



Reliability Analysis Update

Aaron Berner, Senior Manager

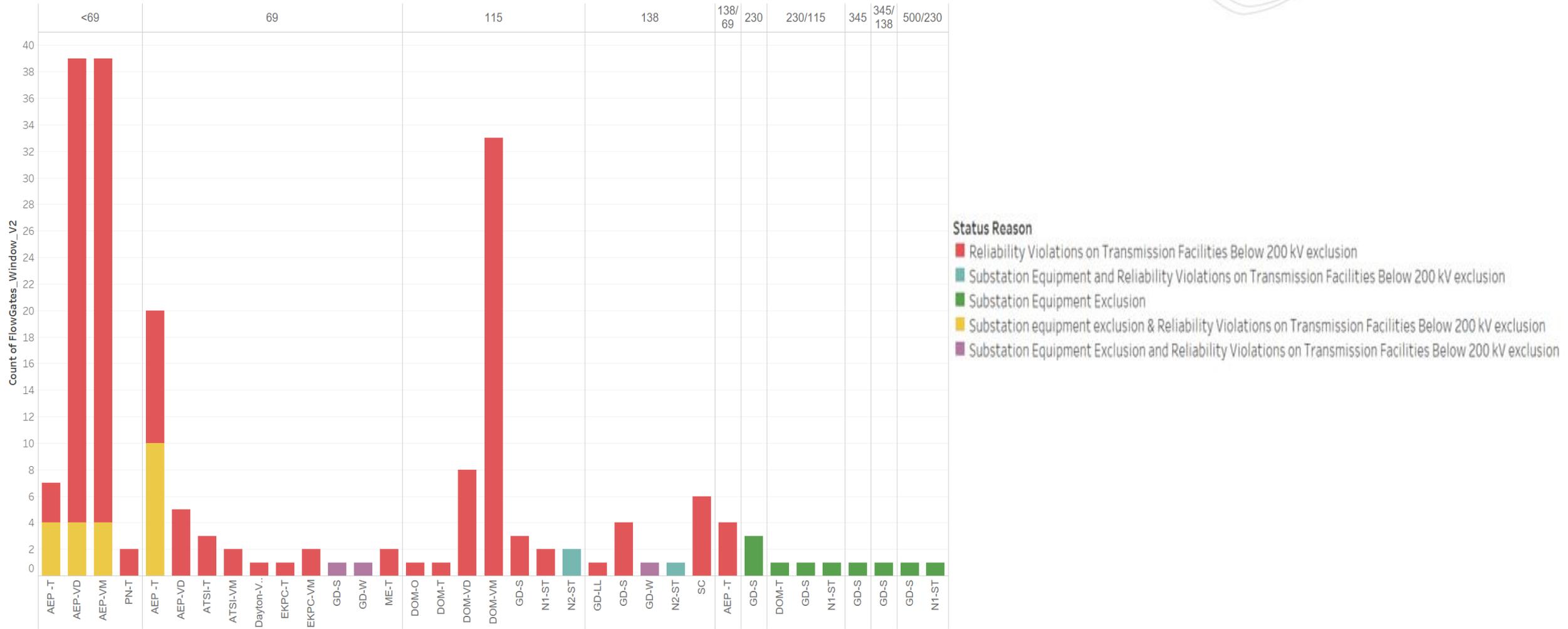
Transmission Expansion Advisory Committee

Tuesday, October 5, 2021



2021 RTEP Proposal Window

- Window opened on 7/02/2021
- Window closed on 8/31/2021
- For this Window, PJM seeks technical solutions, also called proposals, to resolve potential reliability criteria violations on facilities identified below in accordance with all applicable planning criteria (PJM, NERC, SERC, RFC, and Local Transmission Owner criteria).
- 57 total proposals submitted from 10 different entities (see Appendix for details)
 - 21 Greenfield
 - 36 Upgrades
- Cost Estimates: Approximate range from \$600k to \$136M
- 15 Proposals identified with Cost Containment
- 577 flowgates were addressed



- PJM has reviewed changes which have occurred since the original 2021 RTEP violations were identified
- The significant changes include, deactivations, withdrawal of deactivations, and execution of Interconnection Service Agreements by Interconnection Customers
- The re-tool has resulted in some changes to results, reducing and eliminating the violations previously identified – all changes have been posted in an update on the Competitive Planning page
 - One item of note is that flowgate GD-S30 was eliminated – this is specifically called out here as there were 10 proposals received that will not be evaluated for this flowgate, and there was a potential interaction with the Market Efficiency window
 - A review of these proposals in relation to the Market Efficiency window will continue

First Read

Baseline Reliability Projects

Process Stage: First Review

Criteria: GenDeliv

Assumption Reference: 2026 RTEP assumption

Model Used for Analysis: 2026 RTEP cases

Proposal Window Exclusion: Substation Equipment Exclusion

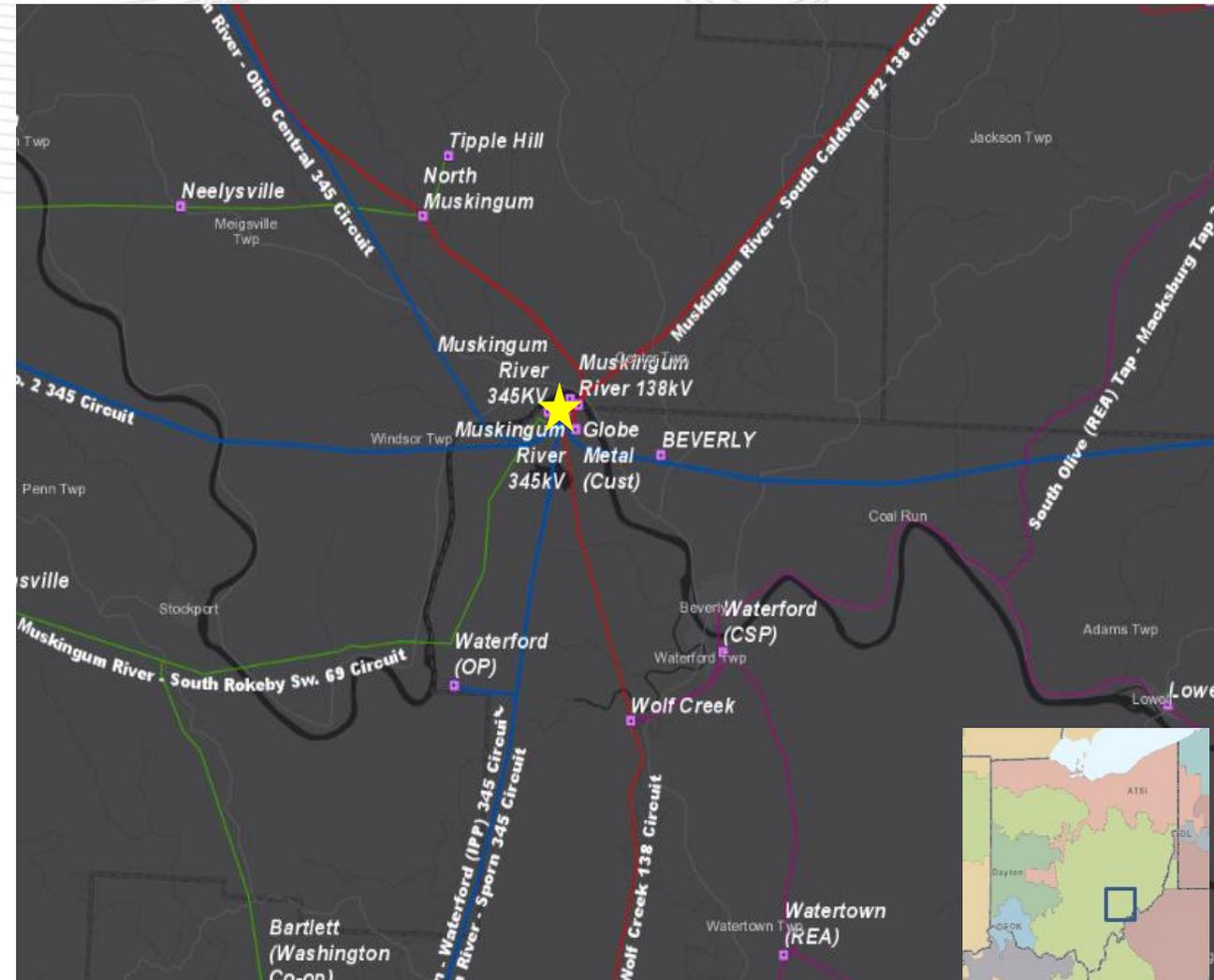
Problem Statement:

FG: GD-S419

In 2026 Summer Gen Deliv test, the Waterford – Muskingum 345kV line is overloaded for a breaker contingency.

Existing Facility Rating:

Branch	SN/SE/WN/WE (MVA)
05WATERFORD – 05MUSKNG 345KV	1025/1318/1298/1522 for certain contingencies





AEP Transmission Zone: Baseline Muskingum-Waterford 345 kV Bus/Riser Upgrades

Proposed Solution:

Replace the 2156 ACSR & 2874 ACSR bus and risers with 2-bundled 2156 ACSR at Muskingum River 345 kV station to address loading issues on Muskingum - Waterford 345 kV line.

Total Estimated Cost: \$0.53M

Preliminary Facility Rating:

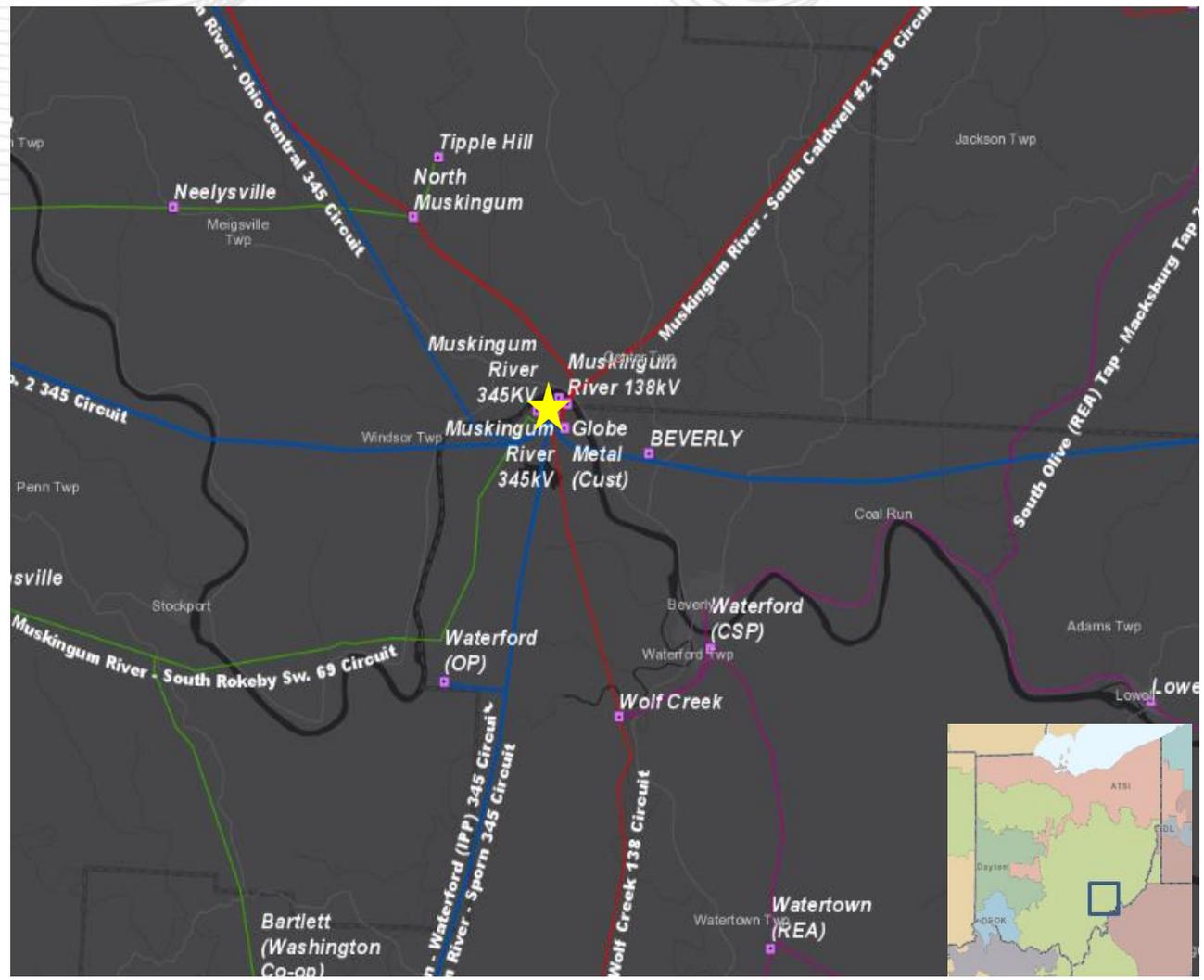
Branch	SN/SE/WN/WE (MVA)
05WATERFORD – 05MUSKNG 345KV	2051/2635/2597/2830

Alternatives: None

Ancillary Benefit: This proposal also addresses a portion of supplemental need AEP-2020-AEP001

