# Submission of Supplemental Projects for Inclusion in the Local Plan



# Met-Ed Transmission Zone M-3 Process Middletown Junction-Smith Street #1 115 kV New Customer

Need Number:ME-2023-005Process Stage:Submission of Supplemental Projects for<br/>Inclusion in the Local Plan 1/3/2024Previously Presented:Need Meeting - 5/18/2023

Solution Meeting – 07/20/2023

### **Project Driver(s):**

**Customer Service** 

### Specific Assumption Reference(s)

New customer connection request will be evaluated per FirstEnergy's "Requirements for Transmission Connected Facilities" document and "Transmission Planning Criteria" document.

### **Problem Statement**

New Customer Connection - has requested a new 115 kV delivery point near the Middletown Junction-Smith Street #1 115 kV line. The anticipated load of the new customer connection is 12 MVA.



# Requested in-service date is 05/31/2024.

SRRTEP Committee: Mid-Atlantic – FirstEnergy Supplemental

# Met-Ed Transmission Zone M-3 Process Middletown Junction-Smith Street #1 kV New Customer- Solution



Need Number:ME-2023-005Process Stage:Submission of<br/>Inclusion in the

Submission of Supplemental Projects for Inclusion in the Local Plan

**Selected Solution:** 

115 kV Transmission Line Tap

- Install three SCADA controlled transmission line switches
- Construct approximately 0.2 miles of transmission line using 556 ACSR 26/7 from tap point to customer substation
- Install one 115 kV revenue metering package at customer substation
- Modify relay settings at Middletown Junction and Smith Street substations

Estimated Project Cost: \$4.9M

Projected In-Service: 7/3/2024

Supplemental Project ID: s3017



Legend		
500 kV		
345 kV		
115 kV		
69 kV		
34.5 kV		
23 kV		
New		



## Met-Ed Transmission Zone M-3 Process Hokes Ring Bus

Need Number:	ME-2023-003
Process Stage:	Submission of Supplemental Projects for Inclusion in the Local Plan 6/24/2024
Previously Presented:	Need Meeting 4/20/2023
	Solution Meeting 11/16/2023

### **Project Driver:**

Operational Flexibility and Efficiency

### Specific Assumption Reference:

System Performance Projects

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

### **Problem Statement:**

The loss of Hokes Substation results in the loss of approximately 23 MW of load and approximately 2650 customers. Substation consists of:

- Three 69 kV transmission lines
- Two 69-13.2 kV distribution transformers





Need Number:ME-2023-003Process Stage:Submission of Supplemental Projects for<br/>Inclusion in the Local Plan 6/24/2024

### **Selected Solution:**

- Convert Hokes Substation into a six-breaker ring bus
- Upgrade terminal equipment to transmission line ratings and adjust relay settings

### **Transmission Line Ratings:**

- Hokes Lehigh Portland Cement 69 kV Line
  - Before Proposed Solution: 50 / 50 MVA (SN/SE)
  - After Proposed Solution: 53 / 64 MVA (SN/SE)
- Hokes Smith Street 69 kV Line
  - Before Proposed Solution: 43 / 44 MVA (SN/SE)
  - After Proposed Solution: 139 / 169 MVA (SN/SE)
- Hokes Jackson 69 kV Line
  - Before Proposed Solution: 51 / 62 MVA (SN/SE)
  - After Proposed Solution: 139 / 169 MVA (SN/SE)
- Hokes Violet Hill 69 kV Line
  - Before Proposed Solution: 51 / 66 MVA (SN/SE)
  - After Proposed Solution: 74 / 90 MVA (SN/SE)

### Estimated Project Cost: \$24.1M

Projected In-Service: 6/1/2025 SRRTEP Committee: Mid-Atlantic – FirstEnergy Supplemental Supplemental Project ID: s3263.1

### Met-Ed Transmission Zone M-3 Process Hokes Ring Bus





## Met-Ed Transmission Zone M-3 Process North Lebanon – Fredericksburg 69 kV Line



Need Number:ME-2023-007Process Stage:Submission of Supplemental Projects for<br/>Inclusion in the Local Plan 6/24/2024Previously Presented:Need Meeting 05/18/2023<br/>Solution Meeting 11/16/2023

**Project Driver:** 

Performance and Risk, Operational Flexibility and Efficiency Specific Assumption Reference:

System Performance Projects

- System reliability and performance
- Load at risk in planning and operational scenarios

### **Problem Statement:**

A N-1-1 outage of the North Hershey – Grantville 69 kV and North Lebanon – Fredericksburg 69 kV lines can lead to a potential voltage collapse resulting in a loss of service to 80 MW of load and 10,600 customers.



