Economic Analysis Report

2021 SAA Proposal Window to Support NJ OSW

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EXECUTIVE SUMMARY

Background

As part of the 2021 SAA Proposal Window to support NJ Offshore Wind ("OSW"), PJM received proposals to meet New Jersey's goal of interconnecting up to 7,500 MW of offshore wind. The proposals were categorized into four options according to the function and location of the proposal. Altogether, PJM received a diverse set of 80 proposals.

- Option 1a proposals: Onshore transmission upgrades to resolve potential reliability criteria violations on PJM facilities in accordance with all applicable planning criteria (PJM, NERC, SERC, RFC, and Local Transmission Owner criteria).
- Option 1b proposals: Onshore new transmission connection facilities
- Option 2 proposals: Offshore new transmission connection facilities
- Option 3 proposals: Offshore new transmission network facilities[1]

Offshore Wind Scenarios

PJM worked with the NJBPU to create OSW scenarios involving various combinations of the submitted Option1b and Option 2 proposals. Each scenario contains the awarded NJ Solicitation #1 for 1,100 MW and NJ Solicitation #2 for 2,658 MW. While the scope for the submission of proposals did not allow alternative points of injection (POIs) for NJ Solicitation #1, it did allow alternative POIs for NJ Solicitation #2. For the purpose of this report, a selected scenario included a combination of a selected transmission package along with the corresponding OSW generation injection it supported.

PJM performed initial reliability screening of these scenarios and selected a subset for economic analysis. Therefore, each scenario was vetted by PJM for reliability concerns prior to the economic analysis. Tables 1 and 2 illustrate the POI locations and MW injection amounts for the scenarios selected for economic analysis. The Appendix A to this report provides detailed energy market simulation results for each scenario.

[1] In the context of this report, no Option 3 Proposals were analyzed for economic benefits

Table 1. Table 1. POI Scenarios - Option 1b Only

		Alt POI	Default POI	Alt POI	Alt POI	Default POI	Alt POI	Default POI	Alt POI
Scenarios	Total (MW)	New Freedom 500 kV	Cardiff 230 kV	Half Acre 500 kV	Lighthouse 500 kV	Smithburg 500 kV	Atlantic 230 kV	Larrabee 230 kV	Werner 230 kV
2a	6258	-	2658	-	-	1200	1200	1200	-
3	6458	1148	1510	2200	-	-	-	1200	400
12	6400	-	1510	-	4890	-	-	-	-
13	6400	-	1510	-	4890	-	-	-	-
14	6400	-	1510	2400	-	1690	-	-	800
18[2]	6310	-	1510	-	-	2400	1200	1200	-

Note 1: All POI Scenarios include Solicitation #1 (1,100 MW), which has been subtracted from the total MW.
Note 2: All MW assumed to be injected at the offshore platform.
Note 3: All POI Scenarios include Option 1a transmission upgrades.

Table 2. POI Scenarios - Option 1b/2

		Alt POI	Default POI	Alt POI	Default POI	Alt POI	Default POI	Alt POI	Default POI	Alt POI	Alt POI	Alt POI
Scenarios	Total (MW)	Reega 230 kV	Cardiff 230 kV	Fresh Ponds 500 kV	Deans 500 kV	Lighthouse 500 kV	Smithburg 500 kV	Atlantic 230 kV	Larrabee 230 kV	Neptune 230 kV	Sewaren 230 kV	Werner 230 kV
1.2	6310	-	1510	-	1200	-	2400	-	1200	-	-	-
1.2a	6400	-	1510	-	1342	-	2348	-	1200	-	-	-
1.2c	6400	-	1510	-	2542	-	1148	-	1200	-	-	-
4	6410	-	1510	3000	-	-	-	-	-	1500	-	400
4a	6400	-	1510	2242	-	-	1148	-	-	1500	-	-
5	6310	-	1510	-	-	-	2400	1200	1200	-	-	-
6	6400	-	1510	-	-	4890	-	-	-	-	-	-
7	6400	-	1510	-	-	4890	-	-	-	-	-	-

[2] PJM performed the energy and capacity market analysis for the NJ BPU-selected finalist Scenario 18. The final solution selected by NJ BPU was scenario 18a, which is equivalent to the Scenario 18 in terms of points of injection

		Alt POI	Default POI	Alt POI	Default POI	Alt POI	Default POI	Alt POI	Default POI	Alt POI	Alt POI	Alt POI
Scenarios	Total (MW)	Reega 230 kV	Cardiff 230 kV	Fresh Ponds 500 kV	Deans 500 kV	Lighthouse 500 kV	Smithburg 500 kV	Atlantic 230 kV	Larrabee 230 kV	Neptune 230 kV	Sewaren 230 kV	Werner 230 kV
10	6400	-	1510	-	2290	-	-	-	1200	-	1400	-
11	6399	-	1510	-	1247	-	1148	-	1247	-	1247	-
15	6400	-	1510	4890	-	-	-	-	-	-	-	-
16	6400	2658	-	3742	-	-	-	-	-	-	-	-
16a	6400	-	1510	3742	-	-	1148	-	-	-	-	-
17	6400	-	1510	-	1890	-	-	-	-	3000	-	-
19	6258	-	1510	-	3600	-	1148	-	-	-	-	-
20	6400	-	1510	1342	-	-	1148	-	-	2400	-	-
20a	6400	-	1510	-	1342	-	1148	-	-	2400	-	-

Note 1: All POI Scenarios include Solicitation #1 (1,100 MW), which has been subtracted from the total MW.
Note 2: All MW assumed to be injected at the offshore platform.
Note 3: All POI Scenarios include Option 1a transmission upgrades.

Objective

PJM performed various market simulations to evaluate the economic performance of selected offshore wind injection scenarios, focusing on key New Jersey market metrics. The objective of the analysis was to evaluate the potential relative market performance benefits of the competing transmission proposals.

Summary of Findings

PJM performed energy market simulations to evaluate the economic performance of selected offshore wind scenarios on key New Jersey market metrics. The PJM analysis utilized PROMOD, a production cost simulation software, which incorporates extensive market modeling details. These include generating unit operating constraints and economic characteristics, transmission grid topology and fundamental forecasts of market conditions. For each scenario, PJM provided the following outputs from the energy market simulations: Gross Load Payments and load-weighted LMPs for zones of interest to the NJ BPU; unit summary level annual energy and curtailment, generation-weighted LMPs and energy market value of New Jersey's OSW POIs; estimated emissions in New Jersey; PJM-wide production costs.

A key takeaway from the analysis is that while there are some differences between results from scenarios, they may not be, at a decisional level, significant. For example, for the Option 1b category, the largest difference in NJ Load Payments between two scenarios is 0.11%, and the largest difference in POI Annual Average LMP is 2.16%. For the Option 1b/2 category, the same metrics are 0.43% and 4.24% respectively. Also worth noting is that some scenarios result in curtailments at various POIs. Detailed simulation results for completed scenarios can be found in Appendix A – Energy Market Results.

Some of the scenarios included in analysis created POI unit curtailment or increased congestion at nearby locations. For these scenarios, PJM tested additional transmission upgrades to determine if they mitigate this increased congestion within the simulations. These additional upgrades are optional, that is not required as a result of the reliability analysis.

PJM also evaluated the potential for Incremental Auction Revenue Rights (IARRs) created by the transmission upgrades using the current process for Regional Transmission Expansion Plan (RTEP) Incremental Rights-Eligible Required Transmission Enhancements. The analysis performed indicated no available IARRs for any of the proposals analyzed. (See Appendix B for additional IARR analysis detail).

The PJM Capacity Market Operations team, using the 2023/2024 Delivery Year auction data as inputs, executed 7 different Base Residual Auction (BRA) scenario runs for this study. The base scenario assumed that no off shore wind or transmission upgrades would be constructed, and resulted in an estimated 2028/2029 total capacity cost for the key LDAs of $1.01 billion. The remaining 6 BRA scenario runs all included 7,500 MW (ICAP) of installed offshore wind units and each of the 3 scenarios (1.2c, 16a and 18) was run with proposed transmission upgrades completed and then again without those same upgrades. The average total capacity cost for scenarios run without upgrades was $626 million, while the average cost with transmission upgrades was $612.3 million.

NJ SAA PROPOSAL WINDOW ECONOMIC ANALYSES

For the purpose of this window, PJM with guidance and input from the NJ BPU performed a series of analyses to evaluate the economic performance of select OSW scenarios developed in support of the NJ public policy goal to interconnect up to 7,500 MW of offshore wind generation between 2028 and 2035.

The solicitation window was conducted under PJM's State Agreement Approach component of the Regional Transmission Expansion Plan (RTEP). As part of this process, PJM performed and evaluated energy market simulations, evaluated potential Incremental Auction Revenue Rights (IARRs), and will evaluate potential capacity market benefits. This is to support the NJ BPU's evaluation and selection of the most cost effective scenario to achieve its policy goals, in accordance with the evaluation criteria outlined in the SAA Proposal Window Overview.

Energy Market Simulations

PJM undertook 2028 energy market simulations for the New Jersey Offshore Wind Study. These studies were primarily focused on estimating the impact of selected OSW scenarios on key New Jersey market metrics. Additional outputs of the simulations provided to the NJ BPU are listed below.

Overview

PJM's energy market simulation portion of SAA-related economic analysis relies heavily on the market simulation tools that PJM uses for the market efficiency component of the RTEP. PJM Manual 14B and Manual 14F further describe the market efficiency component of the RTEP.

The PJM energy market analysis utilized a production cost simulation tool, PROMOD by Hitachi Energy, which incorporates extensive electric market details. These include generating unit operating characteristics, transmission grid topology and constraints to provide nodal locational marginal price (LMP) forecasting and transmission analysis,

fundamental forecasts of market conditions. The PROMOD "base case" used by PJM as the starting point for this analysis included the best available topology (2025 RTEP) and the forecasted 2028 market conditions as used for the 2020/21 Long-Term Window for market efficiency analyses.

PJM created a "Scenario" by adding the combination of a selected transmission package along with the corresponding OSW generation injection it supported.

Energy Market Simulation Outputs

PJM provided the following PROMOD outputs from the 2028 energy market simulations for the base case and all scenario cases to the NJ BPU:

- Estimated Gross Load Payments and load-weighted LMPs for load serving entities of interest to the NJ BPU.
- The generation-weighted LMPs and energy market value of New Jersey's OSW generation being evaluated at the POIs.
- Simulated OSW summary and unit-level energy and curtailments of New Jersey's OSW generation being evaluated.
- Estimated emissions in New Jersey.
- PJM-wide production costs.

Energy Market Simulation Results (At a glance)

Option 1b Only Results

Table 3 summarizes the average generation-weighted LMP and total market value of the NJ OSW POIs by scenario. Table 3 also includes the total unit energy and curtailment of all of NJ's OSW POIs by scenario. See Appendix A for similar detailed tables for each individual POI in each selected scenario. Table 4 includes the PJM-wide production cost for each selected scenario. Tables 5 includes the NJ emissions by selected scenario. Table 6 includes the Gross Load Payments for load serving entities of interest for each selected scenario. Table 7 includes the Load LMPs for load serving entities of interest for each selected scenario.

Tables 3 through 7 include scenario results without the optional market efficiency transmission upgrades.

Table 3. OSW Scenario Summary - Option 1b Only

Scenarios	Generation (MWh)	Curtailment (MWh)	Market Value ($M)	POI LMP ($/MWh)
2a	22,775,056	28,722	$696.05	$30.56
3	23,515,816	16,751	$728.53	$30.98
12	23,321,217	0	$726.30	$31.14
13	23,321,217	0	$726.48	$31.15
14	23,271,326	49,891	$714.39	$30.70
18	22,993,262	0	$717.86	$31.22

Table 4. PJM Production Cost by Scenario - Option 1b Only

Scenarios	PJM Production Cost ($M)
2a	$ 18,872.23
3	$ 18,854.25
12	$ 18,858.04
13	$ 18,856.29
14	$ 18,860.15
18	$ 18,864.49

Table 5. NJ Emissions (Metric Tons) by Scenario - Option 1b Only

Scenarios	PJM SO2 Annual Total	PJM NOx Annual Total	PJM CO2 Annual Total
2a	2,544	1,464	7,161,738
3	2,541	1,464	7,152,373
12	2,550	1,465	7,156,363
13	2,548	1,465	7,155,526
14	2,552	1,466	7,161,417
18	2,554	1,466	7,149,926

Table 6. Zonal Annual Gross Load Payment ($M) by Scenario - Option 1b Only

Scenarios	AECO	JCPL	PSEG	RECO	New Jersey	APS	BGE	DUQ	FE-ATSI	METED	PECO	PENELEC	PLGRP
Base	$360	$857	$1,629	$52	$2,898	$1,700	$1,175	$469	$2,283	$572	$1,417	$593	$1,482
2a	$342	$822	$1,577	$51	$2,792	$1,676	$1,145	$465	$2,266	$556	$1,372	$583	$1,439
3	$344	$825	$1,575	$51	$2,795	$1,675	$1,145	$465	$2,266	$555	$1,370	$582	$1,438

12	$344	$824	$1,574	$51	$2,793	$1,675	$1,145	$465	$2,266	$555	$1,370	$582	$1,438
13	$344	$825	$1,574	$51	$2,794	$1,676	$1,143	$465	$2,266	$555	$1,370	$582	$1,438
14	$344	$822	$1,578	$51	$2,795	$1,675	$1,145	$465	$2,267	$555	$1,373	$582	$1,438
18	$344	$823	$1,576	$51	$2,795	$1,676	$1,146	$465	$2,266	$556	$1,372	$583	$1,439

Table 7. Zonal Load-Weighted LMPs ($/MWh) by Scenario - Option 1b Only

Scenarios	AECO	JCPL	PSEG	RECO	New Jersey	APS	BGE	DUQ	FE-ATSI	METED	PECO	PENELEC	PLGRP
Base	$35.34	$35.89	$35.22	$35.63	$35.44	$33.30	$35.28	$32.40	$33.34	$34.40	$35.02	$32.96	$34.18
2a	$33.61	$34.40	$34.10	$34.94	$34.14	$32.82	$34.40	$32.13	$33.11	$33.44	$33.90	$32.41	$33.20
3	$33.76	$34.53	$34.06	$34.90	$34.18	$32.81	$34.38	$32.12	$33.10	$33.41	$33.86	$32.39	$33.18
12	$33.79	$34.51	$34.04	$34.90	$34.16	$32.82	$34.40	$32.12	$33.10	$33.42	$33.87	$32.39	$33.18
13	$33.81	$34.53	$34.04	$34.91	$34.17	$32.82	$34.34	$32.12	$33.10	$33.42	$33.87	$32.39	$33.18
14	$33.74	$34.42	$34.12	$34.91	$34.17	$32.81	$34.39	$32.13	$33.11	$33.42	$33.93	$32.39	$33.18
18	$33.82	$34.47	$34.08	$34.92	$34.18	$32.82	$34.41	$32.13	$33.11	$33.44	$33.91	$32.40	$33.20

Key Takeaways

There are some scenario differences, but they may not be at a high level significant. The largest difference in NJ Load Payments between two scenarios is 0.11%. The largest difference in POI Annual Average LMP is 2.16%.

Some scenarios result in OSW unit curtailment. The highest scenario annual curtailment is 49,891 MWh, or 0.21% of total annual generation.

Simulation outputs for completed scenarios can be found in Appendix A– Energy Market Results Option 1b Only Proposals.

Optional Upgrades from Energy Market Simulations - Option 1b

For some of the 1b scenarios listed above, PJM tested optional upgrades that could provide additional energy market benefits.