Required IS date: 6/1/2026

Projected IS date: 9/1/2025



AEP Transmission Zone: Baseline Albion-Kendallville Rebuild

Process Stage: First Read

Criteria: AEP FERC 715 Criteria

Assumption Reference: 2026 RTEP assumption

Model Used for Analysis: 2026 RTEP cases

Proposal Window Exclusion: None

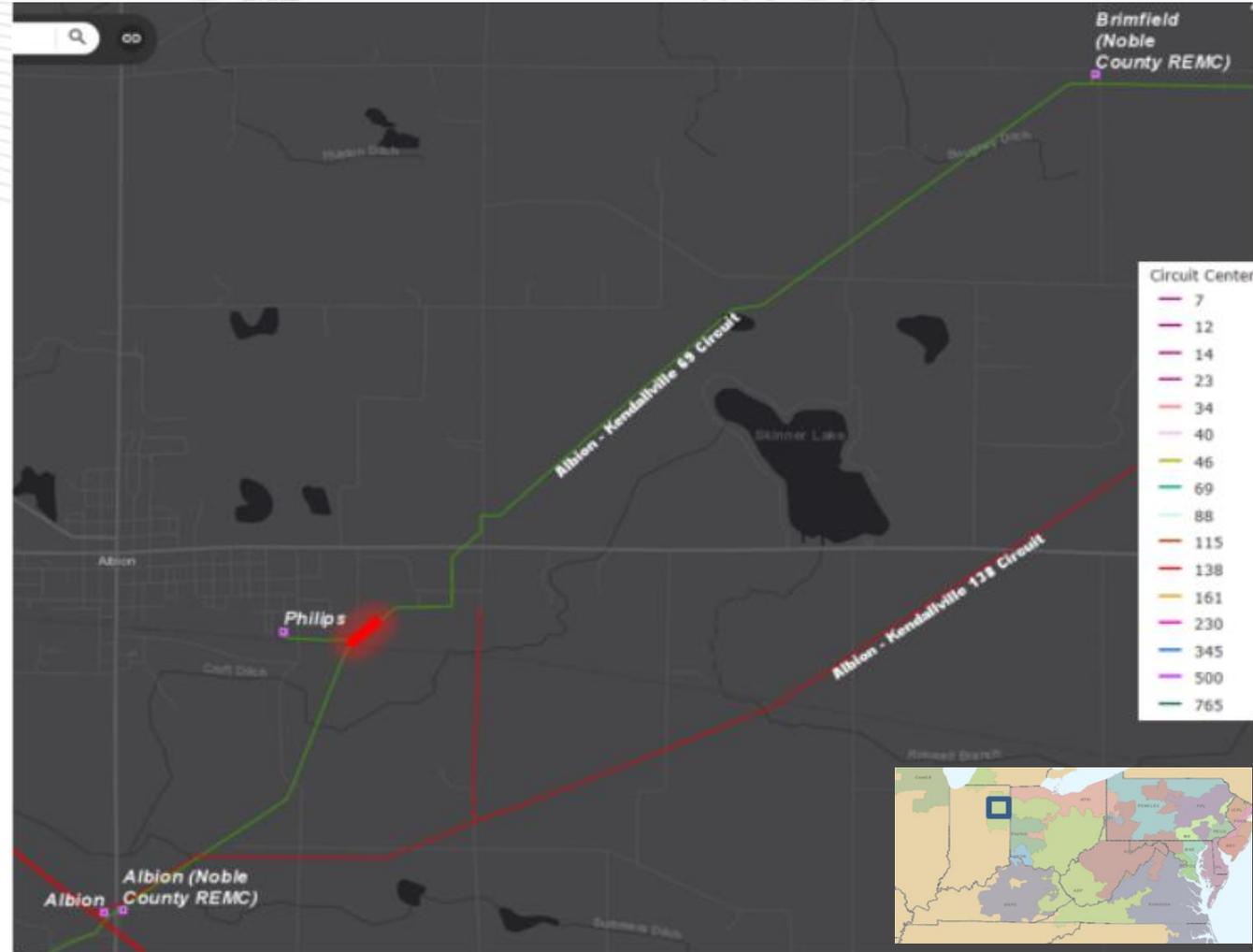
Problem Statement:

AEP-T43, AEP-T44, AEP-T45, AEP-T46

In 2026 RTEP summer case, the Albion - Philips Switch and Philips Switch - Brimfield Switch 69kV line are overloaded for multiple N-1-1 contingency pairs.

Existing Facility Rating:

Branch	SN/SE/WN/WE (MVA)
05BRIMFLD8 – 05PHILOPSZ 69KV	50/50/63/63
05PHILOPSZ – 05ALBION Z 69KV	50/50/63/63



SN / SE / WN / WE: Summer Normal / Summer Emergency / Winter Normal / Winter Emergency



AEP Transmission Zone: Baseline Albion-Kendallville Rebuild

As part of the 2021 RTEP Window #1, the projects listed in the table below are proposed to address the following violations: AEP-T43, AEP-T44, AEP-T45, AEP-T46

Proposal ID	Proposing Entity	Upgrade Description	Upgrade Cost (\$M)
25	AEP	Albion-Kendallville Rebuild	0.61

Proposed Solution: Proposal #2021_1-25: Rebuild approximately 0.3 miles of overloaded 69 kV line between Albion - Philips Switch and Philips Switch - Brimfield Switch with 556 ACSR conductor.

Estimated Cost: \$0.61M

Preliminary Facility Rating:

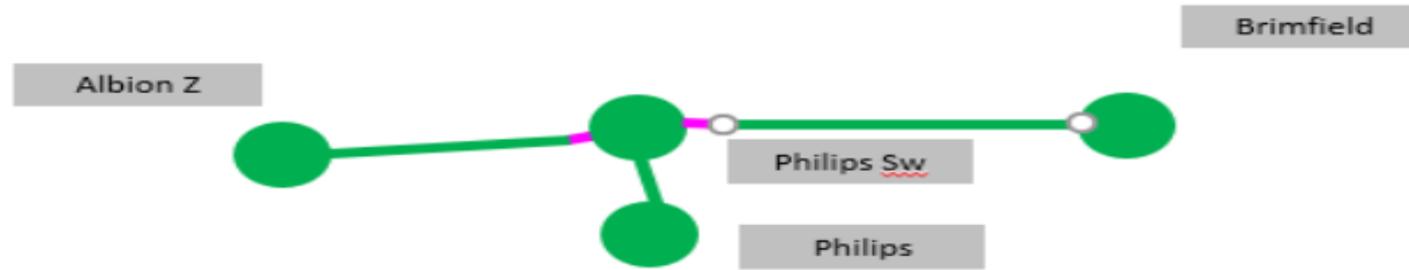
Branch	SN/SE/WN/WE (MVA)
05BRIMFLD8 – 05PHILOPSZ 69KV	82/90/107/113
05PHILOPSZ – 05ALBION Z 69KV	82/90/107/113

Required IS Date: 6/1/2026

Required IS Date: 6/1/2026

SN / SE / WN / WE: Summer Normal / Summer Emergency / Winter Normal / Winter Emergency

AEP Transmission Zone: Baseline Albion-Kendallville Rebuild



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



AEP Transmission Zone: Baseline West Kingsport Area

Process Stage: First Read

Criteria: AEP FERC 715 Criteria

Assumption Reference: 2026 RTEP assumption

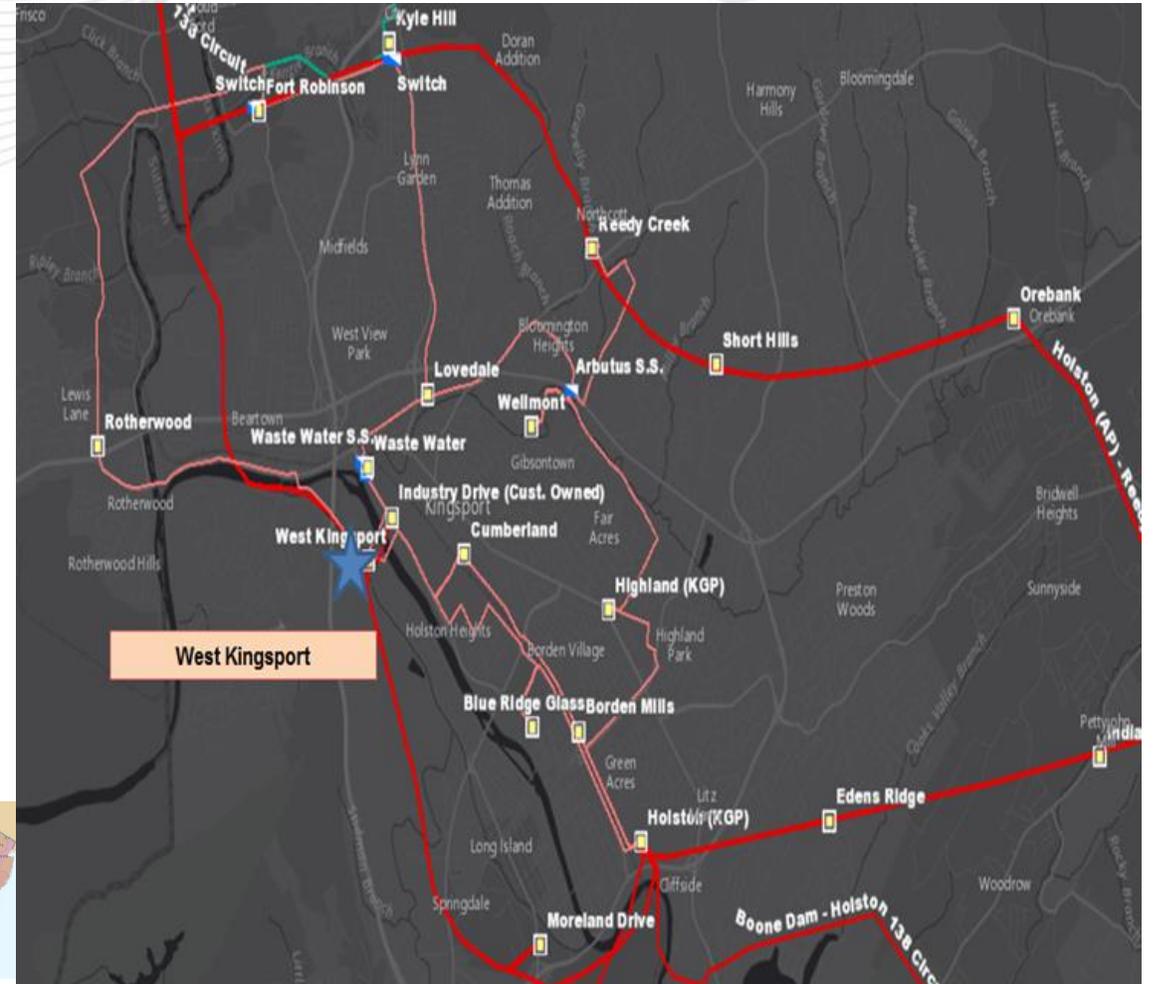
Model Used for Analysis: 2026 RTEP cases

Proposal Window Exclusion: None

Problem Statement:

AEP -T1, AEP -T2, AEP -T3, AEP -T4, AEP -T5

In 2026 RTEP light load case, the Lovedale – Sewage 34.5kV line and the Sewage – West Kingsport 34.5kV lines are overloaded for the N-1-1 contingency pair; and the West Kingsport transformer is overloaded for multiple N-1-1 contingency pairs.





As part of the 2021 RTEP Window #1, the projects listed in the table below are proposed to address the following violations: AEP-T43, AEP-T44, AEP-T45, AEP-T46

Proposal ID	Proposing Entity	Upgrade Description	Upgrade Cost (\$M)
19	AEP	West Kingsport Line Cut In	2.907
909	AEP	West Kingsport Transformer Replacement and Line Rebuilds	7.425

Proposed Solution: Proposal #2021_1-19

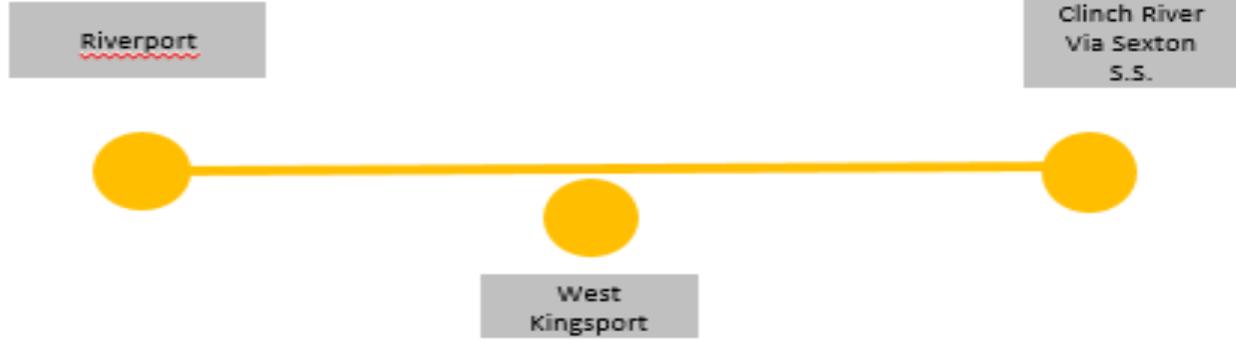
- Install two (2) 138 KV circuit breakers in the M and N strings in the breaker-and-a half configuration in West Kingsport station 138 KV yard to allow the Clinch River – Moreland Dr. 138 KV to cut in the West Kingsport station, Estimated Cost: \$1.846 M
- Upgrade remote end relaying at Riverport 138kV station due to the line cut in at West Kingsport station, Estimated Cost: \$0.251M

Total Estimated Cost: \$2.097M

Required IS Date: 11/1/2026

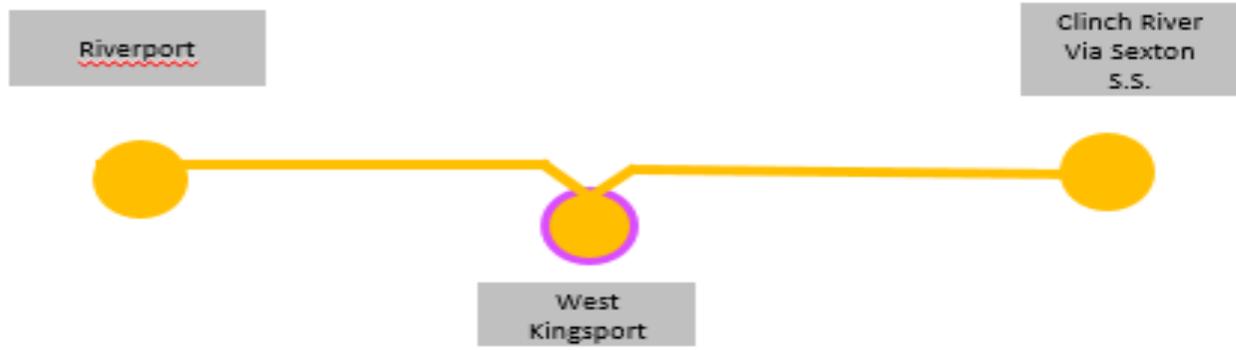
Required IS Date: 11/1/2026

Existing:



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

Proposed:





AEP Transmission Zone: Baseline Leatherwood – Salt Fork 69kV line

Process Stage: First Read

Criteria: AEP FERC 715 Criteria

Assumption Reference: 2026 RTEP assumption

Model Used for Analysis: 2026 RTEP cases

Proposal Window Exclusion: None

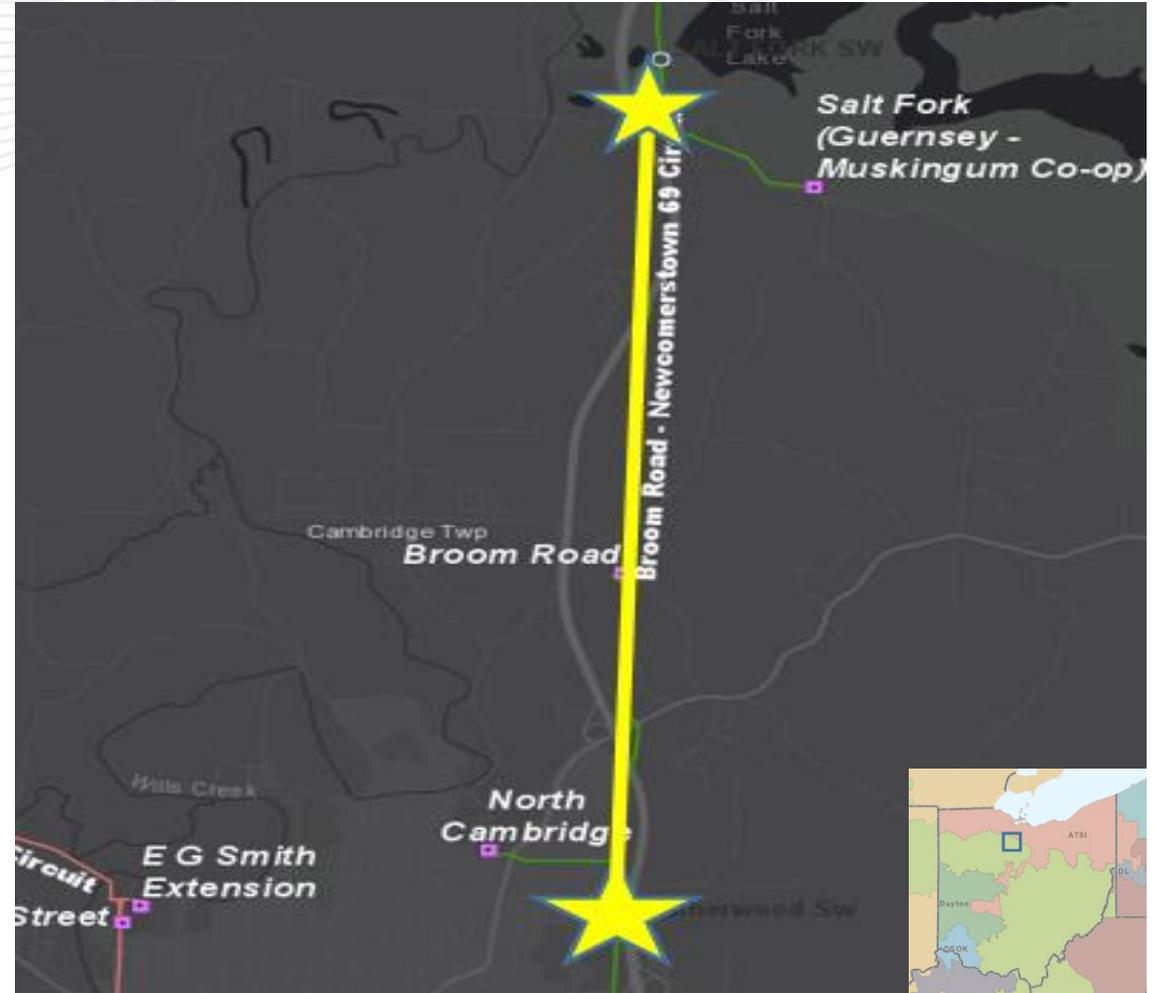
Problem Statement:

AEP-T39, AEP-T40, AEP-T41, AEP-T42

In 2026 RTEP summer case, the Leatherwood – Broom Road 69kV line and Broom Road – Salt Fork 69kV line are overloaded for a N-1-1 contingency pair.

Existing Facility Rating:

Branch	SN/SE/WN/WE (MVA)
05LEATHERW – 05BROOMRD 69KV	46/46/60/60
05BROOMRD – 05SALTFRKZ 69KV	46/46/60/60



SN / SE / WN / WE: Summer Normal / Summer Emergency / Winter Normal / Winter Emergency



AEP Transmission Zone: Baseline Leatherwood – Salt Fork 69kV line

As part of the 2021 RTEP Window #1, the projects listed in the table below are proposed to address the following violations: AEP-T39, AEP-T40, AEP-T41, AEP-T42

Proposal ID	Proposing Entity	Upgrade Description	Upgrade Cost (\$M)
115	AEP	Salt Fork-Leatherwood Rebuild	9.101
920	AEP	West Cambridge Transformer Addition	4.953

Proposed Solution: Proposal #2021_1-115

- Rebuild ~4.2 miles of overloaded sections of the 69 kV line between Salt Fork Switch and Leatherwood Switch with 556 ACSR. Estimated cost: \$9.062M
- Update relay settings at Broom Road station. Estimated cost: \$0.039M

Estimated Cost: \$9.101M

Additional Benefit: Addresses part of the supplemental need AEP-2021-OH006 (presented in 2/17/2021 W-SRRTEP)

Preliminary Facility Rating:

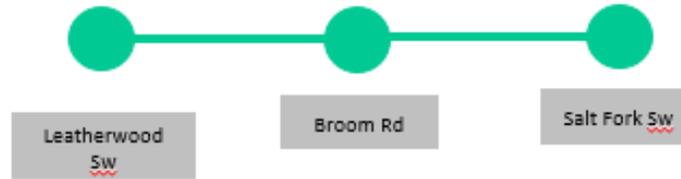
Branch	SN/SE/WN/WE (MVA)
05LEATHERW – 05BROOMRD 69KV	73/90/91/106
05BROOMRD – 05SALTFRKZ 69KV	73/73/91/91

Required IS Date: 6/1/2026

Required IS Date: 6/1/2026

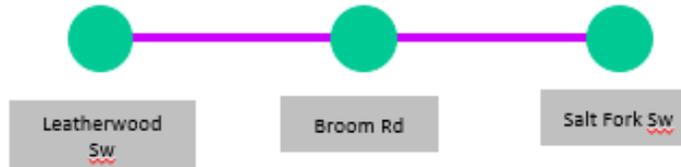
SN / SE / WN / WE: Summer Normal / Summer Emergency / Winter Normal / Winter Emergency

Existing:



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

Proposed:





As part of the 2021 RTEP Window #1, the projects listed in the table below are proposed to address the following violations: AEP -T9, AEP -T10, AEP -T11, AEP -T12, AEP -T13, AEP -T14

Proposal ID	Proposing Entity	Upgrade Description	Upgrade Cost (\$M)
116	AEP	Bancroft-Milton Rebuild	56.729
336	AEP	Cabell Station Expansion and Cut In	13.684

Proposed Solution: Proposal #2021_1-116

- Rebuild approximately 20 miles of line between Bancroft and Milton stations with 556 ACSR conductor. Estimated cost: \$56.553M
- Replace the jumpers around Hurricane switch with 556 ACSR. Estimated cost: \$0.014M
- Replace the jumpers around Teays switch with 556 ACSR.. Estimated cost: \$0.014M
- Winfield Station Relay Settings: Update relay settings to coordinate with remote ends on line rebuild. Estimated cost: \$0.047M
- Bancroft Station Relay Settings: Update relay settings to coordinate with remote ends on line rebuild. Estimated cost: \$0.027M
- Milton Station Relay Settings: Update relay settings to coordinate with remote ends on line rebuild. Estimated cost: \$0.027M
- Putnam Village Station Relay Settings: Update relay settings to coordinate with remote ends on line rebuild. Estimated cost: \$0.047M

Total Estimated Cost: \$56.729M



AEP Transmission Zone: Baseline Bancroft-Milton 69kV line

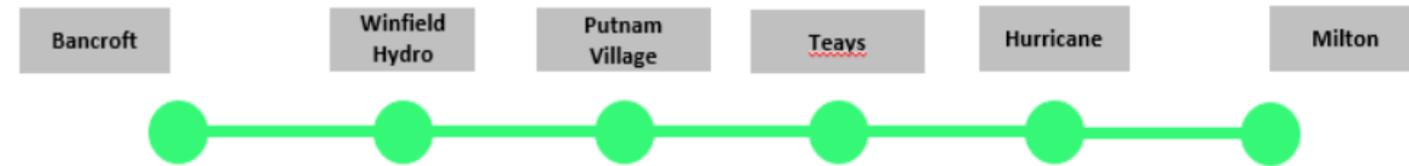
Additional Benefit: The Bancroft - Milton 69 kV line is mostly comprised of 1920s and 1930s steel lattice construction and has experienced 28 momentary outages and 10 permanent outages since 2015, resulting in 840,000 CMI. Any supplemental needs not addressed in this proposal will go through the M-3 process as needed.

Preliminary Facility Rating:

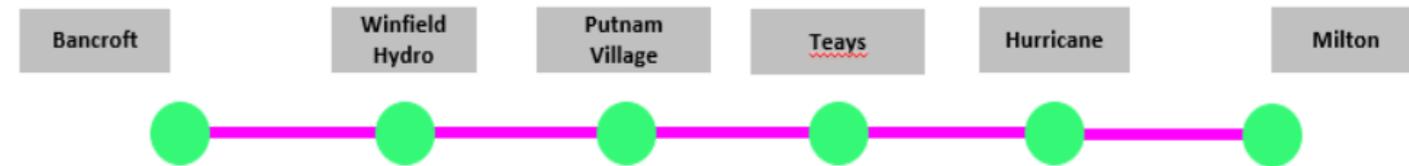
Branch	SN/SE/WN/WE (MVA)
05HURRICAN – 05MILTON 69KV	102/142/129/159
05HURRICAN – 05TEAYS 69KV	102/142/129/159
05TEAYS – 05PUTNAM VLG 69KV	102/142/129/159
05WINFIELD – 05PUTNAM VLG 69KV	102/142/129/159
05BANCROFT – 05PUTNAM VLG 69KV	102/142/129/159

Required IS Date: 11/1/2026
Projected IS Date: 6/30/2026

Existing



Proposed



Legend	
345 kV	
138 kV	
69 kV	
46 kV	
New	

SN / SE / WN / WE: Summer Normal / Summer Emergency / Winter Normal / Winter Emergency



PECO Transmission Zone: Baseline

Process Stage: First Review

Criteria: Summer Generator Deliverability

Assumption Reference: 2026 RTEP assumption

Model Used for Analysis: 2026 RTEP Summer case

Proposal Window Exclusion: None

Problem Statement:

The PECO portion of the Croydon – Burlington 230 kV circuit is overloaded for multiple contingencies.

Violations were posted as part of the 2021 Window 1: FG# GD-S485, GD-S674 and GD-S486

Existing Facility Rating: 752SN/906E, 840WN/996WE MVA

Proposed Facility Rating: 851SN/995SE, 892WN/1020WE MVA

Proposed Solution:

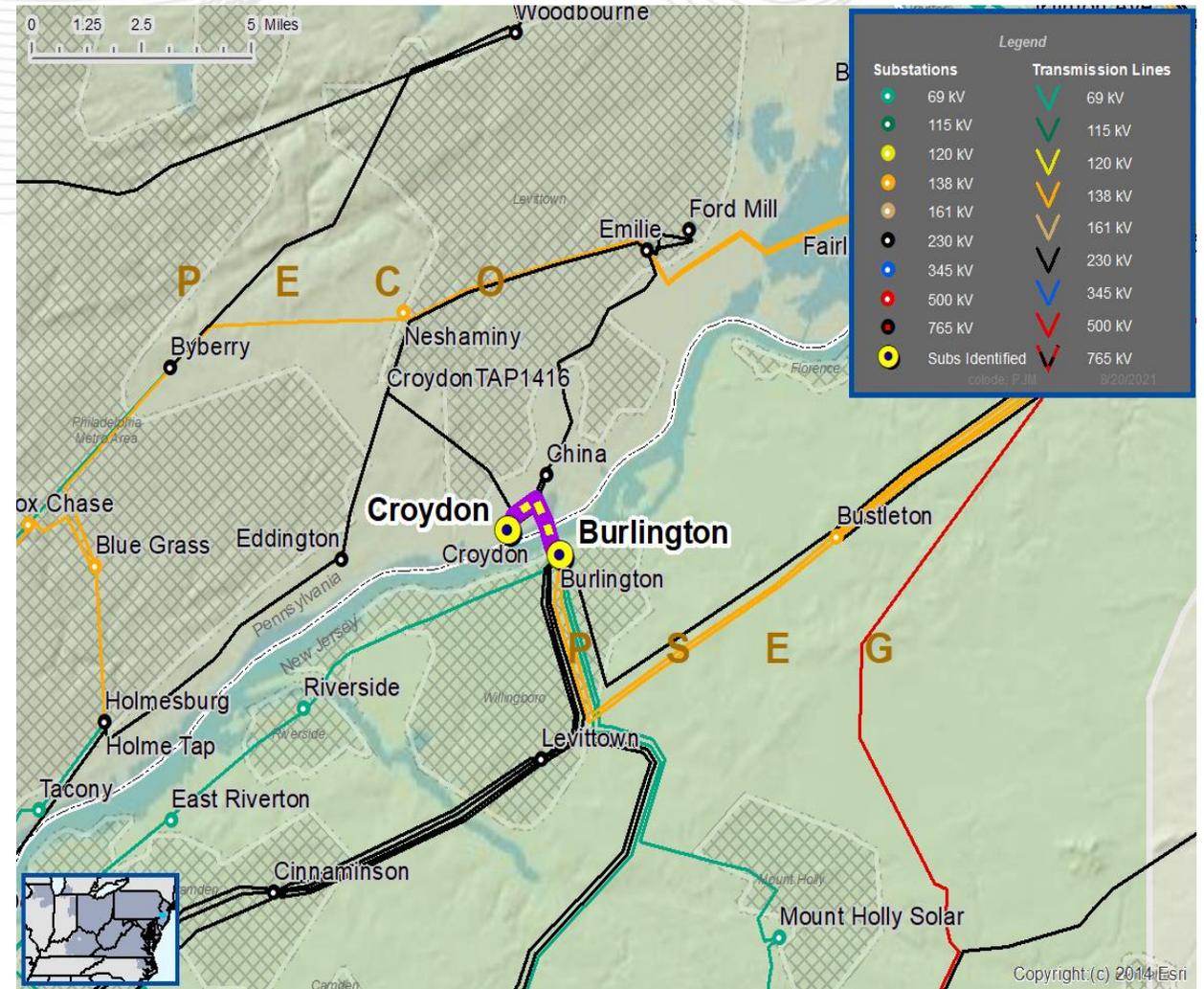
Proposal ID 88- Replace a 0.76 mile length of the Croydon-Burlington 230 kV line conductor. The existing conductor is 1590 kcmil ACSR and will be replaced by 1622 kcmil ACSS/TW.

