



Reliability Analysis Update

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Transmission Expansion Advisory Committee

April 12, 2022

First Review

Baseline Reliability Projects

Process Stage: First Review

Criteria: Summer N-1-1 Voltage

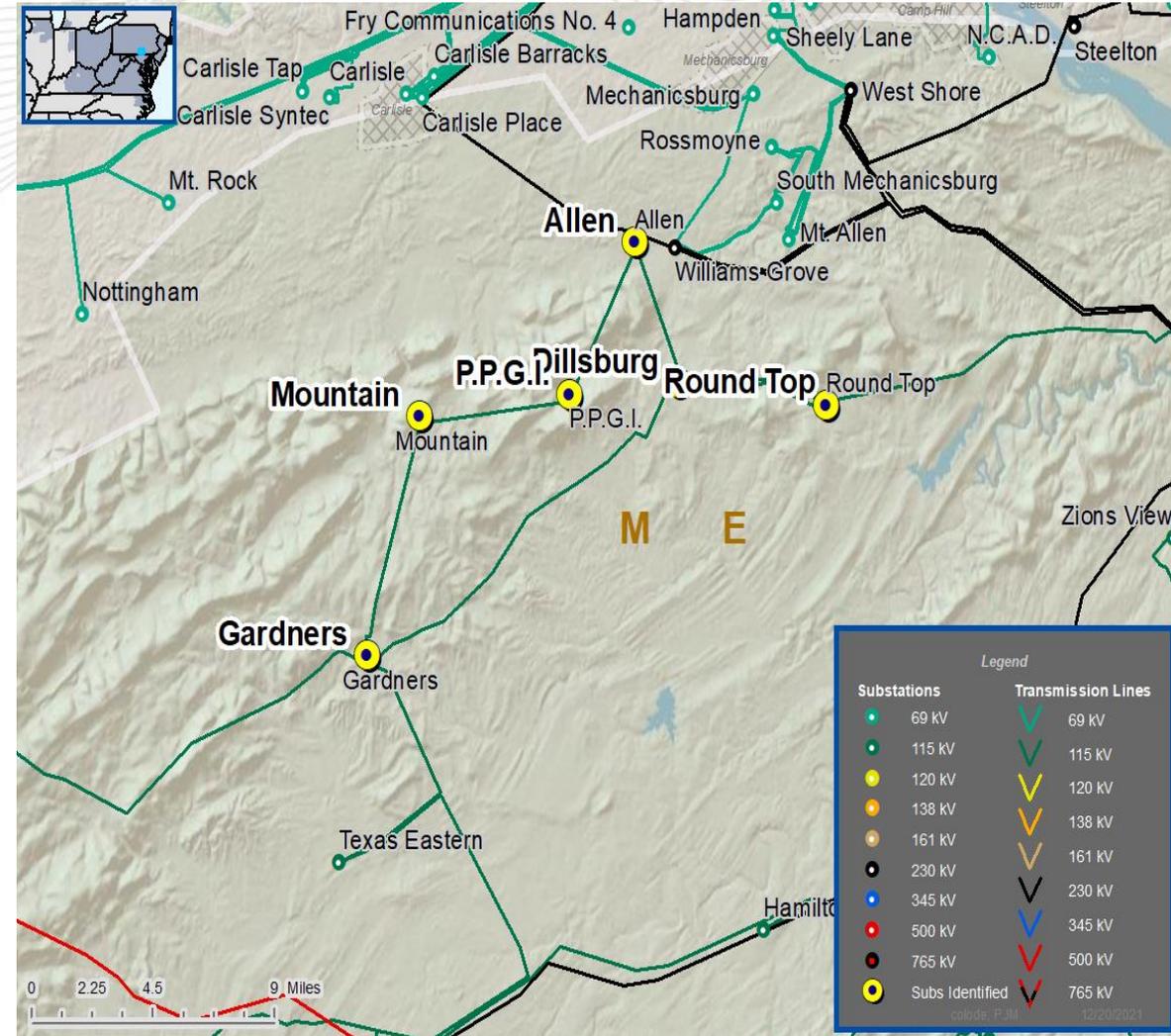
Assumption Reference: 2026 RTEP assumption

Model Used for Analysis: 2026 RTEP Summer case

Proposal Window Exclusion: None

Problem Statement:

Voltage magnitude and voltage drop violation at several 115 kV stations in the Allen (MetEd) vicinity for N-1-1 contingencies.