These additional market efficiency upgrades were added to the corresponding scenarios to test if they mitigate specific congestion and curtailment caused by the scenario. Results presented in Appendix A include the additional economic upgrades, if any were identified.

These additional upgrades are optional; that is not required as a result of the reliability analysis. A decision to include them or not in any selected package will be discussed with the NJ BPU. See Table 8 below for a list of scenarios with potential market efficiency (ME) upgrades and estimated cost for Option 1b scenarios.

Table 8. Option 1b Market Efficiency (ME) Upgrades

Scenario	Additional Upgrades	Estimated Cost
2a	East Windsor-Smithburg 230 kV	$75 million
14	Clarksville-Lawrence 230 kV	$19 million

Option 1b/2 Results

Table 9 summarizes the average generation-weighted LMP and total market value of the NJ OSW POIs by scenario. Table 9 also includes the total unit energy and curtailment of all of NJ's OSW POIs by scenario. See Appendix A for similar detailed tables for each individual POI in each selected scenario. Table 10 includes the PJM-wide production cost for each selected scenario. Table 11 includes the NJ emissions by selected scenario. Table 12 includes the Gross Load Payments for load serving entities of interest for each selected scenario. Table 13 includes the Load LMPs for load serving entities of interest for each selected scenario.

Tables 9 through 13 include scenario results without the optional market efficiency transmission upgrades.

Table 9. OSW Scenario Summary - Option 1b/2

Scenarios	Generation (MWh)	Curtailment (MWh)	Market Value ($M)	POI LMP ($/MWh)
1.2	22,900,363	92,899	$691.14	$30.18
1.2a	23,245,913	75,304	705.71	$30.36
1.2c	23,250,226	70,991	$706.48	$30.39
4	23,356,955	702	$730.71	$31.28
4a	23,314,533	6,685	$723.91	$31.05
5	22,993,262	0	$717.86	$31.22
6	23,321,217	0	$726.30	$31.14
7	23,321,217	0	$726.48	$31.15
10	23,321,217	0	$733.58	$31.46
11	23,317,575	0	$732.66	$31.42
15	23,321,217	0	$731.42	$31.36
16	23,216,594	4,623	$717.79	$30.78
16a	23,317,893	3,324	$724.98	$31.09
17	23,321,193	24	$723.37	$31.02

Scenarios	Generation (MWh)	Curtailment (MWh)	Market Value ($M)	POI LMP ($/MWh)
19	22,803,778	0	$716.35	$31.41
20	23,309,716	11,502	$721.70	$30.96
20a	23,309,651	11,566	$721.83	$30.97

Table 10. PJM Production Cost by Scenario - Option 1b/2

Scenarios	PJM Production Cost ($M)
1.2	$18,867.37
1.2a	$18,858.77
1.2c	$18,858.96
4	$18,857.00
4a	$18,858.53
5	$18,864.49
6	$18,858.04
7	$18,856.29
10	$18,857.81
11	$18,857.00
15	$18,854.86
16	$18,857.78
16a	$18,857.02
17	$18,858.27
19	$18,868.99
20	$18,858.94
20a	$18,857.74

Table 11. NJ Emissions (Metric Tons) by Scenario - Option 1b/2

Scenarios	PJM SO2 Annual Total	PJM NOx Annual Total	PJM CO2 Annual Total
1.2	2,554	1,469	7,165,879
1.2a	2,549	1,464	7,155,790
1.2c	2,549	1,465	7,159,109
4	2,551	1,462	7,129,594
4a	2,551	1,465	7,151,385
5	2,554	1,466	7,149,926

Scenarios	PJM SO2 Annual Total	PJM NOx Annual Total	PJM CO2 Annual Total
6	2,550	1,465	7,156,363
7	2,548	1,465	7,155,526
10	2,551	1,465	7,147,313
11	2,552	1,464	7,140,054
15	2,551	1,466	7,176,815
16	2,543	1,467	7,190,574
16a	2,550	1,466	7,175,776
17	2,550	1,462	7,122,435
19	2,552	1,467	7,182,748
20	2,552	1,464	7,133,504
20a	2,552	1,463	7,131,884

Table 12. Zonal Annual Gross Load Payment ($M) by Scenario - Option 1b/2

Scenarios	AECO	JCPL	PSEG	RECO	New Jersey	APS	BGE	DUQ	FE-ATSI	METED	PECO	PENELEC	PLGRP
1.2	$344	$818	$1,575	$51	$2,788	$1,676	$1,146	$465	$2,266	$556	$1,372	$583	$1,439
1.2a	$344	$818	$1,574	$51	$2,787	$1,675	$1,145	$465	$2,266	$555	$1,371	$582	$1,438
1.2c	$344	$819	$1,574	$51	$2,788	$1,675	$1,145	$465	$2,266	$555	$1,371	$582	$1,438
4	$345	$824	$1,574	$51	$2,794	$1,675	$1,145	$465	$2,266	$555	$1,371	$582	$1,438
4a	$344	$824	$1,574	$51	$2,793	$1,675	$1,145	$465	$2,266	$555	$1,370	$582	$1,438
5	$344	$823	$1,576	$51	$2,795	$1,676	$1,146	$465	$2,266	$556	$1,372	$583	$1,439
6	$344	$824	$1,574	$51	$2,793	$1,675	$1,145	$465	$2,266	$555	$1,370	$582	$1,438
7	$344	$825	$1,574	$51	$2,794	$1,676	$1,143	$465	$2,266	$555	$1,370	$582	$1,438
10	$345	$827	$1,576	$51	$2,799	$1,677	$1,147	$464	$2,264	$556	$1,374	$583	$1,440
11	$345	$825	$1,573	$51	$2,794	$1,675	$1,145	$464	$2,266	$555	$1,371	$582	$1,438
15	$345	$827	$1,574	$51	$2,798	$1,675	$1,145	$465	$2,266	$555	$1,371	$582	$1,438
16	$342	$828	$1,575	$51	$2,797	$1,675	$1,145	$465	$2,267	$555	$1,370	$582	$1,438
16a	$344	$826	$1,574	$51	$2,796	$1,675	$1,145	$465	$2,266	$555	$1,371	$582	$1,438
17	$344	$822	$1,574	$51	$2,791	$1,675	$1,145	$465	$2,266	$555	$1,371	$582	$1,438
19	$345	$827	$1,576	$51	$2,799	$1,676	$1,146	$465	$2,266	$555	$1,372	$582	$1,439
20	$344	$821	$1,574	$51	$2,790	$1,675	$1,145	$465	$2,265	$555	$1,371	$582	$1,438
20a	$344	$821	$1,574	$51	$2,791	$1,675	$1,145	$465	$2,266	$555	$1,371	$582	$1,438

Table 13. Zonal Load-Weighted LMPs ($/MWh) by Scenario - Option 1b/2

Scenarios	AECO	JCPL	PSEG	RECO	New Jersey	APS	BGE	DUQ	FE-ATSI	METED	PECO	PENELEC	PLGRP
1.2	$33.74	$34.24	$34.06	$34.92	$34.09	$32.83	$34.41	$32.13	$33.11	$33.43	$33.91	$32.40	$33.20
1.2a	$33.73	$34.27	$34.03	$34.90	$34.08	$32.81	$34.39	$32.12	$33.09	$33.41	$33.89	$32.39	$33.17
1.2c	$33.75	$34.30	$34.04	$34.90	$34.09	$32.81	$34.40	$32.12	$33.09	$33.41	$33.89	$32.39	$33.18
4	$33.83	$34.50	$34.04	$34.89	$34.16	$32.81	$34.39	$32.12	$33.10	$33.41	$33.88	$32.39	$33.17
4a	$33.79	$34.49	$34.04	$34.90	$34.16	$32.81	$34.39	$32.12	$33.10	$33.41	$33.87	$32.38	$33.18
5	$33.82	$34.47	$34.08	$34.92	$34.18	$32.82	$34.41	$32.13	$33.11	$33.44	$33.91	$32.40	$33.20
6	$33.79	$34.51	$34.04	$34.90	$34.16	$32.82	$34.40	$32.12	$33.10	$33.42	$33.87	$32.39	$33.18
7	$33.81	$34.53	$34.04	$34.91	$34.17	$32.82	$34.34	$32.12	$33.10	$33.42	$33.87	$32.39	$33.18
10	$33.91	$34.63	$34.07	$34.97	$34.23	$32.84	$34.44	$32.10	$33.07	$33.46	$33.95	$32.43	$33.22
11	$33.84	$34.55	$34.02	$34.88	$34.17	$32.81	$34.40	$32.12	$33.10	$33.41	$33.89	$32.38	$33.18
15	$33.86	$34.64	$34.05	$34.90	$34.21	$32.81	$34.40	$32.12	$33.10	$33.41	$33.89	$32.39	$33.17
16	$33.62	$34.66	$34.07	$34.92	$34.20	$32.81	$34.39	$32.13	$33.11	$33.41	$33.86	$32.39	$33.18
16a	$33.82	$34.60	$34.04	$34.89	$34.19	$32.81	$34.39	$32.11	$33.09	$33.40	$33.87	$32.38	$33.17
17	$33.81	$34.40	$34.04	$34.90	$34.14	$32.81	$34.40	$32.12	$33.10	$33.41	$33.89	$32.39	$33.17
19	$33.88	$34.64	$34.07	$34.92	$34.23	$32.82	$34.41	$32.12	$33.10	$33.43	$33.91	$32.40	$33.19
20	$33.80	$34.38	$34.04	$34.89	$34.12	$32.81	$34.40	$32.11	$33.09	$33.41	$33.89	$32.39	$33.17
20a	$33.80	$34.39	$34.04	$34.89	$34.13	$32.81	$34.40	$32.11	$33.09	$33.41	$33.90	$32.39	$33.17

Key Takeaways

There are some scenario differences, but they may not be at a high level significant. The largest difference in NJ Load Payments between two scenarios is 0.43%. The largest difference in POI Annual Average LMP is 4.24%.

Some scenarios result in OSW unit curtailment. The highest scenario annual curtailment is 92,899 MWh, or 0.41% of total annual generation.

Simulation outputs for completed scenarios can be found in Appendix A – Energy Market Results Option 1b/2 Proposals.

Optional Upgrades from Energy Market Simulations - Option 1b/2

For some of the 1b/2 scenarios listed above, PJM tested optional upgrades that could provide addition energy market benefits.

These additional market efficiency upgrades were added to the corresponding scenarios to test if they mitigate specific congestion and curtailment caused by the scenario. Results presented in Appendix A include the additional economic upgrades, if any were identified.

These additional upgrades are optional; that is not required as a result of the reliability analysis. A decision to include them or not in any selected package will be discussed with the NJ BPU. See Table 14 below for a list of scenarios with potential market efficiency (ME) upgrades and estimated cost for Option 1b/2 scenarios.

Table 14. Option 1b/2 Market Efficiency (ME) Upgrades

Scenario	Additional Upgrades	Estimated Cost
1.2	East Windsor-Smithburg 230 kV Smithburg-Deans 500kV	$75 million $13.2 million
1.2a	East Windsor-Smithburg 230 kV Smithburg-Deans 500kV	$75 million $13.2 million
1.2c	East Windsor-Smithburg 230 kV Smithburg-Deans 500kV	$75 million $13.2 million
20	East Windsor-Smithburg 230 kV	$75 million
20a	East Windsor-Smithburg 230 kV	$75 million

Market Efficiency Analysis for Finalist Scenarios

The completion of the initial reliability analysis screening, market efficiency analysis and identification of an initial set of onshore upgrades for each scenario was necessary to provide NJ BPU with a comparative framework of preliminary transmission cost estimates for the scenarios under evaluation that considers both the offshore and onshore transmission needs. The NJ BPU will use this information to select one to three scenarios for further, more comprehensive reliability analysis that will consider both a further review of the competitive Option 1a proposal clusters as well as a full set of reliability studies. Additional market efficiency analysis may be needed depending on the results of the final reliability analysis.

RTEP IARR Analysis

Background

Some NJ SAA proposals may be eligible for Allocation of Incremental Auction Revenue Rights (IARRs). PJM used the existing process from the Regional Transmission Expansion Plan (RTEP) for IARRs to perform analyses based on the current IARR model. The process is normally conducted before the Annual ARR Allocation. PJM calculates and allocates those IARRs, if any are created by the upgrade, based on the percentage cost responsibility assigned to Responsible Customers, who are assigned cost responsibility for RTEP upgrades that meet certain criterion.

All IARR products have the following characteristics:

- IARR MWs are awarded for the incremental capability created for the life of the facility or 30 years, whichever is less
- Must be simultaneously feasible with all existing Stage 1 ARRs

- Valued each year based on Annual FTR Auction clearing prices

Addition information on IARR evaluation is described in the PJM Manual 6, Section 4.9.2. This process is performed annually for all IARR-eligible RTEP projects.

IARR Analysis Assumptions

IARR Analysis is based on the current operations/market model and utilizes the Simultaneous Feasibility Test with all requested annual Auction Revenue Rights (ARRs) modeled as generation at source points and load at sink points.

The model and current limiting facilities are posted on the PJM website:

https://www.pjm.com/markets-and-operations/ftr

RTEP IARR Overview

The projects for NJ BPU qualify for RTEP IARR analysis if they are backbone upgrades:

- Baseline 500 kV projects
- Baseline 345 kV double circuit projects

PJM evaluates the constraint most relieved by the RTEP upgrade under study. To that end PJM determines an eligible path and evaluates if IARRs could be awarded:

- Source: aggregate pnode up to ten generator buses
- Sink: zone
- MWs

Calculation Method

The NJ SAA proposals qualify for RTEP IARR analysis if they are backbone upgrades:

- Baseline 500 kV projects
- Baseline 345 kV double circuit projects

PJM performed preliminary IARR analysis on the following projects. See Appendix B for the detailed description of the five projects studied.

- 63 North Delta Option A (Double Circuit)
- 296 North Delta Option B (Series Reactor)
- 203 The Broad Creek - Robinson Run Transmission Project
- 345 New 500 kV Peach Bottom - Conastone Line

- 587 Wiley Rd – Conastone 500 kV Project

PJM determined the constraint most relieved by those upgrades. All five projects evaluated were studied against the Peach Bottom – Conastone constraint.

The source point of the IARR was a new aggregate pricing point comprised of up to ten generator buses having the largest positive distribution factor (DFAX) on the most relieved constraint.

- Source: Hunterstown, Westport, Wagner, Calvert Cliffs

The sink point of the IARR was a new aggregate pricing point comprised of the load-weighted average of the transmission zone for which the aggregate DFAX on the most relieved constraint is negative

- Sink: BGE

IARRs associated with an upgrade are calculated by determining the incremental ARR capability between the source and sink points created by the project.

- Using the base network topology, ARR capability between the specified source-sink combination is measured by increasing MW transfers from the specified source to the specified sink until a transmission limit is encountered.
- Using a network topology which includes the expansion project, the ARR capability between the specified source-sink combination is measured by increasing MW transfers from the specified source to the specified sink until a transmission limit is encountered.
- The incremental ARR (IARR) capability between the source-sink combination created by the expansion project is the difference between the ARR capability in the base system and the ARR capability in the system which includes the project.

IARR Analysis Conclusion

No available IARRs were found for any of the proposals analyzed.

