



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

PJM Staff White Paper

PJM Interconnection  
December 2021

For Public Use

This page is intentionally left blank

## Contents

<b>I.</b>	<b>Executive Summary</b> .....	<b>1</b>
<b>II.</b>	<b>Baseline Reliability Recommendations</b> .....	<b>1</b>
<b>III.</b>	<b>Baseline Reliability Projects Summary</b> .....	<b>1</b>
	A. AEP Transmission Zone .....	1
	B. DEOK Transmission Zone .....	2
	C. Dominion Transmission Zone .....	2
	D. Baseline Reliability Project Details .....	2
	Baseline Project b3347: Bancroft-Milton 69 kV.....	2
	Baseline Project b3336: Benton Harbor-Riverside 138 kV.....	3
	Baseline Project b3334: Miami Fort-Hebron Tap 138 kV.....	5
	Baseline Project b3321: Cranes Comer-Stafford 230 kV.....	6
<b>IV.</b>	<b>Transmission Owner Criteria Projects</b> .....	<b>6</b>
<b>V.</b>	<b>Interconnection Queue Projects</b> .....	<b>6</b>
<b>VI.</b>	<b>Changes to Previously Approved Projects</b> .....	<b>8</b>
	Scope/Cost Changes .....	8
	DPL Transmission Zone.....	8
	Accelerations .....	8
	APS Transmission Zone.....	9
	DEOK Transmission Zone.....	9
<b>VII.</b>	<b>Review by the Transmission Expansion Advisory Committee (TEAC)</b> .....	<b>9</b>
<b>VIII.</b>	<b>Cost Allocation</b> .....	<b>9</b>
<b>IX.</b>	<b>Board Approval</b> .....	<b>9</b>
	<b>Attachment A – Reliability Project Single-Zone Allocations</b> .....	<b>10</b>
	<b>Attachment B – Reliability Project Multi-Zone Allocations</b> .....	<b>12</b>
	<b>Attachment C – Interconnection Queue Projects</b> .....	<b>13</b>
	<b>Attachment D – Interconnection Network Upgrades</b> .....	<b>33</b>

## I. Executive Summary

On September 22, 2021, the PJM Board of Managers approved changes to the Regional Transmission Expansion Plan (RTEP), totaling an overall net increase of \$77.05 million, to resolve baseline reliability criteria violations and address 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 \$165.73 million. Scope changes to existing projects will result in a net decrease of \$70.08 million. This yields an overall RTEP net increase of \$95.65 million, for which PJM recommended Board approval. PJM is also providing the annual update of RTEP generation and merchant transmission network upgrades in this white paper. PJM has identified \$47.64 million in new network upgrades and an approximately \$1.15 million increase due to scope changes for projects with an Interconnection Service Agreement (ISA). Additionally, PJM recommended the cancellation of \$9.65 million in previously identified network upgrades as a result of updates to analysis performed for project withdrawals in the New Services Queue. The net change in network upgrades total \$39.14 million, and altogether, the changes result in an overall RTEP baseline net increase of approximately \$134.79 million. With these changes, RTEP projects will total approximately \$38,933.5 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 December 8, 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 summary of baseline projects with estimated costs equal to or greater than \$10 million is provided below. 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). Projects with estimated costs less than \$10 million typically include, by way of example, transformer replacements, line reconductoring, breaker replacements and upgrades to terminal equipment, including relay and wave trap replacements.

### A. AEP Transmission Zone

- Rebuild approximately 20 miles of line between Bancroft and Milton 69 kV stations – b3347: \$56.73 million

- Rebuild Benton Harbor-Riverside 138 kV double circuit extension (6 miles) – b3336: \$14.9 million

### ***B. DEOK Transmission Zone***

- Rebuild the section of MiamiFort-Hebron Tap 138 kV – b3334: \$44.3 million

### ***C. Dominion Transmission Zone***

- Rebuild the Cranes Corner-Stafford 230 kV line – b3321: \$19.6 million

PJM also recommended projects totaling \$30.2 million, whose individual cost estimates are less than \$10 million. The projects include, but are not limited to, 69 kV line rebuilds, a reconductor of a short 230 kV line portion, remote end relay upgrades, reactor installations, transformer installation and replacements, capacitor bank installations, and circuit breaker installation and replacements.

A more detailed description of the larger-scope projects that PJM recommended to the Board is provided below.

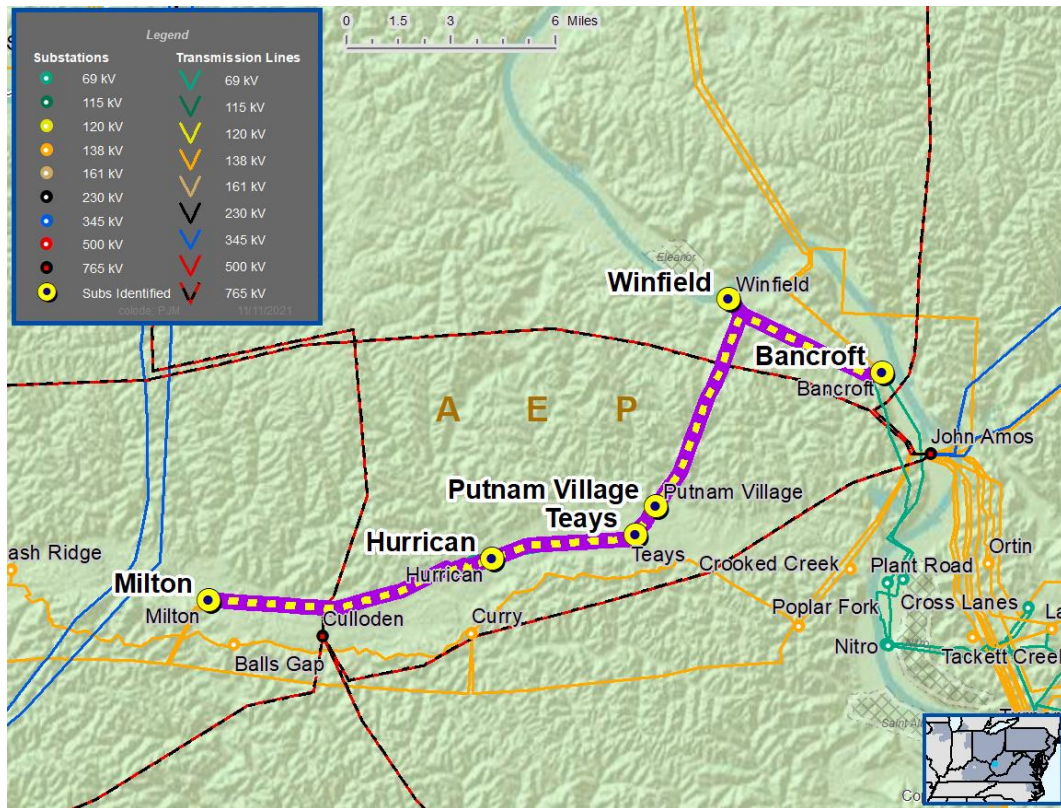
### ***D. Baseline Reliability Project Details***

#### **Baseline Project b3347: Bancroft-Milton 69 kV**

##### **AEP Transmission Zone**

In the 2026 Light Load RTEP case, the Bancroft-Putnam Village, Putnam Village-Winfield, Putnam Village-Teays and the Hurrigan-Milton 69 kV lines are overloaded for an N-1 outage combination. The Hurrigan-Teays 69 kV line is also overloaded for various N-1 outage combinations.

**Map 1. b3347: Bancroft-Milton 69 kV**



The recommended solution, solicited through the 2021 Window 1 competitive proposal process, is to rebuild approximately 20 miles of line between Bancroft and Milton 69 kV stations with 556 ACSR conductor. The project includes the replacement of jumpers around Hurrican and Teays switches with 556 ACSR, and update of relay settings at Winfield, Bancroft, Milton and Putnam Village 69 kV stations to coordinate with remote ends on the line rebuild. The estimated cost for this project is \$56.73 million, with a required in-service of November 2026. The projected in-service date is June 2026, and the local transmission owner, AEP, will be designated to complete this work.

