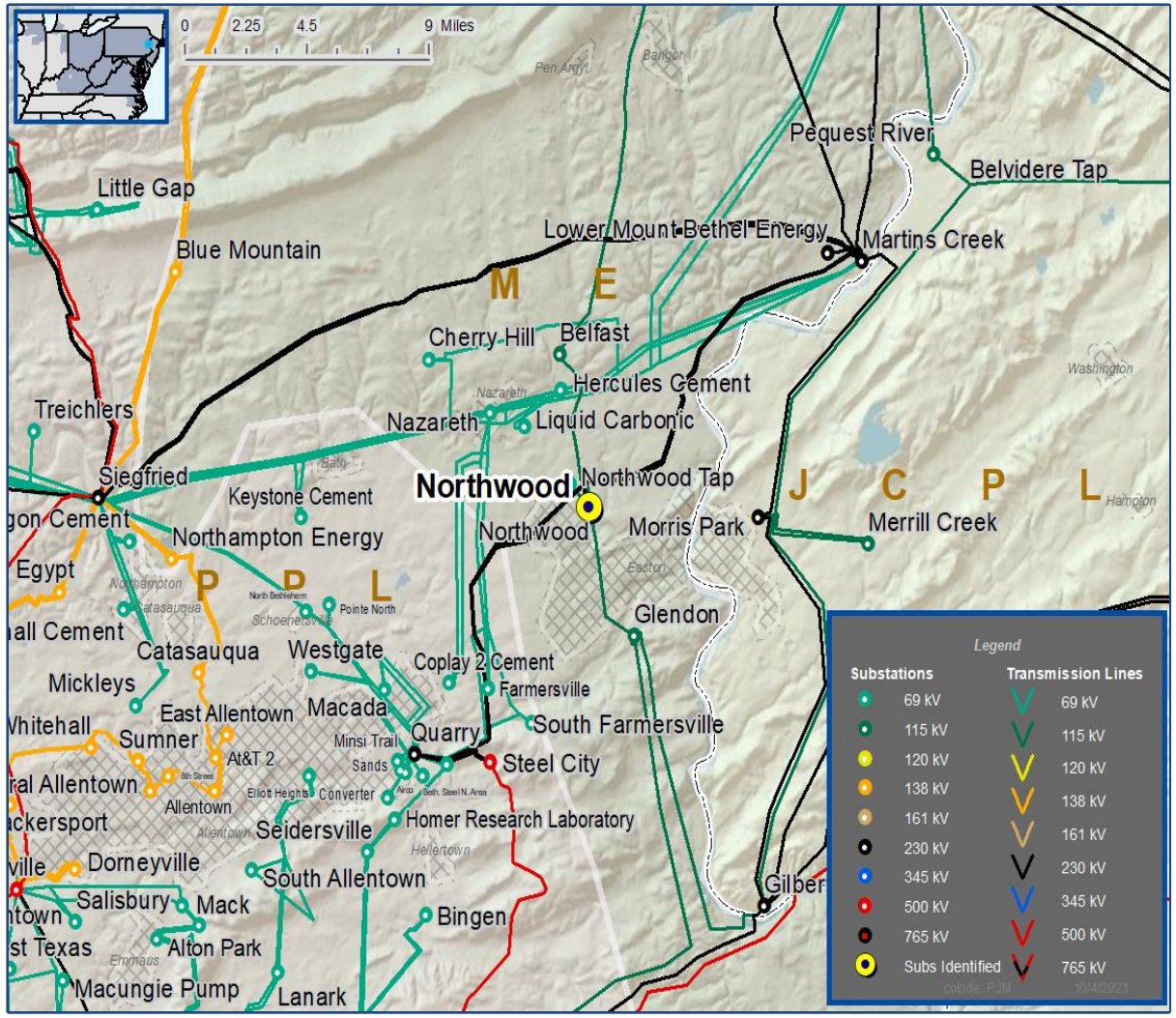
Specific Assumption Reference:

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 115 kV service; anticipated load is 30 MVA; location is near the Northwood 230 & 115 kV substation

Requested in-service date is 5/31/2022



Met-Ed Transmission Zone M-3 Process
New Customer Substation

Need Number: ME-2021-004

Selected Solution:

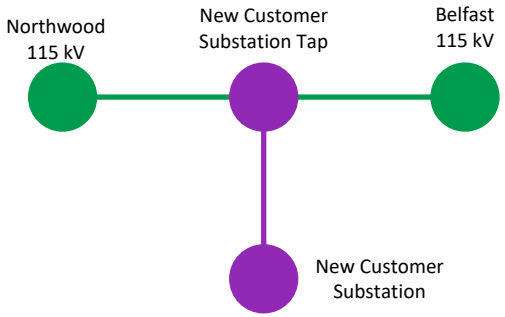
- Tap the Northwood - Belfast 115 kV line
- Install 115 kV switches
- Construct ~1 span of 115 kV to customer substation

Estimated Project Cost: $2.2M

Projected In-Service: 9/30/2022

Supplemental Project ID: s2709

Model: 2022 RTEP model for 2026 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: ME-2021-001

Process Stage: Submission of Supplemental Project for Inclusion in the Local Plan 10/11/2022

Previously Presented:

Solution Meeting 10/14/2021

Need Meeting 5/20/2021

Project Driver:

Customer Service

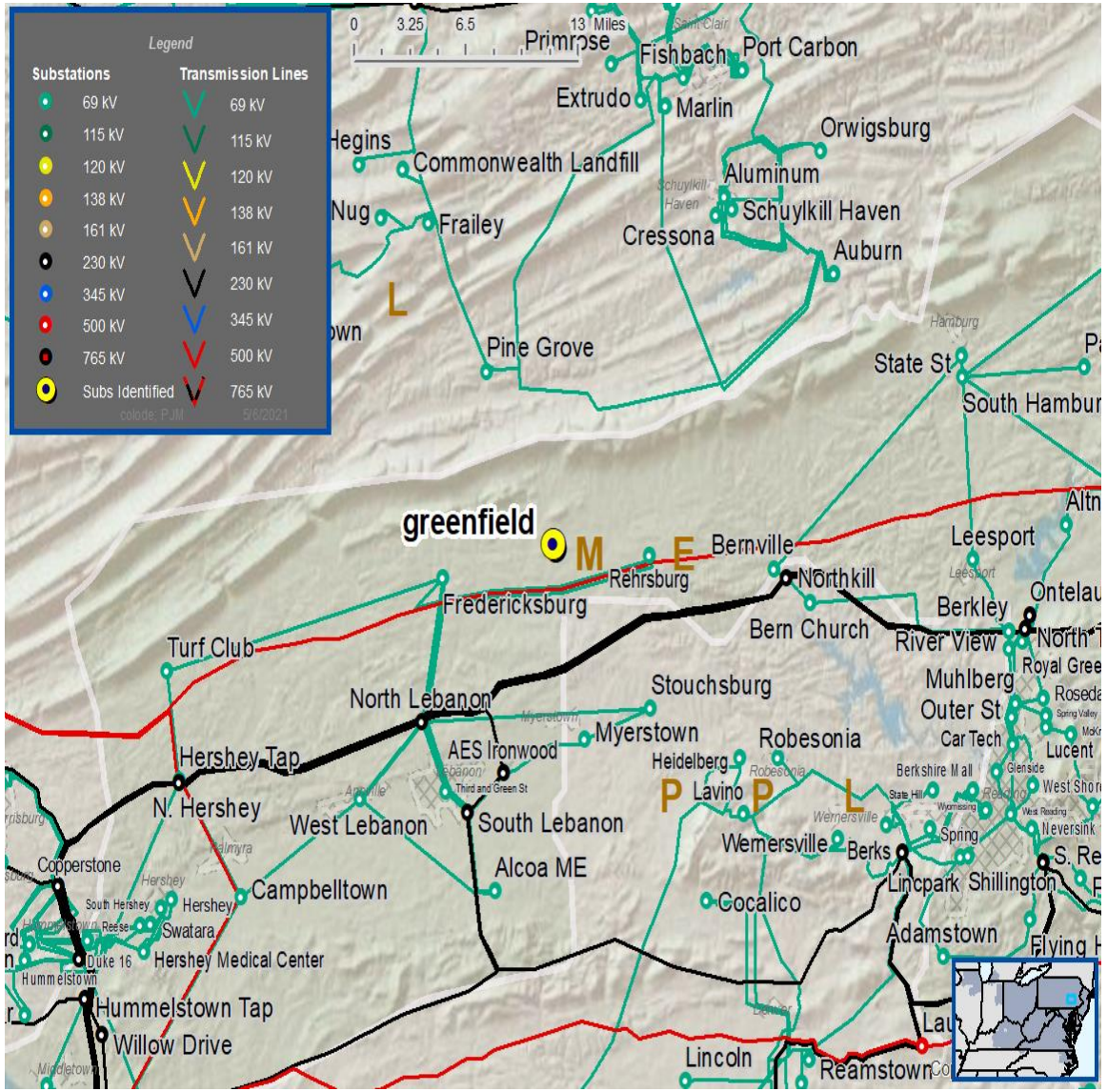
Specific Assumption Reference:

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 69 kV service; anticipated load is 12 MVA; location is near the Frystown 69 kV substation

Requested in-service date is 11/1/2021



Met-Ed Transmission Zone M-3 Process
New Customer Substation

Need Number: ME-2021-001

Process Stage: Submission of Supplemental Project for Inclusion in the Local Plan 10/11/2022

Selected Solution:

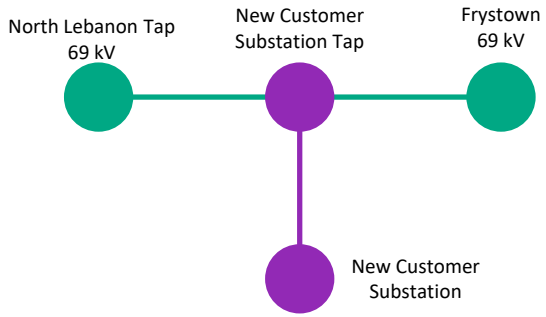
- Tap the North Lebanon Tap - Frystown 69 kV line
- Install 69 kV switches
- Construct ~2 span of 69 kV to customer substation

Estimated Project Cost: $0.8M

Projected In-Service: 11/01/2021

Supplemental ID: s2672

Model: 2020 RTEP model for 2025 Summer (50/50)



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

Met-Ed Transmission Zone M-3 Process
Gitts Run 115 kV Substation

Need Number: ME-2019-031

Process Stage: Submission of Supplemental Project for Inclusion in the Local Plan 10/13/2022

Previously Presented:

Solutions Meeting 7/21/2022

Needs Meeting 5/31/2019

Project Driver:

Operational Flexibility and Efficiency

Specific Assumption Reference:

System Performance Projects

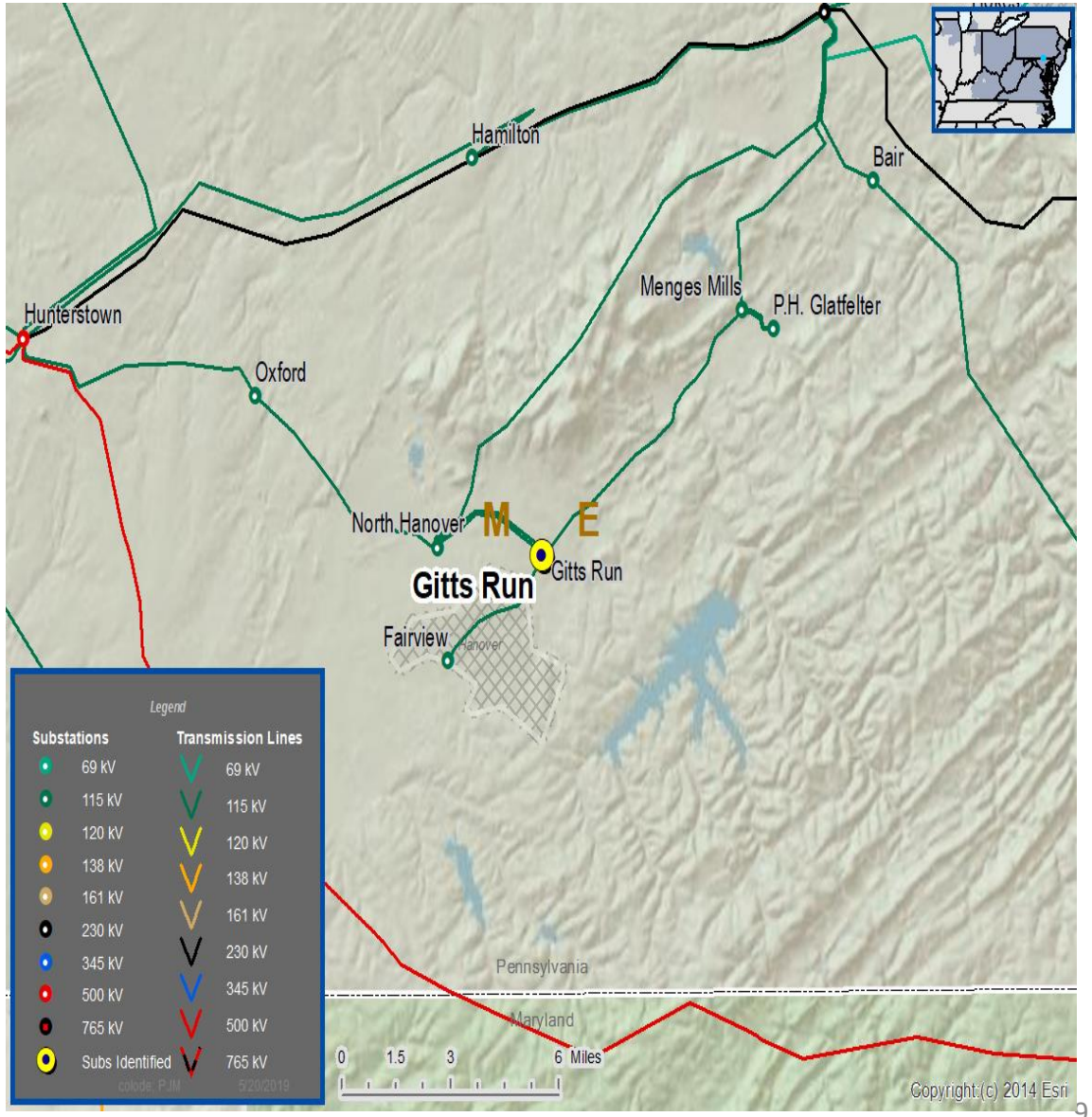
- Load at risk in planning and operational scenarios
- Add/Expand Bus Configuration
- Reduce the amount of exposed potential local load loss during contingency conditions
- Eliminate simultaneous outages to multiple networked elements

Problem Statement:

The loss of Gitts Run substation results in loss of approximately 40 MW of load and approximately 2900 customers.

Substation consists of:

- Four 115 kV transmission lines
- Two distribution transformers connected to transmission with switches
- One normally open bus tie switch



Met-Ed Transmission Zone M-3 Process
Gitts Run 115 kV Substation

Need Number: ME-2019-031

Process Stage: Submission of Supplemental Project for Inclusion in the Local Plan 10/13/2022

Selected Solution:

Gitts Run 115 kV Substation

- Construct six breaker ring bus

North Hanover 115 kV Substation

- Remove line trap

Transmission Line Rating:

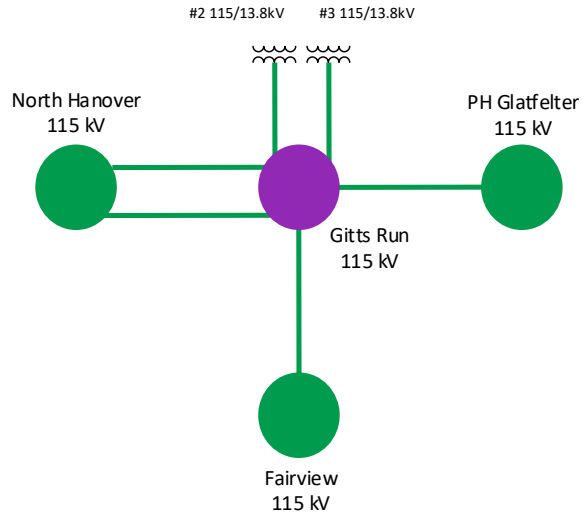
- Gitts Run – North Hanover 115 kV 996 Line
  - Before Proposed Solution: 221/263 MVA (SN/SE)
  - After Proposed Solution: 221/263 MVA (SN/SE)
- Gitts Run – North Hanover 115 kV 995 Line
  - Before Proposed Solution: 221/262 MVA (SN/SE)
  - After Proposed Solution: 221/263 MVA (SN/SE)
- Gitts Run – PH Glatfelter 115 kV Line
  - Before Proposed Solution: 221/262 MVA (SN/SE)
  - After Proposed Solution: 221/262 MVA (SN/SE)
- Gitts Run – Fairview 115 kV Line
  - Before Proposed Solution: 232/282 MVA (SN/SE)
  - After Proposed Solution: 232/282 MVA (SN/SE)