Need Number: Process Stage: ME-2023-007 Submission of Supplemental Projects for Inclusion in the Local Plan 6/24/2024

### **Selected Solution:**

Rebuild North Lebanon – Fredericksburg 73 69 kV Line as double circuit.

At North Lebanon Substation

- Add 69 kV breaker
- Replace limiting terminal equipment
- At Fredericksburg Substation
- Add 69 kV breaker

Transmission Line Ratings:

- North Lebanon-Fredericksburg 69 kV Line
  - Before Proposed Solution: 82/103 MVA (SN/SE)
  - After Proposed Solution: 139/169 MVA (SN/SE)

Estimated Project Cost: \$13.6 M Projected In-Service: 12/31/2026 Supplemental Project ID: s3264.1

## Met-Ed Transmission Zone M-3 Process North Lebanon – Fredericksburg 69 kV Line



	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 Northkill – Rehrersburg 69 kV Line

Need Number:	ME-2023-008
Process Stage:	Submission of Supplemental Projects for Inclusion in the Local Plan 6/24/2024
Previously Presented:	Need Meeting 06/15/2023

Solution Meeting 11/16/2023

### **Project Driver:**

System Performance Projects

### **Specific Assumption Reference:**

Add/Expand Bus Configuration

Accommodate Future Transmission Facilities

Build New Transmission Line

- Network Radial Lines
- Contingency constrained facilities

Automatic Sectionalizing Schemes

### **Problem Statement:**

The Rehrersburg Substation is fed radially off the Frystown – South Lebanon 69 kV Line. An N-1 outage of this line forces an outage of SRTEP Committee: Mid-Atlantic– Firstenergy Supplemental Rehrersburg Substation, causing a loss of 10.1 MW and 1,230 customers.





### Met-Ed Transmission Zone M-3 Process Northkill – Rehrersburg 69 kV Line





Need Number:ME-2023-008Process Stage:Submission of Supplemental Projects for<br/>Inclusion in the Local Plan 6/24/2024

#### **Selected Solution:**

- Construct new 69 kV line from Structure #37 on the S. Lebanon Frystown/Rehrersburg 83 69 kV Line to the Northkill Substation (Approximately 8.9 miles). (s3300.1)
- Create a new line terminal and add a fourth 69 kV breaker at Northkill Substation.
- Install two (2) sets of 69 kV disconnect switches with SCADA control and Auto-Transfer Scheme.
- Install 1 set of 69 kV disconnect switches with SCADA control on the tap to Rehrersburg Substation. (s3300.2)
- Rebuild the Bernville-Northkill 845 69 kV Line (0.84 mi) to double circuit construction.
- New line will share ~0.94 miles of common structure with newly rebuilt 825 line (s3300.3)

#### **Tranmission Line Ratings:**

- Rehrersburg T– South Lebanon 69 kV Line
  - Before Proposed Solution: 55 / 56 MVA (SN/SE)
  - After Proposed Solution: 74 / 90 MVA (SN/SE)
- Rehrersburg T– Frystown 69 kV Line
  - Before Proposed Solution: 55 / 56 MVA (SN/SE)
  - After Proposed Solution: 74 / 90 MVA (SN/SE

#### Estimated Project Cost: \$24.13M

Projected In-Service: 12/01/2026

SupplementahProject ID/is3800rttis3300t2ns3300.3pplemental



### Met-Ed Transmission Zone M-3 Process

### Campbelltown 69 kV Ring Bus

Need Number:ME-2019-034Process Stage:Submission of Supplemental Projects for<br/>Inclusion in the Local Plan 6/24/2024

**Previously Presented:** 

Need Meeting – 05/31/2019

Solution Meeting – 02/15/2024

Supplemental Project Driver:

Operational Flexibility and Efficiency

Specific Assumption References:

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 Campbelltown Substation results in the loss of approximately 40 MW of load and approximately 8,800 customers.
- Campbelltown Substation consists of:
  - Three networked 69 kV transmission lines
  - Two distribution transformers connected to the bus with switches
  - No bus tie breaker