Note: The upgrade is also identified for deactivation study.

Estimated Cost: \$0.794 M

Alternatives: N/A

Required In-Service: 6/1/2026



Process Stage: First Review

Criteria: Summer N-1 and Generator Deliverability

Assumption Reference: 2026 RTEP assumption

Model Used for Analysis: 2026 RTEP Summer case

Proposal Window Exclusion: Substation Equipment

Problem Statement:

The Juniata 500/230 kV transformer #2 is overloaded for line fault stuck breaker contingency.

Violations were posted as part of the 2021 Window 1: FG# N1-ST31 and GD-S429

Existing Facility Rating: 685SN/814SE, 842WN/911WE MVA

Proposed Facility Rating: 776SN/1010SE, 971WN/1040WE MVA

Proposed Solution:

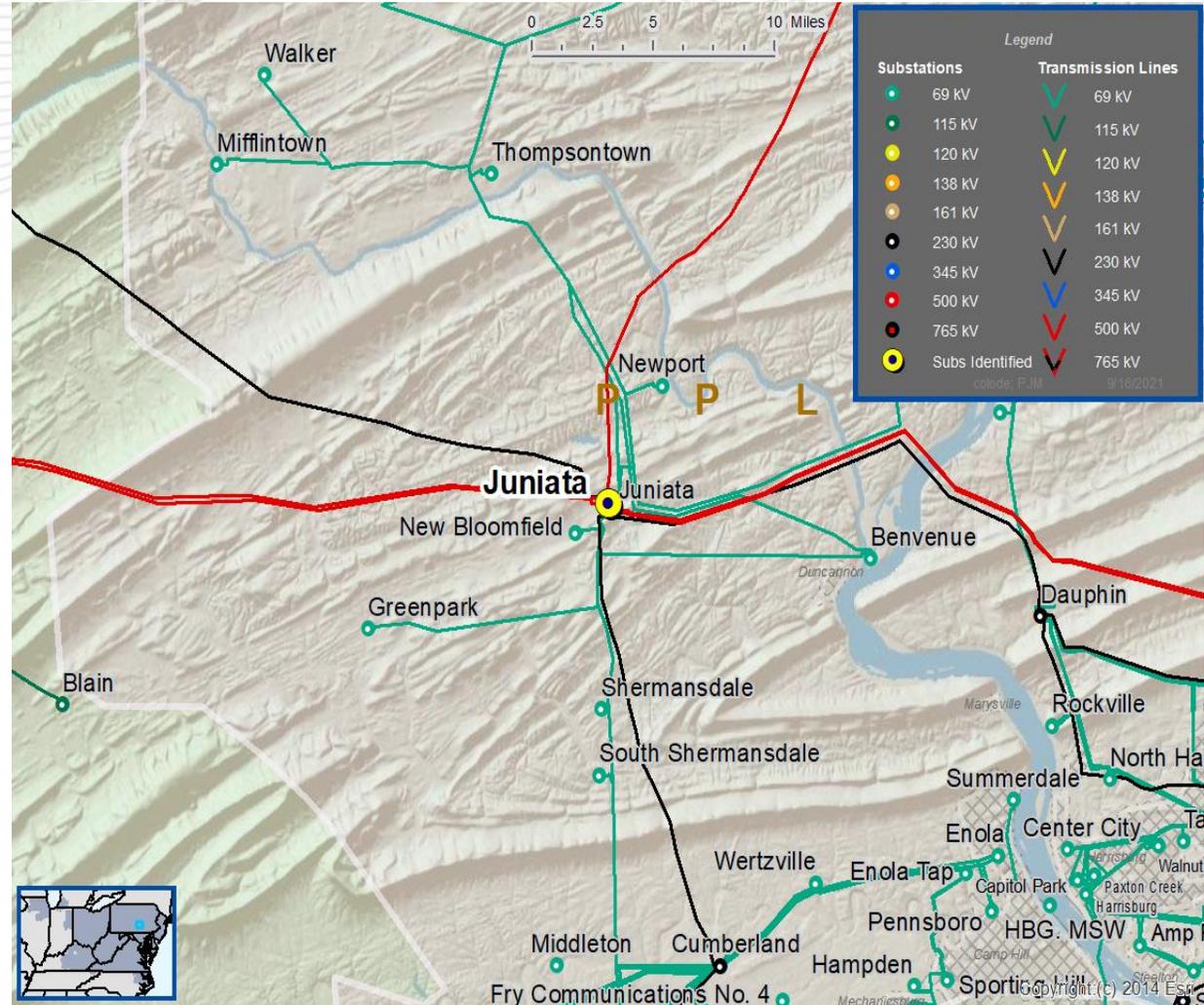
Juniata: Replace the limiting 230kV T2 transformer leads, bay conductor and bus conductor with double bundle 1590 ACSR . Replace the limiting 1200A MODs on the Bus tie breaker with 3000A MODs.

Note: If the S0945.1 (Rebuild Juniata 230 kV station) moves forward and construction is completed prior to 6/1/2026, the baseline project may not be needed and may be canceled.

Estimated Cost: \$0.684 M

Alternatives: N/A

Required In-Service: 6/1/2026



Process Stage: First Review

Criteria: Summer Generator Deliverability

Assumption Reference: 2026 RTEP assumption

Model Used for Analysis: 2026 RTEP Summer case

Proposal Window Exclusion: Substation Equipment

Problem Statement:

East Towanda - Canyon 230 kV is overloaded for pre-contingency plus multiple contingencies.

Violations were posted as part of the 2021 Window 1: GD-S14, GD-S15, GD-S38

Existing Facility Rating: : 515SN/615SE, 619WN/703WE MVA

Proposed Facility Rating: 546SN/666SE, 619WN/790WE MVA.

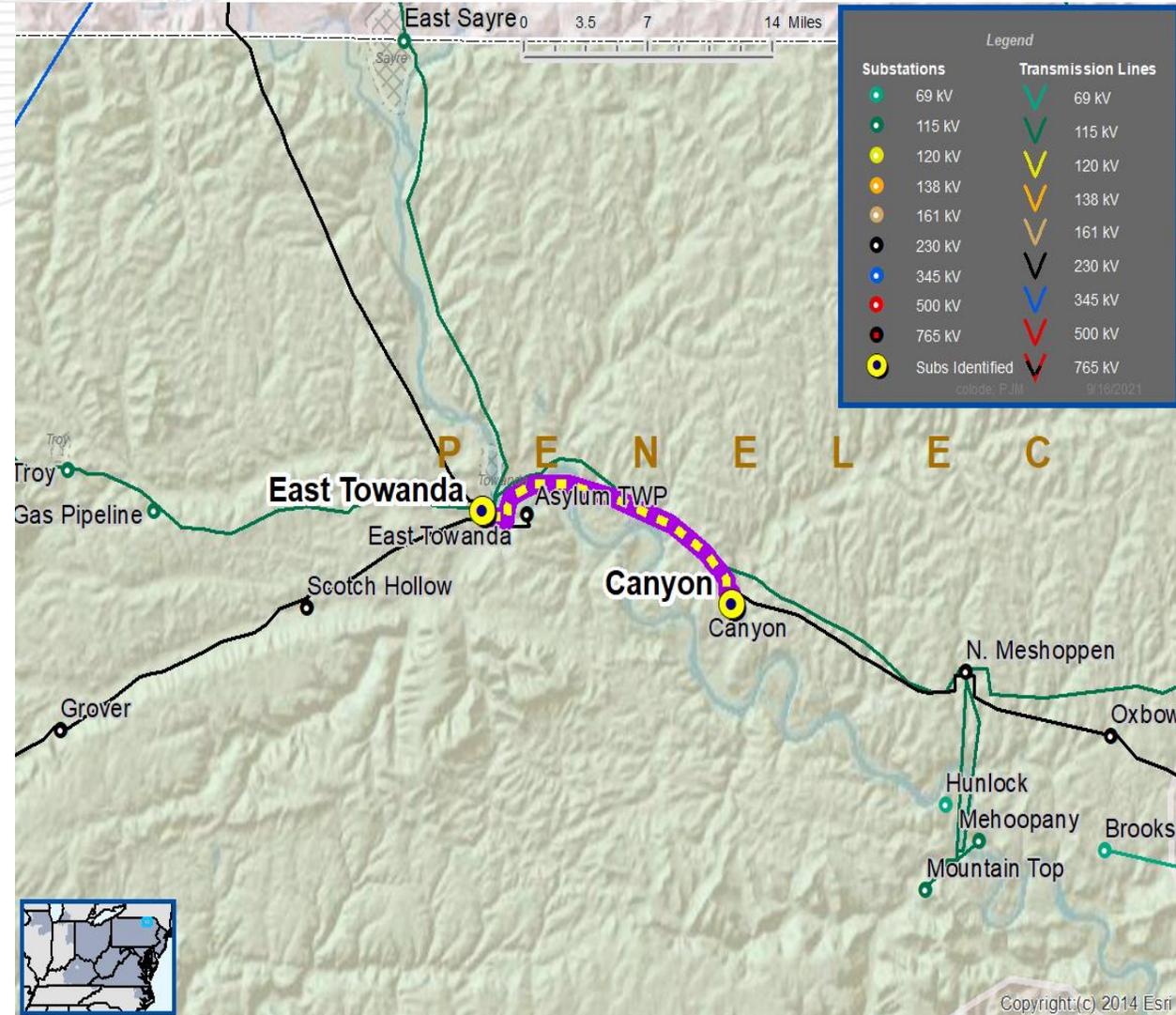
Proposed Solution:

Replace several pieces of 1033.5 AAC substation conductor at East Towanda 230 kV.

Estimated Cost: \$0.407 M

Alternatives: N/A

Required In-Service: 6/1/2026



Process Stage: First Review

Criteria: Summer and Winter, N-1 and N-1-1 Voltage

Assumption Reference: 2026 RTEP assumption

Model Used for Analysis: 2026 RTEP Summer case

Proposal Window Exclusion: None

Problem Statement: Post-contingency high voltage violation in Penelec, Grover area. Potential voltage violation at the Grover and surrounding 230 kV stations for N-1, N-1-1 contingencies.

Violations were posted as part of the 2021 Window 1: (N1-SVM1, N1-SVM2, N2-SVM1, N2-SVM2, N2-SVM3, N2-SVM4, N2-SVM5, N2-SVM6, N2-SVM7, N1-WVM1, N1-WVM2, N1-WVM3, N1-WVM4, N2-WVM1, N2-WVM2, N2-WVM3, N2-WVM4, N2-WVM5, N2-WVM6, N2-WVM7, N2-WVM8, N2-WVM9)

Existing Facility Rating: N/A

Preferred Solution:

Proposal ID 745 - Marshall 230 kV Substation: Install dual reactors and expand existing ring bus