Example of limiting facilities

Pre-Upgrade Limit	Post-Upgrade ARR Capability	Post-Upgrade Limit	IARR MW	Source	Sink
JACK ME 230 KV JAC-TMI l/o L500.Conastone-PeachBottom.5012	0	JACK ME 230 KV JAC-TMI l/o L500.Conastone-PeachBottom.5012	0	Hunterstown, Westport, Wagner, Calvert Cliffs	BGE

The completed limiting facility list (updated annually):

https://pjm.com/-/media/markets-ops/ftr/iarr-limiting-facilities.ashx

PJM Capacity Market Simulation Outputs

PJM was requested by NJ BPU to provide the following outputs from the capacity market simulations for the base case and all scenario change cases to help the NJ BPU Staff evaluate the system impacts and estimate NJ capacity-market-related benefits for each of the selected scenarios:

- The difference in aggregate cleared capacity MW by resource type for the entire RTO for each proposed solution package.
- Results of a limited analyses to illustrate the sensitivity of prices to changes of supply in each of the New Jersey LDAs (across a range of several thousand MW).
- Locational Reliability Charges by NJ Load zone
- Increase in CETL created by the proposed solutions (if any)
- The value of ICTRs created by the proposed solutions (if any)
- Capacity prices by NJ LDA

Capacity Market Benefits

The identified offshore wind scenarios may provide capacity market economic benefits as a result of the addition of the offshore wind and the transmission enhancements necessary to reliably interconnect the offshore wind to the PJM grid. These benefits may result because of the addition of offshore wind generation (OSW) with low offer prices or to the extent the proposed transmission scenario increases the Capacity Emergency Transfer Limit (CETL) of one or more modeled Locational Deliverability Areas (LDAs). PJM used capacity market simulations utilizing the 2023/2024 Base Residual Auction (BRA) offer data to estimate the reduction in capacity load payments for a given LDA associated with OSW capacity injections and any increased CETL enabled by the transmission solution. The 2023/2024 planning parameters, except as highlighted below, and capacity market supply sell offers will serve as inputs to the BRA engine simulations, with and without the proposed transmission enhancement and the corresponding wind generation injections, to determine capacity market economic benefits for the year 2028. Further, projected 2028/2029 CETL values were used for the simulations for MAAC, EMAAC, SWMAAC and BGE LDAs. The VRR curve has been updated based on the values for 2028 found in the 2022 Load Forecast Report. Additionally PJM changed all offers to be flexible for the entire offered MW amount to avoid make whole questions, and removed all energy efficiency (EE) offers since cleared EE is now offset by addbacks to the demand curve.

PJM Capacity Market Simulation Results

PJM completed capacity market simulations to evaluate the capacity market benefit of multiple offshore wind scenarios. For each scenario, these simulations identified the capacity market benefits of the offshore wind with and without the onshore transmission upgrades necessary to reliably interconnect the offshore wind. The results from each transmission upgrade scenario were very similar. The estimated reduction in annual capacity cost in NJ related to 2,370.9 MW UCAP of offshore wind offered at $0/MW-day is $395.6M on average across the simulations. The

estimated reduction in annual capacity cost in NJ related to the transmission upgrade is $13.8M on average across the simulations, with negligible differences between the studied scenarios.

Benchmark - No Offshore Wind Scenario

To serve as a benchmark for the simulations that include offshore wind, PJM first ran a scenario without offshore wind and the associated onshore transmission upgrades ("no OSW scenario"). The no OSW scenario used the updated VRR curve to account for the expected peak load within PJM, a decrease in the CETL values for EMAAC, SWMAAC and MAAC LDAs to reflect no onshore transmission upgrades, and no additional MW offered into the market.

Error! Reference source not found.5 shows the zonal UCAP obligation (MW), the zonal net load Price ($/MW-Day), and total cost ($/Delivery Year) for the base case. MAAC, EMAAC and SWMAAC were the binding constraints, meaning the NJ zones did not bind or have a price adder. The total zonal UCAP obligation for the zones of interest is 34,779 MW with a total cost of $1.01 billion.

Table 15. Zonal MW, Net Load Price, and Total Cost: No OSW Scenario

Zone	Zonal UCAP Obligation (MW)	Zonal Net Load Price ($/MW-Day)	Total Cost ($/Delivery Year)
AE	2,820	$85.62	$88,123,855
JCPL	6,605	$85.62	$206,430,129
PS	10,895	$85.62	$340,488,543
RECO	442	$85.62	$13,806,071
BGE	7,289	$70.18	$186,723,004
PEPCO	6,728	$70.18	$172,336,544
Total	34,779		$1,007,908,145

Table 16 shows the cleared MW (UCAP) by resource type for the no OSW case. There was a total of 142,131 MW (UCAP) that cleared in PJM, and 1,044 MW UCAP of wind resources.

Table 16. Total Cleared MW by Resource Type: No OSW Scenario

Resource Type	Cleared MW (UCAP)
Battery	0
CC	44,261

CT	23,219
Diesel	515
Hydro	4,144
Nuclear	22,617
Solar	1,368
Steam	35,768
Wind	1,378
Total	142,131

Scenario 1.2c without Transmission Upgrades

Next, scenario 1.2c without transmission upgrades was simulated using scenario-specific CETL inputs, but with the addition of an additional 2,370.9 MW UCAP of offshore wind offered at $0/MW-day into the market.

Table 17 shows the zonal UCAP obligation (MW), the zonal net load Price ($/MW-Day), and total cost ($/Delivery Year) for scenario 1.2c without transmission upgrades. Only MAAC, DPL-SOUTH and BGE were the binding constraints, meaning the NJ zones did not bind or have a price adder. The total zonal UCAP obligation for the zones of interest is 34,815 MW with a total cost of $901.1 million.

Table 17. Zonal MW, Net Load Price, and Total Cost: Scenario 1.2c without Transmission Upgrades

Zone	Zonal UCAP Obligation (MW)	Zonal Net Load Price ($/MW-Day)	Total Cost ($/Delivery Year)
AE	2,819	$47.60	$48,977,706
JCPL	6,603	$47.60	$114,730,277
PS	10,891	$47.60	$189,237,612
RECO	442	$47.60	$7,673,174
BGE	7,287	$55.83	$148,475,361
PEPCO	6,725	$47.60	$116,852,644
Total	34,766		$625,946,774

Table 18 shows the MW (UCAP) by resource type for Scenario 1.2c without transmission upgrades. There was a total of 142,251 MW (UCAP) that cleared in PJM, and 3,415 MW UCAP of wind resources.

Table 18. Total Cleared MW by Resource Type: Scenario 1.2c without Transmission Upgrades

Resource Type	Cleared MW (UCAP)
Battery	0
CC	47,592
CT	22,234
Diesel	481
Hydro	3,677
Nuclear	26,365
Solar	1,868
Steam	27,873
Wind	3,415
Total	142,251

Scenario 1.2c with Transmission Upgrades

Scenario 1.2c with transmission upgrades uses increased CETL values for BGE, EMAAC, MAAC, and SWMAAC LDAs to reflect on-shore transmission upgrades and includes the addition of the additional 2,370.9 MW UCAP of offshore wind offered at $0/MW-day into the market.

Table 19 shows the zonal UCAP obligation (MW), the zonal net load Price ($/MW-Day), and total cost ($/Delivery Year) for Scenario 1.2c with Transmission Upgrades. As in the scenario without upgrades, MAAC, DPL-SOUTH and BGE were the binding constraints, meaning the NJ zones did not bind or have a price adder. The total zonal UCAP obligation for the zones of interest is 34,750 MW with a total cost of $612.4 million.

Table 19. Zonal MW, Net Load Price, and Total Cost: Scenario 1.2c with Transmission Upgrades

Zone	Zonal UCAP Obligation (MW)	Zonal Net Load Price ($/MW-Day)	Total Cost ($/Delivery Year)
AE	2,817	$46.71	$48,032,826
JCPL	6,600	$46.71	$112,516,896

PS	10,886	$46.71	$185,586,833
RECO	441	$46.71	$7,525,143
BGE	7,283	$54.24	$144,179,258
PEPCO	6,722	$46.71	$114,598,318
Total	34,750		$612,439,273

Table 20 shows the cleared MW (UCAP) by resource type for Scenario 1.2c with transmission upgrades. There was a total of 144,805 MW (UCAP) that cleared in PJM, and 3,415 MW UCAP of wind resources.

Table 20. Total Cleared MW by Resource Type: Scenario 1.2c with Transmission Upgrades

Resource Type	Cleared MW (UCAP)
Battery	0
CC	48,038
CT	22,900
Diesel	481
Hydro	3,677
Nuclear	26,365
Solar	1,868
Steam	28,928
Wind	3,415
Total	144,805

Scenario 16a without Transmission Upgrades

Scenario 16a without transmission upgrades was simulated using scenario-specific CETL inputs, and includes the addition of an additional 2,370.9 MW UCAP of offshore wind offered at $0/MW-day into the market. The CETL values for MAAC, EMAAC and SWMAAC LDAs were increased as compared with the no OSW scenario, and the CETL was slightly reduced for the BGE LDA to reflect no on-shore transmission upgrades.

Table 21 shows the zonal UCAP obligation (MW), the zonal net load Price ($/MW-Day), and total cost ($/Delivery Year) for Scenario 16a without Transmission Upgrades. As in the cases for Scenario 1.2c, MAAC, DPL-SOUTH and BGE were the binding constraints, meaning the NJ zones did not bind or have a price adder. The total zonal UCAP obligation for the zones of interest is 34,766 MW with a total cost of $626.1 million.

Table 21. Zonal MW, Net Load Price, and Total Cost: Scenario 16a without Transmission Upgrades

Zone	Zonal UCAP Obligation (MW)	Zonal Net Load Price ($/MW-Day)	Total Cost ($/Delivery Year)
AE	2,819	$47.60	$48,977,713
JCPL	6,603	$47.60	$114,730,294
PS	10,891	$47.60	$189,237,640
RECO	442	$47.60	$7,673,175
BGE	7,287	$55.87	$148,590,545
PEPCO	6,725	$47.60	$116,852,661
Total	34,766		$626,062,030

Table 22 shows the cleared MW (UCAP) by resource type for Scenario 16a without transmission upgrades. There was a total of 142,251 MW (UCAP) that cleared in PJM, and 3,415 MW UCAP of wind resources.

Table 22. Total Cleared MW by Resource Type: Scenario 16a without Transmission Upgrades

Resource Type	Cleared MW (UCAP)
Battery	0
CC	47,600
CT	22,234
Diesel	481
Hydro	3,677
Nuclear	26,365
Solar	1,868
Steam	27,865

Wind	3,415
Total	142,251

Scenario 16a with Transmission Upgrades

Scenario 16a with transmission upgrades was simulated using the same inputs as the Scenario 16a without transmission upgrades, but increased the CETL values for BGE, EMAAC, MAAC, and SWMAAC LDAs to reflect on-shore transmission upgrades.

Table 23 shows the zonal UCAP obligation (MW), the zonal net load Price ($/MW-Day), and total cost ($/Delivery Year) for Scenario 16a with Transmission Upgrades. Again, MAAC, DPL-SOUTH and BGE were the binding constraints, meaning the NJ zones did not bind or have a price adder. The total zonal UCAP obligation for the zones of interest is 34,737 MW with a total cost of $612.3 million.

Table 23. Zonal MW, Net Load Price, and Total Cost: Scenario 16a with Transmission Upgrades

Zone	Zonal UCAP Obligation (MW)	Zonal Net Load Price ($/MW-Day)	Total Cost ($/Delivery Year)
AE	2,816	$46.71	$48,015,675
JCPL	6,597	$46.71	$112,476,720
PS	10,882	$46.71	$185,520,566
RECO	441	$46.71	$7,522,456
BGE	7,280	$54.27	$144,204,395
PEPCO	6,719	$46.71	$114,557,399
Total	34,737		$612,297,211

Table 24 shows the cleared MW (UCAP) by resource type for Scenario 16a with transmission upgrades. There was a total of 142,130 MW (UCAP) that cleared in PJM, and 3,415 MW UCAP of wind resources.

Table 24. Total Cleared MW by Resource Type: Scenario 16a with Transmission Upgrades

Resource Type	Cleared MW (UCAP)
Battery	0
CC	47,327
CT	22,551

Diesel	481
Hydro	3,677
Nuclear	26,365
Solar	1,868
Steam	27,355
Wind	3,415
Total	142,130

Scenario 18 without Transmission Upgrades

Scenario 18[3] without transmission upgrades was simulated using scenario-specific CETL inputs, including updated MAAC CETL values from the previous iteration, and includes the addition of an additional 2,370.9 MW UCAP of offshore wind offered at $0/MW-day into the market. The CETL values for MAAC, EMAAC and SWMAAC LDAs were increased as compared with the no OSW scenario, and the CETL for the BGE LDA was slightly reduced to reflect no on-shore transmission upgrades.

Table 25 shows the zonal UCAP obligation (MW), the zonal net load Price ($/MW-Day), and total cost ($/Delivery Year) for Scenario 18 without Transmission Upgrades. Again, MAAC, DPL-SOUTH and BGE were the binding constraints, meaning the NJ zones did not bind or have a price adder. The total zonal UCAP obligation for the zones of interest is 34,766 MW with a total cost of $626.1 million.

Table 25. Zonal MW, Net Load Price, and Total Cost: Scenario 18 without Transmission Upgrades

Zone	Zonal UCAP Obligation (MW)	Zonal Net Load Price ($/MW-Day)	Total Cost ($/Delivery Year)
AE	2,819	$47.60	$48,977,708
JCPL	6,603	$47.60	$114,730,281
PS	10,891	$47.60	$189,237,619
RECO	442	$47.60	$7,673,174
BGE	7,287	$55.89	$148,648,261

[3] id.

PEPCO	6,725	$47.60	$116,852,648
Total	34,766		$626,119,690

Table 26 shows the cleared MW (UCAP) by resource type for Scenario 18 without transmission upgrades. There was a total of 142,130 MW (UCAP) that cleared in PJM, and 3,415 MW UCAP of wind resources.

Table 26. Zonal MW, Net Load Price, and Total Cost: Scenario 18 without Transmission Upgrades

Resource Type	Cleared MW (UCAP)
Battery	0
CC	47,576
CT	22,234
Diesel	481
Hydro	3,677
Nuclear	26,365
Solar	1,868
Steam	27,889
Wind	3,415
Total	142,251

Scenario 18 with Transmission Upgrades

Scenario 18 with transmission upgrades was simulated using scenario-specific CETL inputs, including updated MAAC CETL values from the previous iteration, and includes the addition of an additional 2,370.9 MW UCAP of offshore wind offered at $0/MW-day into the market. The CETL values for MAAC, EMAAC, SWMAAC and BGE LDAs were all increased as compared with the no OSW scenario to reflect the on-shore upgrades.

Table 27 shows the zonal UCAP obligation (MW), the zonal net load Price ($/MW-Day), and total cost ($/Delivery Year) for Scenario 18 without Transmission Upgrades. Again, MAAC, DPL-SOUTH and BGE were the binding constraints, meaning the NJ zones did not bind or have a price adder. The total zonal UCAP obligation for the zones of interest is 34,766 MW with a total cost of $626.1 million.

Table 27. Zonal MW, Net Load Price, and Total Cost: Scenario 18 with Transmission Upgrades

Zone	Zonal UCAP Obligation (MW)	Zonal Net Load Price ($/MW-Day)	Total Cost ($/Delivery Year)
AE	2,816	$46.71	$48,014,284
JCPL	6,597	$46.71	$112,473,461
PS	10,882	$46.71	$185,515,190
RECO	441	$46.71	$7,522,238
BGE	7,280	$54.20	$144,012,352
PEPCO	6,719	$46.71	$114,554,080
Total	34,736		$612,091,604

Table 28 shows the cleared MW (UCAP) by resource type for Scenario 18 with transmission upgrades. There was a total of 142,126 MW (UCAP) that cleared in PJM, and 3,415 MW UCAP of wind resources.