Met-Ed Transmission Zone M-3 Process Campbelltown 69 kV Ring Bus

Need Number:ME-2019-034Process Stage:Submission of<br/>Inclusion in the

Submission of Supplemental Projects for Inclusion in the Local Plan 6/24/2024

Selected Solution:

- Convert Campbelltown into a five breaker 69 kV ring bus
- At Campbelltown Substation:
  - Replace two 69 kV circuit breakers and associated disconnect switches
  - Install two new 69 kV circuit breakers and associated disconnect switches
  - Relocate one existing 69 kV circuit breaker and associated disconnect switches
  - Install new bus conductor
  - Install four standard transmission line relay panels
  - Replace substation conductor
- At North Lebanon Substation:
  - Replace one 69 kV circuit breaker
  - Replace one 69 kV disconnect switch
  - Install one standard transmission line relay panel
  - Replace substation conductor
- At Middletown Substation:
  - Replace one 69 kV circuit breaker
  - Replace one 69 kV disconnect switch
  - Install one standard transmission line relay panel
  - Replace substation conductor
     SRRTEP Committee: Mid-Atlantic– FirstEnergy Supplemental



	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 Campbelltown 69 kV Ring Bus

Need Number:ME-2019-034Process Stage:Submission of Supplemental Projects for<br/>Inclusion in the Local Plan 6/24/2024

Selected Solution (continued):

### **Transmission Line Ratings:**

- Campbelltown Swatara #70 69 kV Line
  - Before Proposed Solution: 71 / 90 / 85 / 109 MVA (SN/SE/WN/WE)
  - After Proposed Solution: 74 / 90 / 85 / 109 MVA (SN/SE/WN/WE)
- Campbelltown Campbelltown Tap #72 69 kV Line
  - Before Proposed Solution: 82 / 103 / 108 / 124 MVA (SN/SE/WN/WE)
  - After Proposed Solution: 139 / 169 / 158 / 201 MVA (SN/SE/WN/WE)

Estimated Project Cost: \$10.0M

Projected In-Service: 6/1/2026

Supplemental Project ID: s3287.1



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



 Need Number:
 ME-2019-043

 Process Stage:
 Submission of Supplemental Projects for Inclusion in the Local Plan 6/24/2024

 Previously Presented:
 Need Meeting 07/31/2019

Solution Meeting 2/15/2024

#### **Project Driver:**

Equipment Material Condition, Performance and Risk Specific Assumption Reference:

Line Condition Rebuild/Replacement

- Age/condition of wood pole transmission line structures
- Age/condition of steel tower or steel pole transmission line structures
- Age/condition of transmission line conductors

System Performance Projects

Substation/line equipment limits

#### **Problem Statement:**

The Carpenter Technology – South Reading 69 kV Line is exhibiting deterioration.

- Total line distance is approximately 5.9 miles.
- 125 out of 151 structures failed inspection (83% failure rate).
- Failure reasons include age, woodpecker holes, and sound.
- Transmission line ratings are limited by terminal equipment
  - Carpenter Technology Glenside 69 kV Line
    - Existing line rating: 82/103 MVA (SN/SE)
    - Existing conductor rating: 102/124 MVA (SN/SE)
  - Glenside South Reading 69 kV Line
    - Existing line rating: 82/103 MVA (SN/SE)
    - Existing conductor rating: 102/124 MVA (SN/SE)

### Met-Ed Transmission Zone M-3 Process Carpenter Technology – South Reading 69 kV Line





### Met-Ed Transmission Zone M-3 Process Carpenter Technology – South Reading 69 kV Line

Need Number:ME-2019-043Process Stage:Submission of Supplemental Projects for<br/>Inclusion in the Local Plan 6/24/2024

### **Selected Solution:**

Rebuild approximately 5.9 miles of the Carpenter Technology – South Reading 69 kV Line.