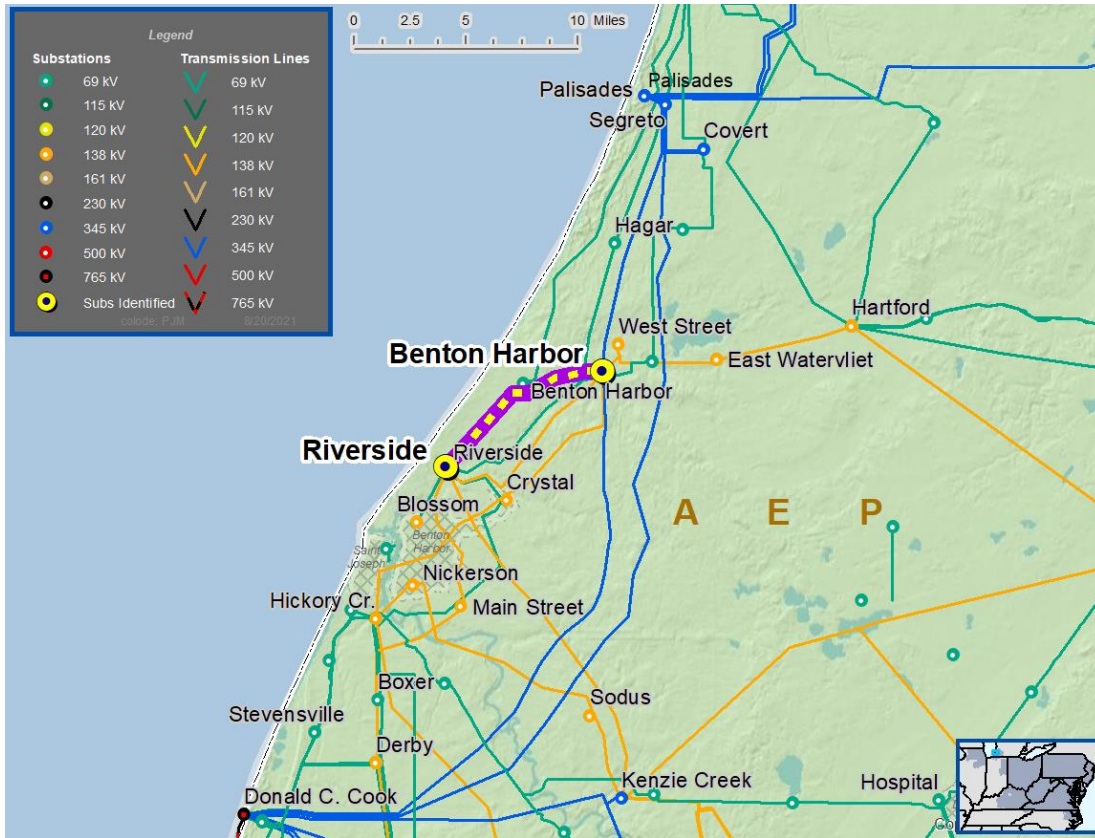
**Baseline Project b3336: Benton Harbor-Riverside 138 kV**

**AEP Transmission Zone**

The deactivation of Zimmer 1, which has a requested deactivation date of May 31, 2022, results in the overload of the Benton Harbor-Riverside 138 kV line for an N-2 outage.



Map 2. b3336: Benton Harbor-Riverside 138 kV



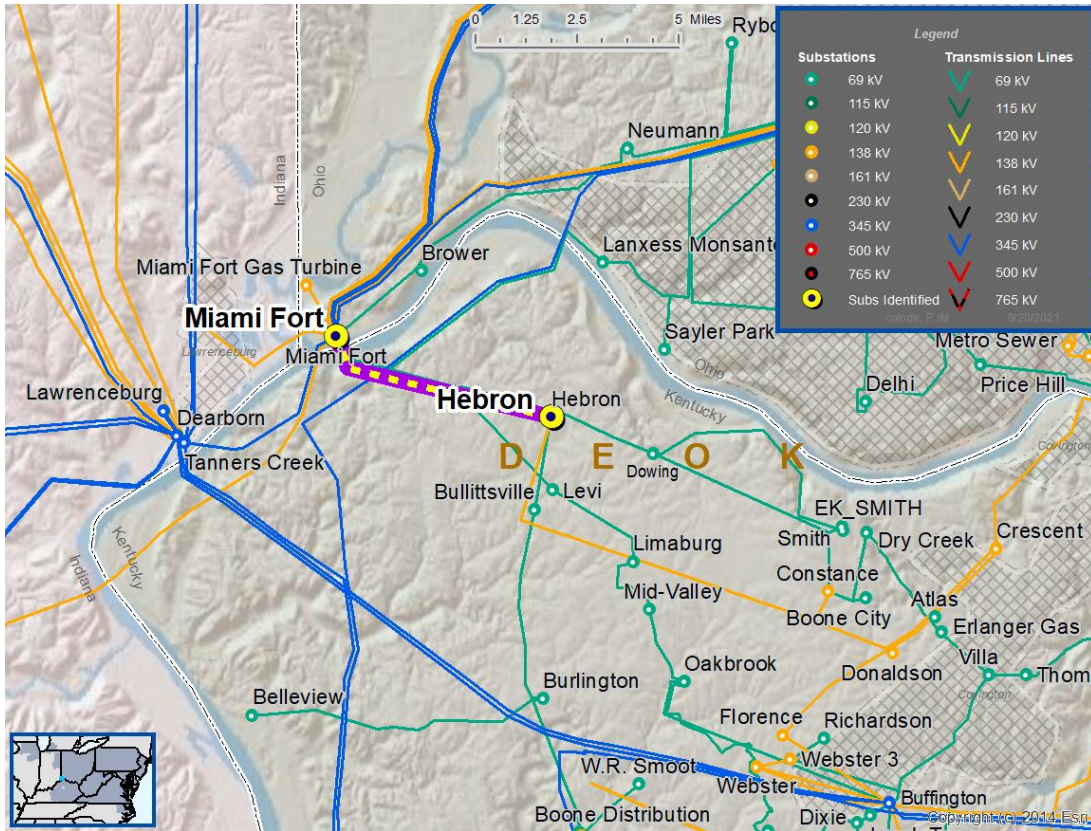
The recommended solution was previously a supplemental solution, which has been converted to a baseline project, and is to rebuild the Benton Harbor-Riverside 138 kV double circuit extension (6 miles). The estimated cost for this project is \$14.9 million, with a required in-service date of June 2022. The projected in-service date is November 2021, and the local transmission owner, AEP, will be designated to complete this work.

### Baseline Project b3334: Miami Fort-Hebron Tap 138 kV

#### DEOK Transmission Zone

The deactivation of Zimmer 1, which has a requested deactivation date of May 31, 2022, results in the overload of the Miami Fort-Hebron Tap 138 kV line for an N-2 outage.

Map 3. b3334: Miami Fort-Hebron Tap 138 kV



The recommended solution is to rebuild the section of Miami Fort-Hebron Tap 138 kV line. The estimated cost for this project is \$44.3 million, with a required in-service date of June 2022. The projected in-service date is June 2025 and operating measures have been identified to mitigate reliability impacts in interim. The local transmission owner, DEOK, will be designated to complete this work.

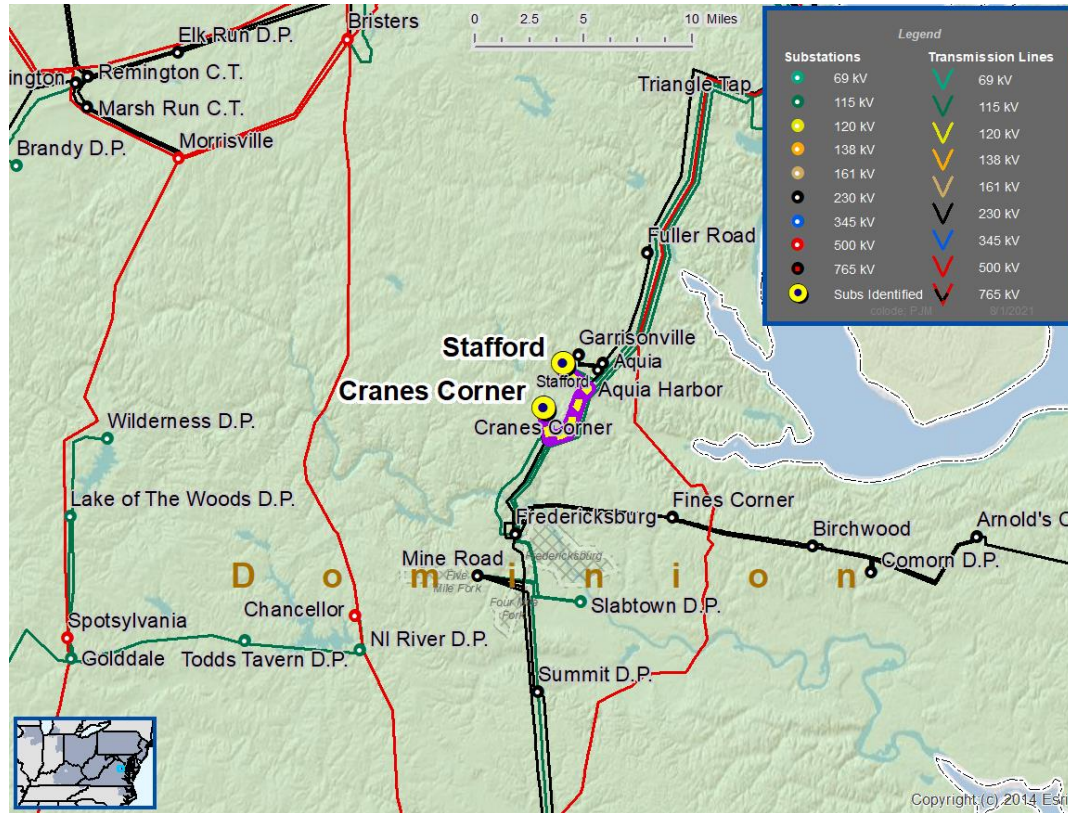


## Baseline Project b3321: Cranes Corner-Stafford 230 kV

### Dominion Transmission Zone

The deactivation of Morgantown 1 and 2, which have a requested deactivation date of May 31, 2022, results in the overload of the Cranes Corner-Stafford 230 kV line for an N-1 outage.

Map 4. b3321: Cranes Corner-Stafford 230 kV



The recommended solution is to rebuild the Cranes Corner-Stafford 230 kV line. The estimated cost for this project is \$19.6 million, with a required in-service date of June 2022. The projected in-service date is December 2023, and operating measures have been identified to mitigate reliability impacts in interim. The local transmission owner, Dominion, will be designated to complete this work.