	# of Flowgates
Violations were posted as part of the 2021 Window 1	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

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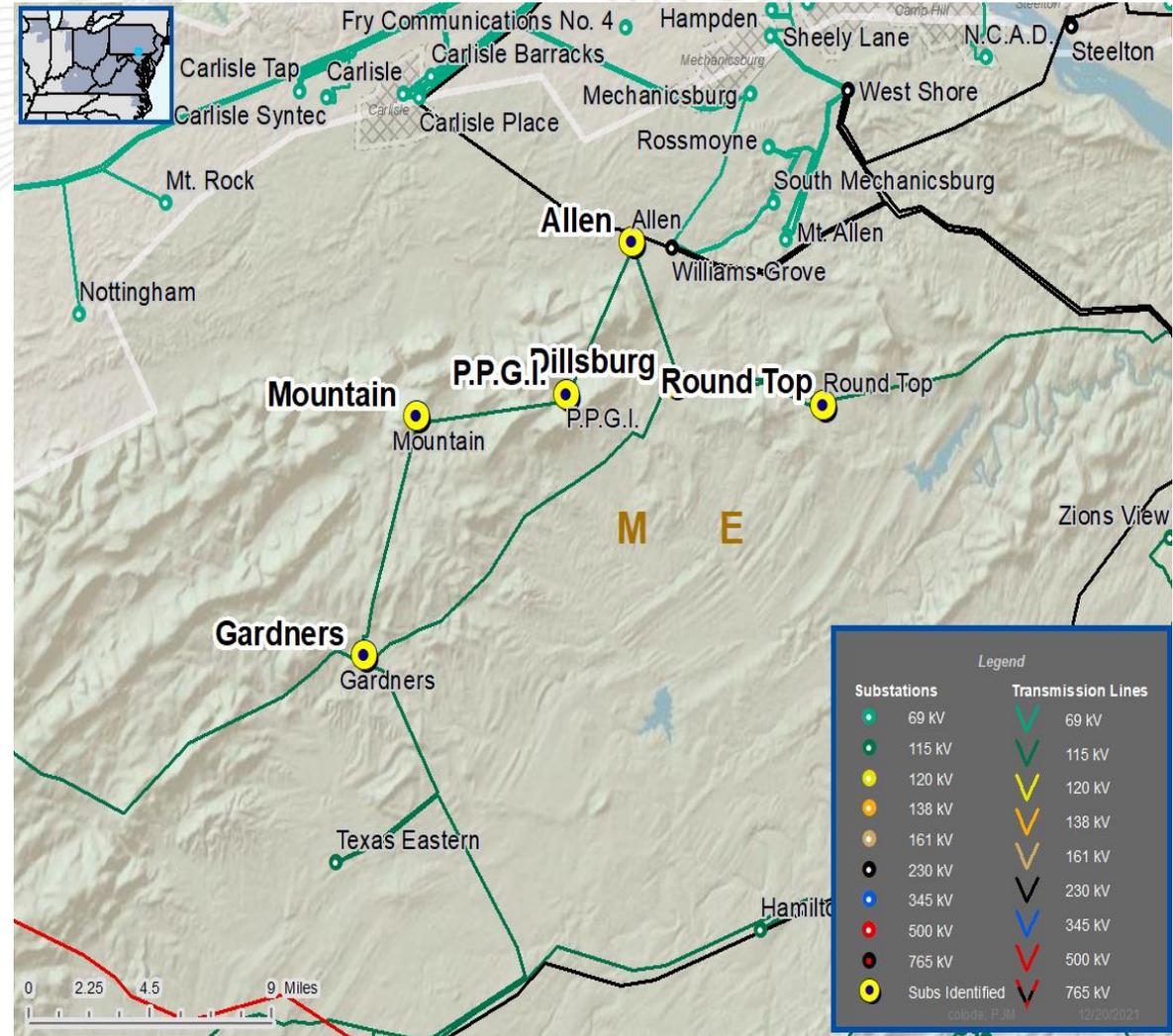
Proposed Solution:

Proposal ID 99 : At the existing PPL Williams Grove Substation, install a new 300 MVA 230/115 kV transformer. Construct a new ~3.4 mile 115 kV single circuit transmission line from Williams Grove to Allen Substation. Install a new Allen four breaker ring bus Switchyard near the existing METED Allen Substation on adjacent property presently owned by FE. Terminate the Round Top - Allen and the Allen-PPGI 115 kV lines into the new switchyard.