At South Reading Substation:

- Replace 69 kV breaker, line-side disconnect and line relaying
- Install surge arresters

At Carpenter Technology Substation:

Replace 69 kV line-side disconnect and line relaying

At Glenside Substation:

Replace 69 kV motor-operated airbreak switches, disconnects and CCVTs

### **Transmission Line Ratings:**

- Carpenter Technology Glenside 69 kV Line:
  - Before Proposed Solution: 82 / 103 / 108 / 124 MVA (SN/SE/WN/WE)
  - After Proposed Solution: 102 / 124 / 118 / 150 MVA (SN/SE/WN/WE)
- Glenside South Reading 69 kV Line:
  - Before Proposed Solution: 82 / 103 / 108 / 124 MVA (SN/SE/WN/WE)
  - After Proposed Solution: 102 / 124 / 118 / 150 MVA (SN/SE/WN/WE)

### Estimated Project Cost: \$15.2M

**Projected In-Service:** 05/29/2026 **Supplemental Project ID:** s3288.1







### Met-Ed Transmission Zone M-3 Process Birdsboro – Birdsboro Extrusions 69 kV Line

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	Le Substations	gend Transmission Lines 69 kV 115 kV 120 kV 138 kV 138 kV 230 kV 345 kV 500 kV 4d 765 kV	Carsonia
	FI	ving Hills	M E Painted Sky Lorane Boonetown-Road Pioneer Crossing Pioneer Crossing Birdsboro Birdsboro Extrusions
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ns			

### Need Number: Process Stage:

**Previously Presented:** 

Project Driver:

Increased System Reliability

#### Specific Assumption Reference:

System Performance Projects

Add/Expand Bus Configuration

Accommodate Future Transmission Facilities

Build New Transmission Line

- Network Radial Lines
- Contingency constrained facilities
   Automatic Sectionalizing Schemes

### **Problem Statement:**

An N-1-1 contingency can lead to an overload of the Birdsboro – Birdsboro Extrusions 69 kV Line up to 111%.

Existing 69 kV line rating between Birdsboro Substation and Birdsboro Extrusions Substation is 71/90 MVA (SN/SE).

ME-2023-011

Submission of Supplemental Projects for Inclusion in the Local Plan 6/24/2024

Need Meeting 11/16/2023 Solution Meeting 02/15/2024



### Met-Ed Transmission Zone M-3 Process Birdsboro – Birdsboro Extrusions 69 kV Line

Need Number:ME-2023-011Process Stage:Submission of Supplication of the Log

Submission of Supplemental Projects for Inclusion in the Local Plan 6/24/2024

### **Selected Solution:**

- Rebuild and reconductor approximately 0.5 miles of the Birdsboro Birdsboro Extrusions 69 kV Line.
- At Birdsboro Substation:
  - Replace 69 kV circuit breaker
  - Replace four 69 kV disconnect switches
  - Replace existing line drop and bus conductor
  - Replace existing line and breaker relaying
- At South Reading Substation:
  - Adjust relay settings

### **Transmission Line Ratings:**

- Birdsboro Birdsboro Extrusions 69 kV Line
  - Before Proposed Solution: 71 / 90 / 85 / 103 MVA (SN/SE/WN/WE)
  - After Proposed Solution: 111 / 134 /125 / 159 MVA (SN/SE/WN/WE)

Estimated Project Cost: \$2.1M

Projected In-Service: 12/10/2025

Supplemental Project ID: s3289.1







# Met-Ed Transmission Zone M-3 Process Violet Hill No. 6 115-69 kV Transformer



#### Need Number: ME-2024-003

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

### 9/17/2024

Previously Presented: Solution Meeting - 04/18/2024

Need Meeting - 02/15/2024

#### **Project Driver:**

Operational Flexibility and Efficiency

Equipment Material Condition, Performance, and Risk

#### **Specific Assumption Reference:**

System Performance Projects

- Add/Replace Transformers
- Upgrade relay schemes

#### End of Life Criteria

- Transformers at or beyond expected service life
- Outdated or obsolete technology and equipment

#### **Problem Statement:**

The existing No. 6 115-69 kV Transformer at Violet Hill is 66 years old and is approaching end of life. The transformer is experiencing increased corrective maintenance costs. Maintenance history demonstrates that the transformer has oil leaks and paper degradation.

The Violet Hill 69 kV breaker '6B32' and the electromechanical relaying is 55 years old. The relaying equipment has a history of misoperation and is approaching end of life.

The transformer is limited by terminal equipment.