Table 28. Zonal MW, Net Load Price, and Total Cost: Scenario 18 with Transmission Upgrades

Resource Type	Cleared MW (UCAP)
Battery	0
CC	47,327
CT	22,573
Diesel	481
Hydro	3,677
Nuclear	26,365
Solar	1,868
Steam	27,329
Wind	3,415
Total	142,126

APPENDIX A: OFFSHORE WIND SCENARIO ENERGY MARKET SIMULATION RESULTS

OPTION 1B ONLY SCENARIOS

Scenario 2a

Table 29. Scenario 2a POI Summary (MW)

		Alt POI	Default POI	Alt POI	Alt POI	Default POI	Alt POI	Default POI	Alt POI
Scenario	Total (MW)	New Freedom 500 kV	Cardiff 230 kV	Half Acre 500 kV	Lighthouse 500 kV	Smithburg 500 kV	Atlantic 230 kV	Larrabee 230 kV	Werner 230 kV
2a	6258	-	2658	-	-	1200	1200	1200	-

Scenario 2a Results

Table 30. PJM Production Cost - Scenario 2a

Scenario	PJM Production Cost ($M)
2a	$18,872.23

Table 31. NJ Emissions (Metric Tons) – Scenario 2a

Scenario	PJM SO2 Annual Total	PJM NOx Annual Total	PJM CO2 Annual Total
2a	2,544	1,464	7,161,738

Table 32. Zonal Annual Gross Load Payment ($M) - Scenario 2a

Scenario	AECO	JCPL	PSEG	RECO	New Jersey	APS	BGE	DUQ	FE-ATSI	METED	PECO	PENELEC	PLGRP
Base	$360	$857	$1,629	$52	$2,898	$1,700	$1,175	$469	$2,283	$572	$1,417	$593	$1,482
2a	$342	$822	$1,577	$51	$2,792	$1,676	$1,145	$465	$2,266	$556	$1,372	$583	$1,439

Table 33. Zonal Load-Weighted LMPs ($/MWh) - Scenario 2a

Scenario	AECO	JCPL	PSEG	RECO	New Jersey	APS	BGE	DUQ	FE-ATSI	METED	PECO	PENELEC	PLGRP
Base	$35.34	$35.89	$35.22	$35.63	$35.44	$33.30	$35.28	$32.40	$33.34	$34.40	$35.02	$32.96	$34.18
2a	$33.61	$34.40	$34.10	$34.94	$34.14	$32.82	$34.40	$32.13	$33.11	$33.44	$33.90	$32.41	$33.20

Table 34. OSW POI Generation Summary Report – Scenario 2a

Scenario 2A	Generation (MWh)	Curtailment (MWh)	Market Value ($M)	POI LMP ($/MWh)
POI_Atlantic	4,372,242	486	$134.73	$30.82
POI_Cardiff	9,685,593	0	$292.81	$30.23
POI_Larrabee	4,372,728	0	$134.19	$30.69
POI_Smithburg	4,344,493	28,236	$134.31	$30.92
Total	22,775,056	28,722	$696.05	$30.56

Scenario 2a with ME Upgrades Results

For this scenario PJM tested an additional optional market efficiency (ME) upgrade to determine if POI curtailment could be mitigated within the simulations.

Table 35. Scenario 2a Market Efficiency (ME) Upgrades

Scenario	Additional Upgrades	Estimated Cost
2a	East Windsor-Smithburg 230 kV	$75 million

The results below include the additional economic upgrade.

The additional upgrades are optional; that is not required as a result of the reliability analysis. A decision to include it or not in Scenario 2a will be discussed with the NJ BPU.

Table 36. PJM Production Cost - Scenario 2a with ME upgrades

Scenario	PJM Production Cost ($M)
2a	$18,871.39

Table 37. NJ Emissions (Metric Tons) – Scenario 2a with ME upgrades

Scenario	PJM SO2 Annual Total	PJM NOx Annual Total	PJM CO2 Annual Total
2a	2,545	1,464	7,163,126

Table 38. Zonal Annual Gross Load Payment ($M) - Scenario 2a with ME upgrades

Scenario	AECO	JCPL	PSEG	RECO	New Jersey	APS	BGE	DUQ	FE-ATSI	METED	PECO	PENELEC	PLGRP
Base	$360	$857	$1,629	$52	$2,898	$1,700	$1,175	$469	$2,283	$572	$1,417	$593	$1,482
2a	$343	$824	$1,577	$51	$2,794	$1,676	$1,145	$465	$2,266	$556	$1,371	$583	$1,439

Table 39. Zonal Load-Weighted LMPs ($/MWh) - Scenario 2a with ME upgrades

Scenario	AECO	JCPL	PSEG	RECO	New Jersey	APS	BGE	DUQ	FE-ATSI	METED	PECO	PENELEC	PLGRP
Base	$35.34	$35.89	$35.22	$35.63	$35.44	$33.30	$35.28	$32.40	$33.34	$34.40	$35.02	$32.96	$34.18
2a	$33.64	$34.50	$34.10	$34.93	$34.17	$32.82	$34.40	$32.13	$33.11	$33.44	$33.90	$32.41	$33.20

Table 40. OSW POI Generation Summary Report – Scenario 2a with ME Upgrades

Scenario 2A/Upgrades	Generation (MWh)	Curtailment (MWh)	Market Value ($M)	POI LMP ($/MWh)
POI_Atlantic	4,372,728	0	$137.11	$31.35
POI_Cardiff	9,685,593	0	$293.72	$30.33
POI_Larrabee	4,372,728	0	$136.64	$31.25
POI_Smithburg	4,372,728	0	$138.15	$31.59
Total	22,803,778	0	$705.61	$30.94

Scenario 3

Table 41. Scenario 3 POI Summary (MW)

		Alt POI	Default POI	Alt POI	Alt POI	Default POI	Alt POI	Default POI	Alt POI
Scenario	Total (MW)	New Freedom 500 kV	Cardiff 230 kV	Half Acre 500 kV	Lighthouse 500 kV	Smithburg 500 kV	Atlantic 230 kV	Larrabee 230 kV	Werner 230 kV
3	6458	1148	1510	2200	-	-	-	1200	400

Scenario 3 Results

Table 42. PJM Production Cost - Scenario 3

Scenario	PJM Production Cost ($M)
3	$18,854.25

Table 43. NJ Emissions (Metric Tons) – Scenario 3

Scenario	PJM SO2 Annual Total	PJM NOx Annual Total	PJM CO2 Annual Total
3	2,541	1,464	7,152,373

Table 44. Zonal Annual Gross Load Payment ($M) - Scenario 3

Scenario	AECO	JCPL	PSEG	RECO	New Jersey	APS	BGE	DUQ	FE-ATSI	METED	PECO	PENELEC	PLGRP
Base	$360	$857	$1,629	$52	$2,898	$1,700	$1,175	$469	$2,283	$572	$1,417	$593	$1,482
3	$344	$825	$1,575	$51	$2,795	$1,675	$1,145	$465	$2,266	$555	$1,370	$582	$1,438

Table 45. NJ Load-Weighted LMPs ($/MWh) – Scenario 3

Scenario	AECO	JCPL	PSEG	RECO	New Jersey	APS	BGE	DUQ	FE-ATSI	METED	PECO	PENELEC	PLGRP
Base	$35.34	$35.89	$35.22	$35.63	$35.44	$33.30	$35.28	$32.40	$33.34	$34.40	$35.02	$32.96	$34.18
3	$33.76	$34.53	$34.06	$34.90	$34.18	$32.81	$34.38	$32.12	$33.10	$33.41	$33.86	$32.39	$33.18

Table 46. OSW POI Generation Summary Report – Scenario 3

Scenario 3	Generation (MWh)	Curtailment (MWh)	Market Value ($M)	POI LMP ($/MWh)
POI_Cardiff	5,502,349	0	$168.74	$30.67
POI_Deans	8,016,669	0	$252.53	$31.50
POI_Larrabee	4,372,728	0	$137.73	$31.50
POI_New_Freedom	4,183,244	0	$130.68	$31.24
POI_Werner	1,440,825	16,751	$38.85	$26.96
Total	23,515,816	16,751	$728.53	$30.98

Scenario 12

Table 47. Scenario 12 POI Summary (MW)

		Alt POI	Default POI	Alt POI	Alt POI	Default POI	Alt POI	Default POI	Alt POI
Scenarios	Total (MW)	New Freedom 500 kV	Cardiff 230 kV	Half Acre 500 kV	Lighthouse 500 kV	Smithburg 500 kV	Atlantic 230 kV	Larrabee 230 kV	Werner 230 kV
12	6400	-	1510	-	4890	-	-	-	-

Scenario 12 Results

Table 48. PJM Production Cost – Scenario 12

Scenario	PJM Production Cost ($M)
12	$ 18,858.04

Table 49. NJ Emissions (Metric Tons) – Scenario 12

Scenario	PJM SO2 Annual Total	PJM NOx Annual Total	PJM CO2 Annual Total
12	2,550	1,465	7,156,363

Table 50. Zonal Annual Gross Load Payment ($M) - Scenario 12

Scenario	AECO	JCPL	PSEG	RECO	New Jersey	APS	BGE	DUQ	FE-ATSI	METED	PECO	PENELEC	PLGRP
Base	$360	$857	$1,629	$52	$2,898	$1,700	$1,175	$469	$2,283	$572	$1,417	$593	$1,482
12	$344	$824	$1,574	$51	$2,793	$1,675	$1,145	$465	$2,266	$555	$1,370	$582	$1,438

Table 51. NJ Load-Weighted LMPs ($/MWh) – Scenario 12

Scenario	AECO	JCPL	PSEG	RECO	New Jersey	APS	BGE	DUQ	FE-ATSI	METED	PECO	PENELEC	PLGRP
Base	$35.34	$35.89	$35.22	$35.63	$35.44	$33.30	$35.28	$32.40	$33.34	$34.40	$35.02	$32.96	$34.18
12	$33.79	$34.51	$34.04	$34.90	$34.16	$32.82	$34.40	$32.12	$33.10	$33.42	$33.87	$32.39	$33.18

Table 52. OSW POI Generation Summary Report - Scenario 12

Scenario 12	Generation (MWh)	Curtailment (MWh)	Market Value ($M)	POI LMP ($/MWh)
POI_Cardiff	5,502,349	0	$168.94	$30.70
POI_Lighthouse	17,818,868	0	$557.36	$31.28
Total	23,321,217	0	$726.30	$31.14

Scenario 13

Table 53. Scenario 13 POI Summary (MW)

Scenario	Total (MW)	Alt POI Reega 230 kV	Default POI Cardiff 230 kV	Alt POI Fresh Ponds 500 kV	Default POI Deans 500 kV	Alt POI Lighthouse 500 kV	Default POI Smithburg 500 kV	Alt POI Atlantic 230 kV	Default POI Larrabee 230 kV	Alt POI Neptune 230 kV	Alt POI Sewaren 230 kV
13	6400	-	1510	-	-	4890	-	-	-	-	-

Scenario 13 Results

Table 54. PJM Production Cost - Scenario 13

Scenario	PJM Production Cost ($M)
13	$ 18,856.29

Table 55. NJ Emissions (Metric Tons) – Scenario 13

Scenario	PJM SO2 Annual Total	PJM NOx Annual Total	PJM CO2 Annual Total
13	2,548	1,465	7,155,526

Table 56. Zonal Annual Gross Load Payment ($M) - Scenario 13

Scenario	AECO	JCPL	PSEG	RECO	New Jersey	APS	BGE	DUQ	FE-ATSI	METED	PECO	PENELEC	PLGRP
Base	$360	$857	$1,629	$52	$2,898	$1,700	$1,175	$469	$2,283	$572	$1,417	$593	$1,482
13	$344	$825	$1,574	$51	$2,794	$1,676	$1,143	$465	$2,266	$555	$1,370	$582	$1,438

Table 57. NJ Load-Weighted LMPs ($/MWh) – Scenario 13

Scenario	AECO	JCPL	PSEG	RECO	New Jersey	APS	BGE	DUQ	FE-ATSI	METED	PECO	PENELEC	PLGRP
Base	$35.34	$35.89	$35.22	$35.63	$35.44	$33.30	$35.28	$32.40	$33.34	$34.40	$35.02	$32.96	$34.18
13	$33.81	$34.53	$34.04	$34.91	$34.17	$32.82	$34.34	$32.12	$33.10	$33.42	$33.87	$32.39	$33.18

Table 58. OSW POI Generation Summary Report - Scenario 13

Scenario 13	Generation (MWh)	Curtailment (MWh)	Market Value ($M)	POI LMP ($/MWh)
POI_Cardiff	5,502,349	0	$169.26	$30.76
POI_Lighthouse	17,818,868	0	$557.22	$31.27
Total	23,321,217	0	$726.48	$31.15

Scenario 14

Table 59. Scenario 14 POI Summary (MW)

		Alt POI	Default POI	Alt POI	Alt POI	Default POI	Alt POI	Default POI	Alt POI
Scenario	Total (MW)	New Freedom 500 kV	Cardiff 230 kV	Half Acre 500 kV	Lighthouse 500 kV	Smithburg 500 kV	Atlantic 230 kV	Larrabee 230 kV	Werner 230 kV
14	6400	-	1510	2400	-	1690	-	-	800

Scenario 14 Results

Table 60. PJM Production Cost - Scenario 14

Scenario	PJM Production Cost ($M)
14	$18,860.15

Table 61. NJ Emissions (Metric Tons) – Scenario 14

Scenario	PJM SO2 Annual Total	PJM NOx Annual Total	PJM CO2 Annual Total
14	2,552	1,466	7,161,417

Table 62. Zonal Annual Gross Load Payment ($M) - Scenario 14

Scenario	AECO	JCPL	PSEG	RECO	New Jersey	APS	BGE	DUQ	FE-ATSI	METED	PECO	PENELEC	PLGRP
Base	$360	$857	$1,629	$52	$2,898	$1,700	$1,175	$469	$2,283	$572	$1,417	$593	$1,482
14	$344	$822	$1,578	$51	$2,795	$1,675	$1,145	$465	$2,267	$555	$1,373	$582	$1,438

Table 63. Zonal Load-Weighted LMPs ($/MWh) - Scenario 14

Scenario	AECO	JCPL	PSEG	RECO	New Jersey	APS	BGE	DUQ	FE-ATSI	METED	PECO	PENELEC	PLGRP
Base	$35.34	$35.89	$35.22	$35.63	$35.44	$33.30	$35.28	$32.40	$33.34	$34.40	$35.02	$32.96	$34.18
14	$33.74	$34.42	$34.12	$34.91	$34.17	$32.81	$34.39	$32.13	$33.11	$33.42	$33.93	$32.39	$33.18

Table 64. OSW POI Generation Summary Report – Scenario 14

Scenario 2A	Generation (MWh)	Curtailment (MWh)	Market Value ($M)	POI LMP ($/MWh)
POI_Half Acre	8,701,967	43,490	$265.91	$30.56
POI_Cardiff	5,502,349	0	$167.72	$30.48
POI_Werner	2,908,751	6,402	$88.87	$30.55
POI_Smithburg	6,158,260	0	$191.90	$31.16
Total	23,271,326	49,891	$714.39	$30.70

Scenario 14 with ME Upgrades Results

For this scenario PJM tested an additional optional market efficiency (ME) upgrade to determine if POI curtailment could be mitigated within the simulations.