Estimated Project Cost: $14.4 M

Projected In-Service: 12/22/2023

Supplemental Project ID: s2763

Model: 2021 RTEP For 2026 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: ME-2021-002

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan 10/13/2022

Previously Presented: Solution Meeting 2/8/2022

Need Meeting 10/05/2021

Project Driver:

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

Specific Assumption Reference:

System Condition Projects

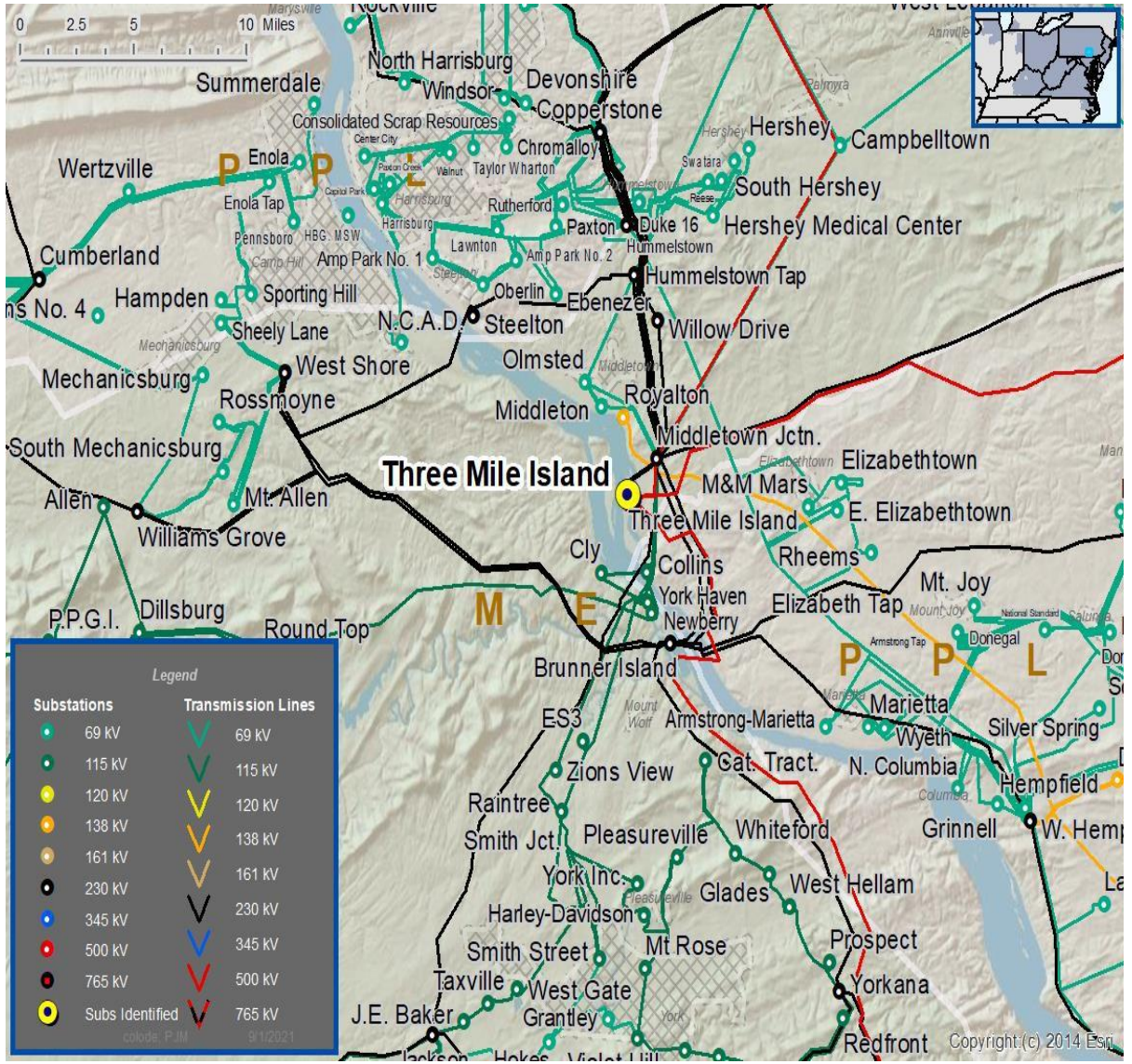
- Substation Condition Rebuild/Replacement

Problem Statement:

TMI 500 500/230 kV Transformer

- Transformer has increased failure probability due to:
  - Transformer is 50 years old.
  - High level gases
  - Obsolete parts
  - Oil leaks

Transformer circuit rating is the existing transformer rating of 840/1070 MVA (SN/SE).