**Existing Ratings** 

84/111 MVA SN/SSTE 109/125 MVA WN/WSTE



# Met-Ed Transmission Zone M-3 Process Violet Hill No. 6 115-69 kV Transformer

Need Number: ME-2024-003

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan 9/17/2024

Previously Presented: Solution Meeting - 4/18/2024

Need Meeting – 02/15/2024

#### **Selected Solution:**

- At Violet Hill Substation:
  - Replace the 115-69 kV Transformer #6 with a new 125 MVA transformer
  - Replace 69 kV circuit breaker with new 3000 A, 72 kV breaker
  - Replace (3) 69 kV breaker disconnect switches with new 2000 A, 69 kV switches
  - Replace 69 kV strain bus conductor
  - Replace 115 kV strain bus conductor
  - Replace 69 kV disconnect switch on the transformer
  - Replace transformer relaying with standard FE relay panel
  - Upgrades will meet or exceed the transformer ratings of 116/125/125/133 MVA (SN/SE/WN/WE)
- Violet Hill 69 kV Tie 6 Bank Line:
  - Rebuild line to meet ratings of new substation equipment

Estimated Project Cost: \$6.1M

Projected In-Service: 5/1/2028

Supplemental Project ID: s3330.1



115-69 kV XFMR #6

	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 South Reading Substation

### Need Number: ME-2023-021

**Process Stage:** Submission of Supplemental Projects for Inclusion in the Local Plan 9/17/2024

Previously Presented: Solution Meeting - 4/30/2024

Need Meeting – 12/05/2023

### **Project Driver:**

**Operational Flexibility and Efficiency** 

### Specific Assumption Reference:

System Performance Projects

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

### **Problem Statement:**

South Reading Substation contains multiple 230 kV networked elements and two 230 – 69 kV transformers. Multiple stuck breaker contingencies or a fault on the 230 kV bus at South Reading results in the loss of South Reading Substation.





#### Need Number: ME-2023-021

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan 9/17/2024

Previously Presented: Solution Meeting - 2/06/2024

Need Meeting - 12/05/2023

### Selected Solution:

- Convert South Reading 230 kV into a ten (10) breaker Double Breaker Double Bus configuration.
- At South Reading 230 kV Substation:
  - Install (8) 230 kV 3000 A circuit breakers
  - Install (21) 230 kV disconnect switches
  - Install dual conductor for strain bus
  - Reconductor No.4 and No.8 bus to meet TL rating of 547/667 MVA (SN/SE)
  - Install new control house for relay panels
  - Install (21) relay panels

### **Transmission Line Ratings:**

- Boonetown South Reading 230 kV Line
  - Before Proposed Solution: 445/ 531 MVA (SN/SE)
  - After Proposed Solution: 546 / 666 MVA (SN/SE)
- Lauschtown South Reading 230 kV Line
  - Before Proposed Solution: 494 / 621 MVA (SN/SE)
  - After Proposed Solution: 546 / 666 MVA (SN/SE)
- Berks South Reading 230 kV Line
  - Before Proposed Solution: 520 / 621 MVA (SN/SE)
  - After Proposed Solution: 546 / 666 MVA (SN/SE)

### Estimated Project Cost: \$9.85M

#### Projected In-Service: 6/1/2025

#### Supplemental Project ID: s3331.1







### Need Numbers: ME-2023-023

**Process Stage:** Submission of Supplemental Projects for Inclusion in the Local Plan 9/17/2024

Previously Presented: Solution Meeting 04/30/2024

Need Meeting 12/05/2023

**Project Driver:** 

Equipment Material Condition, Performance and Risk

**Operational Flexibility and Efficiency** 

#### **Specific Assumption Reference:**

System Performance Projects Global Factors

System reliability and performance

Add/Replace Transformers

Past System Reliability/Performance

#### **Problem Statement:**

- The South Reading #7 Transformer 230-69 kV is approximately 50 years old.
- The transformer has elevated methane and ethane gases above IEEE limits
- Existing transformer ratings:
  - 273/343/419 MVA SN/SE/SLD
  - 340/398/448 MVA WN/WE/WLD





Need Numbers: ME-2023-023

**Process Stage:** Submission of Supplemental Projects for Inclusion in the Local Plan 9/17/2024

### **Selected Solution:**

- Replace the existing #7 bank 230/69 kV with a 230/69 kV, 135/180/224 MVA transformer
- Replace the existing ground bank transformer and ground bank switch
- Replace limiting conductor and electromechanical relays to exceed transformer rating

Estimated Project Cost: \$6.10 M Projected In-Service: 12/31/2026 Supplemental Project ID: s3332.1