Table 65. Scenario 14 Market Efficiency (ME) Upgrades

Scenario	Additional Upgrades	Estimated Cost
14	East Windsor-Smithburg 230 kV	$75 million

The results below include the additional economic upgrade.

The additional upgrades are optional; that is not required as a result of the reliability analysis. A decision to include it or not in Scenario 14 will be discussed with the NJ BPU.

Table 66. PJM Production Cost - Scenario 14 with ME upgrades

Scenario	PJM Production Cost ($M)
14	$18,858.04

Table 67. NJ Emissions (Metric Tons) – Scenario 14 with ME upgrades

Scenario	PJM SO2 Annual Total	PJM NOx Annual Total	PJM CO2 Annual Total
14	2,550	1,465	7,138,304

Table 68. Zonal Annual Gross Load Payment ($M) - Scenario 14 with ME upgrades

Scenario	AECO	JCPL	PSEG	RECO	New Jersey	APS	BGE	DUQ	FE-ATSI	METED	PECO	PENELEC	PLGRP
Base	$360	$857	$1,629	$52	$2,898	$1,700	$1,175	$469	$2,283	$572	$1,417	$593	$1,482
14	$345	$825	$1,574	$51	$2,795	$1,675	$1,145	$465	$2,266	$555	$1,371	$582	$1,438

Table 69. Zonal Load-Weighted LMPs ($/MWh) - Scenario 14 with ME upgrades

Scenario	AECO	JCPL	PSEG	RECO	New Jersey	APS	BGE	DUQ	FE-ATSI	METED	PECO	PENELEC	PLGRP
Base	$35.34	$35.89	$35.22	$35.63	$35.44	$33.30	$35.28	$32.40	$33.34	$34.40	$35.02	$32.96	$34.18
14	$33.84	$34.55	$34.04	$34.89	$34.18	$32.81	$34.39	$32.12	$33.10	$33.41	$33.88	$32.38	$33.17

Table 70. OSW POI Generation Summary Report – Scenario 14 with ME Upgrades

Scenario 2A/Upgrades	Generation (MWh)	Curtailment (MWh)	Market Value ($M)	POI LMP ($/MWh)
POI_Half Acre	8,745,456	0	$275.59	$31.51
POI_Cardiff	5,502,349	0	$169.57	$30.82
POI_Werner	2,908,504	6,648	$88.97	$30.59
POI_Smithburg	6,158,260	0	$194.05	$31.51
Total	23,314,569	6,648	$728.19	$31.23

Scenario 18

Table 71. Scenario 18 POI Summary (MW)

Scenario	Total (MW)	Alt POI Reega 230 kV	Default POI Cardiff 230 kV	Alt POI Fresh Ponds 500 kV	Default POI Deans 500 kV	Alt POI Lighthouse 500 kV	Default POI Smithburg 500 kV	Alt POI Atlantic 230 kV	Default POI Larrabee 230 kV	Alt POI Neptune 230 kV	Alt POI Sewaren 230 kV
18	6310	-	1510	-	-	-	2400	1200	1200	-	-

Scenario 18 Results

Table 72. PJM Production Cost - Scenario 18

Scenario	PJM Production Cost ($M)
18	$ 18,864.49

Table 73. NJ Emissions (Metric Tons) – Scenario 18

Scenario	PJM SO2 Annual Total	PJM NOx Annual Total	PJM CO2 Annual Total
18	2,554	1,466	7,149,926

Table 74. Zonal Annual Gross Load Payment ($M) - Scenario 18

Scenario	AECO	JCPL	PSEG	RECO	New Jersey	APS	BGE	DUQ	FE-ATSI	METED	PECO	PENELEC	PLGRP
Base	$360	$857	$1,629	$52	$2,898	$1,700	$1,175	$469	$2,283	$572	$1,417	$593	$1,482
18	$344	$823	$1,576	$51	$2,795	$1,676	$1,146	$465	$2,266	$556	$1,372	$583	$1,439

Table 75. NJ Load-Weighted LMPs ($/MWh) – Scenario 18

Scenario	AECO	JCPL	PSEG	RECO	New Jersey	APS	BGE	DUQ	FE-ATSI	METED	PECO	PENELEC	PLGRP
Base	$35.34	$35.89	$35.22	$35.63	$35.44	$33.30	$35.28	$32.40	$33.34	$34.40	$35.02	$32.96	$34.18

18	$33.82	$34.47	$34.08	$34.92	$34.18	$32.82	$34.41	$32.13	$33.11	$33.44	$33.91	$32.40	$33.20

Table 76. OSW POI Generation Summary Report - Scenario 18

Scenario 18	Generation (MWh)	Curtailment (MWh)	Market Value ($M)	POI LMP ($/MWh)
POI_Larrabee	4,372,728	0	$136.47	$31.21
POI_Cardiff	5,502,349	0	$169.13	$30.74
POI_Smithburg	8,745,456	0	$275.37	$31.49
POI_Atlantic	4,372,728	0	$136.88	$31.30
Total	22,993,262	0	$717.86	$31.22

OPTION 1B/2 SCENARIOS

Scenario 1.2

Table 77. Scenario 1.2 POI Summary (MW)

		Alt POI	Default POI	Alt POI	Default POI	Alt POI	Default POI	Alt POI	Default POI	Alt POI	Alt POI	Alt POI
Scenario	Total (MW)	Reega 230 kV	Cardiff 230 kV	Fresh Ponds 500 kV	Deans 500 kV	Lighthouse 500 kV	Smithburg 500 kV	Atlantic 230 kV	Larrabee 230 kV	Neptune 230 kV	Sewaren 230 kV	Warner 230 kV
1.2	6310	-	1510	-	1200	-	2400	-	1200	-	-	-

Scenario 1.2 Results

Table 78. PJM Production Cost - Scenario 1.2

Scenario	PJM Production Cost ($M)
1.2	$18,867.37

Table 79. NJ Emissions (Metric Tons) – Scenario 1.2

Scenario	PJM SO2 Annual Total	PJM NOx Annual Total	PJM CO2 Annual Total
1.2	2,554	1,469	7,165,879

Table 80. Zonal Annual Gross Load Payment ($M) - Scenario 1.2

Scenario	AECO	JCPL	PSEG	RECO	New Jersey	APS	BGE	DUQ	FE-ATSI	METED	PECO	PENELEC	PLGRP
Base	$360	$857	$1,629	$52	$2,898	$1,700	$1,175	$469	$2,283	$572	$1,417	$593	$1,482
1.2	$344	$818	$1,575	$51	$2,788	$1,676	$1,146	$465	$2,266	$556	$1,372	$583	$1,439

Table 81. NJ Load-Weighted LMPs ($/MWh) – Scenario 1.2

Scenario	AECO	JCPL	PSEG	RECO	New Jersey	APS	BGE	DUQ	FE-ATSI	METED	PECO	PENELEC	PLGRP
Base	$35.34	$35.89	$35.22	$35.63	$35.44	$33.30	$35.28	$32.40	$33.34	$34.40	$35.02	$32.96	$34.18
1.2	$33.74	$34.24	$34.06	$34.92	$34.09	$32.83	$34.41	$32.13	$33.11	$33.43	$33.91	$32.40	$33.20

Table 82. OSW POI Generation Summary Report - Scenario 1.2

Scenario 1.2	Generation (MWh)	Curtailment (MWh)	Market Value ($M)	POI LMP ($/MWh)
POI_Deans	4,372,728	0	$138.90	$31.77
POI_Larrabee	4,372,728	0	$129.91	$29.71
POI_Cardiff	5,502,349	0	$167.25	$30.40
POI_Smithburg	8,652,558	92,899	$255.08	$29.48
Total	22,900,363	92,899	$691.14	$30.18

Scenario 1.2 with ME Upgrades Results

For this scenario PJM tested an additional optional market efficiency (ME) upgrade to determine if POI curtailment could be mitigated within the simulations.

Table 83. Scenario 1.2 Market Efficiency (ME) Upgrades

Scenario	Additional Upgrades	Estimated Cost
1.2	East Windsor-Smithburg 230 kV Smithburg-Deans 500kV	$75 million $13.2 million

The results below include the additional economic upgrade.

The additional upgrades are optional; that is not required as a result of the reliability analysis. A decision to include it or not in Scenario 1.2 will be discussed with the NJ BPU.

Table 84. PJM Production Cost - Scenario 1.2 with ME Upgrades

Scenario	PJM Production Cost ($M)
1.2	$ 18,866.08

Table 85. NJ Emissions (Metric Tons) – Scenario 1.2 with ME Upgrades

Scenario	PJM SO2 Annual Total	PJM NOx Annual Total	PJM CO2 Annual Total
1.2	2,554	1,468	7,168,997

Table 86. Zonal Annual Gross Load Payment ($M) - Scenario 1.2 with ME Upgrades

Scenario	AECO	JCPL	PSEG	RECO	New Jersey	APS	BGE	DUQ	FE-ATSI	METED	PECO	PENELEC	PLGRP
Base	$360	$857	$1,629	$52	$2,898	$1,700	$1,175	$469	$2,283	$572	$1,417	$593	$1,482
1.2	$345	$824	$1,575	$51	$2,795	$1,676	$1,146	$465	$2,267	$555	$1,372	$583	$1,439

Table 87. NJ Load-Weighted LMPs ($/MWh) – Scenario 1.2 with ME Upgrades

Scenario	AECO	JCPL	PSEG	RECO	New Jersey	APS	BGE	DUQ	FE-ATSI	METED	PECO	PENELEC	PLGRP
Base	$35.34	$35.89	$35.22	$35.63	$35.44	$33.30	$35.28	$32.40	$33.34	$34.40	$35.02	$32.96	$34.18
1.2	$33.83	$34.50	$34.07	$34.92	$34.18	$32.83	$34.41	$32.13	$33.11	$33.43	$33.91	$32.40	$33.20

Table 88. OSW POI Generation Summary Report - Scenario 1.2 with ME Upgrades

Scenario 1.2/Upgrades	Generation (MWh)	Curtailment (MWh)	Market Value ($M)	POI LMP ($/MWh)
POI_Deans	4,372,728	0	$138.27	$31.62
POI_Larrabee	4,372,728	0	$136.34	$31.18
POI_Cardiff	5,502,349	0	$169.09	$30.73
POI_Smithburg	8,739,112	6,344	$271.96	$31.12
Total	22,986,918	6,344	$715.66	$31.13

Scenario 1.2a

Table 89. Scenario 1.2a POI Summary (MW)

Scenario	Total (MW)	Alt POI Reega 230 kV	Default POI Cardiff 230 kV	Alt POI Fresh Ponds 500	Default POI Deans 500 kV	Alt POI Lighthouse 500 kV	Default POI Smithburg 500 kV	Alt POI Atlantic 230 kV	Default POI Larrabee 230 kV	Alt POI Neptune 230 kV	Alt POI Sewaren 230 kV	Alt POI Warner 230 kV
1.2a	6400	-	1510	-	1342	-	2348	-	1200	-	-	-

Scenario 1.2a Results

Table 90. PJM Production Cost - Scenario 1.2a

Scenario	PJM Production Cost ($M)
1.2a	$18,858.77

Table 91. NJ Emissions (Metric Tons) – Scenario 1.2a

Scenario	PJM SO2 Annual Total	PJM NOx Annual Total	PJM CO2 Annual Total
1.2a	2,549	1,464	7,155,790

Table 92. Zonal Annual Gross Load Payment ($M) - Scenario 1.2a

Scenario	AECO	JCPL	PSEG	RECO	New Jersey	APS	BGE	DUQ	FE-ATSI	METED	PECO	PENELEC	PLGRP
Base	$360	$857	$1,629	$52	$2,898	$1,700	$1,175	$469	$2,283	$572	$1,417	$593	$1,482
1.2a	$344	$818	$1,574	$51	$2,787	$1,675	$1,145	$465	$2,266	$555	$1,371	$582	$1,438

Table 93. NJ Load-Weighted LMPs ($/MWh) – Scenario 1.2a

Scenario	AECO	JCPL	PSEG	RECO	New Jersey	APS	BGE	DUQ	FE-ATSI	METED	PECO	PENELEC	PLGRP
Base	$35.34	$35.89	$35.22	$35.63	$35.44	$33.30	$35.28	$32.40	$33.34	$34.40	$35.02	$32.96	$34.18
1.2a	$33.73	$34.27	$34.03	$34.90	$34.08	$32.81	$34.39	$32.12	$33.09	$33.41	$33.89	$32.39	$33.17

Table 94. OSW POI Generation Summary Report - Scenario 1.2a

Scenario 1.2a	Generation (MWh)	Curtailment (MWh)	Market Value ($M)	POI LMP ($/MWh)
POI_Larrabee	4,372,728	0	$130.94	$29.95
POI_Cardiff	5,502,349	0	$167.43	$30.43
POI_Smithburg	8,480,668	75,304	$252.30	$29.75
POI_Deans	4,890,168	0	$155.04	$31.70
Total	23,245,913	75,304	$705.71	$30.36

Scenario 1.2a with ME Upgrades Results

For this scenario PJM tested an additional optional market efficiency (ME) upgrade to determine if POI curtailment could be mitigated within the simulations.

Table 95. Scenario 1.2a Market Efficiency (ME) Upgrades

Scenario	Additional Upgrades	Estimated Cost
1.2a	East Windsor-Smithburg 230 kV Smithburg-Deans 500kV	$75 million $13.2 million

The results below include the additional economic upgrade.