Estimated Cost: \$17.82 M

Required In-Service: 6/1/2026

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Proposal ID#	Project Type	Project Description	Total Construction current year Cost (M\$)
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.	15.10
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.	21.58
561	Greenfield	At the existing PPL Williams Grove Substation, install a new 75 MVA 115 / 69 kV transformer and construct a new ~3.4 mile 115 kV single circuit transmission line from Williams Grove to Allen Substation. Install a new Allen four breaker ring bus Switchyard near the existing METED Allen Substation on adjacent new property to be purchased and owned by PPL. Terminate the Round Top - Allen and the Allen-PPGI 115 kV lines into the new switchyard.	15.62
992	Greenfield	At the existing PPL Williams Grove Substation, install a new 300 MVA 230/115 kV transformer. Construct a new ~3.4 mile 115 kV single circuit transmission line from Williams Grove to Allen Substation. Install a new Allen four breaker ring bus Switchyard near the existing METED Allen Substation on adjacent new property to be purchased and owned by PPL. Terminate the Round Top - Allen and the Allen-PPGI 115 kV lines into the new switchyard	18.57
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.	20.25
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 Allen115 kV station. Install (2) breakers at Williams Grove 230 kV, (1) breaker at Williams Grove 115 kV, and (1) breaker at Allen 115 kV.	12.03
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.	28.54
477	Upgrade	Install +/- 90 MVAR STATCOM at Roundtop Substation	32.16
457	Greenfield	At the existing PPL Williams Grove Substation, install a new 75 MVA 115 / 69 kV transformer and construct a new ~3.4 mile 115 kV single circuit transmission line from Williams Grove to Allen Substation. Install a new Allen four breaker ring bus Switchyard near the existing METED Allen Substation on adjacent new property presently owned by FE. Terminate the Round Top - Allen and the Allen-PPGI 115 kV lines into the new switchyard.	15.27
99	Greenfield	At the existing PPL Williams Grove Substation, install a new 300 MVA 230/115 kV transformer. Construct a new ~3.4 mile 115 kV single circuit transmission line from Williams Grove to Allen Substation. Install a new Allen four breaker ring bus Switchyard near the existing METED Allen Substation on adjacent property presently owned by FE. Terminate the Round Top - Allen and the Allen-PPGI 115 kV lines into the new switchyard.	17.82

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PJM Proposal ID	Current Year Cost (M)	Comments
292	\$15.10	Resolves all the flowgates identified, however the project required additional greenfield
582	\$21.58	Resolves all the flowgates identified, however required additional greenfield
561	\$15.62	Resolves all the flowgates identified, however the additional feed to Allen 115 kV is from 69 kV PPL system. The project also requires additional greenfield
992	\$18.57	Resolves all the flowgates identified, however the project required additional greenfield
386	\$20.25	This project is similar to ID 113 with additional work to solve ME need. The ME need is already addressed independently. Resolves all the flowgates identified, but lacks operational flexibility.
113	\$12.03	Resolves all the flowgates identified, however lacks operational flexibility.
789	\$28.54	Resolves all the flowgates identified, however causes a new violation.
477	\$32.16	Resolves all the flowgates identified, however it doesn't provide the additional benefit a new line provides
457	\$15.27	Resolves all the flowgates identified, however the additional feed to Allen 115 kV is from 69 kV PPL system
99	\$17.82	Resolves all the flowgates identified, the only greenfield will be the transmission line.

Second Review

Baseline Reliability Projects

Process Stage: Second Review

Criteria: Winter Generation Deliverability

Assumption Reference: 2026 RTEP assumption

Model Used for Analysis: 2026 RTEP Winter retool case

Proposal Window Exclusion: None

Problem Statement:

The Dresden 345/138 kV No. 81 transformer is overloaded for an N-2 outage. Violations were posted as part of the 2021 Window 2: FG# GD-W2-W211, GD-W2-W214