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



### Need Numbers: ME-2023-024

**Process Stage:** Submission of Supplemental Projects for Inclusion in the Local Plan 9/17/2024

Previously Presented: Solution Meeting 04/30/2024

Need Meeting 12/05/2023

**Project Driver:** 

Equipment Material Condition, Performance and Risk

**Operational Flexibility and Efficiency** 

#### **Specific Assumption Reference:**

System Performance Projects Global Factors

System reliability and performance

Add/Replace Transformers

Past System Reliability/Performance

#### **Problem Statement:**

- The South Reading #8 230-69 kV Transformer is approximately 41 years old.
- The transformer is exhibiting issues with its cooling system, annunciator, oil leaks, and bushings.
- The transformer has elevated ethane gas levels above IEEE limits.
- Existing transformer ratings:
  - 278/358/423 MVA SN/SE/SLD
  - 345/401/448 MVA WN/WE/WLD





Need Numbers: ME-2023-024

**Process Stage:** Submission of Supplemental Projects for Inclusion in the Local Plan 9/17/2024

Previously Presented: Solution Meeting 04/30/2024

Need Meeting 12/05/2023

### **Selected Solution:**

- Replace the existing South Reading 230-69 kV #8 Transformer
- Replace limiting conductor and disconnect switches
- Replace relaying at South Reading Substation

### **Transformer Ratings:**

- Before Proposed Solution: 249 / 300 / 312 / 347 MVA (SN/SSTE/WN/WSTE)
- After Proposed Solution: 328 / 400 / 371 / 474 MVA (SN/SSTE/WN/WSTE)

Estimated Project Cost: \$8.80M Projected In-Service: 6/1/2025 Supplemental Project ID: s3333.1



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 Smith Street Transformers

### Need Number: ME-2024-001

**Process Stage:** Submission of Supplemental Projects for Inclusion in the Local Plan 9/17/2024

Previously Presented: Solution Meeting 05/16/2024

Need Meeting 01/18/2024

#### **Project Driver:**

Operational Flexibility and Efficiency

Equipment Material Condition, Performance, and Risk

#### **Specific Assumption Reference:**

### System Performance Projects

Add/Replace Transformers

### End of Life Criteria

- Transformers at or beyond expected service life
- Outdated or obsolete technology and equipment

#### **Problem Statement:**

The #1 115-69 kV Transformer at Smith Street Substation is 59 years old and is approaching end of life. The transformer has experienced multiple fan failures, low pressure alarms and oil leaks that have been difficult to repair due to the condition of the transformer.

Existing #1 transformer ratings:

30/33/39/41 MVA (SN/SLTE/WN/WLTE)

The #3A 115-69-13.2 kV Transformer at Smith Street Substation is 73 years old and is approaching end of life. The transformer has experienced multiple oil leaks that have been difficult to repair due to the condition of the transformer.

Existing #3A transformer ratings:

65/72/88/94 MVA (SN/SLTE/WN/WLTE)





# Met-Ed Transmission Zone M-3 Process Smith Street 115/69 kV Transformer #1

Need Number: ME-2024-001

**Process Stage:** Submission of Supplemental Projects for Inclusion in the Local Plan 9/17/2024

#### **Selected Solution:**

- At Smith Street Substation:
  - Replace the 115-69 kV Transformer #1 with new 50 MVA Xfmr
  - Install new relaying with standard FE relay package
  - Install new 69 kV 3000 A circuit breaker
  - Install (2) 72 kV 2000 A disconnect switches
  - Install (1) Xfmr 115 kV 2000 A disconnect switch on high side
  - Upgrades should meet or exceed transformer ratings of 30/40/39/48 MVA (SN/SE/WN/WE)
- Hokes Smith Street 69 kV Line
  - Re-terminate line into Smith Street

### **Transformer Ratings:**

- 140/185/233 MVA SN/SE/SLD
- 182/222/233 MVA WN/WE/WLD

Estimated Project Cost: \$6.6M

Projected In-Service: 6/1/2024

Supplemental Project ID: s3337.1



XFMR #1

	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 Baldy 69 kV

### Need Number: ME-2023-010

**Process Stage:** Submission of Supplemental Projects for Inclusion in the Local Plan 9/17/2024

Previously Presented: Solution Meeting -10/19/2023

Need Meeting - 09/14/2023

### **Project Driver:**

Performance and Risk, Operational Flexibility and Efficiency

### Specific Assumption Reference:

System Performance Projects

- System reliability and performance
- Reliability of Non-Bulk Electric System (Non-BES) Facilities