## IV. Transmission Owner Criteria Projects

Of the \$165.73 million of the new recommended baseline transmission system enhancements, approximately \$71.47 million is driven by transmission owner planning criteria, which makes up approximately 43 percent of the new project cost estimates.

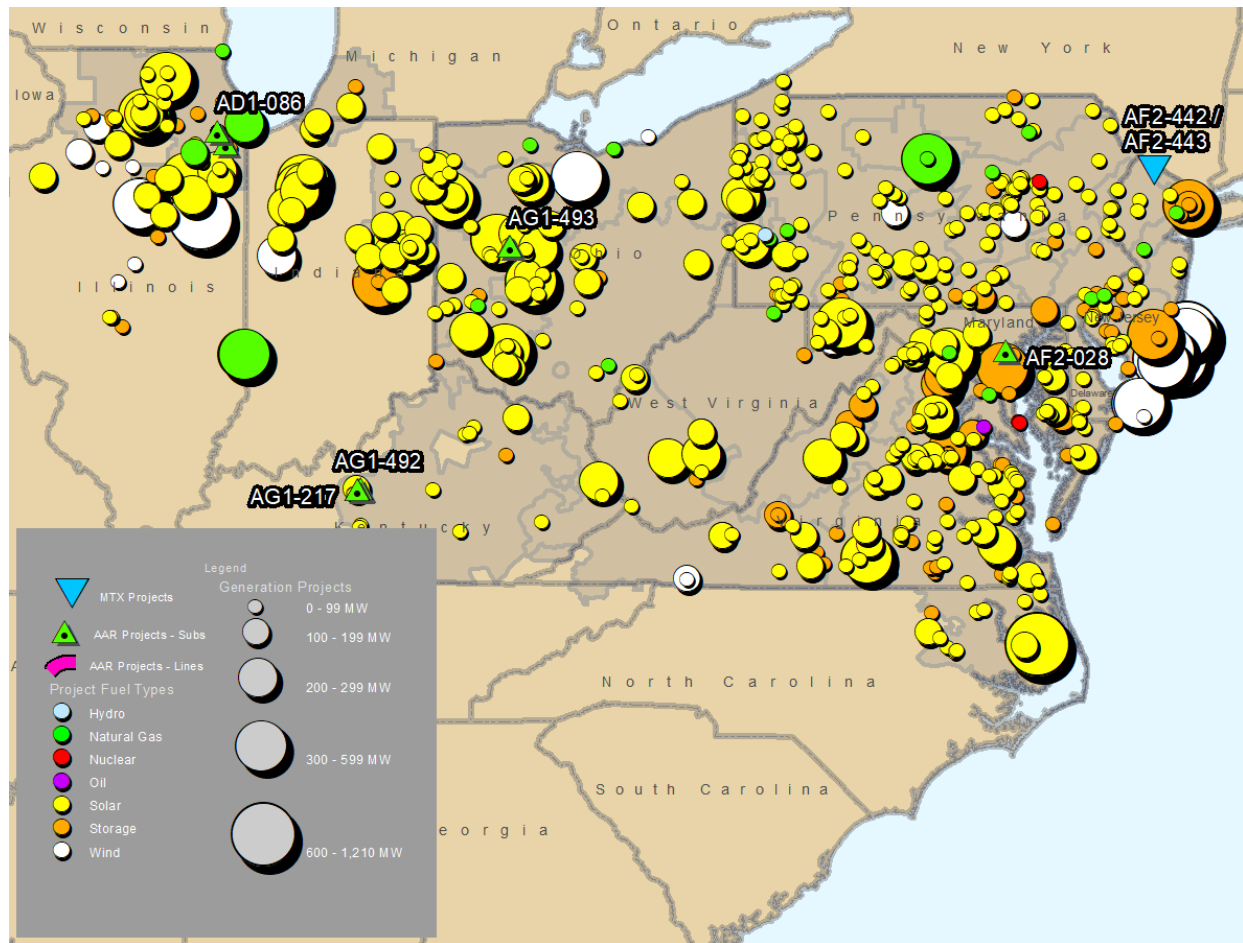
## V. Interconnection Queue Projects

Throughout 2021, PJM has continued to study new service customer requests that are submitted into our interconnection queue. These studies evaluate the impact of the new service request and include an evaluation of

new generation interconnections, increases in generation at existing stations, long-term firm transmission service requests and merchant transmission interconnection requests.

These studies were last reviewed with the Board Reliability Committee in December of 2020. Since that time, PJM has completed 678 new System Impact Studies, and 338 service requests have withdrawn. New projects with signed ISAs, project scope changes and project cancellations have resulted in a net increase of \$39.14 million for network upgrades. The map below shows the locations of the new units associated with the completed interconnection System Impact Studies along with the fuel type and relative size. A listing of the projects with recently completed impact studies is provided in Attachment C to this white paper. A listing of the network upgrades associated with these projects is shown in Attachment D to this report. The cost for the network upgrades associated with these interconnection projects is the responsibility of the developer.

**Map 5. Completed Interconnection System Impact Studies**



## VI. Changes to Previously Approved Projects

### *Scope/Cost Changes*

The following scope/cost modifications with changes in estimated costs equal to or greater than \$5 million were recommended:

#### **DPL Transmission Zone**

The following are scope/cost changes associated with the Indian River 4 deactivation, slated to retire on May 31, 2022, and reflects a total cost decrease of \$76.78 million.

- Baseline project b3326 (Vienna-Nelson 138 kV line rebuild) has undergone a cost increase. The cost increase is due to the initial estimate being based on cost-per-mile basis, whereas additional information was incorporated into the updated estimate. The additional cost is due to factors such as the terrain that the line is built on, and the continuing increase in material costs. The total cost of the project has increased from \$31.25 million to \$38.5 million, yielding an RTEP increase of \$7.25 million.
- Baseline project b3329 (Farmview-Milford 138 kV line rebuild) has undergone a scope change. The new scope is to re-rate the Farmview-Milford 138 kV line. The total cost of the project has decreased from \$5.5 million to \$0.3 million, yielding an RTEP decrease of \$5.2 million.
- Baseline project b3330 (Farmview-South Harrington 138 kV line rebuild) has undergone a scope change. The new scope is to re-rate the Farmview-South Harrington 138 kV line. The total cost of the project has decreased from \$16.9 million to \$0.25 million, yielding an RTEP decrease of \$16.65 million.
- Baseline project b3332 (Steele-Milford 230 kV line rebuild) has undergone a scope change. The new scope is to re-rate the Steele-Milford 230 kV line. The total cost of the project has decreased from \$63 million to \$0.6 million, yielding an RTEP decrease of \$62.4 million.
- Baseline project b3327 (disconnect switch upgrade at Kent 69 kV) has undergone a cost increase, reflecting a refined cost estimate. The total cost of the project has increased from \$0.18 million to \$0.25 million, yielding an RTEP increase of \$0.07 million.
- Baseline project b3331 (bus conductor and relay upgrade at North Seaford 138 kV) has undergone a cost increase, reflecting a refined cost estimate. The total cost of the project has increased from \$0.35 million to \$0.5 million, yielding an RTEP increase of \$0.15 million.

These changes, with individual scope/cost modifications less than \$5 million that together result in an increase of \$6.7 million, yield a net RTEP decrease of \$70.08 million.

### *Accelerations*

The following project accelerations were recommended:

### **APS Transmission Zone**

- Baseline project b3240 (Morgan-Cherry Run 138 kV terminal equipment upgrade) has been accelerated. PJM’s annual market efficiency acceleration analysis of reliability upgrades determined that the project reduces congestion. The previous required in-service date for this project was December 2025 and has been accelerated to June 2024. There is no impact to the scope or cost of the project.

### **DEOK Transmission Zone**

- Baseline project b3214 (Yukon-Smithton-Shepler Hill Jct 138 kV reconductor) has been accelerated. The project resolves the overload identified in the deactivation study for Zimmer 1, which has a requested deactivation date of May 31, 2022. The previous required in-service date for this project was June 2023 and has been accelerated to June 2022. There is no impact to the scope or cost of the project.

## **VII. 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 November 2021 TEAC and October 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.

## **VIII. 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 (OATT). 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 at FERC 30 days following approval by the Board.