The additional upgrades are optional; that is not required as a result of the reliability analysis. A decision to include it or not in Scenario 1.2 will be discussed with the NJ BPU

Table 96. PJM Production Cost - Scenario 1.2a with ME Upgrades

Scenario	PJM Production Cost ($M)
1.2a	$18,857.15

Table 97. NJ Emissions (Metric Tons) – Scenario 1.2a with ME Upgrades

Scenario	PJM SO2 Annual Total	PJM NOx Annual Total	PJM CO2 Annual Total
1.2a	2,548	1,466	7,160,717

Table 98. Zonal Annual Gross Load Payment ($M) - Scenario 1.2a with ME Upgrades

Scenario	AECO	JCPL	PSEG	RECO	New Jersey	APS	BGE	DUQ	FE-ATSI	METED	PECO	PENELEC	PLGRP
Base	$360	$857	$1,629	$52	$2,898	$1,700	$1,175	$469	$2,283	$572	$1,417	$593	$1,482
1.2a	$344	$824	$1,574	$51	$2,793	$1,675	$1,145	$465	$2,266	$555	$1,371	$582	$1,438

Table 99. NJ Load-Weighted LMPs ($/MWh) – Scenario 1.2a with ME Upgrades

Scenario	AECO	JCPL	PSEG	RECO	New Jersey	APS	BGE	DUQ	FE-ATSI	METED	PECO	PENELEC	PLGRP
Base	$35.34	$35.89	$35.22	$35.63	$35.44	$33.30	$35.28	$32.40	$33.34	$34.40	$35.02	$32.96	$34.18
1.2a	$33.81	$34.49	$34.04	$34.90	$34.16	$32.81	$34.39	$32.12	$33.10	$33.41	$33.88	$32.39	$33.17

Table 100. OSW POI Generation Summary Report - Scenario 1.2a with ME Upgrades

Scenario 1.2a/Upgrades	Generation (MWh)	Curtailment (MWh)	Market Value ($M)	POI LMP ($/MWh)
POI_Larrabee	4,372,728	0	$136.63	$31.25
POI_Cardiff	5,502,349	0	$169.06	$30.72
POI_Smithburg	8,552,340	3,632	$266.89	$31.21
POI_Deans	4,890,168	0	$154.42	$31.58
Total	23,317,586	3,632	$727.00	$31.18

Scenario 1.2c

Table 101. Scenario 1.2c POI Summary (MW)

		Alt POI	Default POI	Alt POI	Default POI	Alt POI	Default POI	Alt POI	Default POI	Alt POI	Alt POI	Alt POI
Scenario	Total (MW)	Reega 230 kV	Cardiff 230 kV	Fresh Ponds 500 kV	Deans 500 kV	Lighthouse 500 kV	Smithburg 500 kV	Atlantic 230 kV	Larrabee 230 kV	Neptune 230 kV	Sewaren 230 kV	Warner 230 kV
1.2c	6400	-	1510	-	2542	-	1148	-	1200	-	-	-

Scenario 1.2c Results

Table 102. PJM Production Cost - Scenario 1.2c

Scenario	PJM Production Cost ($M)
1.2c	$18,858.96

Table 103. NJ Emissions (Metric Tons) – Scenario 1.2c

Scenario	PJM SO2 Annual Total	PJM NOx Annual Total	PJM CO2 Annual Total
1.2c	2,549	1,465	7,159,109

Table 104. Zonal Annual Gross Load Payment ($M) - Scenario 1.2c

Scenario	AECO	JCPL	PSEG	RECO	New Jersey	APS	BGE	DUQ	FE-ATSI	METED	PECO	PENELEC	PLGRP
Base	$360	$857	$1,629	$52	$2,898	$1,700	$1,175	$469	$2,283	$572	$1,417	$593	$1,482
1.2c	$344	$819	$1,574	$51	$2,788	$1,675	$1,145	$465	$2,266	$555	$1,371	$582	$1,438

Table 105. NJ Load-Weighted LMPs ($/MWh) – Scenario 1.2c

Scenario	AECO	JCPL	PSEG	RECO	New Jersey	APS	BGE	DUQ	FE-ATSI	METED	PECO	PENELEC	PLGRP
Base	$35.34	$35.89	$35.22	$35.63	$35.44	$33.30	$35.28	$32.40	$33.34	$34.40	$35.02	$32.96	$34.18
1.2c	$33.75	$34.30	$34.04	$34.90	$34.09	$32.81	$34.40	$32.12	$33.09	$33.41	$33.89	$32.39	$33.18

Table 106. OSW POI Generation Summary Report - Scenario 1.2c

Scenario 1.2c	Generation (MWh)	Curtailment (MWh)	Market Value ($M)	POI LMP ($/MWh)
POI_Larrabee	4,372,728	0	$131.79	$30.14
POI_Cardiff	5,502,349	0	$167.68	$30.47
POI_Smithburg	8,484,980	70,991	$252.06	$29.71
POI_Deans	4,890,168	0	$154.96	$31.69
Total	23,250,226	70,991	$706.48	$30.39

Scenario 1.2c Results with ME Upgrades Results

Table 107. PJM Production Cost - Scenario 1.2c with ME Upgrades

Scenario	PJM Production Cost ($M)
1.2c	$18,857.85

Table 108. NJ Emissions (Metric Tons) – Scenario 1.2c with ME Upgrades

Scenario	PJM SO2 Annual Total	PJM NOx Annual Total	PJM CO2 Annual Total
1.2c	2,548	1,465	7,159,685

Table 109. Zonal Annual Gross Load Payment ($M) - Scenario 1.2c with ME Upgrades

Scenario	AECO	JCPL	PSEG	RECO	New Jersey	APS	BGE	DUQ	FE-ATSI	METED	PECO	PENELEC	PLGRP
Base	$360	$857	$1,629	$52	$2,898	$1,700	$1,175	$469	$2,283	$572	$1,417	$593	$1,482
1.2c	$344	$824	$1,574	$51	$2,794	$1,675	$1,145	$465	$2,266	$555	$1,371	$582	$1,438

Table 110. NJ Load-Weighted LMPs ($/MWh) – Scenario 1.2c with ME Upgrades

Scenario	AECO	JCPL	PSEG	RECO	New Jersey	APS	BGE	DUQ	FE-ATSI	METED	PECO	PENELEC	PLGRP
Base	$35.34	$35.89	$35.22	$35.63	$35.44	$33.30	$35.28	$32.40	$33.34	$34.40	$35.02	$32.96	$34.18
1.2c	$33.82	$34.51	$34.04	$34.90	$34.17	$32.81	$34.40	$32.12	$33.10	$33.41	$33.88	$32.39	$33.18

Table 111. OSW POI Generation Summary Report - Scenario 1.2c with ME Upgrades

Scenario 1.2c	Generation (MWh)	Curtailment (MWh)	Market Value ($M)	POI LMP ($/MWh)
POI_Larrabee	4,372,728	0	$136.75	$31.27
POI_Cardiff	5,502,349	0	$169.08	$30.73
POI_Smithburg	8,553,135	2,837	$266.98	$31.21
POI_Deans	4,890,168	0	$154.39	$31.57
Total	23,318,380	2,837	$727.20	$31.19

Scenario 4

Table 112. Scenario 4 POI Summary

Scenario	Total (MW)	Alt POI Reega 230 kV	Default POI Cardiff 230 kV	Alt POI Fresh Ponds 500 kV	Default POI Deans 500 kV	Alt POI Lighthouse 500 kV	Default POI Smithburg 500 kV	Alt POI Atlantic 230 kV	Default POI Larrabee 230 kV	Alt POI Neptune 230 kV	Alt POI Sewaren 230 kV	Alt POI Warner 230 kV
4	6410	-	1510	3000	-	-	-	-	-	1500	-	400

Scenario 4 Results

Table 113. PJM Production Cost - Scenario 4

Scenario	PJM Production Cost ($M)
4	$ 18,857.00

Table 114. NJ Emissions (Metric Tons) – Scenario 4

Scenario	PJM SO2 Annual Total	PJM NOx Annual Total	PJM CO2 Annual Total
4	2,551	1,462	7,129,594

Table 115. Zonal Annual Gross Load Payment ($M) - Scenario 4

Scenario	AECO	JCPL	PSEG	RECO	New Jersey	APS	BGE	DUQ	FE-ATSI	METED	PECO	PENELEC	PLGRP
Base	$360	$857	$1,629	$52	$2,898	$1,700	$1,175	$469	$2,283	$572	$1,417	$593	$1,482
4	$345	$824	$1,574	$51	$2,794	$1,675	$1,145	$465	$2,266	$555	$1,371	$582	$1,438

Table 116. NJ Load-Weighted LMPs ($/MWh) – Scenario 4

Scenario	AECO	JCPL	PSEG	RECO	New Jersey	APS	BGE	DUQ	FE-ATSI	METED	PECO	PENELEC	PLGRP
Base	$35.34	$35.89	$35.22	$35.63	$35.44	$33.30	$35.28	$32.40	$33.34	$34.40	$35.02	$32.96	$34.18
4	$33.83	$34.50	$34.04	$34.89	$34.16	$32.81	$34.39	$32.12	$33.10	$33.41	$33.88	$32.39	$33.17

Table 117. OSW POI Generation Summary Report - Scenario 4

Scenario 4	Generation (MWh)	Curtailment (MWh)	Market Value ($M)	POI LMP ($/MWh)
POI_Fresh Ponds	10,931,118	702	$343.96	$31.47
POI_Cardiff	5,502,349	0	$169.31	$30.77
POI_Werner	1,457,577	0	$46.16	$31.67
POI_Neptune	5,465,910	0	$171.28	$31.34
Total	23,356,955	702	$730.70	$31.28

Scenario 4a

Table 118. Scenario 4a POI Summary (MW)

		Alt POI	Default POI	Alt POI	Default POI	Alt POI	Default POI	Alt POI	Default POI	Alt POI	Alt POI	Alt POI
Scenario	Total (MW)	Reega 230 kV	Cardiff 230 kV	Fresh Ponds 500 kV	Deans 500 kV	Lighthouse 500 kV	Smithburg 500 kV	Atlantic 230 kV	Larrabee 230 kV	Neptune 230 kV	Sewaren 230 kV	Warner 230 kV
4a	6400	-	1510	2242	-	-	1148	-	-	1500	-	-

Scenario 4a Results

Table 119. PJM Production Cost - Scenario 4a

Scenario	PJM Production Cost ($M)
4a	$18,858.53

Table 120. NJ Emissions (Metric Tons) – Scenario 4a

Scenario	PJM SO2 Annual Total	PJM NOx Annual Total	PJM CO2 Annual Total
4a	2,551	1,465	7,151,385

Table 121. Zonal Annual Gross Load Payment ($M) - Scenario 4a

Scenario	AECO	JCPL	PSEG	RECO	New Jersey	APS	BGE	DUQ	FE-ATSI	METED	PECO	PENELEC	PLGRP
Base	$360	$857	$1,629	$52	$2,898	$1,700	$1,175	$469	$2,283	$572	$1,417	$593	$1,482
4a	$344	$824	$1,574	$51	$2,793	$1,675	$1,145	$465	$2,266	$555	$1,370	$582	$1,438

Table 122. NJ Load-Weighted LMPs ($/MWh) – Scenario 4a

Scenario	AECO	JCPL	PSEG	RECO	New Jersey	APS	BGE	DUQ	FE-ATSI	METED	PECO	PENELEC	PLGRP
Base	$35.34	$35.89	$35.22	$35.63	$35.44	$33.30	$35.28	$32.40	$33.34	$34.40	$35.02	$32.96	$34.18
4a	$33.79	$34.49	$34.04	$34.90	$34.16	$32.81	$34.39	$32.12	$33.10	$33.41	$33.87	$32.38	$33.18

Table 123. OSW POI Generation Summary Report - Scenario 4a

Scenario 4a	Generation (MWh)	Curtailment (MWh)	Market Value ($M)	POI LMP ($/MWh)
POI_Fresh Ponds	8,163,029	6,685	$254.31	$31.15
POI_Cardiff	5,502,349	0	$168.70	$30.66
POI_Smithburg	4,183,244	0	$130.16	$31.11
POI_Neptune	5,465,910	0	$170.74	$31.24
Total	23,314,533	6,685	$723.91	$31.05

Scenario 5

Table 124. Scenario 5 POI Summary

		Alt POI	Default POI	Alt POI	Default POI	Alt POI	Default POI	Alt POI	Default POI	Alt POI	Alt POI	Alt POI

Scenario	Total (MW)	Reega 230 kV	Cardiff 230 kV	Fresh Ponds 500 kV	Deans 500 kV	Lighthouse 500 kV	Smithburg 500 kV	Atlantic 230 kV	Larrabee 230 kV	Neptune 230 kV	Sewaren 230 kV	Warner 230 kV
5	6310	-	1510	-	-	-	2400	1200	1200	-	-	-

Scenario 5 Results

Table 125. PJM Production Cost - Scenario 5

Scenario	PJM Production Cost ($M)
5	$ 18,864.49

Table 126. NJ Emissions (Metric Tons) – Scenario 5

Scenario	PJM SO2 Annual Total	PJM NOx Annual Total	PJM CO2 Annual Total
5	2,554	1,466	7,149,926

Table 127. Zonal Annual Gross Load Payment ($M) - Scenario 5

Scenario	AECO	JCPL	PSEG	RECO	New Jersey	APS	BGE	DUQ	FE-ATSI	METED	PECO	PENELEC	PLGRP
Base	$360	$857	$1,629	$52	$2,898	$1,700	$1,175	$469	$2,283	$572	$1,417	$593	$1,482
5	$344	$823	$1,576	$51	$2,795	$1,676	$1,146	$465	$2,266	$556	$1,372	$583	$1,439

Table 128. NJ Load-Weighted LMPs ($/MWh) – Scenario 5

Scenario	AECO	JCPL	PSEG	RECO	New Jersey	APS	BGE	DUQ	FE-ATSI	METED	PECO	PENELEC	PLGRP
Base	$35.34	$35.89	$35.22	$35.63	$35.44	$33.30	$35.28	$32.40	$33.34	$34.40	$35.02	$32.96	$34.18
5	$33.82	$34.47	$34.08	$34.92	$34.18	$32.82	$34.41	$32.13	$33.11	$33.44	$33.91	$32.40	$33.20

Table 129. OSW POI Generation Summary Report - Scenario 5

Scenario 5	Generation (MWh)	Curtailment (MWh)	Market Value ($M)	POI LMP ($/MWh)

POI_Larrabee	4,372,728	0	$136.47	$31.21
POI_Cardiff	5,502,349	0	$169.13	$30.74
POI_Smithburg	8,745,456	0	$275.37	$31.49
POI_Atlantic	4,372,728	0	$136.88	$31.30
Total	22,993,262	0	$717.85	$31.22

Scenario 6

Table 130. Scenario 6 POI Summary

Scenario	Total (MW)	Alt POI Reega 230 kV	Default POI Cardiff 230 kV	Alt POI Fresh Ponds 500 kV	Default POI Deans 500 kV	Alt POI Lighthouse 500 kV	Default POI Smithburg 500 kV	Alt POI Atlantic 230 kV	Default POI Larrabee 230 kV	Alt POI Neptune 230 kV	Alt POI Sewaren 230 kV	Alt POI Warner 230 kV
6	6400	-	1510	-	-	4890	-	-	-	-	-	-

Scenario 6 Results

Table 131. PJM Production Cost - Scenario 6

Scenario	PJM Production Cost ($M)
6	$ 18,858.04

Table 132. NJ Emissions (Metric Tons) – Scenario 6

Scenario	PJM SO2 Annual Total	PJM NOx Annual Total	PJM CO2 Annual Total
6	2,550	1,465	7,156,363

Table 133. Zonal Annual Gross Load Payment ($M) - Scenario 6

Scenario	AECO	JCPL	PSEG	RECO	New Jersey	APS	BGE	DUQ	FE-ATSI	METED	PECO	PENELEC	PLGRP
Base	$360	$857	$1,629	$52	$2,898	$1,700	$1,175	$469	$2,283	$572	$1,417	$593	$1,482
6	$344	$824	$1,574	$51	$2,793	$1,675	$1,145	$465	$2,266	$555	$1,370	$582	$1,438

Table 134. NJ Load-Weighted LMPs ($/MWh) – Scenario 6

Scenario	AECO	JCPL	PSEG	RECO	New Jersey	APS	BGE	DUQ	FE-ATSI	METED	PECO	PENELEC	PLGRP
Base	$35.34	$35.89	$35.22	$35.63	$35.44	$33.30	$35.28	$32.40	$33.34	$34.40	$35.02	$32.96	$34.18
6	$33.79	$34.51	$34.04	$34.90	$34.16	$32.82	$34.40	$32.12	$33.10	$33.42	$33.87	$32.39	$33.18

Table 135. OSW POI Generation Summary Report - Scenario 6

Scenario 6	Generation (MWh)	Curtailment (MWh)	Market Value ($M)	POI LMP ($/MWh)
POI_Cardiff	5,502,349	0	$168.94	$30.70
POI_Lighthouse	17,818,868	0	$557.36	$31.28
Total	23,321,217	0	$726.30	$31.14

Scenario 7

Table 136. Scenario 7 POI Summary (MW)

		Alt POI	Default POI	Alt POI	Default POI	Alt POI	Default POI	Alt POI	Default POI	Alt POI	Alt POI	Alt POI
Scenario	Total (MW)	Reega 230 kV	Cardiff 230 kV	Fresh Ponds 500 kV	Deans 500 kV	Lighthouse 500 kV	Smithburg 500 kV	Atlantic 230 kV	Larrabee 230 kV	Neptune 230 kV	Sewaren 230 kV	Warner 230 kV
7	6400	-	1510	-	-	4890	-	-	-	-	-	-