Met-Ed Transmission Zone M-3 Process
TMI #1 500/230 kV Transformer Replacement

Need Number: ME-2021-002

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan 10/13/2022

Selected Solution:

Replace TMI #1 500/230 kV Transformer

- Replace the #1 500/230 kV transformer and associated equipment with a 450/600/750 MVA transformer
- Install a 230 kV circuit breaker

Transformer Rating:

TMI #1 500/230 kV Transformer

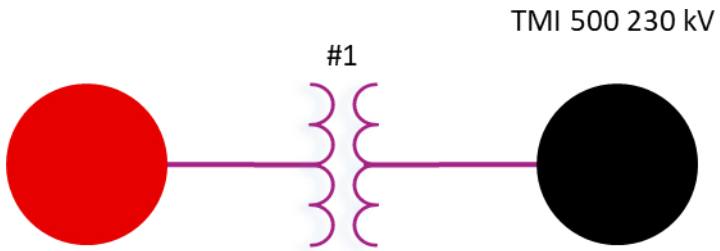
- Before Proposed Solution: 840/1070/1049/1219 MVA (SN/SE/WN/WE)
- After Proposed Solution (anticipated): 972/1100/1182/1364 MVA (SN/SE/WN/WE)

Estimated Cost: $25.2M

Projected In-Service: 11/1/2022

Supplemental Project ID: s2711

Model: 2021 Series 2026 Summer RTEP 50/50



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

Met-Ed Transmission Zone M-3 Process

Need Number: ME-2021-003

Process Stage: Submission of Supplemental Project for Inclusion in the Local Plan 10/13/2022

Previously Presented:

Solution Meeting 9/14/2021

Need Meeting 6/15/2021

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

System Condition Projects

- Substation Condition Rebuild/Replacement

Upgrade Relay Schemes

- Relay schemes that have a history of misoperation
- Obsolete and difficult to repair communication equipment (DTT, Blocking, etc.)
- Communication technology upgrades

Problem Statement:

A communication service carrier has notified FirstEnergy of the anticipated retirement of an analog communications channel in the Met-Ed service territory. The existing Potential Overreaching Transfer Trip (POTT) scheme on the West Reading - Car Tech 69 kV line will be impacted by this planned retirement.

The existing relaying and terminal hardware on the Cartech – West Reading 69 kV line does not maintain compatibility with available communications protocols and FirstEnergy standards.

The relaying type is identified by FirstEnergy as being prone to frequent misoperations.

The anticipated analog circuit retirement is anticipated 6/8/2021 .

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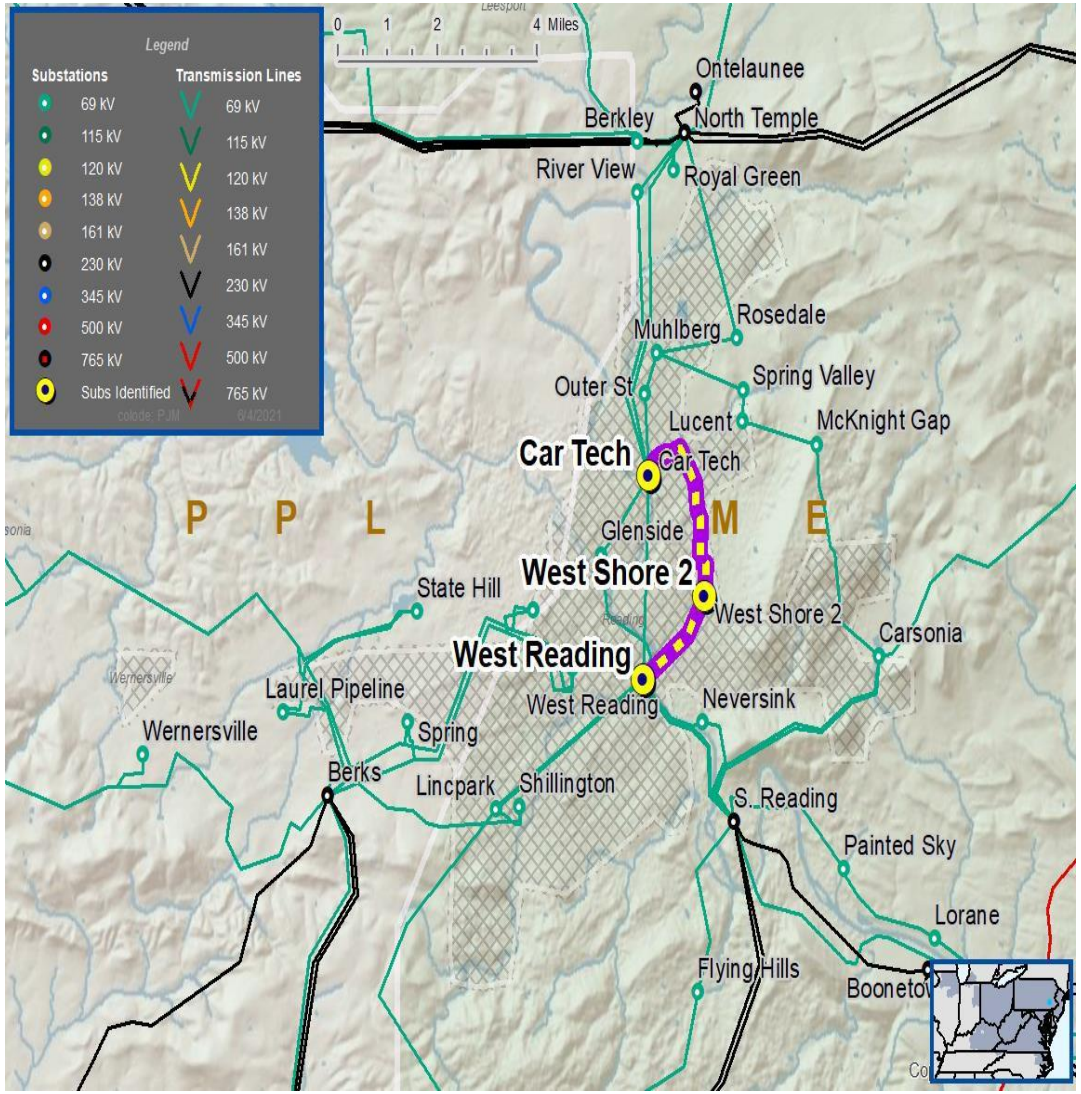