## **IX. Board Approval**

The PJM Reliability and Security Committee is requested to endorse the changes to the RTEP proposed in this white paper, and recommended to the full Board for approval the changes to existing RTEP projects as detailed in this white paper to be included in PJM’s RTEP. On December 8, 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
b2668.1	Replace the bus/risers at Dequine 345 kV station	\$2.30	AEP	AEP	6/1/2020
b3320	Replace the CT at Don Marquis 345 kV	\$0.08	AEP	AEP	6/1/2022
b3321	Rebuild Cranes Corner-Stafford 230 kV line	\$19.60	Dominion	Dominion	6/1/2022
b3334	Rebuild the section of Miami Fort-Hebron Tab 138 kV	\$44.30	DEOK	DEOK	6/1/2022
b3335	Reconductor a 0.76 mile portion of the Croydon-Burlington 230 kV line	\$0.79	PECO	PECO	6/1/2022
b3336	Rebuild Benton Harbor-Riverside 138 kV double circuit extension (6 miles).	\$14.90	AEP	AEP	6/1/2022
b3337	Replace the one (1) Hyatt 138 kV breaker “AB1(101N)” with 3000 A, 63 kA interrupting breaker.	\$0.48	AEP	AEP	6/1/2026
b3338	Replace the two (2) Kenny 138 kV breakers, “102” (SC-3) and “106” (SC-4), each with a 3000 A, 63 kA interrupting breaker.	\$0.76	AEP	AEP	6/1/2026
b3339	Replace the one (1) Canal 138 kV breaker “3” with 3000 A, 63 kA breaker.	\$0.48	AEP	AEP	6/1/2026
b3340	Replace one (1) Cheswick 138 kV breaker with a 3000 A, 63 kA breaker: “Z-53 LF_3”.	\$0.35	DL	DL	6/1/2026
b3341.1	Marysville Substation: Install two 69 kV 16.6 MVAR cap banks; Install five 69 kV circuit breakers; Upgrade station relaying; Replace 600 A wave trap on the Marysville-Kings Creek 69 kV (6660) circuit	\$2.43	Dayton	Dayton	6/1/2026
b3341.2	Darby Substation: Upgrade remote end relaying at Darby 69 kV substation	\$0.25	Dayton	Dayton	6/1/2026
b3341.3	Kings Creek: Upgrade remote end relaying at Kings Creek 69 kV substation	\$0.25	Dayton	Dayton	6/1/2026
b3342	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.	\$0.53	AEP	AEP	6/1/2026
b3343	Rebuild approximately 0.3 miles of overloaded 69 kV line between Albion-Philips Switch and Philips Switch-Brimfield Switch with 556 ACSR conductor.	\$0.61	AEP	AEP	6/1/2026



<b>b3344.1</b>	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	\$1.85	AEP	AEP	11/1/2026
<b>b3344.2</b>	Upgrade remote end relaying at Riverport 138 kV station due to the line cut in at West Kingsport station	\$0.25	AEP	AEP	11/1/2026
<b>b3345.1</b>	Rebuild ~4.2 miles of overloaded sections of the 69 kV line between Salt Fork Switch and Leatherwood Switch with 556 ACSR.	\$9.06	AEP	AEP	6/1/2026
<b>b3345.2</b>	Update relay settings at Broom Road station.	\$0.04	AEP	AEP	6/1/2026
<b>b3347.1</b>	Rebuild approximately 20 miles of line between Bancroft and Milton stations with 556 ACSR conductor	\$56.55	AEP	AEP	11/1/2026
<b>b3347.2</b>	Replace the jumpers around Hurrigan switch with 556 ACSR	\$0.01	AEP	AEP	11/1/2026
<b>b3347.3</b>	Replace the jumpers around Teays switch with 556 ACSR	\$0.01	AEP	AEP	11/1/2026
<b>b3347.4</b>	Winfield Station Relay Settings: Update relay settings to coordinate with remote ends on line rebuild	\$0.05	AEP	AEP	11/1/2026
<b>b3347.5</b>	Bancroft Station Relay Settings: Update relay settings to coordinate with remote ends on line rebuild	\$0.03	AEP	AEP	11/1/2026
<b>b3347.6</b>	Milton Station Relay Settings: Update relay settings to coordinate with remote ends on line rebuild.	\$0.03	AEP	AEP	11/1/2026
<b>b3347.7</b>	Putnam Village Station Relay Settings: Update relay settings to coordinate with remote ends on line rebuild	\$0.05	AEP	AEP	11/1/2026
<b>b3664</b>	Juniata: Replace the limiting 230 kV T2 transformer leads, bay conductor and bus conductor with double bundle 1590 ACSR. Replace the limiting 1200 A MODs on the Bus tie breaker with 3000 A MODs	\$0.68	PPL	PPL	6/1/2026
<b>b3665</b>	Replace several pieces of 1033.5 AAC substation conductor at East Towanda 230 kV (on East Towanda-Canyon 230 kV)	\$0.41	PENELEC	PENELEC	6/1/2026
<b>b3666</b>	Marshall 230 kV Substation: Install dual reactors and expand existing ring bus	\$5.83	PENELEC	PENELEC	6/1/2026
<b>b3667</b>	Pierce Brook Substation: Install second 230/115 kV transformer	\$5.07	PENELEC	PENELEC	6/1/2026

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

None

## Attachment C – Interconnection Queue Projects

### Auction Revenue Rights Requests

	Path Name	Rights Requested	Transmission Owner
<b>AD1-086</b>	Goodings Grove-East Frankfort 345 kV	23.9 MVA	ComEd
<b>AF2-028</b>	Pumphrey 115 kV	120 MVAR	BGE
<b>AG1-217</b>	Cent Hardin-Kargle 69 kV Upgrade	100 MVA	EKPC
<b>AG1-492</b>	Kargle-Elizabethtown 69 kV	100 MVA	EKPC
<b>AG1-493</b>	Blue Jacket-Blue Jacket Tap 69 kV	80 MVA	Dayton

### Generation Interconnection Requests

Queue Position	Transmission Owner	Fuel Type	MW Energy	MW Capacity
<b>AA1-111</b>	JCPL	Natural Gas	463	463
<b>AB1-087</b>	AEC	Natural Gas	575	550
<b>AB1-088</b>	AEP	Natural Gas	575	550
<b>AB1-092</b>	JCPL	Natural Gas	41	17
<b>AB2-120</b>	Dominion	Solar	100	38
<b>AB2-130</b>	Dominion	Solar	85	32.3
<b>AB2-132</b>	BGE	Wind; Storage	0	2.2
<b>AB2-135</b>	Dominion	Solar	64	29.9
<b>AB2-136</b>	Dominion	Solar	51.1	24.8
<b>AB2-172</b>	Dominion	Solar	50	19
<b>AB2-185</b>	Dominion	Solar	8	5.6
<b>AC1-008</b>	ATSI	Nuclear	6.3	19.2
<b>AC1-033</b>	BGE	Wind	100.8	13.1
<b>AC1-074</b>	DPL	Solar	80	56
<b>AC1-189</b>	Dayton	Solar	80	53.4
<b>AC2-012</b>	Dayton	Solar	150	57
<b>AC2-017</b>	ATSI	Nuclear	11.1	11.1
<b>AC2-075</b>	DPL	Solar	20	13.3
<b>AC2-141</b>	Dayton	Solar	240	168.2
<b>AC2-154</b>	BGE	Solar	50	19
<b>AC2-156</b>	BGE	Solar	20	7.6
<b>AC2-157</b>	AEP	Solar	200	76
<b>AC2-186</b>	Dominion	Solar	10	3.8

Queue Position	Transmission Owner	Fuel Type	MW Energy	MW Capacity
AC2-187	Dominion	Solar	20	7.6
AC2-188	Dominion	Solar	20	7.6
AC2-195	APS	Solar	99.96	62.1
AD1-013	BGE	Solar	40	15.4
AD1-016	BGE	Solar	20	7.6
AD1-039	BGE	Natural Gas	102.7	112.7
AD1-043	AEP	Solar	120	45.6
AD1-067	BGE	Wind	5.725	1.1
AD1-070	AEP	Solar	205	36
AD1-081	APS	Solar	20	13.2
AD1-087	Dayton	Solar	64.2	43.7
AD1-097	JCPL	Natural Gas	67	34.8
AD1-098	BGE	Solar	100	57.8
AD1-100	BGE	Wind	850	150
AD1-101	AEP	Solar	49.9	18.96
AD1-103	APS	Wind	500.4	65.052
AD1-115	Dayton	Solar	50	19
AD1-118	APS	Natural Gas	60	60
AD1-119	AEP	Solar	49.9	18.96
AD1-129	ComEd	Solar	12.5	7.5
AD1-133	ComEd	Solar	300	180
AD1-148	ComEd	Wind	0	36.3
AD2-038	ComEd	Wind	150	26.4
AD2-048	DPL	Solar	70	46.7
AD2-055	JCPL	Natural Gas	44	35
AD2-060	ComEd	Solar	20	20
AD2-112	AEP	Natural Gas; Other	20	50.4
AD2-131	ComEd	Storage	50	8.3
AD2-133	JCPL	Wind	100.33	18
AD2-134	ComEd	Wind	108.33	21.7
AD2-163	ATSI	Solar	180	120.7
AD2-180	AEP	Wind	110	15.08
AD2-214	ComEd	Solar	68	40.8

Queue Position	Transmission Owner	Fuel Type	MW Energy	MW Capacity
AE1-001	ATSI	Nuclear	28.1	7.1
AE1-007	ComEd	Solar	20	7.6
AE1-020	DPL	Offshore Wind	816	229.3
AE1-044	DEOK	Solar	200	111.7933
AE1-064	AEP	Solar	102.1	67.3
AE1-071	ME	Solar	100.1	62.1
AE1-087	Dominion	Storage	20	16
AE1-104	AEC	Offshore Wind	432	121.4
AE1-107	Dominion	Solar	53.1	31
AE1-108	AEP	Solar	149.5	89.7
AE1-109	AEP	Solar	20	8.7
AE1-113	ComEd	Wind	300	66
AE1-130	AEP	Solar	83	55.3
AE1-138	EKPC	Solar	22	13.2
AE1-144	DPL	Solar; Storage	120	80.2
AE1-146	AEP	Solar	120	81.8
AE1-163	ComEd	Wind	350	49
AE1-183	ATSI	Solar	20	12
AE1-207	AEP	Solar	160	67.2
AE1-208	AEP	Solar	130	55
AE1-209	AEP	Wind	100	13
AE1-210	AEP	Wind	100	13
AE1-245	AEP	Wind	150	19.5
AE1-250	AEP	Solar; Storage	150	90
AE2-024	DPL	Offshore Wind	882	155.23
AE2-025	DPL	Offshore Wind	445.2	78.36
AE2-030	AEP	Solar	18	7.56
AE2-193	ATSI	Solar	120	50.4
AE2-211	EKPC	Solar	55	23.1
AE2-217	ATSI	Solar	180	108
AE2-221	ComEd	Solar	300	180
AE2-222	AEC	Offshore Wind	300	85.424
AE2-226	APS	Solar	99	59.4