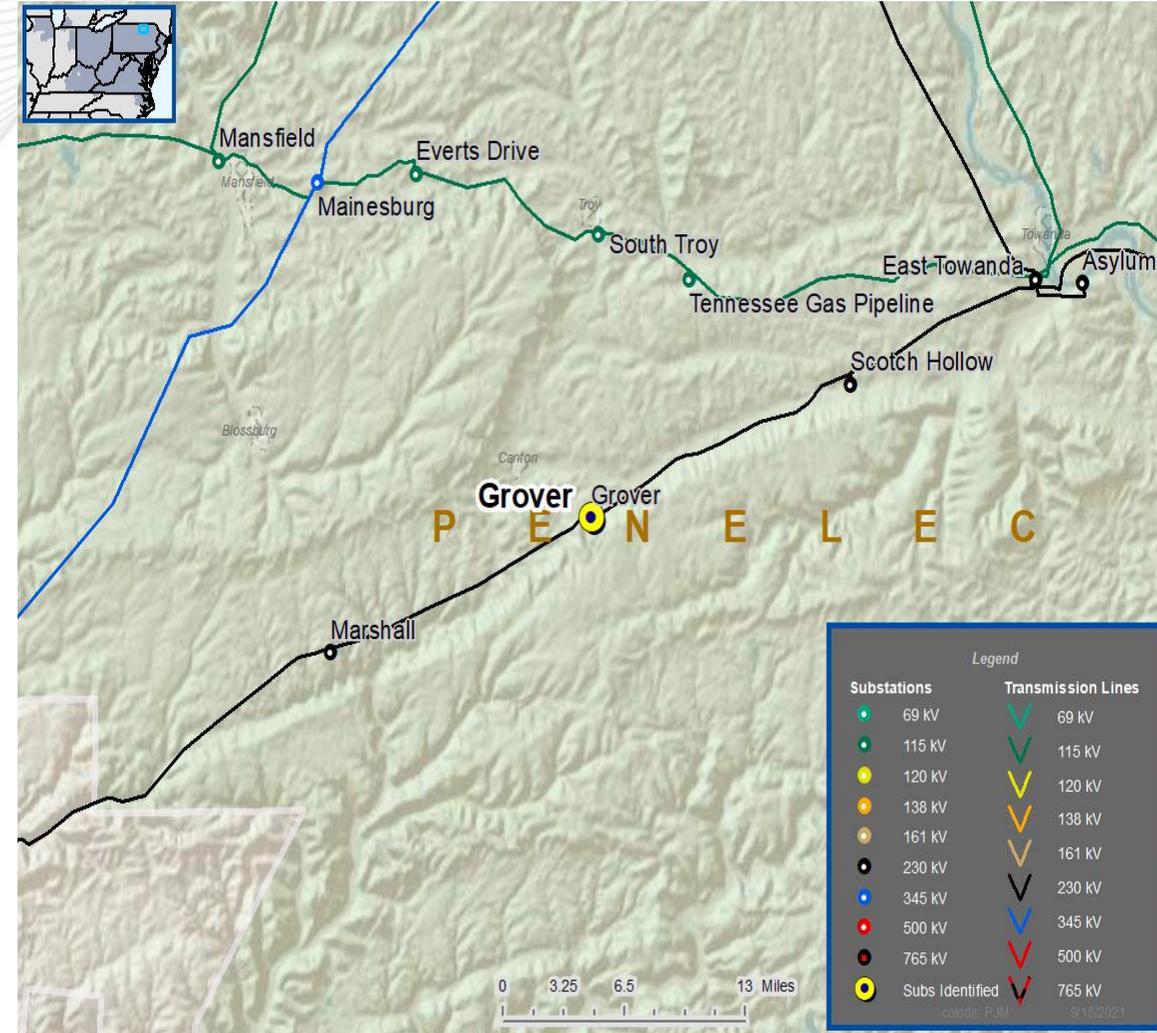
Estimated Cost: \$5.83 M

Alternatives:

Proposal ID 634 - Grover 230 kV Substation: Install dual reactors and convert the station to a ring bus. \$16.32

Proposal ID 498 - Grover Substation: Install two reactors and install line breakers. \$5.11 M

Required In-Service: 6/1/2026



Process Stage: First Review

Criteria: Summer N-1-1 Voltage

Assumption Reference: 2026 RTEP assumption

Model Used for Analysis: 2026 RTEP Summer case

Proposal Window Exclusion: None

Problem Statement: Post-contingency voltage magnitude and voltage drop violation in Penelec, Mansfield area. Potential voltage violation at the Mansfield and surrounding 115 kV stations for N-1-1 contingencies.

Violations were posted as part of the 2020 Window 1: (N2-SVM48, N2-SVM49, N2-SVM50, N2-SVD19, N2-SVD20, N2-SVD21, N2-SVD22, N2-SVD23, N2-SVD24, N2-SVD25, N2-SVD26, N2-SVD27, N2-SVD28, N2-SVD29)

Existing Facility Rating: N/A

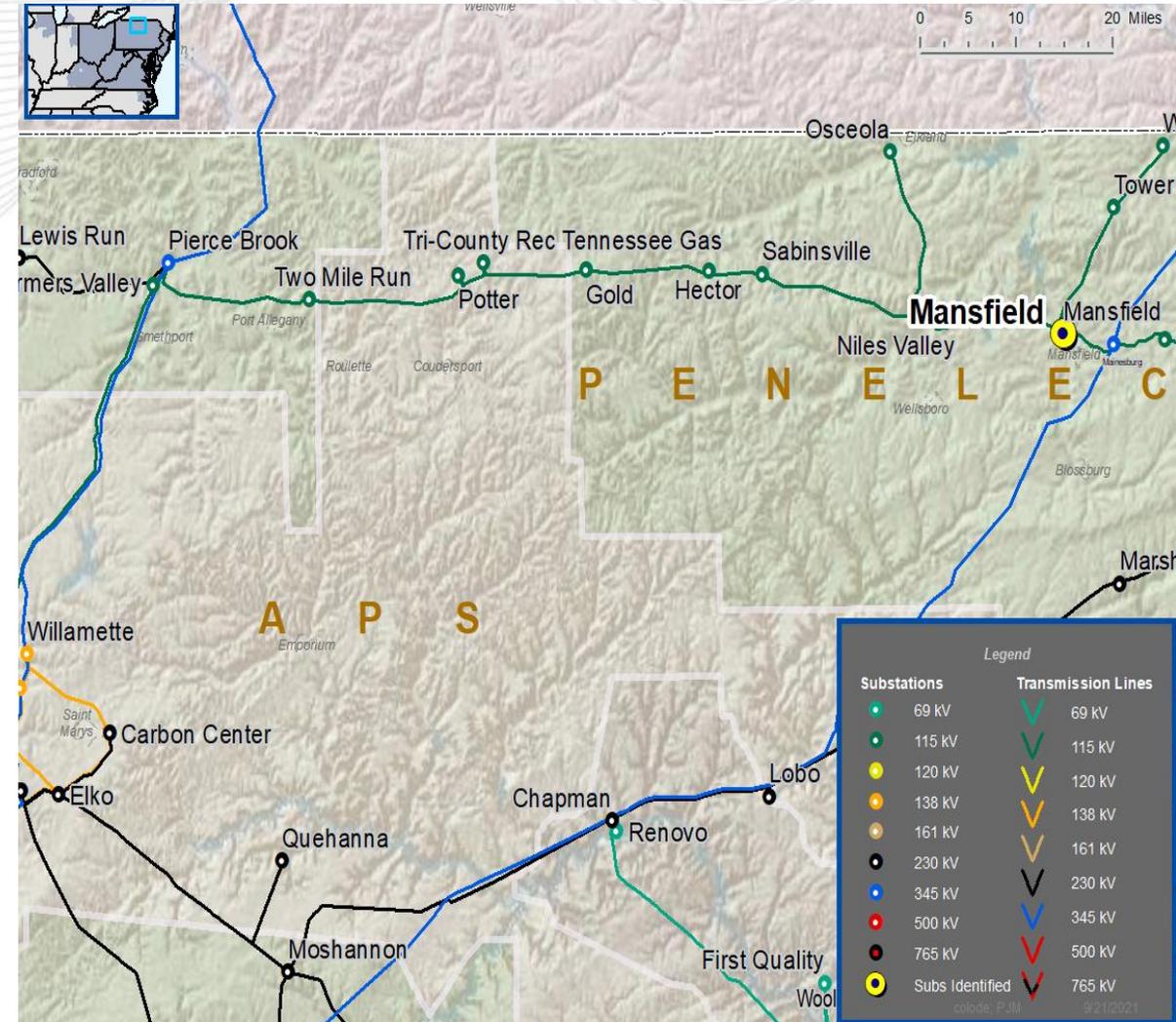
Proposed Solution:

Proposal ID 101 - Pierce Brook Substation: Install second 230/115 kV transformer.

Estimated Cost: \$5.07 M

Alternatives: N/A

Required In-Service: 6/1/2026



- PJM performed a sensitivity study to determine reliability impacts associated with the removal of the 9A project from the case used to perform the 2021 RTEP
 - Summer generation deliverability thermal violations
 - Messick Road-Morgan 138 kV
 - TMI 500/230kV transformer
 - Pleasant View 500/230 kV transformer
 - Winter generation deliverability thermal violations
 - Messick Road-Morgan 138 kV
 - TMI 500/230kV transformer
 - Pleasant View 500/230kV transformer
 - Ridgley-Messick Road 138 kV
 - Shade Gap-Roxbury 115 kV
 - All additional criteria analysis (e.g., N-1, N-1-1, Light Load, etc.) completed with no violations identified

Note: Violations are small in magnitude and operating steps for a short term duration can mitigate issues pending further review in 2022 RTEP

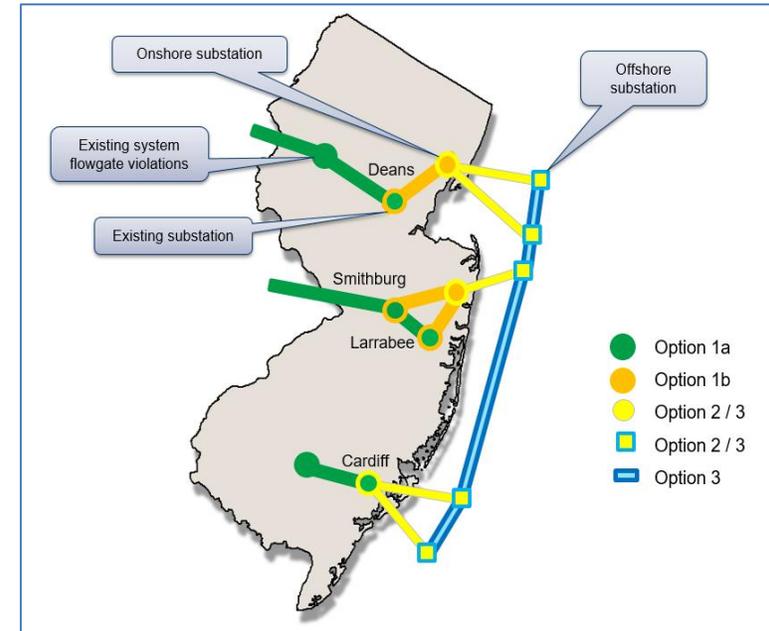
- On September 22, 2021, the PJM Board endorsed PJM's recommendation to suspend the Transource 9A Project, due to permitting risks, in order to remove it from the models pending further updates
- Benefit to Cost ratio was not recalculated at this time
- PJM will remove the Transource 9A Project as a part of the 2022 RTEP to determine the need for any reliability reinforcements
- PJM is not cancelling the project at this time
- Following the determination of any reinforcements for the baseline RTEP reliability, PJM will begin to review impacts to the interconnection queue and will include this updated topology in future market efficiency studies
- Designated Entity Agreement milestones are now subject to the outcome of project-related court litigation and any resulting regulatory process, or other terms and conditions in the Designated Entity Agreement



2021 SAA Proposal Window to Support NJ OSW

- Following a request from New Jersey BPU, PJM opened an RTEP proposal window to solicit submissions to build the necessary transmission to meet New Jersey's goal of facilitating the delivery of a total of 7,500 MW of offshore wind through 2035
 - Schedule
 - Open Window April 15
 - Close Window September 17

- The proposal window received a robust response from both incumbent and non-incumbent entities
- Proposals span the breadth of the requested submissions (Option 1a, Option 1b, Option 2, & Option 3)
- Proposals for Option 1a include both upgrades to the existing system as well as greenfield upgrades



Note: Option designations refer to the four portions of the requested proposal as outlined in the *PJM RTEP – 2021 NJ OFFSHORE WIND TRANSMISSION SAA PROPOSAL WINDOW OVERVIEW* document

- Proposals received include multiple combinations of the individual proposals which expand the number of possible combinations beyond the number of proposals received
- NJBPU has issued a guidance document indicating certain processes which will be employed going forward during evaluations – This document can be found on the NJBPU website (link below), is referenced in the notice to the TEAC on 9/24, and is also contained in the non-encrypted link for materials associated with the window on PJM’s competitive planning page

NJBPU guidance document: <https://www.nj.gov/bpu/pdf/ofrp/SAA%20Process%20Overview.pdf>



Current Status to Review 2021 SAA Proposal Window for NJ OSW

- Proposal evaluations are ongoing and additional details are expected to be available for the November TEAC
- Total number of individual proposals received: 79
- Total number of proposals with Cost Commitment provisions: 57

	Option 1a	Option 1b	Option 2	Option 3
Number of proposals addressing individual options	45	22	26	8



Entities That Provided Proposals for 2021 SAA Proposal Window for NJ OSW

- Anbaric Development Partners, LLC
- Atlantic City Electric Company
- Atlantic Power Transmission (APT), a Blackstone Infrastructure Partners portfolio company
- Con Edison Transmission, Inc.
- Jersey Central Power & Light Company
- LS Power Grid Mid-Atlantic, LLC
- Mid-Atlantic Offshore Development, LLC, a joint venture of EDF Renewables North America (EDFR) and Shell New Energies US, LLC (Shell New Energies)
- NextEra Energy Transmission MidAtlantic Holdings, LLC
- Outerbridge New Jersey, LLC, a subsidiary of Rise Light & Power, LLC
- PPL Electric Utilities
- PSEG Renewable Transmission LLC and Orsted N.A. Transmission Holding, LLC
- Public Service Electric & Gas Company
- Transource Energy, LLC