### **Problem Statement:**

An N-1-1 outage of Baldy – Lyons 69 kV Line and Baldy – East Topton 69 kV Line can lead to a voltage collapse resulting in loss of service to 10,688 customers or 70 MW of load





### Met-Ed Transmission Zone M-3 Process Baldy 69 kV

Need Number: ME-2023-010 Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan 9/17/2024 Previously Presented: Solution Meeting –10/19/2023 Need Meeting – 09/14/2023

### **Selected Solution:**

• Install a 69 kV, 19.8 MVAR effective cap bank at Baldy 69 kV Substation

Estimated Project Cost: \$1.1M

Projected In-Service: 12/30/2024

Supplemental Project ID: s3338.1





### Met-Ed Transmission Zone M-3 Process Hamilton 115 kV Ring Bus

### Need Number: ME-2019-033

**Process Stage:** Submission of Supplemental Projects for Inclusion in the Local Plan 9/17/2024

Previously Presented: Solutions Meeting 10/19/2023

Needs Meeting 05/31/2019

### **Project Driver:**

**Operational Flexibility and Efficiency** 

### Specific Assumption Reference:

**Global Considerations** 

- System reliability and performance
- 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 Hamilton 115 kV Substation results in loss of approximately 30 MW of load and approximately 3600 customers.

The Substation consists of:

- Two (2) 115 kV lines
- Two (2) distribution transformers with high side disconnect switches
- One (1) generator connected with a high side disconnect switch





## Met-Ed Transmission Zone M-3 Process Hamilton 115 kV Ring Bus

Need Number: ME-2019-033

**Process Stage:** Submission of Supplemental Projects for Inclusion in the Local Plan 9/17/2024

Previously Presented: Solutions Meeting 10/19/2023

Needs Meeting 05/31/2019

### **Selected Solution:**

Convert Hamilton Substation into a 115 kV five (5) breaker ring bus

- Remove all 115 kV equipment and structures, excluding:
  - Three (3) transformer disconnect switches
  - Hamilton Jackson 115 kV dead-end structure
- Install four (4) 115 kV breakers & associated disconnect switches and CVTs
- Relocate one (1) existing breaker and two (2) 115 kV line disconnect switches
- Upgrade relaying

Estimated Project Cost: \$7.70M

Projected In-Service: 06/01/2025

Supplemental Project ID: s3339.1



	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 Yorkana 230 kV Substation

### Need Number: ME-2022-005

**Process State:** Submission of Supplemental Projects for Inclusion in the Local Plan 9/17/2024

Previously Presented: Solution Meeting 10/31/2023

Need Meeting 9/6/2022

### **Project Driver:**

Operational Flexibility and Efficiency

### Specific Assumption Reference:

System Performance Projects

- Add/Expand Bus Configuration
- Eliminate simultaneous outages to multiple networked elements

### **Problem Statement:**

The Yorkana 230 kV substation is configured as a four-breaker ring bus consisting of three 230 kV lines and two 230/115 kV transformers. One of the transformers is tapped on a 230 kV line terminal. Taking an outage of the transformer would require also taking an outage of the 230 kV line.

A fault on the transformer or line would result in loss of both facilities. A faulted circuit breaker could result in loss of two 230 kV lines and a transformer.





### Met-Ed Transmission Zone M-3 Process Yorkana 230 kV Substation

### Need Number: ME-2022-005

**Process State:** Submission of Supplemental Projects for Inclusion in the Local Plan 9/17/2024

### **Selected Solution:**

### Yorkana 230kV Substation

- Expand 230kV Ring Bus to a five-breaker ring bus
  - Install 1 new 230kV circuit breaker
  - Relocate the Brunner Island 230kV terminal

### **Transmission Line Rating:**

- Brunner Island Yorkana 230kV 1055 Line:
  - Before and after Proposed Solution: 647/801 MVA (SN/SE)
- Jackson Yorkana 230kV 1052 Line:
  - Before and after Proposed Solution: 627/775 MVA (SN/SE)
- Otter Creek Yorkana:
  - Before and after Proposed Solution: 647/801 MVA (SN/SE)

Estimated Project Cost: \$3.70 M

Projected In-Service: 6/1/2025

Supplemental Project ID: s3340.1



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





# North Temple – Allentown Cement 69 kV Line Customer Connection

#### Panther South Hamburg Substations Transmission Lines 69 kV 138 kV 138 kV 161 kV 161 kV Baldy 230 kV 0 230 kV 345 kV 500 kV Moselem EPennmfg & Lyons Subs Identified 0 Altn Cmt Altn Cmt 1.5 3 Leesport 6 Miles 1 1 1 1 1 1 1 Ontelaunee Berkley Vorth Temple River View Rosedale Muhlberg Friedenburg Spring Valley Outer St Car Tech Lucent McKnight Gap West Shore 2 State Hill Glenside Carsonia Berkshire Mal