Queue Position	Transmission Owner	Fuel Type	MW Energy	MW Capacity
AE2-251	AEC	Offshore Wind	1200	337.2
AE2-285	ATSI	Solar	50	30
AE2-290	AEP	Solar	100	60
AE2-303	ComEd	Solar	49.9	30
AE2-309	APS	Solar; Storage	19.84	16.66
AE2-333	APS	Solar	100	60
AF1-014	DEOK	Solar	19.9	7.2
AF1-022	APS	Solar	14	8.4
AF1-078	ComEd	Solar	45	18.9
AF1-099	APS	Solar; Storage	126.5	75.9
AF1-147	DL	Solar	100	60
AF1-148	AEP	Solar; Storage	159	95.4
AF1-223	AEP	Solar	150	90
AF1-236	DL	Solar	1210	459.8
AF1-282	ComEd	Solar	100	60
AF1-283	ComEd	Solar	130	78
AF1-304	ME	Solar; Storage	100	60
AF2-001	ME	Solar	20	12
AF2-002	ME	Solar	10	6
AF2-004	ATSI	Natural Gas	33	33
AF2-005	ATSI	Natural Gas	8	8
AF2-006	PENELEC	Solar	20	12
AF2-010	ME	Solar	77	46
AF2-013	DL	Storage	100	100
AF2-014	AEP	Solar	150	90
AF2-016	AEC	Storage	300	120
AF2-018	AEP	Solar	200	133.9
AF2-019	AEC	Storage	40	40
AF2-020	AEC	Storage	20	8
AF2-021	AEC	Storage	20	8
AF2-023	AEC	Storage	50	20
AF2-024	AEC	Storage	50	20
AF2-025	AEC	Storage	20	20

Queue Position	Transmission Owner	Fuel Type	MW Energy	MW Capacity
AF2-027	ComEd	Storage	50	20
AF2-029	APS	Storage	20	8
AF2-030	EKPC	Storage	20	8
AF2-031	ComEd	Storage	20	8
AF2-032	ComEd	Solar	20	13.6
AF2-033	Dayton	Storage	20	8
AF2-034	ComEd	Solar; Storage	20	10.8
AF2-035	DL	Solar	80	48
AF2-037	DL	Solar	94	56.4
AF2-038	JCPL	Storage	20	8
AF2-039	ME	Solar	13.5	8.1
AF2-040	Dominion	Storage	75	75
AF2-041	ComEd	Solar	300	180
AF2-042	Dominion	Solar	500	300
AF2-046	Dominion	Solar	150	99.8
AF2-047	Dominion	Solar	150	99.8
AF2-048	AEP	Solar	70	46.6
AF2-049	Dominion	Solar	60	34.5
AF2-050	ME	Solar	50	30
AF2-051	ME	Solar	50	33
AF2-054	Dominion	Solar	19.9	11.94
AF2-055	JCPL	Storage; Solar	50	30
AF2-056	PENELEC	Solar	50	33
AF2-057	Dominion	Storage	20	20
AF2-059	AEP	Solar	20	8.4
AF2-060	Dominion	Storage	9	9
AF2-061	Dominion	Storage	40	40
AF2-063	Dominion	Solar	150	90
AF2-065	Dominion	Solar	150	76.5
AF2-066	ComEd	Solar	80	48
AF2-067	ComEd	Solar	40	24
AF2-068	AEP	Solar	150	90
AF2-069	ComEd	Wind	9.3	2.2
AF2-075	APS	Solar	50	30
AF2-076	Dominion	Solar	50	30

Queue Position	Transmission Owner	Fuel Type	MW Energy	MW Capacity
AF2-077	Dominion	Solar	20	12
AF2-078	AEP	Solar; Storage	200	120
AF2-079	ComEd	Solar	165	99
AF2-080	Dominion	Solar	70	48.5
AF2-081	Dominion	Solar	80	56
AF2-082	PENELEC	Solar	55	33
AF2-083	AEP	Solar	150	100
AF2-084	ComEd	Solar	42	28.1
AF2-086	PENELEC	Solar	19.6	11.8
AF2-088	ME	Solar	6.5	3.9
AF2-090	DPL	Solar	110	73.6
AF2-091	Dominion	Solar	34	14.3
AF2-092	ME	Solar	12	7.2
AF2-094	AEP	Solar; Storage	40	26.4
AF2-095	ComEd	Solar; Storage	200	136
AF2-102	EKPC	Solar	3	1.8
AF2-105	AEP	Solar	100	60
AF2-106	AEP	Solar	150	90
AF2-107	AEP	Solar	50	32.3
AF2-108	Dominion	Solar; Storage	10	10
AF2-110	Dominion	Solar	20	7.72
AF2-112	APS	Solar	17	11.4
AF2-115	Dominion	Solar	25	15
AF2-116	APS	Solar	20	13.3
AF2-117	APS	Solar	70	46.67
AF2-119	Dominion	Solar	80	48
AF2-120	Dominion	Solar	62	37.2
AF2-121	ME	Solar	20	12
AF2-122	AEP	Solar	107.7	64.62
AF2-123	ATSI	Solar	49	20.58
AF2-124	JCPL	Solar	120	50.4
AF2-125	AEP	Solar	54	35.5
AF2-126	ATSI	Solar	51	34
AF2-127	AEP	Solar	38	24.9
AF2-128	ComEd	Wind	79.5	13.992
AF2-129	ATSI	Solar	20	12
AF2-130	ME	Solar	20	12



Queue Position	Transmission Owner	Fuel Type	MW Energy	MW Capacity
AF2-132	AEP	Solar	300	180
AF2-133	AEP	Solar	300	180
AF2-134	AEP	Solar	100	60
AF2-136	Dominion	Solar	0	0
AF2-137	AEP	Solar	500	210
AF2-138	DPL	Solar	19.8	8.32
AF2-139	EKPC	Solar	8.8	3.7
AF2-140	PENELEC	Natural Gas	0	30
AF2-141	ME	Storage	0	8
AF2-142	ComEd	Solar	150	90
AF2-143	ComEd	Solar	150	90
AF2-144	Dominion	Solar; Storage	17	10.2
AF2-146	ME	Solar	20	12
AF2-148	ME	Solar	13.5	8.1
AF2-149	AEP	Solar	80	32
AF2-150	ATSI	Solar	88	36.96
AF2-152	PENELEC	Oil	2	2
AF2-153	PENELEC	Oil	2	2
AF2-154	PENELEC	Natural Gas	5	5
AF2-155	PENELEC	Natural Gas	13	13
AF2-156	PENELEC	Natural Gas	2	2
AF2-157	PENELEC	Natural Gas	0	1
AF2-158	PENELEC	Natural Gas	4	4
AF2-159	PENELEC	Natural Gas	2	2
AF2-160	Dayton	Natural Gas	3.5	3.5
AF2-162	AEP	Solar	45	30
AF2-164	ODEC	Solar	80	48
AF2-165	OVEC	Solar	20	12
AF2-166	PECO	Solar	20	12
AF2-168	PPL	Natural Gas; Solar; Other	5	0
AF2-171	Dominion	Solar	150	90
AF2-173	AEP	Solar	200	84
AF2-174	AEC	Solar	11	4.62
AF2-175	EKPC	Solar	3	1.8
AF2-176	ATSI	Solar	60	36
AF2-177	AEP	Wind	200	26
AF2-183	ComEd	Storage	80	32

Queue Position	Transmission Owner	Fuel Type	MW Energy	MW Capacity
AF2-186	AEP	Solar	45	18.9
AF2-187	ATSI	Solar	130	78
AF2-188	AEP	Solar	112	67.2
AF2-189	AEP	Solar	150	90
AF2-191	AEP	Solar	110	66
AF2-193	Dominion	Offshore Wind	440	119
AF2-194	Dominion	Offshore Wind	440	119
AF2-196	Dominion	Offshore Wind	30	9
AF2-198	AEP	Storage	22.4	8.96
AF2-199	ComEd	Solar	100	60
AF2-200	ComEd	Solar	200	120
AF2-203	PENELEC	Solar	20	12
AF2-204	AEP	Solar; Storage	110	72
AF2-205	AEP	Solar	200	120
AF2-207	Dominion	Storage	50.4	20.16
AF2-208	DPL	Storage	100.8	40.32
AF2-209	AEP	Solar; Storage	140	95.4
AF2-210	Dayton	Solar	200	120
AF2-211	AEP	Solar	100	60
AF2-212	ComEd	Solar	150	90
AF2-213	EKPC	Storage	81.2	32.48
AF2-222	Dominion	Solar	167	100
AF2-223	AEP	Solar; Storage	200	120
AF2-224	AEP	Solar	100	42
AF2-225	ComEd	Solar	150	63
AF2-226	ComEd	Storage	50	20
AF2-227	PENELEC	Solar	63.75	38.25
AF2-228	PENELEC	Solar	61	36.6
AF2-229	PECO	Solar	20	10.9
AF2-232	PENELEC	Solar; Storage	40	24
AF2-233	PENELEC	Solar; Storage	20	12
AF2-234	PENELEC	Solar; Storage	40	24
AF2-235	PECO	Solar	10	6
AF2-238	PECO	Solar	20	12
AF2-239	PENELEC	Solar	20	11.1
AF2-240	PENELEC	Solar	7	3.78
AF2-241	PENELEC	Solar	20	11.3