Facilitator:
Sue Glatz,
Suzanne.Glatz@pjm.com

Secretary:
Mike Zhang,
Michael.Zhang@pjm.com

SME/Presenter:
Aaron Berner,
Aaron.Berner@pjm.com

Reliability Analysis Update



Member Hotline

(610) 666 – 8980

(866) 400 – 8980

custsvc@pjm.com

Appendix

Proposal ID #	Project Type	Project Description	Total Construction Cost M\$	Zone	kV Level	Analysis	Flowgate
560	Greenfield	The Persia - ElimSPORT 230kV Transmission Project will include a new 3-position ring bus interconnecting the Dale - Milesburg 230kV transmission line. The proposed project will include a 230kV transmission line to connect the new substation with a new line position at the existing ElimSPORT 230kV Substation.	135.548	APS	230kv	Thermal, GenDeliv	APS-VD45, APS-VD46
608	Greenfield	The Persia - Yeagertown 230kV Transmission Project will include a new 3-position ring bus interconnecting the Dale - Milesburg 230kV transmission line. The proposed project will include a 230kV transmission line to connect the new substation with a new line position at the existing Yeagertown 230kV Substation.	77.592	APS	230kv	Thermal, GenDeliv	APS-VD45, APS-VD46
779	Upgrade	Convert Shingletown 230 kV Substation into a six-breaker ring bus. The current configuration is a straight bus with three 230 kV lines and two 230-46 kV transformers. The scope of work includes the installation of five 230 kV breakers & disconnect switches, relocation of one 230 kV breaker, CVT installations, Wavetraps installations, bus & substation conductor construction, SCADA/communications, and relaying. There will be remote-end upgrades at Lewistown & Shawville substations.	11.926	APS	230kv	Thermal, GenDeliv	APS-VD45, APS-VD46
919	Upgrade	Upgrade the Shingletown #82 230-46 kV Transformer Circuit by installing a 230 kV breaker and disconnect switches, removing existing 230 kV switches, replacing 46 kV disconnect switches, replacing limiting substation conductor, and installing/replacing relays.	1.668	APS	230kv	Thermal, GenDeliv	APS-VD45, APS-VD46



2021 RTEP Window 1 Cluster #2

Proposal ID #	Project Type	Project Description	Total Construction Cost M\$	Zone	kV Level	Analysis	Flowgate
292	Greenfield	The Dogwood Run project includes a new 115/230kV substation. This substation will include a 115kV 3-position ringbus and a 115/230kV transformer. The substation will connect via a short (~0.25 mile) 230kV line to a new line position at the nearby William Grove Substation. The Allen to Roundtop 115kV transmission line will be tied into the substation via an approximately 2 mile double circuit transmission line.	15.098	MetED	115kv	Thermal, GenDeliv	N2-SVM8, N2-SVM9, N2-SVM10, N2-SVM11, N2-SVM12, N2-SVM13, N2-SVM16, N2-SVM17, N2-SVM18, N2-SVM19, N2-SVM26, N2-SVM27, N2-SVD1, N2-SVD2, N2-SVD3, N2-SVD4, N2-SVD5, N2-SVD6, N2-SVD7, N2-SVD8, N2-SVD9, N2-SVD10, N2-SVD11, N2-SVD12, N2-SVD15, N2-SVD16
582	Greenfield	The Dogwood Sprint 500 kV project includes a new 500/115kV substation interconnecting the Juniata - Three Mile Island 500kV transmission line and the Allen to Roundtop 115kV transmission line. The substation will include a 500kV three-position ringbus that steps down, via a 500/115kV transformer, to a 115kV three-position ringbus.	21.583	MetED	500kv	Thermal, GenDeliv	N2-SVM8, N2-SVM9, N2-SVM10, N2-SVM11, N2-SVM12, N2-SVM13, N2-SVM16, N2-SVM17, N2-SVM18, N2-SVM19, N2-SVM26, N2-SVM27, N2-SVD1, N2-SVD2, N2-SVD3, N2-SVD4, N2-SVD5, N2-SVD6, N2-SVD7, N2-SVD8, N2-SVD9, N2-SVD10, N2-SVD11, N2-SVD12, N2-SVD15, N2-SVD16

Proposal ID #	Project Type	Project Description	Total Construction Cost M\$	Zone	kV Level	Analysis	Flowgate
561	Greenfield	At the existing Williams Grove Substation, install a new 115 / 69 kV transformer. Terminate the new transformer into 69 kV Bay 1. Terminate the new Williams Grove - Allen 115 kV line into the high side of the new Williams Grove 115 / 69 kV transformer. The 115 kV transformer will have both a high-side and low-side breaker. Install a new Allen four breaker ring bus Switchyard near the existing Allen Substation on adjacent new property to be purchased and owned by the Proposer. Terminate the Round Top - Allen and the Allen-PPGI 115 kV lines into the new switchyard. Extend a new 115 kV line from the new switchyard to the existing Allen Substation (~ 0.25 miles). Construct a new ~3.4 mile 115 kV single circuit transmission line from Williams Grove to the new Allen Switchyard. Remove PPGI and Roundtop 115 kV line terminations at the existing Allen Substation. Terminate the new 115 kV lead line from the new Allen 115 kV Switchyard into the existing Allen Substation (~ 0.25 miles).	15.6170	MetED	115kv	Thermal, GenDeliv	N2-SVM8, N2-SVM9, N2-SVM10, N2-SVM11, N2-SVM12, N2-SVM13, N2-SVM16, N2-SVM17, N2-SVM18, N2-SVM19, N2-SVM26, N2-SVM27, N2-SVD1, N2-SVD2, N2-SVD3, N2-SVD4, N2-SVD5, N2-SVD6, N2-SVD7, N2-SVD8, N2-SVD9, N2-SVD10, N2-SVD11, N2-SVD12, N2-SVD15, N2-SVD16

Proposal ID #	Project Type	Project Description	Total Construction Cost M\$	Zone	kV Level	Analysis	Flowgate
992	Greenfield	<p>At the existing Williams Grove Substation, install a new 230/115 kV transformer. Terminate the new transformer into Bay 1. Terminate the new Williams Grove - Allen 115 kV line into the low side of the new Williams Grove 230/115 kV transformer through one new, in series, 115 kV low-side transformer breaker. Install a new Allen four breaker ring bus Switchyard near the existing Allen Substation on adjacent new property to be purchased and owned. Terminate the Round Top - Allen and the Allen-PPGI 115 kV lines into the new switchyard. Extend new 115 kV line from the new switchyard to the existing Allen Substation (~ 0.25 miles). Construct a new ~3.4 mile 115 kV single circuit transmission line from Williams Grove to the new Allen Switchyard. Remove PPGI and Round Top 115 kV line terminations from the existing Allen substation. Terminate the new 115 kV lead line from the new Allen 115 kV switchyard into the existing Allen Substation (~ 0.25 miles).</p>	18.57	MetED	115kv	Thermal, GenDeliv	N2-SVM8, N2-SVM9, N2-SVM10, N2-SVM11, N2-SVM12, N2-SVM13, N2-SVM16, N2-SVM17, N2-SVM18, N2-SVM19, N2-SVM26, N2-SVM27, N2-SVD1, N2-SVD2, N2-SVD3, N2-SVD4, N2-SVD5, N2-SVD6, N2-SVD7, N2-SVD8, N2-SVD9, N2-SVD10, N2-SVD11, N2-SVD12, N2-SVD15, N2-SVD16



2021 RTEP Window 1 Cluster #2

Proposal ID #	Project Type	Project Description	Total Construction Cost M\$	Zone	kV Level	Analysis	Flowgate
386	Greenfield	Expand the existing incumbent Williams Grove 230 kV station to add a new 230/115 kV transformer. Construct a 3.7 mile greenfield 115 kV line from Williams Grove 115 kV station to Allen 115 kV station. Install (2) breakers at Williams Grove 230 kV, (1) breaker at Williams Grove 115 kV, and (1) breaker at Allen 115 kV. Also, reconductor 14.2 miles of existing Juniata - Cumberland 230kV line. (hereinafter, "the Project")	20.253	MetED	230kv	Thermal, GenDeliv	N2-SVM8, N2-SVM9, N2-SVM10, N2-SVM11, N2-SVM12, N2-SVM13, N2-SVM16, N2-SVM17, N2-SVM18, N2-SVM19, N2-SVM26, N2-SVM27, N2-SVD1, N2-SVD2, N2-SVD3, N2-SVD4, N2-SVD5, N2-SVD6, N2-SVD7, N2-SVD8, N2-SVD9, N2-SVD10, N2-SVD11, N2-SVD12, N2-SVD15, N2-SVD16
113	Greenfield	Expand the existing incumbent Williams Grove 230 kV station to add a new 230/115 kV transformer. Construct a 3.7 mile greenfield 115 kV line from Williams Grove 115 kV station to Allen 115 kV station. Install (2) breakers at Williams Grove 230 kV, (1) breaker at Williams Grove 115 kV, and (1) breaker at Allen 115 kV. (hereinafter, "the Project")	12.026	MetED	230kv	Thermal, GenDeliv	N2-SVM8, N2-SVM9, N2-SVM10, N2-SVM11, N2-SVM12, N2-SVM13, N2-SVM16, N2-SVM17, N2-SVM18, N2-SVM19, N2-SVM26, N2-SVM27, N2-SVD1, N2-SVD2, N2-SVD3, N2-SVD4, N2-SVD5, N2-SVD6, N2-SVD7, N2-SVD8, N2-SVD9, N2-SVD10, N2-SVD11, N2-SVD12, N2-SVD15, N2-SVD16
789	Greenfield	Loop the PPL owned Cumberland - Williams Grove 230 kV Line into a new MAIT owned substation constructed adjacent to the line. The substation will be a three-breaker ring bus and will include a 300 MVA 230/115 kV transformer. The MAIT owned Allen 115 kV Substation is to be reconfigured into a four-breaker ring bus. A new 115 kV line (approx. 2.1 miles) is to be constructed and terminated at the new substation and the Allen Substation along the TMI-Juniata 500 kV Line corridor.	28.543	MetED	230kv	Thermal, GenDeliv	N2-SVM8, N2-SVM9, N2-SVM10, N2-SVM11, N2-SVM12, N2-SVM13, N2-SVM16, N2-SVM17, N2-SVM18, N2-SVM19, N2-SVM26, N2-SVM27, N2-SVD1, N2-SVD2, N2-SVD3, N2-SVD4, N2-SVD5, N2-SVD6, N2-SVD7, N2-SVD8, N2-SVD9, N2-SVD10, N2-SVD11, N2-SVD12, N2-SVD15, N2-SVD16
477	Upgrade	Install +/- 90 MVAR STATCOM at Roundtop Substation	32.158	MetED	230kv	Thermal, GenDeliv	N2-SVM8, N2-SVM9, N2-SVM10, N2-SVM11, N2-SVM12, N2-SVM13, N2-SVM16, N2-SVM17, N2-SVM18, N2-SVM19, N2-SVM26, N2-SVM27, N2-SVD1, N2-SVD2, N2-SVD3, N2-SVD4, N2-SVD5, N2-SVD6, N2-SVD7, N2-SVD8, N2-SVD9, N2-SVD10, N2-SVD11, N2-SVD12, N2-SVD15, N2-SVD16



2021 RTEP Window 1 Cluster #2

Proposal ID #	Project Type	Project Description	Total Construction Cost M\$	Zone	kV Level	Analysis	Flowgate
457	Greenfield	At the existing Williams Grove Substation, install a new 75 MVA 115 / 69 kV transformer. Terminate the new transformer into 69 kV Bay 1. Terminate the new Williams Grove - Allen 115 kV line into the high side of the new Williams Grove 115 / 69 kV transformer. The 115 kV transformer will have both a high-side and low-side breaker. Install a new Allen four breaker ring bus Switchyard near the existing Allen Substation on adjacent property owned by the incumbent TO. Terminate the Round Top - Allen and the Allen-PPGI 115 kV lines into the new switchyard. Extend new 115 kV line from the new switchyard to the existing Allen Substation. Remove PPGI and Roundtop 115 kV line terminations from the existing Allen substation. Construct a new ~3.4 mile 115 kV single circuit transmission line from Williams Grove to the new Allen Switchyard . Remove PPGI and Roundtop 115 kV line terminations from the existing Allen Substation. Terminate the new 115 kV lead line from the new Allen 115 kV switchyard into the existing Allen Substation (~ 0.25 miles).	15.270	MetED	115kv	Thermal, GenDeliv	N2-SVM8, N2-SVM9, N2-SVM10, N2-SVM11, N2-SVM12, N2-SVM13, N2-SVM16, N2-SVM17, N2-SVM18, N2-SVM19, N2-SVM26, N2-SVM27, N2-SVD1, N2-SVD2, N2-SVD3, N2-SVD4, N2-SVD5, N2-SVD6, N2-SVD7, N2-SVD8, N2-SVD9, N2-SVD10, N2-SVD11, N2-SVD12, N2-SVD15, N2-SVD16

Proposal ID #	Project Type	Project Description	Total Construction Cost M\$	Zone	kV Level	Analysis	Flowgate
99	Greenfield	<p>At the existing Williams Grove Substation, install a new 230/115 kV transformer. Terminate the new transformer into Bay 1. Terminate the new Williams Grove - Allen 115 kV line into the low side of the new Williams Grove 230/115 kV transformer through one new, in series, 115 kV low-side transformer breaker. Install a new Allen four breaker ring bus Switchyard near the existing Allen Substation on adjacent property. Terminate the Round Top - Allen and the Allen-PPGI 115 kV lines into the new switchyard. Extend new 115 kV line from the new switchyard to the existing Allen Substation. Remove PPGI and Roundtop 115 kV line terminations from the existing Allen Substation. Construct a new ~3.4 mile 115 kV single circuit transmission line from Williams Grove to the new Allen Switchyard. Remove PPGI and Round Top 115 kV line terminations from the existing Allen substation. Terminate the new 115 kV lead line from the new Allen 115 kV Switchyard into the existing Allen Substation (~ 0.25 miles).</p>	17.822	MetED	230kv	Thermal, GenDeliv	<p>N2-SVM8, N2-SVM9, N2-SVM10, N2-SVM11, N2-SVM12, N2-SVM13, N2-SVM16, N2-SVM17, N2-SVM18, N2-SVM19, N2-SVM26, N2-SVM27, N2-SVD1, N2-SVD2, N2-SVD3, N2-SVD4, N2-SVD5, N2-SVD6, N2-SVD7, N2-SVD8, N2-SVD9, N2-SVD10, N2-SVD11, N2-SVD12, N2-SVD15, N2-SVD16</p>

Proposal ID #	Project Type	Project Description	Total Construction Cost M\$	Zone	kV Level	Analysis	Flowgate
306	Upgrade	Replace the Shawville 2A 230/115-17.2 kV Transformer with a larger unit.	5.376	PENELEC	230kv	Thermal, GenDeliv	N1-LLT20, N1-LLT21, GD-LL45, GD-LL46
100	Upgrade	Install a new 230/115 kV transformer and associated facilities. Replace the Plant's 2B 115-17.2 kV transformer with a larger 230/17.2 kV transformer.	8.775	PENELEC	230kv	Thermal, GenDeliv	N1-LLT20, N1-LLT21, GD-LL45, GD-LL46