Met-Ed Transmission Zone M-3 Process

Need Number	Transmission Line / Substation Locations	Existing Line Rating (SN / SE)	Existing Conductor Rating (SN / SE)	Limiting Terminal Equipment
ME-2021-003	Carpenter Technology - West Shore Tap 25 69 kV Line West Shore Tap - West Reading 25 69 kV Line	100 / 100 139 / 169	139 / 169 139 / 169	Line Relaying, Substation Conductor N/A

Met-Ed Transmission Zone M-3 Process

Need Number	Transmission Line / Substation Locations	Supplemental Project ID	New MVA Line Rating (SN / SE)	Scope of Work	Estimated Cost ($ M)	Target ISD
ME-2021-003	Carpenter Technology - West Shore Tap 25 69 kV Line West Shore Tap - West Reading 25 69 kV Line	s2645	132/ 158 139 / 169	• At Carpenter Technology – Replace circuit breaker, and line relaying. • At West Reading – Replace circuit breaker, and line relaying.	$2.1	6/9/2021

Need Number: ME-2022-001

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan 10/13/2022

Previously Presented: Solution Meeting 3/17/2022

Need Meeting 2/17/2022

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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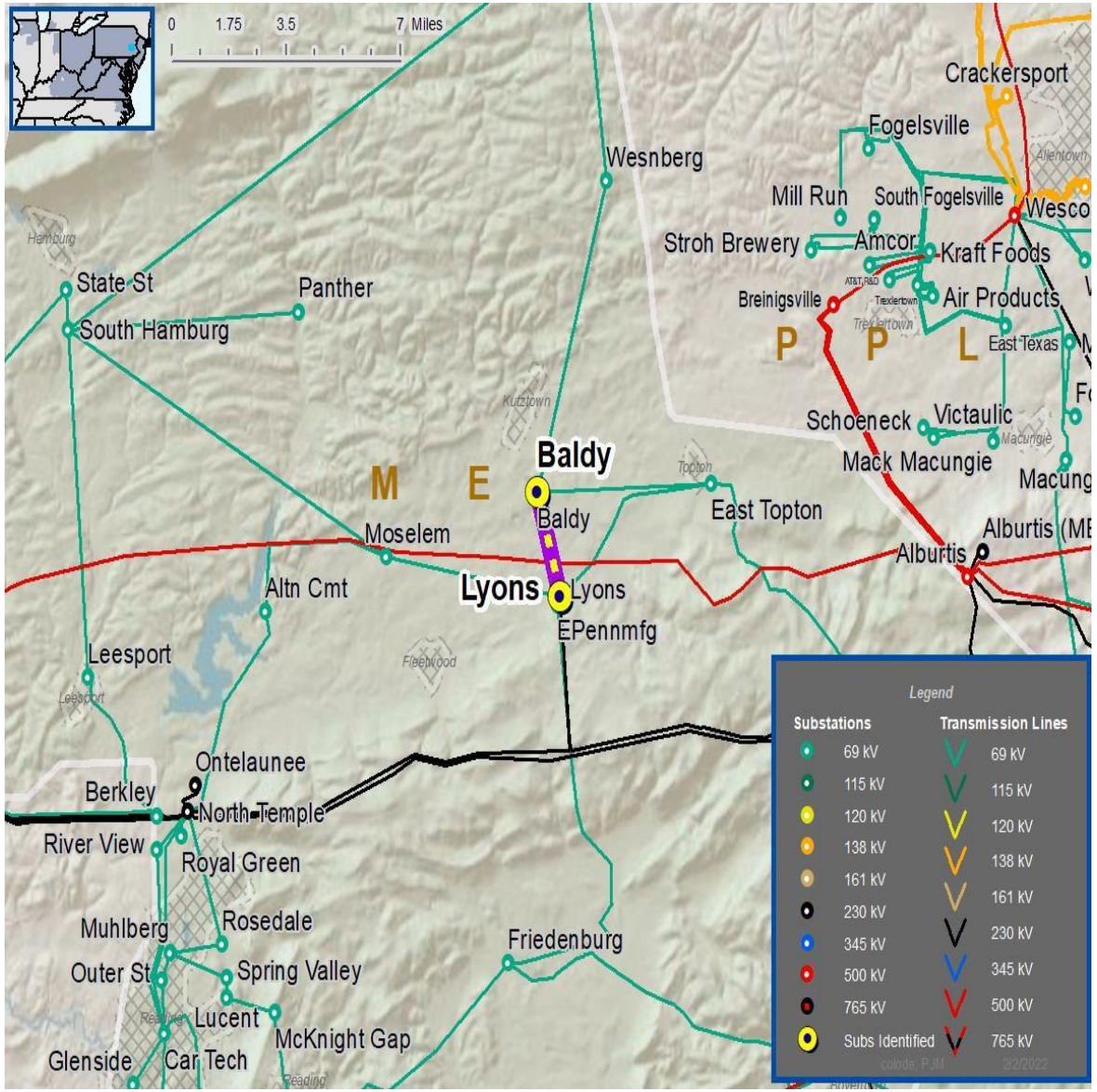


Met-Ed Transmission Zone M-3 Process

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.