Queue Position	Transmission Owner	Fuel Type	MW Energy	MW Capacity
AF2-242	Dominion	Solar	80	45
AF2-243	PENELEC	Solar	15	9
AF2-247	PPL	Solar	5	2.1
AF2-248	DPL	Solar	7.2	3.4
AF2-249	DPL	Storage	3	0.6
AF2-251	PENELEC	Nuclear	50	0
AF2-252	ComEd	Storage	50	20
AF2-259	Dominion	Solar	25	15
AF2-260	DPL	Solar	85	53
AF2-263	ComEd	Solar	98	58.8
AF2-266	Dominion	Storage	50	50
AF2-274	APS	Solar; Storage	3	0
AF2-275	APS	Solar; Storage	3	0
AF2-276	APS	Solar; Storage	3	0
AF2-291	AEP	Solar	100	60
AF2-292	APS	Solar; Storage	1.17	0
AF2-293	APS	Solar; Storage	1.17	0
AF2-294	PENELEC	Solar	20	12
AF2-295	APS	Solar	20	12
AF2-296	PENELEC	Solar	20	12
AF2-297	Dominion	Solar	80	48
AF2-298	Dayton	Solar	49.9	29.9
AF2-299	Dominion	Solar	25	15
AF2-300	Dominion	Solar	20	12
AF2-302	AEP	Solar	20	12
AF2-303	Dominion	Solar; Storage	100	100
AF2-304	Dominion	Solar; Storage	89	89
AF2-305	ComEd	Wind	0	9.2
AF2-306	DPL	Storage	26	26
AF2-308	DPL	Storage	28	28
AF2-309	DPL	Solar	70	42
AF2-310	APS	Solar; Storage	20	20
AF2-311	APS	Solar	100	55
AF2-313	DPL	Solar	19.9	12.7
AF2-314	APS	Solar	10	6
AF2-315	PENELEC	Nuclear	50	0
AF2-316	APS	Solar	150	82.7



Queue Position	Transmission Owner	Fuel Type	MW Energy	MW Capacity
AF2-317	ComEd	Wind	0	15.68
AF2-318	PENELEC	Solar	20	12
AF2-319	ComEd	Storage	50	20
AF2-322	ATSI	Solar	199.67	119.802
AF2-325	DPL	Solar	10	4.2
AF2-328	AEP	Solar	75	45
AF2-329	ComEd	Storage	42.2	42.2
AF2-331	PENELEC	Solar	50	30
AF2-332	PENELEC	Solar	50	30
AF2-333	PENELEC	Solar	20	12
AF2-334	PEPCO	Solar	20	12
AF2-335	AEP	Solar	100	60
AF2-336	PENELEC	Solar	20	12
AF2-337	PENELEC	Solar	20	12
AF2-338	PENELEC	Solar	20	12
AF2-339	PENELEC	Solar	20	12
AF2-341	ATSI	Solar	20	12
AF2-342	ATSI	Solar	20	12
AF2-343	ATSI	Solar	20	12
AF2-344	ATSI	Solar	20	12
AF2-345	ATSI	Solar	20	12
AF2-346	ComEd	Solar	75	45
AF2-349	ComEd	Solar	300	180
AF2-350	ComEd	Solar	100	60
AF2-351	ComEd	Storage	20	8
AF2-352	ComEd	Storage	50	20
AF2-356	APS	Solar	175	105
AF2-357	APS	Solar	24	14.4
AF2-358	DPL	Solar	100	60
AF2-359	AEP	Solar	125	75
AF2-361	PEPCO	Solar	85	35
AF2-363	ComEd	Solar	81.4	48.84
AF2-364	ComEd	Solar	81.4	48.84
AF2-365	DPL	Solar	50	30
AF2-370	AEP	Storage	0	20
AF2-371	AEP	Solar	84	50.4
AF2-375	AEP	Solar	129.6	77.76

Queue Position	Transmission Owner	Fuel Type	MW Energy	MW Capacity
AF2-376	AEP	Storage	50	20
AF2-377	AEP	Storage	50	20
AF2-378	DPL	Solar	2.65	1.11
AF2-380	APS	Solar	15	9
AF2-382	AEP	Solar	75	45
AF2-383	EKPC	Solar; Storage	20	20
AF2-384	Dayton	Solar; Storage	20	20
AF2-385	DPL	Solar	75	47.8
AF2-387	DPL	Solar	100	66.6
AF2-388	AEP	Wind	200	35.2
AF2-393	ComEd	Storage	60	60
AF2-394	ComEd	Storage	40	40
AF2-395	AEP	Natural Gas	51.1	89.6
AF2-397	Dominion	Solar; Storage	130	78
AF2-398	APS	Solar	3	1.9
AF2-403	Dominion	Storage	0	8
AF2-404	Dominion	Storage	0	0
AF2-405	PENELEC	Storage	10	10
AF2-407	AEP	Storage	300	300
AF2-408	AEP	Storage	80	80
AF2-409	DPL	Storage	100	100
AF2-414	PPL	Storage	300	300
AF2-415	PPL	Storage	150	150
AF2-416	PPL	Storage	10	10
AF2-417	PEPCO	Solar	20	12
AF2-418	PEPCO	Solar	20	12
AF2-421	PEPCO	Solar	20	12
AF2-424	PEPCO	Solar	20	12
AF2-425	PEPCO	Solar	20	12
AF2-426	APS	Solar; Storage	1.17	0
AF2-433	PEPCO	Solar	20	12
AF2-434	PEPCO	Solar	20	12
AF2-436	PENELEC	Natural Gas	1.5	1.5
AF2-438	PEPCO	Solar	20	12
AF2-439	PENELEC	Solar	50	26
AF2-440	AEP	Solar	50	25
AF2-444	PEPCO	Solar	19.8	11.8

Queue Position	Transmission Owner	Fuel Type	MW Energy	MW Capacity
AF2-445A	PEPCO	Solar	19.8	11.8
AG1-001	AEC	Solar	31	11.78
AG1-003	AEP	Solar; Storage	400	226
AG1-004	AEP	Storage	200	200
AG1-007	Dominion	Solar	9.4	6
AG1-009	Dominion	Storage	0	0
AG1-010	Dominion	Storage	0	0
AG1-012	APS	Solar; Storage	0	0
AG1-013	Dominion	Storage	0	0
AG1-014	Dominion	Storage	0	0
AG1-015	Dominion	Storage	0	0
AG1-017	AEP	Wind	16.64	2.93
AG1-018	APS	Solar	8	3.2
AG1-019	Dominion	Storage	100	100
AG1-021	Dominion	Solar	20	12
AG1-022	AEP	Solar	20	12
AG1-023	Dominion	Solar	75	15
AG1-024	AEP	Solar	85	35.7
AG1-025	AEP	Solar	20	8.4
AG1-027	Dominion	Solar	127.5	82.11
AG1-028	Dominion	Storage	0	0
AG1-029	APS	Solar	30	13.6
AG1-031	Dominion	Solar	20	8.4
AG1-033	PENELEC	Solar	5	3.2
AG1-034	AEP	Solar	127.5	53.55
AG1-037	Dominion	Solar	5	3
AG1-038	Dominion	Solar	45	18.9
AG1-039	ATSI	Solar	56	23.52
AG1-040	PENELEC	Solar	20	12
AG1-041	PENELEC	Solar	12	7.2
AG1-043	Dominion	Solar	60	36
AG1-044	ComEd	Storage	0.5	0
AG1-045	APS	Solar; Storage	36	18
AG1-047	AEP	Solar	100	60
AG1-049	AEP	Solar	0	17.6
AG1-050	PPL	Storage	20	20
AG1-051	ATSI	Storage	20	20



Queue Position	Transmission Owner	Fuel Type	MW Energy	MW Capacity
AG1-052	EKPC	Storage	20	20
AG1-053	JCPL	Storage	20	20
AG1-054	ATSI	Solar	40	25.2
AG1-057	Dominion	Storage	20	20
AG1-059	APS	Solar	100	60
AG1-060	PPL	Wind	174.8	25.7
AG1-063	ATSI	Storage	2.5	0.7
AG1-064	Dominion	Storage	19.1	8
AG1-065	Dominion	Storage	19.1	8
AG1-066	AEP	Solar	80	48
AG1-067	DPL	Solar	38	24.8
AG1-068	ATSI	Solar	49.9	30.5
AG1-070	DPL	Solar; Storage	45	32.7
AG1-071	DPL	Solar; Storage	55	37.5
AG1-072	DPL	Storage	50	50
AG1-076	AEP	Solar	0	46
AG1-077	PENELEC	0	0	0
AG1-079	DPL	Solar	1.5	0
AG1-080	PPL	Solar	19.9	10.7
AG1-084	Dominion	Solar; Storage	17.5	10.5
AG1-085	Dominion	Solar; Storage	17.5	10.5
AG1-086	Dayton	Solar; Storage	17.5	10.5
AG1-088	AEC	Storage	0	0
AG1-089	AEP	Storage	30	12
AG1-091	AEP	Solar	50	32.4
AG1-092	AEP	Storage	0	0
AG1-094	PENELEC	Natural Gas	35.3	0
AG1-095	APS	Solar	16	10.6667
AG1-097	APS	Solar	0	13
AG1-100	PENELEC	Solar	20	12
AG1-101	APS	Solar	10	6.7
AG1-102	Dominion	Storage	19	6.16
AG1-103	AEC	Storage	0	0
AG1-104	ATSI	Storage	300	120
AG1-107	AEP	Solar	150	85.7
AG1-109	AEP	Storage	0	25
AG1-110	AEC	Storage	0	20