Proposal ID #	Project Type	Project Description	Total Construction Cost M\$	Zone	kV Level	Analysis	Flowgate
634	Upgrade	At Grover 230 kV Substation – Install dual reactors and convert the station to a ring bus.	16.317	PENELEC	230kv	Thermal, GenDeliv	N2-SVM1, N2-SVM2, N2-SVM3, N2-SVM4, N2-SVM5, N2-SVM6, N2-SVM7, N1-SVM1, N1-SVM2, N1-WVM1, N1-WVM2, N1-WVM3, N1-WVM4, N2-WVM1, N2-WVM2, N2-WVM3, N2-WVM4, N2-WVM5, N2-WVM6, N2-WVM7, N2-WVM8
745	Upgrade	At Marshall 230 kV Substation: Install dual reactors and expand the existing ring bus. Relocate Moshannon line terminal. <ul style="list-style-type: none"> - Relocate the Moshannon (Lobo) 230 kV line, wire to be 1033 ACSR or larger - Install one 3000 A breaker and relaying - Install three 2000 A substation switches - Install one line exit 2000 A disconnect switch - Install two reactive switching devices/breakers - Install two 46.4 MVAR shunt reactors - Adjust relaying as necessary 	5.531	PENELEC	230kv	Thermal, GenDeliv	N2-SVM1, N2-SVM2, N2-SVM3, N2-SVM4, N2-SVM5, N2-SVM6, N2-SVM7, N1-SVM1, N1-SVM2, N1-WVM1, N1-WVM2, N1-WVM3, N1-WVM4, N2-WVM1, N2-WVM2, N2-WVM3, N2-WVM4, N2-WVM5, N2-WVM6, N2-WVM7, N2-WVM8

Proposal ID #	Project Type	Project Description	Total Construction Cost M\$	Zone	kV Level	Analysis	Flowgate
498	Upgrade	At Grover 230 kV Substation – Install dual reactors on existing straight bus	5.311	PENELEC	230kv	Thermal, GenDeliv	N2-SVM1, N2-SVM2, N2-SVM3, N2-SVM4, N2-SVM5, N2-SVM6, N2-SVM7, N1-SVM1, N1-SVM2, N1-WVM1, N1-WVM2, N1-WVM3, N1-WVM4, N2-WVM1, N2-WVM2, N2-WVM3, N2-WVM4, N2-WVM5, N2-WVM6, N2-WVM7, N2-WVM8

Proposal ID #	Project Type	Project Description	Total Construction Cost M\$	Zone	kV Level	Analysis	Flowgate
445	Upgrade	<p>Proposal 99-2905~99-2931 - 1 increases the ampacity of Line 2114 between Remington CT and Gainesville (Remington CT - Elk Run - Gainesville) to a summer rating of 1574 MVA by fully reconductoring the line and upgrading the wave trap and substation conductor at Remington CT and Gainesville.</p> <p>This project has full overlap with Supplemental Project #s2340.1 and s2340.2, presented at 06/08/2021 TEAC meeting.</p>	30.68	DOMINON	230kv	Thermal, GenDeliv	GD-S12, GD-S17, GD-S715, GD-S37, GD-S717, N1-ST49
333	Upgrade	<p>Proposal 99-2905~99-2931 - 2 increases the ampacity of Line 2114 between Remington CT and Gainesville (Remington CT - Elk Run - Gainesville) to a summer rating of 1574 MVA by fully reconductoring the line and upgrading the breakers and terminal equipment at Remington CT and Gainesville to achieve a 4000 A single breaker rating. This project has a full overlap with Supplemental Project #s2340.1 and s2340.2, presented at 06/08/2021 TEAC meeting, with the addition of the breaker replacements at Remington CT and Gainesville.</p>	39.692	DOMINON	230kv	Thermal, GenDeliv	GD-S12, GD-S17, GD-S715, GD-S37, GD-S717, N1-ST49



2021 RTEP Window 1 Cluster #5 & #7

Proposal ID #	Project Type	Project Description	Total Construction Cost M\$	Zone	kV Level	Analysis	Flowgate
298	Greenfield	Greenfield Lee District Station	72.876	DOMINON	500kV	Thermal, GenDeliv	GD-S12, GD-S17, GD-S30, GD-S715, GD-S37, GD-S717, N1-ST49

Proposal ID #	Project Type	Project Description	Total Construction Cost M\$	Zone	kV Level	Analysis	Flowgate
637	Upgrade	<p>Proposal 99-2945-1 expands the existing Occoquan substation footprint via the installation of a 500 kV GIS ring bus, one(1) 1100 MVA 500-230 kV transformer and a 230 kV breaker-and-a-half bus configuration. 500 kV Line #571 (Ox – Possum Point) to be cut and looped into the proposed 500kV GIS ring bus. 230kV Line terminations 2001(Occoquan to Possum), 2013 (Occoquan to Ox) and Line 2042 (Ogden Martin to Ox) will be rearranged to terminate in the rebuilt Occoquan station. Line 215(Hayfield to Possum Point) will need to be rearranged to fly over Occoquan.</p> <p>The addition of the new 500-230kV transformer at Occoquan creates two generation deliverability flowgates that need to be addressed as part of this Proposal. Flowgate of Line 2036 (Glebe to Radnor Heights) requires the installation of a new breaker-and-half row at Ox Substation to allow for Line 237 (Braddock-Possum Point) to be cut and terminated at OX substation. Flowgate of Line 2013 (Ox to Occoquan) requires the uprate of the line to a summer rating of 1046 MVA by fully reconductoring the line and upgrading applicable line equipment (CTs and switches)</p> <p>Additionally, Ox Breaker (201342) is overdutied based on the previous work in this Proposal and will need to upgraded to a 63kA breaker.</p>	85.8	DOMINON	500kv	Thermal, GenDeliv	DOM-T3, DOM-T4

Proposal ID #	Project Type	Project Description	Total Construction Cost M\$	Zone	kV Level	Analysis	Flowgate
319	Upgrade	<p>Proposal 99-2945-2 provides for the replacement of OX 500-230kV 280MVA Transformer Banks #1 and #2 with new 500-230kV 440 MVA transformer banks and associated lowside equipment.</p> <p>The addition of the replaced 500-230kV transformers at OX creates a generation deliverability flowgate that will be addressed as part of this Proposal. Flowgate of Line 2036 (Glebe to Radnor Heights) requires the installation of a new breaker-and-half row at Ox Substation to allow for Line #237 (Braddock-Possum Point) to be cut and terminated at OX substation.</p> <p>Additionally, Ox Breaker (201342) is overdutied based on the previous work in this Proposal and will need to be upgraded to a 63kA breaker.</p>	63.767	DOMINON	500kv	Thermal, GenDeliv	DOM-T3, DOM-T4

Proposal ID #	Project Type	Project Description	Total Construction Cost M\$	Zone	kV Level	Analysis	Flowgate
57	Upgrade	<p>Install a 2nd 500kV-230kV 840MVA transformer bank at Possum Point 500kV Yard, a 0.8 mile long 230kV line extension between Possum Point 500kV and Possum Point 230kV substation, and a new 230kV breaker at Possum 230kV Yard to terminate the extension.</p> <p>Note: Possum Point 500kV Substation and Possum Point 230kV Substation are separated by approximately 0.85 miles.</p>	24.538	DOMINON	230kv	Thermal, GenDeliv	DOM-T3, DOM-T4

Proposal ID #	Project Type	Project Description	Total Construction Cost M\$	Zone	kV Level	Analysis	Flowgate
26	Upgrade	Proposal 99-2947-5 is to add 16 MW-64 MWh battery energy storage device at Hollymeade 230 kV substation. The BESS is added as a generator injecting and absorbing real power to replicate discharging and charging modes. The BESS is sized to mitigate the reliability violation for 4 hours.	35.158	DOMINION	230kV	Thermal, GenDeliv	GD-S30
268	Greenfield	Build a new 230kV substation at Hollymeade Tap with a 4-breaker ring bus. Split lines 2054 and 2135 and terminate all 4 lines into the new ring bus. Rebuild 8.72-mile line #2054 section from Charlottesville to New Station, from 2-477 ACSR 90°C to 2-636 ASCR 24/7 MOT – 150°C (rating 1046 MVA). Rebuild 7.1-mile (2.83+4.27=7.1 miles) line #2135 section from New Station to Gordonsville, from 2-477 ACSR 90°C to 2-636 ASCR 24/7 MOT – 150°C (1046 MVA).	33.552	DOMINION	230kV	Thermal, GenDeliv	GD-S30
111	Greenfield	Build a new 8.9-mile 230 kV line between Charlottesville and Proffit Rd. DP 230 kV (“Proffit 230 kV”) stations using 795 ACRS Drake double bundle conductor. Install necessary breakers to accommodate (1) one new 230 kV line at Charlottesville and Proffit 230 kV stations.	23.708	DOMINION	230kV	Thermal, GenDeliv	GD-S30

Proposal ID #	Project Type	Project Description	Total Construction Cost M\$	Zone	kV Level	Analysis	Flowgate
170	Upgrade	Proposal 99-2947-4 is to install one 4.35 Ω series reactor to control the power flow on the 230 kV line #2054 from Charlottesville substation to Proffit Rd. DP to reduce the thermal overload on reliability driver GD-S30.	10.621	DOMINION	230kV	Thermal, GenDeliv	GD-S30
6	Upgrade	Rebuild 8.72-mile line #2054 section from Charlottesville to Hollymeade Tap structure 2054/340A, from 2-477 ACSR 90°C to 2-636 ACSR 24/7 MOT – 150°C (rating 1046 MVA).	16.124	DOMINION	230kV	Thermal, GenDeliv	GD-S30
624	Upgrade	Rebuild 8.72-mile line #2054 section from Charlottesville to Hollymeade Tap structure 2054/340A, from 2-477 ACSR 90°C to 2-768.2 ACSS/TW 20/7 with MOT of 250°C (rating 1574 MVA).	16.504	DOMINION	230kV	Thermal, GenDeliv	GD-S30
38	Greenfield	The Sleepy Hollow - Gordonsville 230kV Transmission Project will include a new 3-position ring bus interconnecting the Mount Eagle - Charlottesville 230kV transmission line and a new 230kV transmission line connecting the new Sleepy Hollow Substation to the existing Gordonsville Substation.	34.860	DOMINION	230kV	Thermal, GenDeliv	GD-S30

Proposal ID #	Project Type	Project Description	Total Construction Cost M\$	Zone	kV Level	Analysis	Flowgate
182	Greenfield	Build a new 18.22-mile 230 kV line between Charlottesville and Gordonsville 230 kV stations using 795 ACRS Drake double bundle conductor. Install necessary breakers to accommodate (1) one new 230 kV line at Charlottesville and Gordonsville DP 230 kV stations.	41.922	DOMINION	230kV	Thermal, GenDeliv	GD-S30
385	Greenfield	Construct a new Cismont 230 kV 4 breaker ring bus station connecting the Charlottesville-Proffit line segment and the Hollymead-Cash's Corner line segment. Rebuild the ~16 mile single circuit 230 kV corridor from Charlottesville-Cismont-Cash's Corner-Gordonsville. (hereinafter, "the Project")	65.468	DOMINION	230kV	Thermal, GenDeliv	GD-S30

Proposal ID #	Project Type	Project Description	Total Construction Cost M\$	Zone	kV Level	Analysis	Flowgate
19	Upgrade	Install two (2) 138 KV circuit breakers in the M and N strings in the breaker-and-a half configuration in West Kingsport station 138 KV yard to allow the Clinch River – Moreland Dr. 138 KV to cut in the West Kingsport station. The existing Clinch River-Moreland Drive line physically passes through the West Kingsport station but does not electrically connect. This project will establish the electrical connection to that line.	2.096	AEP	138kv	Thermal, GenDeliv	AEP -T1, AEP -T2, AEP -T3, AEP -T4, AEP -T5
909	Upgrade	This project comprises of replacing and upgrading the 138/69-34.5 KV transformer with a 90 MVA capable unit at West Kingsport to address thermal overload on T1 at the West Kingsport substation and rebuilding the ~ 1.5 mile long 34.5 KV line from West Kingsport – Lovedale to address lines thermal overload. Proposed ratings (SN/SE/WN/WE): 244218-244219: 90/90/90/90 244200-244213: 41/45/53/57 244213-244219: 38/38/49/49	7.424	AEP	138kv	Thermal, GenDeliv	AEP -T1, AEP -T2, AEP -T3, AEP -T4, AEP -T5

Proposal ID #	Project Type	Project Description	Total Construction Cost M\$	Zone	kV Level	Analysis	Flowgate
503	Greenfield	The LS Rockford - LS West Van Wert transmission project includes the construction of approximately 13 miles of new single circuit 69kV transmission line connecting the proposed LS Rockford Substation to the proposed LS West Van Wert Substation. The LS Rockford Substation will be a 3-position ring bus interconnecting the Rockford - Rockford Tap 69kV transmission line. The third position will be utilized by the LS Rockford - LS West Van Wert 69kV transmission line. The LS West Van Wert Substation will be a 4-position ring bus with one position going to the new LS Rockford substation, two positions to interconnect the West Van Wert to Cavett transmission line, and the final position will be used to connect to the South Van Wert transmission line.	14.414	AEP	69kv	Thermal, GenDeliv	AEP -T15, AEP -T16, AEP -T17, AEP -T18, AEP -T19, AEP -T20, AEP -T21, AEP -T22, AEP -T23, AEP -T24, AEP -T25, AEP -T26, AEP -T27, AEP -T28, AEP -T47, AEP -T48, AEP -T49, AEP -T50, AEP -T51, AEP -T52, AEP -T53, AEP -T54, AEP -T55, AEP -T56, AEP -T57, AEP -T58, AEP -T73, AEP -T74, AEP -T75, AEP -T76
202	Upgrade	AEP is proposing a rebuild of approximately 3.5 miles of the overloaded sections on the 69 kV lines around the Delphos area with 556 ACSR conductor. Expected branch ratings after completion of proposal (SN/SE/WN/WE MVA): 243175 - 245902: 68/73/90/91 245871 - 245902: 73/73/91/91 243175 - 245874: 68/71/71/71 247376 - 245874: 82/90/107/113	8.87	AEP	69kv	Thermal, GenDeliv	AEP -T15, AEP -T16, AEP -T17, AEP -T18, AEP -T19, AEP -T20, AEP -T21, AEP -T22, AEP -T23, AEP -T24, AEP -T25, AEP -T26, AEP -T27, AEP -T28, AEP -T47, AEP -T48, AEP -T49, AEP -T50, AEP -T51, AEP -T52, AEP -T53, AEP -T54, AEP -T55, AEP -T56, AEP -T57, AEP -T58, AEP -T73, AEP -T74, AEP -T75, AEP -T76