Scenario 7 Results

Table 137. PJM Production Cost - Scenario 7

Scenario	PJM Production Cost ($M)
7	$18,856.29

Table 138. NJ Emissions (Metric Tons) – Scenario 7

Scenario	PJM SO2 Annual Total	PJM NOx Annual Total	PJM CO2 Annual Total
7	2,548	1,465	7,155,526

Table 139. Zonal Annual Gross Load Payment ($M) - Scenario 7

Scenario	AECO	JCPL	PSEG	RECO	New Jersey	APS	BGE	DUQ	FE-ATSI	METED	PECO	PENELEC	PLGRP
Base	$360	$857	$1,629	$52	$2,898	$1,700	$1,175	$469	$2,283	$572	$1,417	$593	$1,482
7	$344	$825	$1,574	$51	$2,794	$1,676	$1,143	$465	$2,266	$555	$1,370	$582	$1,438

Table 140. NJ Load-Weighted LMPs ($/MWh) – Scenario 7

Scenario	AECO	JCPL	PSEG	RECO	New Jersey	APS	BGE	DUQ	FE-ATSI	METED	PECO	PENELEC	PLGRP
Base	$35.34	$35.89	$35.22	$35.63	$35.44	$33.30	$35.28	$32.40	$33.34	$34.40	$35.02	$32.96	$34.18
7	$33.81	$34.53	$34.04	$34.91	$34.17	$32.82	$34.34	$32.12	$33.10	$33.42	$33.87	$32.39	$33.18

Table 141. OSW POI Generation Summary Report - Scenario 7

Scenario 7	Generation (MWh)	Curtailment (MWh)	Market Value ($M)	POI LMP ($/MWh)
POI_Cardiff	5,502,349	-	$169.26	$30.76
POI_Lighthouse	17,818,868	-	$557.22	$31.27
Total	23,321,217	-	$726.48	$31.15

Scenario 10

Table 142. Scenario 10 POI Summary (MW)

		Alt POI	Default POI	Alt POI	Default POI	Alt POI	Default POI	Alt POI	Default POI	Alt POI	Alt POI	Alt POI
Scenario	Total (MW)	Reega 230 kV	Cardiff 230 kV	Fresh Ponds 500 kV	Deans 500 kV	Lighthouse 500 kV	Smithburg 500 kV	Atlantic 230 kV	Larrabee 230 kV	Neptune 230 kV	Sewaren 230 kV	Warner 230 kV
10	6400	-	1510	-	2290	-	-	-	1200	-	1400	-

Scenario 10 Results

Table 143. PJM Production Cost - Scenario 10

Scenario	PJM Production Cost ($M)
10	$18,857.81

Table 144. NJ Emissions (Metric Tons) – Scenario 10

Scenario	PJM SO2 Annual Total	PJM NOx Annual Total	PJM CO2 Annual Total
10	2,551	1,465	7,147,313

Table 145. Zonal Annual Gross Load Payment ($M) - Scenario 10

Scenario	AECO	JCPL	PSEG	RECO	New Jersey	APS	BGE	DUQ	FE-ATSI	METED	PECO	PENELEC	PLGRP
Base	$360	$857	$1,629	$52	$2,898	$1,700	$1,175	$469	$2,283	$572	$1,417	$593	$1,482
10	$345	$827	$1,576	$51	$2,799	$1,677	$1,147	$464	$2,264	$556	$1,374	$583	$1,440

Table 146. NJ Load-Weighted LMPs ($/MWh) – Scenario 10

Scenario	AECO	JCPL	PSEG	RECO	New Jersey	APS	BGE	DUQ	FE-ATSI	METED	PECO	PENELEC	PLGRP
Base	$35.34	$35.89	$35.22	$35.63	$35.44	$33.30	$35.28	$32.40	$33.34	$34.40	$35.02	$32.96	$34.18
10	$33.91	$34.63	$34.07	$34.97	$34.23	$32.84	$34.44	$32.10	$33.07	$33.46	$33.95	$32.43	$33.22

Table 147. OSW POI Generation Summary Report - Scenario 10

Scenario 10	Generation (MWh)	Curtailment (MWh)	Market Value ($M)	POI LMP ($/MWh)
POI_Deans	8,344,623	-	$263.71	$31.60
POI_Larrabee	4,372,728	-	$138.06	$31.57
POI_Cardiff	5,502,349	-	$169.63	$30.83
POI_Sewaren	5,101,516	-	$162.18	$31.79
Total	23,321,217	-	733.58	$31.46

Scenario 11

Table 148. Scenario 11 POI Summary (MW)

		Alt POI	Default POI	Alt POI	Default POI	Alt POI	Default POI	Alt POI	Default POI	Alt POI	Alt POI	Alt POI
Scenario	Total (MW)	Reega 230 kV	Cardiff 230 kV	Fresh Ponds 500	Deans 500 kV	Lighthouse 500 kV	Smithburg 500 kV	Atlantic 230 kV	Larrabee 230 kV	Neptune 230 kV	Sewaren 230 kV	Warner 230 kV
11	6399	-	1510	-	1247	-	1148	-	1247	-	1247	-

Scenario 11 Results

Table 149. PJM Production Cost - Scenario 11

Scenario	PJM Production Cost ($M)
11	$18,857.00

Table 150. NJ Emissions (Metric Tons) – Scenario 11

Scenario	PJM SO2 Annual Total	PJM NOx Annual Total	PJM CO2 Annual Total
11	2,552	1,464	7,140,054

Table 151. Zonal Annual Gross Load Payment ($M) - Scenario 11

Scenario	AECO	JCPL	PSEG	RECO	New Jersey	APS	BGE	DUQ	FE-ATSI	METED	PECO	PENELEC	PLGRP
Base	$360	$857	$1,629	$52	$2,898	$1,700	$1,175	$469	$2,283	$572	$1,417	$593	$1,482
11	$345	$825	$1,573	$51	$2,794	$1,675	$1,145	$465	$2,266	$555	$1,371	$582	$1,438

Table 152. NJ Load-Weighted LMPs ($/MWh) – Scenario 11

Scenario	AECO	JCPL	PSEG	RECO	New Jersey	APS	BGE	DUQ	FE-ATSI	METED	PECO	PENELEC	PLGRP
Base	$35.34	$35.89	$35.22	$35.63	$35.44	$33.30	$35.28	$32.40	$33.34	$34.40	$35.02	$32.96	$34.18
11	$33.84	$34.55	$34.02	$34.88	$34.17	$32.81	$34.40	$32.12	$33.10	$33.41	$33.89	$32.38	$33.18

Table 153. OSW POI Generation Summary Report - Scenario 11

Scenario 11	Generation (MWh)	Curtailment (MWh)	Market Value ($M)	POI LMP ($/MWh)
POI_Cardiff	5,502,349	0	$169.48	$30.80
POI_Deans	4,543,994	0	$143.55	$31.59
POI_Larrabee	4,543,994	0	$143.19	$31.51
POI_Sewaren	4,543,994	0	$144.52	$31.80
POI_Smithburg	4,183,244	0	$131.92	$31.54
Total	23,317,575	0	732.66	$31.42

Scenario 15

Table 154. Scenario 15 POI Summary (MW)

Scenario	Total (MW)	Alt POI Reega 230 kV	Default POI Cardiff 230 kV	Alt POI Fresh Ponds 500 kV	Default POI Deans 500 kV	Alt POI Lighthouse 500 kV	Default POI Smithburg 500 kV	Alt POI Atlantic 230 kV	Default POI Larrabee 230 kV	Alt POI Neptune 230 kV	Alt POI Sewaren 230 kV	Alt POI Warner 230 kV
15	6400	-	1510	4890	-	-	-	-	-	-	-	-

Scenario 15 Results

Table 155. PJM Production Cost - Scenario 15

Scenario	PJM Production Cost ($M)
15	$18,854.86

Table 156. NJ Emissions (Metric Tons) – Scenario 15

Scenario	PJM SO2 Annual Total	PJM NOx Annual Total	PJM CO2 Annual Total
15	2,551	1,466	7,176,815

Table 157. Zonal Annual Gross Load Payment ($M) - Scenario 15

Scenario	AECO	JCPL	PSEG	RECO	New Jersey	APS	BGE	DUQ	FE-ATSI	METED	PECO	PENELEC	PLGRP
Base	$360	$857	$1,629	$52	$2,898	$1,700	$1,175	$469	$2,283	$572	$1,417	$593	$1,482
15	$345	$827	$1,574	$51	$2,798	$1,675	$1,145	$465	$2,266	$555	$1,371	$582	$1,438

Table 158. NJ Load-Weighted LMPs ($/MWh) – Scenario 15

Scenario	AECO	JCPL	PSEG	RECO	New Jersey	APS	BGE	DUQ	FE-ATSI	METED	PECO	PENELEC	PLGRP
Base	$35.34	$35.89	$35.22	$35.63	$35.44	$33.30	$35.28	$32.40	$33.34	$34.40	$35.02	$32.96	$34.18
15	$33.86	$34.64	$34.05	$34.90	$34.21	$32.81	$34.40	$32.12	$33.10	$33.41	$33.89	$32.39	$33.17

Table 159. OSW POI Generation Summary Report - Scenario 15

Scenario 15	Generation (MWh)	Curtailment (MWh)	Market Value ($M)	POI LMP ($/MWh)
POI_Fresh Ponds	17,818,868	0	$561.65	$31.52
POI_Cardiff	5,502,349	0	$169.76	$30.85
Total	23,321,217	0	$731.42	$31.36

Scenario 16

Table 160. Scenario 16 POI Summary (MW)

		Alt POI	Default POI	Alt POI	Default POI	Alt POI	Default POI	Alt POI	Default POI	Alt POI	Alt POI	Alt POI
Scenario	Total (MW)	Reega 230 kV	Cardiff 230 kV	Fresh Ponds 500 kV	Deans 500 kV	Lighthouse 500 kV	Smithburg 500 kV	Atlantic 230 kV	Larrabee 230 kV	Neptune 230 kV	Sewaren 230 kV	Warner 230 kV
16	6400	2658	-	3742	-	-	-	-	-	-	-	-

Scenario 16 Results

Table 161. PJM Production Cost - Scenario 16

Scenario	PJM Production Cost ($M)
16	$18,857.78

Table 162. NJ Emissions (Metric Tons) – Scenario 16

Scenario	PJM SO2 Annual Total	PJM NOx Annual Total	PJM CO2 Annual Total
16	2,543	1,467	7,190,574

Table 163. Zonal Annual Gross Load Payment ($M) - Scenario 16

Scenario	AECO	JCPL	PSEG	RECO	New Jersey	APS	BGE	DUQ	FE-ATSI	METED	PECO	PENELEC	PLGRP
Base	$360	$857	$1,629	$52	$2,898	$1,700	$1,175	$469	$2,283	$572	$1,417	$593	$1,482
16	$342	$828	$1,575	$51	$2,797	$1,675	$1,145	$465	$2,267	$555	$1,370	$582	$1,438

Table 164. NJ Load-Weighted LMPs ($/MWh) – Scenario 16

Scenario	AECO	JCPL	PSEG	RECO	New Jersey	APS	BGE	DUQ	FE-ATSI	METED	PECO	PENELEC	PLGRP
Base	$35.34	$35.89	$35.22	$35.63	$35.44	$33.30	$35.28	$32.40	$33.34	$34.40	$35.02	$32.96	$34.18
16	$33.62	$34.66	$34.07	$34.92	$34.20	$32.81	$34.39	$32.13	$33.11	$33.41	$33.86	$32.39	$33.18

Table 165. OSW POI Generation Summary Report - Scenario 16

Scenario 16	Generation (MWh)	Curtailment (MWh)	Market Value ($M)	POI LMP ($/MWh)
POI_Reega	9,680,970	4,623	$287.16	$29.66
POI_Fresh Ponds	13,635,624	0	$430.64	$31.58
Total	23,316,594	4,623	717.79	$30.78

Scenario 16a

Table 166. Scenario 16a POI Summary (MW)

		Alt POI	Default POI	Alt POI	Default POI	Alt POI	Default POI	Alt POI	Default POI	Alt POI	Alt POI	Alt POI
Scenario	Total (MW)	Reega 230 kV	Cardiff 230 kV	Fresh Ponds 500 kV	Deans 500 kV	Lighthouse 500 kV	Smithburg 500 kV	Atlantic 230 kV	Larrabee 230 kV	Neptune 230 kV	Sewaren 230 kV	Warner 230 kV
16a	6400	-	1510	3742	-	-	1148	-	-	-	-	-

Scenario 16a Results

Table 167. PJM Production Cost - Scenario 16a

Scenario	PJM Production Cost ($M)
16a	$18,857.02

Table 168. NJ Emissions (Metric Tons) – Scenario 16a

Scenario	PJM SO2 Annual Total	PJM NOx Annual Total	PJM CO2 Annual Total
16a	2,550	1,466	7,175,776

Table 169. Zonal Annual Gross Load Payment ($M) - Scenario 16a

Scenario	AECO	JCPL	PSEG	RECO	New Jersey	APS	BGE	DUQ	FE-ATSI	METED	PECO	PENELEC	PLGRP
Base	$360	$857	$1,629	$52	$2,898	$1,700	$1,175	$469	$2,283	$572	$1,417	$593	$1,482
16a	$344	$826	$1,574	$51	$2,796	$1,675	$1,145	$465	$2,266	$555	$1,371	$582	$1,438

Table 170. NJ Load-Weighted LMPs ($/MWh) – Scenario 16a

Scenario	AECO	JCPL	PSEG	RECO	New Jersey	APS	BGE	DUQ	FE-ATSI	METED	PECO	PENELEC	PLGRP
Base	$35.34	$35.89	$35.22	$35.63	$35.44	$33.30	$35.28	$32.40	$33.34	$34.40	$35.02	$32.96	$34.18
16a	$33.82	$34.60	$34.04	$34.89	$34.19	$32.81	$34.39	$32.11	$33.09	$33.40	$33.87	$32.38	$33.17

Table 171. OSW POI Generation Summary Report - Scenario 16a

Scenario 16a	Generation (MWh)	Curtailment (MWh)	Market Value ($M)	POI LMP ($/MWh)
POI_Cardiff	5,502,349	0	$169.14	$30.74
POI_Fresh Ponds	13,632,300	3,324	$425.30	$31.20
POI_Smithburg	4,183,244	0	$130.54	$31.21
Total	23,317,893	3,324	$724.98	$31.09

Scenario 17

Table 172. Scenario 17 POI Summary (MW)

Scenario	Total (MW)	Alt POI Reega 230 kV	Default POI Cardiff 230 kV	Alt POI Fresh Ponds 500 kV	Default POI Deans 500 kV	Alt POI Lighthouse 500 kV	Default POI Smithburg 500 kV	Alt POI Atlantic 230 kV	Default POI Larrabee 230 kV	Alt POI Neptune 230 kV	Alt POI Sewaren 230 kV	Alt POI Warner 230 kV
17	6400	-	1510	-	1890	-	-	-	-	3000	-	-

Scenario 17 Results

Table 173. PJM Production Cost - Scenario 17

Scenario	PJM Production Cost ($M)
17	$18,858.27

Table 174. NJ Emissions (Metric Tons) – Scenario 17

Scenario	PJM SO2 Annual Total	PJM NOx Annual Total	PJM CO2 Annual Total
17	2,550	1,462	7,122,435