Queue Position	Transmission Owner	Fuel Type	MW Energy	MW Capacity
AG1-112	APS	Storage	0	10
AG1-113	PENELEC	Storage	0	3.6
AG1-114	PENELEC	Storage	0	10
AG1-115	PPL	Storage	0	100
AG1-116	AEC	Storage	0	0
AG1-117	AEC	Storage	0	0
AG1-125	AEP	Solar	400	234.9
AG1-126	AEP	Solar	400	234.9
AG1-129	AEC	Solar	51	30.6
AG1-130	PPL	Storage	5	2
AG1-131	Dominion	Solar	25.6	15.36
AG1-132	Dayton	Natural Gas	20	20
AG1-133	Dominion	Solar	128	76.8
AG1-134	Dominion	Solar	100	60
AG1-135	Dominion	Solar	60	36
AG1-136	AEP	Storage	100	40
AG1-137	Dominion	Storage	100	40
AG1-138	PENELEC	Solar	5	4.75
AG1-139	PENELEC	Solar	5	4.75
AG1-140	PENELEC	Solar	2.62	1.7
AG1-141	APS	Solar	5	2.8
AG1-142	APS	Solar	2.5	1.4
AG1-143	Dominion	Storage	200	80
AG1-145	Dominion	Solar	20	12
AG1-146	Dominion	Solar	30	18
AG1-147	Dominion	Solar	70	42
AG1-148	PPL	Natural Gas	5	0
AG1-149	DPL	Storage	3	3
AG1-151	Dominion	Storage	100	100
AG1-152	Dominion	Storage	100	40
AG1-153	Dominion	Storage	75	30
AG1-154	Dominion	Storage	50	20
AG1-155	AEP	Storage	20	8
AG1-156	PPL	Solar	60	39.5
AG1-157	PPL	Solar	7.37	0
AG1-158	JCPL	Solar	16	0
AG1-159	Dominion	Storage	0	0



Queue Position	Transmission Owner	Fuel Type	MW Energy	MW Capacity
AG1-160	Dominion	Storage	75	30
AG1-162	AEP	Solar	33.4	17.6
AG1-164	PPL	Solar	20	12
AG1-165	PPL	Solar	20	12
AG1-166	Dominion	Solar	20	12
AG1-167	Dominion	Solar	20	12
AG1-168	Dominion	Solar	20	12
AG1-169	Dominion	Solar	20	12
AG1-170	Dominion	Solar	20	12
AG1-182	APS	Solar	100	65.21
AG1-183	Dominion	Solar	50	35.52
AG1-186	APS	Solar	0	34.79
AG1-187	Dominion	Storage	0	14.48
AG1-190	PPL	Solar	13.2	5.5
AG1-191	EKPC	Solar	15.4	6.5
AG1-193	PENELEC	Solar	20	12
AG1-194	AEP	Solar; Storage	200	104
AG1-195	Dominion	Solar; Storage	150	150
AG1-196	Dominion	Solar; Storage	150	150
AG1-197	PENELEC	Solar	15	9
AG1-198	PENELEC	Solar	12	7.2
AG1-200	PPL	Solar	3,984	1.7
AG1-202	PENELEC	Solar	10	6.6
AG1-203	PENELEC	Solar	10	6.5
AG1-205	PENELEC	Solar	10	6.5
AG1-207	Dayton	Storage	85	85
AG1-209	Dominion	Storage	7	2.8
AG1-210	Dominion	Storage	10	4
AG1-213	Dominion	Storage	10	4
AG1-214	Dominion	Storage	19	7.6
AG1-215	Dominion	Storage	14	5.6
AG1-218	AEP	Solar	250	150
AG1-219	AEP	Solar; Storage	75	39.5
AG1-221	Dominion	Storage	50	20
AG1-223	EKPC	Solar	15.4	6.47
AG1-227	PPL	Solar	20	12
AG1-228	PPL	Solar	20	12



Queue Position	Transmission Owner	Fuel Type	MW Energy	MW Capacity
AG1-231	Dayton	Solar	20	12
AG1-232	AEP	Solar	135	81
AG1-237	AEP	Wind	200	26
AG1-239	ATSI	Solar	150	90
AG1-246	APS	Solar	7.5	4.9
AG1-251	ATSI	Solar	3.88	1.9
AG1-253	PENELEC	Solar	4	2.7
AG1-254	AEC	Solar; Storage	38	25.3
AG1-255	AEC	Solar; Storage	55	36.7
AG1-256	Dominion	Storage	20	8
AG1-257	APS	Solar	19.9	8.3
AG1-259	PPL	Solar	19.9	8.3
AG1-260	PPL	Solar	19.9	8.3
AG1-263	PPL	Storage	20	8
AG1-267	PPL	Storage	20	8
AG1-268	PPL	Storage	80	40.8
AG1-277	PPL	Solar; Storage	40	32
AG1-278	PPL	Solar; Storage	20	15.42
AG1-279	PPL	Solar; Storage	20	15.42
AG1-280	PENELEC	Solar	20	12
AG1-281	PENELEC	Solar	20	12
AG1-282	Dominion	Solar	20	12
AG1-283	PPL	Solar	30	18
AG1-290	ATSI	Storage	20	4
AG1-291	Dayton	Hydro	16.8	13.5
AG1-296	PENELEC	Solar	10	6.5
AG1-299	AEC	Solar	3	1.8
AG1-300	AEC	Solar	3	1.8
AG1-303	PENELEC	Solar	44	26.4
AG1-305	Dominion	Solar	118	70.8
AG1-307	APS	Solar; Storage	80	56
AG1-308	PENELEC	Solar	19.9	8.3
AG1-311	AEP	Solar; Storage	99	69.4
AG1-315	APS	Solar	2	0.84
AG1-317	PENELEC	Storage	1	0.3
AG1-318	DPL	Storage	1	0.3
AG1-322	Dominion	Solar; Storage	70	70

Queue Position	Transmission Owner	Fuel Type	MW Energy	MW Capacity
AG1-323	Dayton	Solar; Storage	40	40
AG1-324	AEP	Solar; Storage	45	31.5
AG1-327	APS	Solar	35	23.1
AG1-330	PPL	Solar; Battery	5	4.5
AG1-335	ATSI	Solar	4	2.7
AG1-336	PPL	Solar; Storage	5	3.8
AG1-337	PPL	Solar; Storage	5	3.7
AG1-338	PENELEC	Solar	5	4.4
AG1-344	Dominion	Solar	20	12
AG1-345	Dominion	Solar	8	4.8
AG1-346	Dominion	Solar	20	12
AG1-348	EKPC	Solar	19.8	8.316
AG1-349	AEP	Solar	260	156
AG1-352	DPL	Solar	50	30
AG1-360	DPL	Solar	8.75	0
AG1-362	PPL	Solar	5	3.2
AG1-363	APS	Solar; Storage	300	220
AG1-365	AEP	Solar	100	60
AG1-366	AEP	Storage	50	20
AG1-368	AEP	Solar	100	60
AG1-369	AEP	Solar	49.9	29.94
AG1-373	ComEd	Storage	0	10
AG1-377	PENELEC	Solar	20	12
AG1-378	PENELEC	Solar	20	12
AG1-382	PENELEC	Solar	20	12
AG1-383	Dominion	Solar	20	15.43
AG1-386	APS	Solar; Storage	20	15.42
AG1-388	Dominion	Solar	20	12
AG1-393	Dominion	Solar	20	12
AG1-394	Dominion	Solar	20	12
AG1-397	DPL	Solar; Storage	9.972	4.1882
AG1-398	ComEd	Wind	0	7.33
AG1-405	DPL	Solar	57	34.2
AG1-406	DPL	Storage	22	22
AG1-410	AEP	Solar	300	180
AG1-412	Dominion	Storage	200	80
AG1-415	APS	Solar	50	25



Queue Position	Transmission Owner	Fuel Type	MW Energy	MW Capacity
AG1-416	APS	Solar; Storage	125	91
AG1-417	AEP	Solar	50	30
AG1-418	AEP	Solar	50	30
AG1-419	JCPL	Solar	50	21
AG1-420	APS	Solar	70	42
AG1-421	Dominion	Solar	200	120
AG1-422	Dominion	Storage	50	50
AG1-424	AEP	Solar	100	60
AG1-436	AEP	Solar	125	75
AG1-447	AEP	Storage	55	55
AG1-448	AEP	Storage	55	55
AG1-453	AEP	Solar	140	84
AG1-454	AEP	Storage	50	50
AG1-456	AEP	Storage	30	30
AG1-460	ComEd	Storage	30	12
AG1-461	DPL	Solar	30	19.5
AG1-465	JCPL	Storage	100	40
AG1-466	Dominion	Solar	14	8.4
AG1-467	Dominion	Solar	15.6	9.36
AG1-468	AEP	Solar	14	8.4
AG1-469	Dominion	Solar	15.6	9.36
AG1-471	DPL	Solar	60	36
AG1-476	AEC	Natural Gas; Other	0	33.1
AG1-478	ComEd	Solar; Storage	19.9	15.9
AG1-481	PENELEC	Solar; Storage	15.53	15.53
AG1-483	PENELEC	Solar; Storage	542.5	542.5
AG1-484	JCPL	Solar; Storage	20	20
AG1-485	Dayton	Storage	55	55
AG1-486	JCPL	Storage	15	15
AG1-487	EKPC	Solar; Storage	20	20
AG1-489	ATSI	Solar; Storage	175	145
AG1-490	ATSI	Solar; Storage	125	105
AG1-495	EKPC	Solar	19.8	8.316
AG1-498	PPL	Solar	8.8	3.7
AG1-499	AEC	Solar	10	6
AG1-501	ATSI	Natural Gas	11.3	10
AG1-504	PPL	Solar	68	41.1