Proposal ID #	Project Type	Project Description	Total Construction Cost M\$	Zone	kV Level	Analysis	Flowgate
786	Upgrade	<p>AEP is proposing the installation of high side and low side sectionalizing equipment on the existing 138/69 kV transformer #4 at Haviland station. The rating on the Haviland transformer #4 will be increased as a part of the proposed due to a 600A switch being replaced.</p> <p>Anticipated SN/SE/WN/WE rating: 106/114/119/119 set by the transformer ratings. NOTE: This proposal also requires DP&L project s2389 to be converted to baseline and in service prior to 6/1/2026 in order to alleviate all flowgates identified. S2389 was included in the 2021 DPL Local Plan at a total cost of \$65.35M.</p>	1.309	AEP	69kv	Thermal, GenDeliv	AEP -T15, AEP -T16, AEP -T17, AEP -T18, AEP -T19, AEP -T20, AEP -T21, AEP -T22, AEP -T23, AEP -T24, AEP -T25, AEP -T26, AEP -T27, AEP -T28, AEP -T47, AEP -T48, AEP -T49, AEP -T50, AEP -T51, AEP -T52, AEP -T53, AEP -T54, AEP -T55, AEP -T56, AEP -T57, AEP -T58, AEP -T73, AEP -T74, AEP -T75, AEP -T76

Proposal ID #	Project Type	Project Description	Total Construction Cost M\$	Zone	kV Level	Analysis	Flowgate
115	Upgrade	<p>AEP is proposing to rebuild ~4.2 miles of overloaded sections of the 69 kV line between Salt Fork Switch and Leatherwood Switch with 556 ACSR. Update relay settings at Broom Road station.</p> <p>Final ratings after proposed upgrades: 245489-245493: 73/73/91/91 SN/SE/WN/WE MVA 245478-245489: 73/90/91/106 SN/SE/WN/WE MVA</p>	9.1	AEP	69kv	Thermal, GenDeliv	AEP -T39, AEP -T40, AEP -T41, AEP -T42
920	Upgrade	<p>AEP is proposing to install a second 138/69 kV transformer at West Cambridge station. The 69 kV bus will be reconfigured into a 3 breaker ring utilizing the existing 69 kV breaker 'F' along with two new 69 kV circuit breakers. The new transformer will be protected by a high side 138 kV circuit switcher. New transformer branch will be created between bus 243144 and 245483 with an initial SE/SN rating of 124/132 MVA. Existing branch ratings at West Cambridge station will not be changing as a part of this proposal.</p>	4.952	AEP	69kv	Thermal, GenDeliv	AEP -T39, AEP -T40, AEP -T41, AEP -T42

Proposal ID #	Project Type	Project Description	Total Construction Cost M\$	Zone	kV Level	Analysis	Flowgate
365	Greenfield	AEP proposes to install a motorized phase over phase switch at Accoville station on the 69kV Line and build approximately 2 miles of new 69kV line from Accoville to Becco station. A 69/46kV 45 MVA transformer will be added at Becco station and connected to the 46kV bus with a circuit breaker on the high and low side. The breaker bypass on circuit breaker D at Huff Creek will be removed and relays updated for the new line connection to Becco. Proposed Ratings (SN/SE/WN/WE MVA): 244525 to 290457: 102/142/129/160 290457 to 244471: 45/45/45/45	13.048	AEP	69kv	Thermal, GenDeliv	AEP -T6, AEP -T7, AEP -T8, AEP-VM1, AEP-VM2, AEP-VM3, AEP-VM4, AEP-VM5, AEP-VM6, AEP-VM7, AEP-VM8, AEP-VM9, AEP-VD1, AEP-VD2, AEP-VD3, AEP-VD4, AEP-VD5, AEP-VD6, AEP-VD7, AEP-VD8, AEP-VD9
310	Upgrade	AEP proposes to rebuild the Becco - Pine Gap 46kV circuit with 556 ACSR. Upgrade relaying at Pine Gap station. Proposed Ratings for all rebuilt branches (SN/SE/WN/WE MVA): 68/95/86/107	51.191	AEP	69kv	Thermal, GenDeliv	AEP -T6, AEP -T7, AEP -T8, AEP-VM1, AEP-VM2, AEP-VM3, AEP-VM4, AEP-VM5, AEP-VM6, AEP-VM7, AEP-VM8, AEP-VM9, AEP-VD1, AEP-VD2, AEP-VD3, AEP-VD4, AEP-VD5, AEP-VD6, AEP-VD7, AEP-VD8, AEP-VD9

Proposal ID #	Project Type	Project Description	Total Construction Cost M\$	Zone	kV Level	Analysis	Flowgate
488	Greenfield	AEP proposes to replace the existing Pine Gap station with a new 138 kV greenfield station called Tin Branch by cutting in the Logan – Sprigg No.2 via a greenfield double circuit line extension. Replace the existing Dehue station with a greenfield distribution station called Argyle by cutting in the Logan – Wyoming #1 138kV circuit via a greenfield double circuit line extension. Reconnect the 138kV customer that is served from the existing Rum Creek station to the proposed Argyle station. Retire approximately 16 miles of the Chauncey – Pine Gap 46kV line, Logan – Pine Gap 46kV line, and Bim – Logan – Sharples 46kV line from Logan to Becco. Rebuild the existing 46 kV line between Argyle station and Becco station on existing ROW. Tin Branch station will be a 138kV straight bus with two 138kV circuit breakers and a 138/12kV distribution bank. Argyle station will be a 5 breaker ring bus and contain a 138/12kV distribution bank and a 138/69-46kV transmission transformer with a breaker on the low side of the transformer. Update relay settings at Wyoming, Logan, Sprigg, Becco, and Chauncey stations.	65.798	AEP	69kv	Thermal, GenDeliv	AEP -T6, AEP -T7, AEP -T8, AEP-VM1, AEP-VM2, AEP-VM3, AEP-VM4, AEP-VM5, AEP-VM6, AEP-VM7, AEP-VM8, AEP-VM9, AEP-VD1, AEP-VD2, AEP-VD3, AEP-VD4, AEP-VD5, AEP-VD6, AEP-VD7, AEP-VD8, AEP-VD9

Proposal ID #	Project Type	Project Description	Total Construction Cost M\$	Zone	kV Level	Analysis	Flowgate
116	Upgrade	<p>Rebuild approximately 20 miles of the overloaded Bancroft-Milton 69kV line with 556 ACSR. Replace risers/jumpers at Hurricane and Teays switches. Update relay settings at Milton, Putnam Village, Winfield, and Bancroft stations. Proposed ratings after upgrade:</p> <p>244863-244873: 102/142/129/159 SN/SE/WN/WE 244873-247774: 102/142/129/159 SN/SE/WN/WE 247774-244732: 102/142/129/159 SN/SE/WN/WE 244732-244715: 102/142/129/159 SN/SE/WN/WE 244715-244722: 102/142/129/159 SN/SE/WN/WE</p>	56.729	AEP	69kv	Thermal, GenDeliv	AEP -T9, AEP - T10, AEP - T11, AEP - T12, AEP - T13, AEP -T14
336	Greenfield	<p>Construct a new 138 kV in/out line to Cabell 138 kV station from the existing Balls Gap - West Huntington 138 kV line. Expand the existing Cabell 138 kV station and install six 138 kV breakers in a ring configuration. Update remote end relay settings at Balls Gap and West Huntington stations. Replace relay package at Darrah and Milton stations.</p>	13.684	AEP	138kv	Thermal, GenDeliv	AEP -T9, AEP - T10, AEP - T11, AEP - T12, AEP - T13, AEP -T15



2021 RTEP Window 1 Non-clustered

Proposal ID #	Project Type	Project Description	Total Construction Cost M\$	Zone	kV Level	Analysis	Flowgate
722	Upgrade	Expand Substation. Install approximately 294 MVar cap bank at 500kV Lexington substation along with a 500kV breaker. Adjust the tap positions associated with the two 230/69kV TXs at Harrisonburg to neutral position and lock them.	5.86	DOMINION	500kv	Thermal, GenDeliv	N1-LLVM1, N1-LLVM2, N1-LLVM3, N1-LLVM4, N1-LLVM5, N1-LLVM6, N1-LLVM7, N1-LLVM8, N1-LLVD1, N1-LLVD2, N1-LLVD3
25	Upgrade	AEP is proposing to rebuild approximately 0.3 miles of overloaded 69 kV line between Albion - Philips Switch and Philips Switch - Brimfield Switch with 556 ACSR conductor. Anticipated SN/SE rating for two branch sections to be addressed (246184 to 246216 & 246216 to 246226) by the project is 82/90/107/113 MVA	0.609	AEP	69kv	Thermal, GenDeliv	AEP -T43, AEP-T44, AEP-T45, AEP-T46



2021 RTEP Window 1 Non-clustered

Proposal ID #	Project Type	Project Description	Total Construction Cost M\$	Zone	kV Level	Analysis	Flowgate
600	Upgrade	<p>This proposal increases the ampacity of Line 2008 between Cub Run and Walney to a summer rating of 1574 MVA by reconductoring the line. System Protection Engineering Coordination Study and System Protection Technician relay resets (CONFIRM).</p> <p>This project overlaps with Supplemental project s2507.1 (DOM-2021-0002-DNH) presented during the 06/08/2021 TEAC meeting and was included in the Dominion 2021 Local Plan on 07/01/2021.</p>	1.934	DOMINION	230kv	Thermal, GenDeliv	N1-ST33



2021 RTEP Window 1 Non-clustered

Proposal ID #	Project Type	Project Description	Total Construction Cost M\$	Zone	kV Level	Analysis	Flowgate
414	Upgrade	<p>This proposal increases the ampacity of Line 2141 between Lakeview and Carolina to a summer rating of 1047 MVA by reconductoring the line.</p> <p>This project partially overlaps with Supplemental project DOM-2021-0025 presented during the 06/08/2021 TEAC meeting.</p>	1.184	DOMINION	230kv	Thermal, GenDeliv	GD-S19
88	Upgrade	Replace a 0.76 mile length of the Croydon-Burlington 230 kV line conductor	0.794	PECO/PSEG	230kv	Thermal, GenDeliv	GD-S485, GD-S674, GD-S486
823	Upgrade	<p>Rebuild the East Towanda to Canyon section of the ETP1 (East Towanda-North Meshoppen) 230 kV Line with 1113 ACSS, approximately 12.4 miles.</p> <p>Replace the 1033 SCCIR at East Towanda 230 kV Substation.</p>	35.274	PENELEC	230kv	Thermal, GenDeliv	GD-S14, GD-S15, GD-S38
589	Upgrade	East Towanda – North Meshoppen 115 kV Line: Rebuild 2.5 miles of 636 ACSR with 1113 ACSS conductor using single circuit construction. Upgrade all terminal equipment to the rating of 1113 ACSS.	6.661	PENELEC	115kv	Thermal, GenDeliv	GD-S13



2021 RTEP Window 1 Non-clustered

Proposal ID #	Project Type	Project Description	Total Construction Cost M\$	Zone	kV Level	Analysis	Flowgate
101	Upgrade	Install a second 230/115 kV transformer at Pierce Brook Substation. Install additional breakers to expand the 230 kV and 115 kV ring bus with an additional position for the new transformer. Review and adjust relaying at remote end stations as necessary.	5.067	APS/PENELEC	230kv	Thermal, GenDeliv	N2-SVM48, N2-SVM49, N2-SVM50, N2-SVD19, N2-SVD20, N2-SVD21, N2-SVD22, N2-SVD23, N2-SVD24, N2-SVD25, N2-SVD26, N2-SVD27, N2-SVD28, N2-SVD29
549	Upgrade	Install a second 345/138 kV transformer at Hayes, 448 MVA nameplate rating. Add one 345 kV circuit breaker (3000A) to provide transformer high side connection between breaker B-18 and the new breaker. Connect the new transformer low side to the 138 kV bus. Add one 138 kV circuit breaker (3000A) at Hayes 138 kV substation between B-42 and the new breaker. Relocate the existing 138 kV No. 1 capacitor bank between B-42 and the new breaker. Protection Per FE standard.	7.595	ATSI	345kv	Thermal, GenDeliv	GD-S712
124	Upgrade	Rebuild approximately 27.7-miles of 500 kV transmission line from Elmont to Chickahominy with current 500 kV standards construction practices. The line was constructed in 1971 with ACAR conductor and 5-series Corten towers that need to be rebuilt to current standards based on the Company's End of Life Criteria.	58.155	DOMINION	500kv	Thermal, GenDeliv	DOM-02

Version No.	Date	Description
1	9/30/2021	<ul style="list-style-type: none">• Original slides posted
2	10/4/2021	<ul style="list-style-type: none">• Updated slides 46 & 51 with corrected project descriptions.
3	10/15/2021	<ul style="list-style-type: none">• Added slide 33 identifying participants in NJ OSW proposal process
4	10/18/2021	<ul style="list-style-type: none">• Updated Slide 33
5	11/9/2021	<ul style="list-style-type: none">• Corrected FG#s on slide 24