### Need Number: ME-2024-010

**Process Stage:** Submission of Supplemental Projects for Inclusion in the Local Plan - 9/23/2024

Previously Presented: Solution Meeting - 6/13/2024

Need Meeting - 5/16/2024

Project Driver(s):

Customer Service

### Specific Assumption Reference(s)

New customer connection request will be evaluated per FirstEnergy's "Requirements for Transmission Connected Facilities" document and "Transmission Planning Criteria" document.

### **Problem Statement**

New Customer Connection – Met-Ed distribution requested 69 kV service for a load of approximately 13 MVA near the North Temple – Allentown Cement 69 kV Line. The service request location is approximately three miles from North Temple Substation.

Requested in-service date is 6/1/2025



# Met-Ed Transmission Zone M-3 Process North Temple – Allentown Cement 69 kV Line Customer Connection

Need Number: ME-2024-010

**Process Stage:** Submission of Supplemental Projects for Inclusion in the Local Plan – 9/23/2024

**Selected Solution:** 

69 kV Transmission Line Tap

- Install three SCADA controlled transmission line switches
- Construct approximately 1-2 spans of transmission line from tap point to customer substation
- Install one 69 kV revenue metering package at customer substation
- Modify relay settings at North Temple and Allentown Cement substations

Estimated Project Cost: \$0.70M

Projected In-Service: 6/1/2025

Supplemental Project ID: s3434.1







### Met-Ed Transmission Zone M-3 Process Hunterstown – North Hanover 115 kV Line Customer Connection



**Process Stage:** Submission of Supplemental Projects for Inclusion in the Local Plan – 9/23/2024

**Previously Presented:** Solution Meeting – 6/13/2024

Need Meeting – 5/16/2024

Project Driver(s):

**Customer Service** 

### Specific Assumption Reference(s)

New customer connection request will be evaluated per FirstEnergy's "Requirements for Transmission Connected Facilities" document and "Transmission Planning Criteria" document.

### **Problem Statement**

New Customer Connection – Met-Ed distribution requested 115 kV service for load of approximately 22 MVA near the Hunterstown – North Hanover 115 kV Line. The service request location is approximately two miles from North Hanover Substation.







### Met-Ed Transmission Zone M-3 Process Hunterstown – North Hanover 115 kV Line Customer Connection

### Need Number: ME-2024-011

**Process Stage:** Submission of Supplemental Projects for Inclusion in the Local Plan – 9/23/2024

#### **Selected Solution:**

#### 115 kV Transmission Line Tap

- Install three SCADA controlled transmission line switches
- Construct approximately 1-2 spans of transmission line from tap point to customer substation
- Install one 115 kV revenue metering package at customer substation
- Modify relay settings at North Hanover and Hunterstown substations

Estimated Project Cost: \$1.70M

Projected In-Service: 1/11/2027

Supplemental Project ID: s3435.1





# Questions?



# Appendix

# High level M-3 Meeting Schedule

### Assumptions

Activity

TOs and Stakeholders Post Needs Meeting slides

Activity	Timing
Posting of TO Assumptions Meeting information	20 days before Assumptions Meeting
Stakeholder comments	10 days after Assumptions Meeting

Needs

### Solutions

Submission of Supplemental Projects & Local Plan

Stakeholder comments	10 days after Needs Meeting
Activity	Timing
TOs and Stakeholders Post Solutions Meeting slides	10 days before Solutions Meeting
Stakeholder comments	10 days after Solutions Meeting

Timing

10 days before Needs Meeting

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**

1/3/2024 – V1 – s3017 added to Local Plan

6/24/2024 – V2 – Local Plan for s3263.1, s3264.1, s3300.1, s3300.2, s3300.3, s3287.1, s3288.1, s3289.1

9/17/2024 – V3 – s3330.1 - s3333.1 and s3337.1 - s3340.1 added to Local Plan

9/23/2024 – V4 – s3434.1, s3435.1 added to Local Plan

9/27/2024 – V5 – Updated solution slide for s3333.1