ME-2022-	Transmission Line / Substation Locations	Existing Line Rating (SN / SE)	Existing Conductor Rating (SN / SE)	Limiting Terminal Equipment
001	Baldy – Kutztown Tap 69 kV Line Kutztown Tap - Lyons	76/90 80/96	80/96 80/96	Substation Conductor Transmission Line Conductor

Met-Ed Transmission Zone M-3 Process Misoperation Relay Projects

Selected Solution:

ME-2022-	Transmission Line / Substation Locations	Supplemental Project ID	New MVA Line Rating (SN / SE)	Scope of Work	Estimate Costs ($ M)	Target ISD
001	Baldy – Kutztown Tap 69 kV Line Kutztown Tap - Lyons	s2713	80/96 80/96	• Baldy 69 kV Substation – Replace line relaying, disconnect switches, substation conductor, and circuit breaker • Lyons 69 kV Substation – Replace line relaying, and circuit breaker	$3.3M	4/15/2022

Model: 2021 RTEP model for 2026 Summer (50/50)

Met-Ed Transmission Zone M-3 Process
New Customer Substation

Need Number: ME-2022-002

Process Stage: Submission of Supplemental Project for Inclusion in the Local Plan 10/13/2022

Previously Presented:

Solution Meeting 7/21/2022

Need Meeting 04/19/2022

Project Driver:

Customer Service

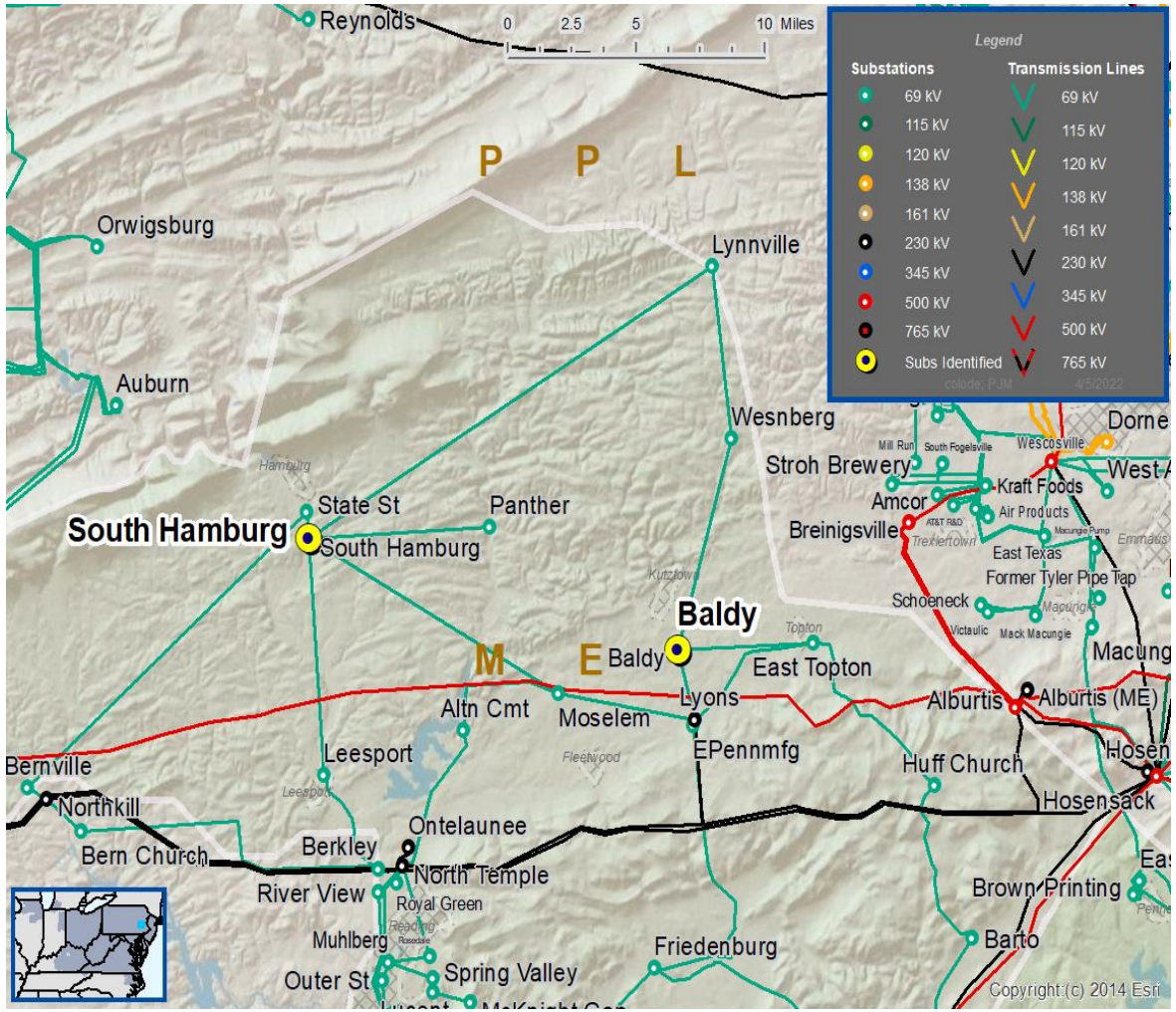
Specific Assumption Reference:

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 69 kV service; anticipated load is 13 MVA; location is near the Baldy – South Hamburg 69kV line.

