



# Transmission Expansion Advisory Committee (TEAC) Recommendations to the PJM Board

PJM Staff White Paper

PJM Interconnection  
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## I. Executive Summary

On April 22, 2021, the PJM Board of Managers approved changes to the Regional Transmission Expansion Plan (RTEP), totaling an overall net increase of \$330.72 million, to resolve baseline reliability criteria violations and address scope changes to existing projects.

Since then, PJM has identified additional baseline reliability criteria violations and the transmission system enhancements needed to solve them at an estimated cost of \$0.54 million. Scope changes to existing projects will result in a net increase of \$247.3 million, and cancellation of existing projects will result in a net decrease of \$26.07 million. This yields an overall RTEP net increase of \$221.77 million, for which PJM recommended Board approval. With these changes, RTEP projects will total approximately \$38,721.6 million since the first Board approvals in 2000.

PJM sought Reliability and Security Committee consideration and full Board approval of the RTEP baseline projects summarized in this white paper. On July 29, 2021, the Board approved the addition of RTEP baseline projects as well as other changes to the RTEP as summarized in this paper.

## II. Baseline Reliability Recommendations

A key dimension of PJM's RTEP process is baseline reliability evaluation, which is necessary before subsequent interconnection requests can be analyzed. Baseline analysis identifies system violations to reliability criteria and standards, determines the potential to improve the market efficiency and operational performance of the system, and incorporates any public policy requirements. PJM then develops transmission system enhancements to solve identified violations and reviews them with stakeholders through the Transmission Expansion Advisory Committee (TEAC) and Subregional RTEP Committee prior to submitting its recommendation to the Board. Baseline reliability transmission enhancement costs are allocated to PJM Responsible Customers.

## III. Baseline Reliability Projects Summary

A complete listing of all recommended projects and their associated cost allocations is included in Attachment A (allocations to a single zone) and Attachment B (allocations to multiple zones).

PJM recommended two baseline projects totaling \$0.54 million that include a breaker replacement and backup relay clearing time modifications.

## IV. Changes to Previously Approved Projects

### A. Cancellations

The following cancellations were recommended:

### **AEP Transmission Zone**

- Merrimac-Midway 69 kV baseline b3286 project (reconductor the first three spans from Merrimac station to Str. 464-3 of 3/0 ACSR conductor utilizing 336 ACSR on the existing Merrimac-Midway 69 kV circuit) is no longer needed. While completing detailed scoping, AEP discovered that the wire size documented as 3/0 is actually 556 AAC, and with the 556 AAC conductor, the line is no longer overloaded.

### **Dominion Transmission Zone**

- Chickahominy 230 kV breaker replacements baseline b3213.1 project (replace eight 50 kA Chickahominy 230 kV breakers with 63 kA breakers) is no longer needed with the AB2-068 queue project withdrawal.
- Possum Point 230 kV breaker replacements baseline b2443.7 project (replace the nineteen 63 kA Possum Point 230 kV breakers with 80 kA breakers) is no longer needed with the Possum Point No. 5 retirement.

### **EKPC Transmission Zone**

- Clay Village 69 kV baseline b2907 project (upgrade the current transformer meters and distance relay associated with the Clay Village-KU Clay Village 69 kV Tap line section to 600 A; at least 64 MVA Winter LTE) is no longer needed due to project duplication. The upgrade was not modeled in the 2020 RTEP case, and the same issue was identified in the 2020 window. This resulted in the recommendation of baseline project b3266 (required in-service date of 12/1/2021), which had the same scope. This is an administrative update to remove the duplicate project from the RTEP.
- The following baseline projects are no longer needed based on EKPC's 2020 screening results, which show that the need for this project has been pushed beyond seven years, primarily due to load forecast updates in the area:
  - Davis-Fayette 69 kV baseline b2783 project (rebuild the Davis-Fayette 69 kV line section to 556.5 MCM [3.15 miles]).
  - Liberty Church Tap-Bacon Creek Tap 69 kV baseline b3045 project (increase the maximum operating temperature of Liberty Church Tap-Bacon Creek Tap 69 kV line 266.8 MCM conductor from 212° F to 266° F).
  - Owen County 69 kV baseline b2334 project (install a 69 kV, 28.06 MVAR capacitor bank at the Owen County substation).
  - Sideview 69 kV baseline b2915 project (resize the Sideview 69 kV capacitor bank from 6.12 MVAR to 9.18 MVAR).

- Summer Shade-JB Galloway Jct 69 kV baseline b3046 project (increase the maximum operating temperature of Summer Shade-JB Galloway Jct 69 kV line 266.8 MCM conductor from 167° F to 212° F).

These changes yield a net RTEP decrease of \$26.07 million.

### ***B. Scope/Cost Changes***

The following scope/cost modifications were recommended:

#### **AEP Transmission Zone**

- The following two baseline projects have undergone a cost increase. The cost increase is due to multiple reasons, including but not limited to: project complexity and terrain, Skin Fork right-of-way delays, unaccounted for rock at drilling and grillage sites, additional Storm Water Pollution Prevention Plan (SWPPP) requirements and changes to station and line scopes.
  - Craneco-Skin Fork 46 kV line section rebuild baseline b2883 project (rebuild the Craneco-Pardee-Three Forks-Skin Fork 46 kV line section [approx. 7.2 miles] utilizing 795 26/7 ACSR conductor [108 MVA rating]). The total cost of the project has increased from \$12.2 million to \$42.2 million, yielding an RTEP increase of \$30 million.
  - Skin Fork baseline b2611 project (install a new 138/46 kV station near Skin Fork). The total cost of the project has increased from \$25.98 million to \$60.1 million, yielding an RTEP increase of \$34.12 million.