Queue Position	Transmission Owner	Fuel Type	MW Energy	MW Capacity
AG1-507	ComEd	Natural Gas	296	296
AG1-508	AEP	Wind	63.3	9.3
AG1-509	AEP	Wind	105.4	15.5
AG1-510	EKPC	Solar; Storage	20	12
AG1-511	EKPC	Solar; Storage	50	30
AG1-512	ComEd	Storage	40	16
AG1-513	ComEd	Storage	10	4
AG1-514	APS	Storage	10	4
AG1-515	APS	Storage	10	4
AG1-516	APS	Storage	10	4
AG1-517	APS	Natural Gas	0	0
AG1-518	Dominion	Solar; Storage	50	50
AG1-519	Dominion	Solar	20	12
AG1-520	PENELEC	Solar; Storage	4	0
AG1-527	APS	Solar	215	129
AG1-528	AEP	Solar	225	135
AG1-532	Dominion	Solar	13.5	8.1
AG1-533	APS	Solar	40	24
AG1-534	Dominion	Storage	200	200
AG1-535	ComEd	Storage	85	85
AG1-537	Dominion	Storage	75	32
AG1-538	Dominion	Storage	75	32
AG1-541	Dominion	Storage	75	32
AG1-545	Dominion	Solar; Storage	20	14
AG1-551	Dominion	Solar	20	13.1
AG1-554	AEP	Solar	49.99	32.7
AG1-555	AEP	Solar; Storage	120	88.4
AG1-558	Dominion	Solar; Storage	20	13.3
AG1-562	AEP	Solar	250	150
AG1-563	EKPC	Solar	0	0.7
AG2-135	PPL	Storage	0.28	0
Y3-013	ComEd	Natural Gas	0	90
Z1-035	ATSI	Offshore Wind	18	2.34

## Merchant Transmission Requests

Queue Position	Project Name	Transmission Owner	MW Energy (nFTIR/nFTWR)	MW Capacity (FTIR/FTWR)
<b>AF2-442</b>	Vernon 115 kV	JCPL	84 NFTIR/NFTWR	0
<b>AF2-443</b>	Vernon 115 kV	JCPL	84 NFTIR/NFTWR	0



## Attachment D – Interconnection Network Upgrades

Upgrade ID	Description	Cost Estimate (\$M)	Required In-Service Date
n1830	Oversight of building the interconnection substation Kensington Ave. TSS 199	\$0.55	12/31/2011
n1831	Kensington Ave. TSS199 – Install 138 kV transmission line tie in	\$0.11	12/31/2011
n1832.1	Relay and SCADA modifications at Davis Creek TSS 86	\$0.36	12/31/2011
n1832.2	Relay and SCADA modifications at Bradley TSS 70	\$0.60	12/31/2011
n1832.3	Relay and SCADA modifications at Kankakee TSS 157	\$0.14	12/31/2011
n1835	Relay modifications at TSS 199 Kensington Ave. substation	\$0.29	12/31/2016
n3243	Transmission loop through new 345 kV Meldahl interconnection substation	\$1.03	12/31/2013
n3244	Relay modification at Zimmer substation	\$0.02	12/31/2013
n3245	Relay modification at Spurlock substation	\$0.02	12/31/2013
n4340.1	Bruce Mansfield breaker Gen-Owned(B72): Replace with an 80 kA circuit breaker	\$1.96	6/1/2018
n5202	Build a three breaker ring bus at Wards Creek substation	\$5.99	2/1/2019
n5204	Upgrade relay to accommodate new generation and interconnection substation at Hopewell-Surry line #240	\$0.06	2/1/2019
n5474	AC1-173 Fiber system modifications at Haviland and East Lima	\$0.01	10/21/2020
n5475	Modify transfer trip equipment at Carolina, Clubhouse and Emporia substations	\$0.15	3/31/2018
n5533	Replace B13250 line trap, line tuner, coax, line relays, and carrier set at Richland substation	\$0.34	10/31/2018
n5648	Relay Settings – convert 2-terminal gen lead to 3-terminal gen lead at AC1-173 substation	\$0.06	10/31/2019
n5781	Provide engineering and construction oversight for the construction of the new AD1-136 substation	\$5.28	6/30/2021
n5782	Reconfigure the South Bethel to Brown 69 kV circuit to loop through the new substation and rework the distribution under build on that circuit path to allow for the new substation	\$0.65	6/30/2021
n5793	Provide station service to Guernsey 765 kV station from Derwent-S. Cumberland 69 kV	\$0.60	4/1/2020
n5803	Build a new three breaker ring bus at the new AB2-100 substation	\$6.03	12/1/2021
n5804	Install new backbone tower on Clubhouse-Lakeview line #254	\$1.29	12/1/2021
n5805	Upgrade protection for Clubhouse-Lakeview line #254 to accommodate AB2-100 generator and switching station	\$0.19	12/1/2021
n5817	Install Dequine 345 kV circuit breaker D	\$1.17	11/5/2019
n5826	Install a fourth breaker in ring bus at Colonial Trail	\$2.50	12/31/2020
n5948	Install and upgrade relays/controls and install fiber interface for new AC1-097 fiber or optical ground wire (“OPGW”) at the Hatfield substation	\$0.34	6/2/2021

Upgrade ID	Description	Cost Estimate (\$M)	Required In-Service Date
n5949	Hatfield substation – fiber work inside the substation – for Optical Ground Wire (“OPGW”) construction, install fiber cable runs to represent All-Dielectric Self-Supporting (“ADSS”) cable extension from substation control house to the telecommunication line structure	\$0.05	6/2/2021
n5969	Install 138 kV revenue metering at Jay substation	\$0.25	10/1/2020
n6025	Expansion of TSS 900 Elwood to accommodate AC1-204 attachment	\$35.76	6/1/2022
n6063	Replace wave trap at both Ladysmith and Possum Point Substations for the Ladysmith-Possum Pt 500 kV line #568. This will increase line rating by 12% to 2913 MVA. Estimated to take 14–16 months to engineer and construct	\$0.50	10/1/2019
n6107	Keystone substation: revise relay settings on South Bend terminal	\$0.03	5/31/2022
n6108	Yukon substation: revise relay settings on South Bend terminal	\$0.03	5/31/2022
n6240	Remote protection and communication work at South Bethel and Brown substations	\$1.12	6/30/2021
n6276	Install OPGW fiber from on the Harrison County-Renaker line section, which is ~9.35 miles in length	\$1.27	6/1/2019
n6306	Install line terminal and metering at TSS92 McLean	\$0.50	6/30/2021
n6307	Install breaker for L91305 at TSS92 McLean	\$2.00	6/30/2021
n6391	Option to build oversight at TSS 939 Mulberry and TSS924 Three Rivers	\$4.24	2/1/2022
n6392	Install fiber optics cable 13.1 miles TSS 939 Mulberry to Sta 23 Collins	\$2.00	2/1/2022
n6393	Modify 93913 relaying at TSS 908 Mole Creek	\$0.22	2/1/2022
n6394	Modify 1202 line relaying Sta 12 Dresden	\$0.21	2/1/2022
n6395	Modify 1227 line relaying Sta 12 Dresden	\$0.21	2/1/2022
n6396	Modify 93915 relaying at Tazewell	\$0.09	2/1/2022
n6397	Modify 1202 tie in at TSS 939 Mulberry	\$0.68	2/1/2022
n6398	Modify 1227 tie in at TSS 939 Mulberry	\$0.68	2/1/2022
n6399	Modify 93913 tie in at TSS 939 Mulberry	\$0.68	2/1/2022
n6400	Modify 93915 tie in at TSS 939 Mulberry	\$0.68	2/1/2022
N6699	Construct new 345 kV AC2-103 interconnection switchyard including SCADA, metering and project management	\$9.66	10/1/2022
N6700	Loop the Beaver-Davis Besse 345 kV circuit ~400 feet into the proposed AC2-103 three breaker ring bus near structure numbers 41800 & 41801	\$1.52	10/1/2022
N6701	Beaver substation – Install standard dual SEL421 panel with UPLC for pilot scheme and DCB, DTT and anti-islanding for the AC2-103 line	\$0.29	10/1/2022

Upgrade ID	Description	Cost Estimate (\$M)	Required In-Service Date
<b>N6702</b>	Davis Besse substation – Install standard dual SEL421 panel with UPLC for pilot scheme and DCB, DTT and anti-islanding for the AC2-103 line	\$0.37	10/1/2022
<b>N6703</b>	AC2-103 ADSS fiber: From the new AC2-103 ring bus interconnection substation to the fiber backbone ~1 mile away to support SCADA transport. The assumed route is ~1 mile in length.	\$0.19	10/1/2022
<b>N6974</b>	Construct a new 7 <sup>th</sup> breaker position onto the 138 kV, six breaker position ring bus at Townsend substation. Install metering control cable and meter cabinets, secondary wiring connections at the metering enclosure, primary and backup solid state multi-function meters for the new metering position, protective relays and perform relay setting changes as required.	\$1.94	10/31/2017