Requested in-service date is 8/30/2023



Met-Ed Transmission Zone M-3 Process
New Customer Substation

Need Number: ME-2022-002

Process Stage: Submission of Supplemental Project for Inclusion in the Local Plan 10/13/2022

Selected Solution:

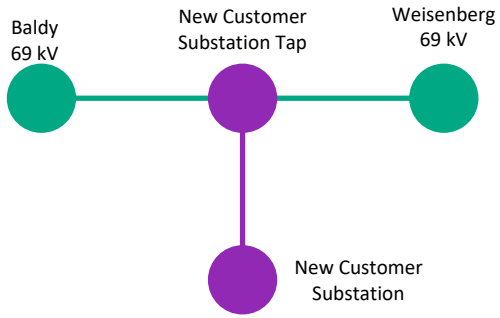
- Tap the Baldy – Weisenberg 69 kV line
- Install 69 kV switches
- Construct ~1 span of 69 kV to customer substation

Estimated Project Cost: $0.8M

Projected In-Service: 8/30/2023

Supplemental Project ID: s2803

Model: 2022 RTEP model for 2026 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: ME-2022-004

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan 10/13/2022

Previously Presented: Solution Meeting 5/16/2022

Need Meeting 4/19/2022

Project Driver:

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

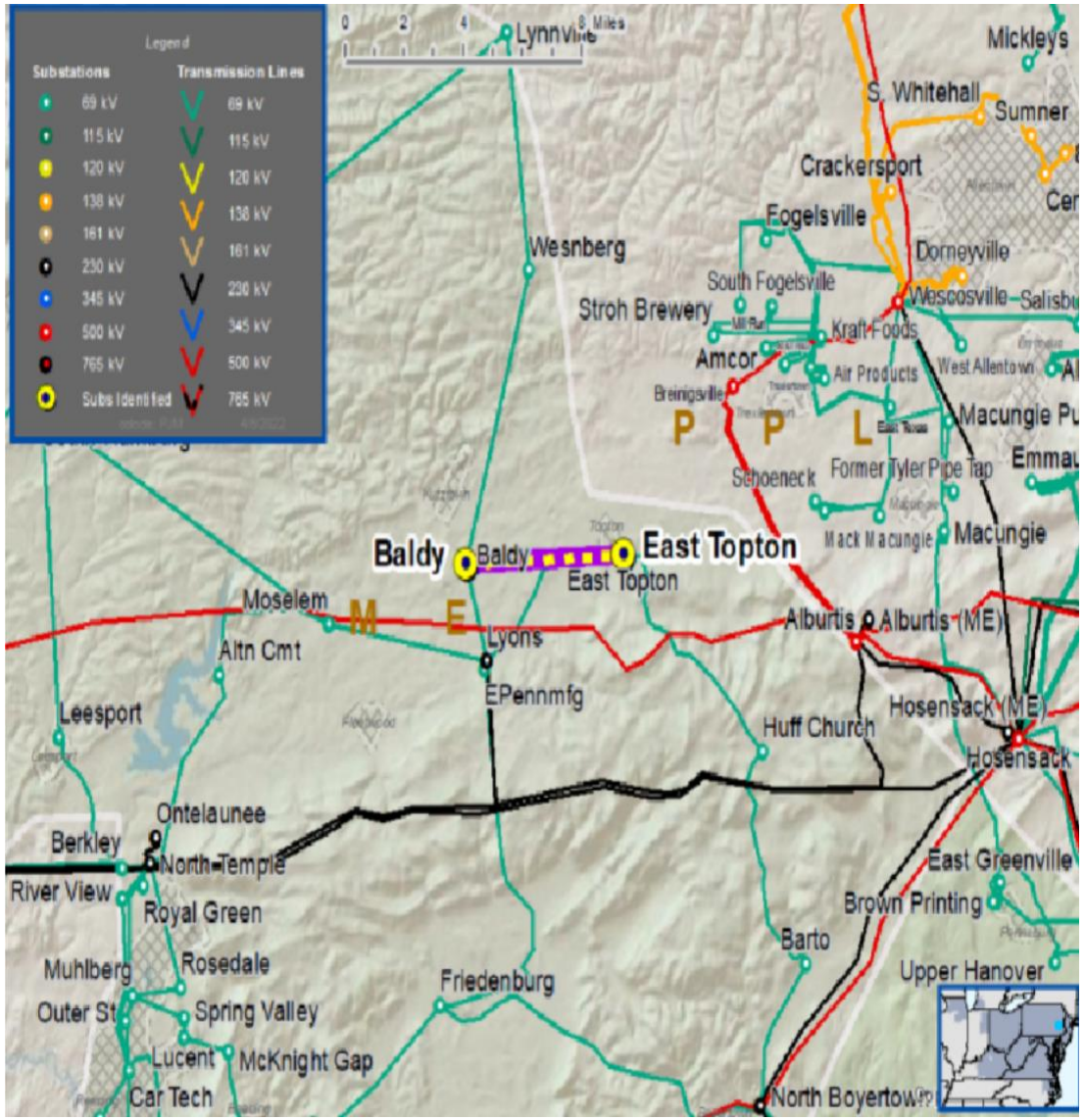
Specific Assumption Reference:

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.

ME-2022-	Transmission Line / Substation Locations	Existing Line Rating (SN / SE)	Existing Conductor Rating (SN / SE)	Limiting Terminal Equipment
004	Baldy – Kutztown Tap 69 kV Line Kutztown Tap – East Topton	76/90 62/62	80/96 80/96	Substation Conductor Relays, and Substation Conductor

Met-Ed Transmission Zone M-3 Process Misoperation Relay Projects

Selected Solution:

ME-2022-	Transmission Line / Substation Locations	Supplemental Project ID	New MVA Line Rating (SN / SE)	Scope of Work	Estimate Costs ($ M)	Target ISD
004	Baldy – Kutztown Tap 69 kV Line Kutztown Tap – East Topton	s2750	80/96 80/96	• Baldy 69 kV Substation – Replace line relaying, and substation conductor • East Topton 69 kV Substation – Replace line relaying, substation conductor and circuit breaker	$1.9M	5/27/2022

Model: 2021 RTEP model for 2026 Summer (50/50)

Revision History

8/12/2022 – V1 – Original version posted to pjm.com

-Added s2708.1, s2708.2,s2709

10/12/2022 – V2 - Added local plan for s2672

10/13/2022 – V3 – Added local plan for s2763, s2711, s2645, s2713, s2803 and s2570