Existing Facility Rating: 403SN/442SE, 420WN480WE MVA

Proposed Facility Rating: No change to transformer rating, 63 kA circuit breaker

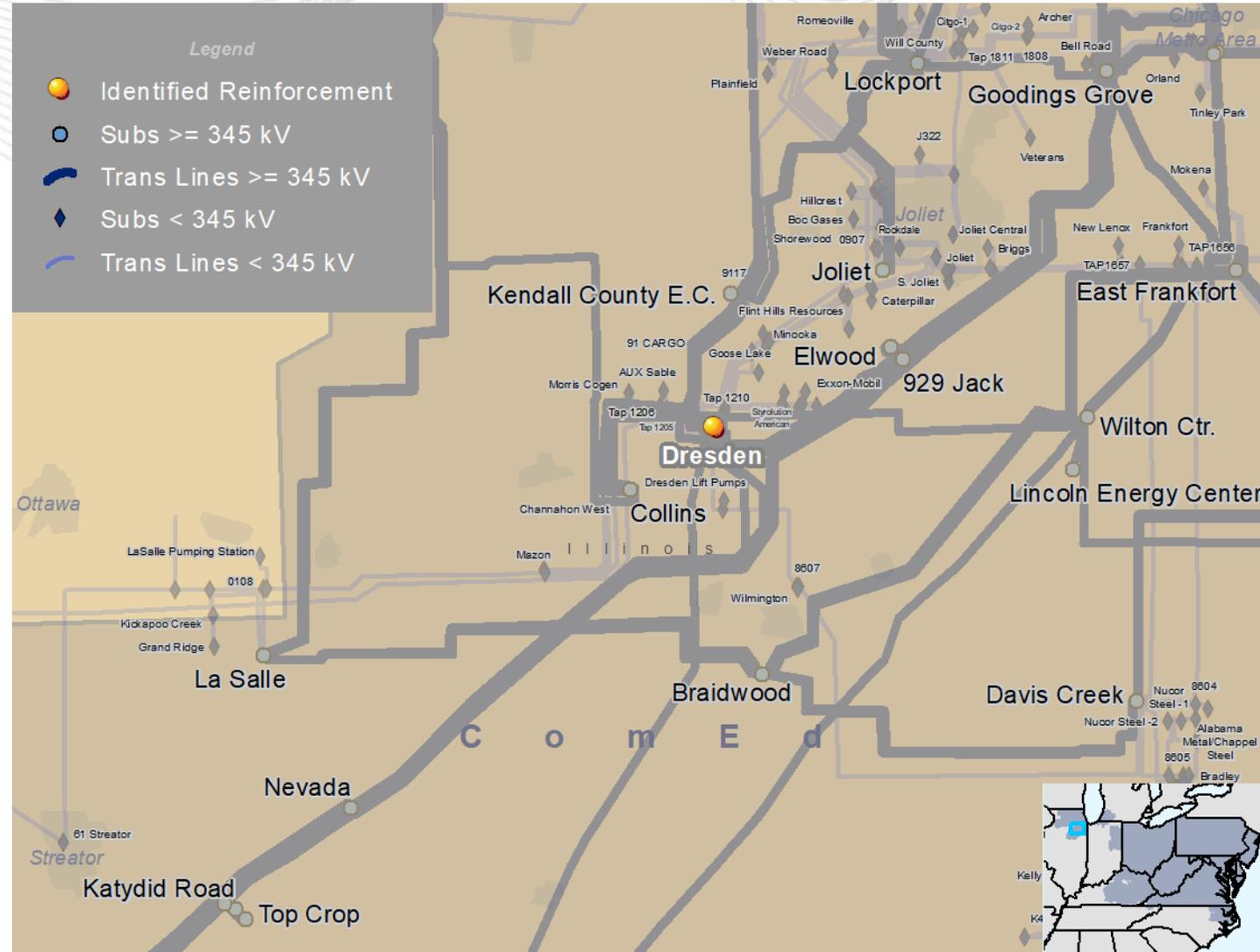
Proposed Solution:

Proposal ID 408 - Install 345 kV bus tie 5-20 circuit breaker in the ring at Dresden station in series with existing bus tie 5-6. (b3711)

Estimated Cost: \$4.26 M

Alternatives: Proposal ID 442 - Interconnect the Katydid Road-Goodings Grove Blue and AB1-122-Mole Creek 345 kV circuits at a new East Spring 345 kV substation. (\$10.4 M)

Required In-Service: 12/1/2026





PJM RTEP 2021 Window 2

- Window opened on 11/03/2021
- Window closed on 01/12/2022
- Cluster 2 evaluation complete (Dresden transformer FGs: GD-W2-W211, GD-W2-W214)
 - Project is recommended at this April, 2022 TEAC
 - Will be presented to Board in July, 2022 for approval
- Cluster 1 evaluation ongoing (Crete-St. John 345 kV FGs: GD-W2-W5, GD-W2-W6)
 - Preliminary 2027 (2022 RTEP) winter generator deliverability results show additional overloaded facilities in the area
 - PJM is evaluating the possibility of opening a 30 day window to include the additional FGs



2022 RTEP

- Model review in progress
- Current schedule (currently targeting the schedule below)
 - Preliminary models posted on March 22
 - Post updates to models on needed basis starting from April
 - Post draft PJM analysis releases on a monthly basis starting from the 2nd week of April
 - Requesting FERC Form 715 analysis results from transmission owners by the 3rd week of May
 - Targeting open 2022 RTEP proposal window between the last week of June and first week of July

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Reliability Analysis Update



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Version No.	Date	Description
1	4/5/2022	<ul style="list-style-type: none">• Original slides posted
2	4/8/2022	<ul style="list-style-type: none">• Added slide #4
3	4/12/2022	<ul style="list-style-type: none">• Made a correction on slide #5 – corrected a project description

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