- Fields Creek 138 kV station baseline b2603 project has undergone a scope change. The modified project scope establishes a new greenfield 138 kV station at Fields Creek, which is located 2.3 miles from the existing line station location (changed from the original proposed site at Wilbur, Near Slaughter Creek Wilbur). Three 138 kV circuit breakers will be installed, and the Cabin Creek-Hernshaw 138 kV circuit will be looped into the new Fields Creek station by constructing approximately 2.3 miles of double circuit 138 kV line extending north from the station. The project constructs approximately 9.8 miles of 138 kV double circuit line using 1033 ACSR 54/7 conductor and one to two #8 Alumoweld and one 86 sq. mm. 0.646" OPGW static wires with one conductor side insulated at 138 kV and one side insulated at 69 kV from Boone substation to Structure 351-11 on the Belle-Cabin Creek No. 1 46 kV line. The 46 kV line insulated to 69 kV will connect to Winifrede, Maxine (Tonys Branch), Peytona, Round Bottom and Boone stations. A 138-69/46 kV 130 MVA transformer and circuit switcher will be added to Boone station, along with a 69 kV 40 kA 3000 amp circuit breaker operated at 46 kV. The modified project scope includes rebuilding the 3.7 miles of 46 kV circuit from the Structure 357-106 to Slaughter Creek, building back a double circuit extension (1.1 miles) back to the existing switches at Peytona, as well as the addition of a new extension to a new switch at Tonys Branch (replaced existing Maxine switch). The project will rebuild the 1.4 miles of 46 kV single circuit to connect the existing line to Hopkins Fork to the new Tonys Branch Switch, and replace two 46 kV switches at the Winifrede 46 kV station. The total cost of the project has increased from \$43.18 million to \$114.5 million, yielding an RTEP increase of \$71.32 million.

### **APS Transmission Zone**

- Flint Run 500/138 kV substation baseline b2996 project has undergone a cost increase. The cost increase is due to multiple reasons, including but not limited to: 138 kV line work increase, which includes a design change to steel poles, increased line length of 0.7 miles, access road issues and vegetation control; substation location change, which required additional civil and environmental engineering and construction, along with real estate costs; a retaining wall at the Waldo Run substation; and additional costs related to engineering and project management. The total cost of the project has increased from \$40.59 million to \$143.4 million, yielding an RTEP increase of \$102.81 million.

### **Dominion Transmission Zone**

- Second Chickahominy 500/230 kV transformer baseline b3213 project has undergone a scope addition to preserve system reliability. The additional scope will relocate the Chickahominy-Elmont 500 kV line (No. 557) to terminate in a new bay at Chickahominy substation and relocate the Chesterfield-Lanexa 115 kV line (No. 92) to allow for the expansion of the Chickahominy substation. The project will also add three new 500 kV breakers with 50 kA interrupting rating and associated equipment at Chickahominy station. The total cost of the project has increased from \$22 million to \$31.05 million, yielding an RTEP increase of \$9.05 million.

- The 115 kV line No. 81 (Carolina-South Justice Branch) and 230 kV line No. 2056 (Hathaway-Hornertown) partial rebuild baseline b3114 project has undergone a scope clarification. The scope clarification includes the rebuild of 1.3 miles of double circuit line No. 81 with 230 kV line No. 239 (Hornertown-Lakeview). However, as this portion of the double circuit was already included in the project scope initially (it was simply missing from the project description), there is no impact to the project cost.

These changes yield a net RTEP increase of \$247.3 million.

## **V. Review by the Transmission Expansion Advisory Committee (TEAC)**

Project needs and recommended solutions as discussed in this report were reviewed with stakeholders during 2021, most recently at the June 2021 TEAC and Subregional RTEP Committee meetings. Written comments were requested to be submitted to PJM to communicate any concerns with project recommendations. No comments have been received as of this white paper publication date.

## **VI. Cost Allocation**

Cost allocations for recommended projects are shown in Attachment A (for allocation to a single zone) and Attachment B (for allocation to multiple zones).

Cost allocations are calculated in accordance with Schedule 12 of the Open Access Transmission Tariff. Baseline reliability project allocations are calculated using a distribution factor methodology that allocates cost to the load zones that contribute to the loading on the new facility. The allocations will be filed with the Federal Energy Regulatory Commission (FERC) no more than 30 days following approval by the Board.

## **VII. Board Approval**

The PJM Reliability and Security Committee is requested to endorse the changes to the RTEP proposed in this white paper, and recommend to the full Board for approval of the changes to existing RTEP projects as detailed in this white paper to be included in PJM's RTEP. On July 29, 2021, the Board approved the addition of RTEP baseline projects as well as other changes to the RTEP as summarized in this paper. The RTEP is published annually on PJM's website.



### Attachment A – Reliability Project Single-Zone Allocations

Upgrade ID	Description	Cost Estimate (\$M)	Transmission Owner	Cost Responsibility	Required In-Service Date
<b>b3316</b>	Greene Substation - replace 138 kV 40 kA breaker GJ-138C with a 63 kA breaker.	\$0.28	Dayton	Dayton	6/1/2025
<b>b3317</b>	Modify backup relay clearing times at the 138 kV STA16 Waukegan station.	\$0.26	ComEd	ComEd	6/1/2023

## **Attachment B – Reliability Project Multi-Zone Allocations**

None