Table 175. Zonal Annual Gross Load Payment ($M) - Scenario 17

Scenario	AECO	JCPL	PSEG	RECO	New Jersey	APS	BGE	DUQ	FE-ATSI	METED	PECO	PENELEC	PLGRP
Base	$360	$857	$1,629	$52	$2,898	$1,700	$1,175	$469	$2,283	$572	$1,417	$593	$1,482
17	$344	$822	$1,574	$51	$2,791	$1,675	$1,145	$465	$2,266	$555	$1,371	$582	$1,438

Table 176. NJ Load-Weighted LMPs ($/MWh) – Scenario 17

Scenario	AECO	JCPL	PSEG	RECO	New Jersey	APS	BGE	DUQ	FE-ATSI	METED	PECO	PENELEC	PLGRP
Base	$35.34	$35.89	$35.22	$35.63	$35.44	$33.30	$35.28	$32.40	$33.34	$34.40	$35.02	$32.96	$34.18
17	$33.81	$34.40	$34.04	$34.90	$34.14	$32.81	$34.40	$32.12	$33.10	$33.41	$33.89	$32.39	$33.17

Table 177. OSW POI Generation Summary Report - Scenario 17

Scenario 17	Generation (MWh)	Curtailment (MWh)	Market Value ($M)	POI LMP ($/MWh)
POI_Cardiff	5,502,349	0	$169.10	$30.73
POI_Deans	6,887,047	0	$217.44	$31.57
POI_Neptune	10,931,797	24	$336.83	$30.81
Total	23,321,193	24	723.37	$31.02

Scenario 19

Table 178. Scenario 19 POI Summary (MW)

		Alt POI	Default POI	Alt POI	Default POI	Alt POI	Default POI	Alt POI	Default POI	Alt POI	Alt POI	Alt POI
Scenario	Total (MW)	Reega 230 kV	Cardiff 230 kV	Fresh Ponds 500 kV	Deans 500 kV	Lighthouse 500 kV	Smithburg 500 kV	Atlantic 230 kV	Larrabee 230 kV	Neptune 230 kV	Sewaren 230 kV	Warner 230 kV
19	6258	-	1510	-	3600	-	1148	-	-	-	-	-

Scenario 19 Results

Table 179. PJM Production Cost - Scenario 19

Scenario	PJM Production Cost ($M)
19	$18,868.99

Table 180. NJ Emissions (Metric Tons) – Scenario 19

Scenario	PJM SO2 Annual Total	PJM NOx Annual Total	PJM CO2 Annual Total
19	2,552	1,467	7,182,748

Table 181. Zonal Annual Gross Load Payment ($M) - Scenario 19

Scenario	AECO	JCPL	PSEG	RECO	New Jersey	APS	BGE	DUQ	FE-ATSI	METED	PECO	PENELEC	PLGRP
Base	$360	$857	$1,629	$52	$2,898	$1,700	$1,175	$469	$2,283	$572	$1,417	$593	$1,482
19	$345	$827	$1,576	$51	$2,799	$1,676	$1,146	$465	$2,266	$555	$1,372	$582	$1,439

Table 182. NJ Load-Weighted LMPs ($/MWh) – Scenario 19

Scenario	AECO	JCPL	PSEG	RECO	New Jersey	APS	BGE	DUQ	FE-ATSI	METED	PECO	PENELEC	PLGRP
Base	$35.34	$35.89	$35.22	$35.63	$35.44	$33.30	$35.28	$32.40	$33.34	$34.40	$35.02	$32.96	$34.18
19	$33.88	$34.64	$34.07	$34.92	$34.23	$32.82	$34.41	$32.12	$33.10	$33.43	$33.91	$32.40	$33.19

Table 183. OSW POI Generation Summary Report - Scenario 19

Scenario 19	Generation (MWh)	Curtailment (MWh)	Market Value ($M)	POI LMP ($/MWh)
POI_Cardiff	5,502,349	0	$169.91	$30.88
POI_Deans	13,118,185	0	$414.32	$31.58
POI_Smithburg	4,183,244	0	$132.12	$31.58
Total	22,803,778	0	$716.35	$31.41

Scenario 20

Table 184. Scenario 20 POI Summary (MW)

		Alt POI	Default POI	Alt POI	Default POI	Alt POI	Default POI	Alt POI	Default POI	Alt POI	Alt POI	Alt POI
Scenario	Total (MW)	Reega 230 kV	Cardiff 230 kV	Fresh Ponds 500 kV	Deans 500 kV	Lighthouse 500 kV	Smithburg 500 kV	Atlantic 230 kV	Larrabee 230 kV	Neptune 230 kV	Sewaren 230 kV	Warner 230 kV
20	6400	-	1510	1342	-	-	1148	-	-	2400	-	-

Scenario 20 Results

Table 185. PJM Production Cost - Scenario 20

Scenario	PJM Production Cost ($M)
20	$18,858.38

Table 186. NJ Emissions (Metric Tons) – Scenario 20

Scenario	PJM SO2 Annual Total	PJM NOx Annual Total	PJM CO2 Annual Total
20	2,552	1,464	7,133,504

Table 187. Zonal Annual Gross Load Payment ($M) - Scenario 20

Scenario	AECO	JCPL	PSEG	RECO	New Jersey	APS	BGE	DUQ	FE-ATSI	METED	PECO	PENELEC	PLGRP
Base	$360	$857	$1,629	$52	$2,898	$1,700	$1,175	$469	$2,283	$572	$1,417	$593	$1,482
20	$344	$821	$1,574	$51	$2,790	$1,675	$1,145	$465	$2,265	$555	$1,371	$582	$1,438

Table 188. NJ Load-Weighted LMPs ($/MWh) – Scenario 20

Scenario	AECO	JCPL	PSEG	RECO	New Jersey	APS	BGE	DUQ	FE-ATSI	METED	PECO	PENELEC	PLGRP
Base	$35.34	$35.89	$35.22	$35.63	$35.44	$33.30	$35.28	$32.40	$33.34	$34.40	$35.02	$32.96	$34.18
20	$33.80	$34.38	$34.04	$34.89	$34.12	$32.81	$34.40	$32.11	$33.09	$33.41	$33.89	$32.39	$33.17

Table 189. OSW POI Generation Summary Report - Scenario 20

Scenario 20	Generation (MWh)	Curtailment (MWh)	Market Value ($M)	POI LMP ($/MWh)
POI_Cardiff	5,502,349	0	$168.80	$30.68
POI_Fresh Ponds	4,890,168	0	$154.50	$31.59
POI_Neptune	8,745,150	306	$268.64	$30.72
POI_Smithburg	4,172,048	11,195	$129.76	$31.10
Total	23,309,716	11,502	$721.70	$30.96

Scenario 20 with ME Upgrades Results

For this scenario PJM tested an additional optional market efficiency (ME) upgrade to determine if POI curtailment could be mitigated within the simulations.

Table 190. Scenario 20 Market Efficiency (ME) Upgrades

Scenario	Additional Upgrades	Estimated Cost
20	East Windsor-Smithburg 230 kV	$75 million

The results below include the additional economic upgrade.

The additional upgrades are optional; that is not required as a result of the reliability analysis. A decision to include it or not in Scenario 20 will be discussed with the NJ BPU.

Table 191. PJM Production Cost - Scenario 20 with ME Upgrades

Scenario	PJM Production Cost ($M)
20	$18,858.97

Table 192. NJ Emissions (Metric Tons) – Scenario 20 with ME Upgrades

Scenario	PJM SO2 Annual Total	PJM NOx Annual Total	PJM CO2 Annual Total
20	2,552	1,463	7,131,480

Table 193. Zonal Annual Gross Load Payment ($M) - Scenario 20 with ME Upgrades

Scenario	AECO	JCPL	PSEG	RECO	New Jersey	APS	BGE	DUQ	FE-ATSI	METED	PECO	PENELEC	PLGRP
Base	$360	$857	$1,629	$52	$2,898	$1,700	$1,175	$469	$2,283	$572	$1,417	$593	$1,482
20	$344	$823	$1,574	$51	$2,792	$1,675	$1,145	$465	$2,265	$555	$1,371	$582	$1,438

Table 194. NJ Load-Weighted LMPs ($/MWh) – Scenario 20 with ME Upgrades

Scenario	AECO	JCPL	PSEG	RECO	New Jersey	APS	BGE	DUQ	FE-ATSI	METED	PECO	PENELEC	PLGRP

Base	$35.34	$35.89	$35.22	$35.63	$35.44	$33.30	$35.28	$32.40	$33.34	$34.40	$35.02	$32.96	$34.18
20	$33.82	$34.44	$34.04	$34.89	$34.15	$32.81	$34.40	$32.11	$33.09	$33.41	$33.89	$32.39	$33.17

Table 195. OSW POI Generation Summary Report - Scenario 20 with ME Upgrades

Scenario 20/Upgrades	Generation (MWh)	Curtailment (MWh)	Market Value ($M)	POI LMP ($/MWh)
POI_Cardiff	5,502,349	0	$169.24	$30.76
POI_Fresh Ponds	4,890,168	0	$154.34	$31.56
POI_Neptune	8,745,456	0	$271.31	$31.02
POI_Smithburg	4,183,244	0	$131.70	$31.48
Total	23,321,218	0	$726.59	$31.16

Scenario 20a

Table 196. Scenario 20a POI Summary (MW)

		Alt POI	Default POI	Alt POI	Default POI	Alt POI	Default POI	Alt POI	Default POI	Alt POI	Alt POI	Alt POI
Scenario	Total (MW)	Reega 230 kV	Cardiff 230 kV	Fresh Ponds 500 kV	Deans 500 kV	Lighthouse 500 kV	Smithburg 500 kV	Atlantic 230 kV	Larrabee 230 kV	Neptune 230 kV	Sewaren 230 kV	Warner 230 kV
20a	6400	-	1510	-	1342	-	1148	-	-	2400	-	-

Scenario 20a Results

Table 197. PJM Production Cost - Scenario 20a

Scenario	PJM Production Cost ($M)
20a	$18,857.74

Table 198. NJ Emissions (Metric Tons) – Scenario 20a

Scenario	PJM SO2 Annual Total	PJM NOx Annual Total	PJM CO2 Annual Total
20a	2,552	1,463	7,131,884

Table 199. Zonal Annual Gross Load Payment ($M) - Scenario 20a

Scenario	AECO	JCPL	PSEG	RECO	New Jersey	APS	BGE	DUQ	FE-ATSI	METED	PECO	PENELEC	PLGRP
Base	$360	$857	$1,629	$52	$2,898	$1,700	$1,175	$469	$2,283	$572	$1,417	$593	$1,482
20a	$344	$821	$1,574	$51	$2,791	$1,675	$1,145	$465	$2,266	$555	$1,371	$582	$1,438

Table 200. NJ Load-Weighted LMPs ($/MWh) – Scenario 20a

Scenario	AECO	JCPL	PSEG	RECO	New Jersey	APS	BGE	DUQ	FE-ATSI	METED	PECO	PENELEC	PLGRP
Base	$35.34	$35.89	$35.22	$35.63	$35.44	$33.30	$35.28	$32.40	$33.34	$34.40	$35.02	$32.96	$34.18
20a	$33.80	$34.39	$34.04	$34.89	$34.13	$32.81	$34.40	$32.11	$33.09	$33.41	$33.90	$32.39	$33.17

Table 201. OSW POI Generation Summary Report - Scenario 20a

Scenario 20a	Generation (MWh)	Curtailment (MWh)	Market Value ($M)	POI LMP ($/MWh)
POI_Cardiff	5,502,349	0	$169.82	$30.68
POI_Deans	4,890,168	0	$154.54	$31.60
POI_Neptune	8,745,158	298	$268.69	$30.72
POI_Smithburg	4,171,975	11,268	$129.78	$31.11
Total	23,309,651	11,566	$721.83	$30.97

Scenario 20a with ME Upgrades Results

For this scenario PJM tested an additional optional market efficiency (ME) upgrade to determine if POI curtailment could be mitigated within the simulations.

Table 202. Scenario 20a Market Efficiency (ME) Upgrades

Scenario	Additional Upgrades	Estimated Cost
20a	East Windsor-Smithburg 230 kV	$75 million

The results below include the additional economic upgrade.

The additional upgrades are optional; that is not required as a result of the reliability analysis. A decision to include it or not in Scenario 20a will be discussed with the NJ BPU.

Table 203. PJM Production Cost - Scenario 20a with ME Upgrades

Scenario	PJM Production Cost ($M)
20a	$18,857.63

Table 204. NJ Emissions (Metric Tons) – Scenario 20a with ME Upgrades

Scenario	PJM SO2 Annual Total	PJM NOx Annual Total	PJM CO2 Annual Total
20a	2,552	1,463	7,131,939

Table 205. Zonal Annual Gross Load Payment ($M) - Scenario 20a with ME Upgrades

Scenario	AECO	JCPL	PSEG	RECO	New Jersey	APS	BGE	DUQ	FE-ATSI	METED	PECO	PENELEC	PLGRP
Base	$360	$857	$1,629	$52	$2,898	$1,700	$1,175	$469	$2,283	$572	$1,417	$593	$1,482
20a	$344	$823	$1,574	$51	$2,792	$1,675	$1,145	$465	$2,266	$555	$1,371	$582	$1,438

Table 206. NJ Load-Weighted LMPs ($/MWh) – Scenario 20a with ME Upgrades

Scenario	AECO	JCPL	PSEG	RECO	New Jersey	APS	BGE	DUQ	FE-ATSI	METED	PECO	PENELEC	PLGRP
Base	$35.34	$35.89	$35.22	$35.63	$35.44	$33.30	$35.28	$32.40	$33.34	$34.40	$35.02	$32.96	$34.18
20a	$33.82	$34.44	$34.04	$34.89	$34.15	$32.81	$34.40	$32.11	$33.09	$33.41	$33.89	$32.39	$33.17

Table 207. OSW POI Generation Summary Report - Scenario 20a with ME Upgrades

Scenario 20a/Upgrades	Generation (MWh)	Curtailment (MWh)	Market Value ($M)	POI LMP ($/MWh)
POI_Cardiff	5,502,349	0	$169.25	$30.76
POI_Deans	4,890,168	0	$154.37	$31.57
POI_Neptune	8,745,456	0	$271.35	$31.03
POI_Smithburg	4,183,244	0	$131.72	$31.49
Total	23,321,218	0	$726.69	$31.16

APPENDIX B: Detailed Proposals Studied for IARR Analysis

Proposal #	Proposal Name	Description
63	North Delta Option A (Double Circuit)	• Build a new station called "North Delta" with two 500/230 kV 1500 MVA transformers and nine breakers (four high side and five low side breakers in ring bus configuration). • Bring two existing lines, Peach Bottom – Delta Power Plant 500 kV and Cooper - Graceton 230 kV, "in and out" of North Delta. • Build a new North Delta – Graceton 230 kV line by rebuilding 6.07 miles of the existing Cooper - Graceton 230 kV line to double circuit. • Install one breaker at Graceton 230 kV to terminate the new line from North Delta.
296	North Delta Option B (Series Reactor)	• Build a new station called "North Delta" with one 500/230 kV 1500 MVA transformer and six breakers (three high side and three low side breakers). • Bring two existing lines, Peach Bottom – Delta Power Plant 500 kV and Cooper - Graceton 230 kV, "in and out" of North Delta. • Rebuild 6.07 miles of the existing Cooper – Graceton 230 kV line as single circuit. • Install a 0.5% (+.005 X) series reactor on the rebuilt North Delta – Graceton 230 kV line at North Delta. • Additionally, upgrade terminal equipment at Peach Bottom 500 kV to increase the Winter ratings of the existing Peach Bottom Conastone 500 kV line.
203	The Broad Creek - Robinson Run Transmission Project	• The Broad Creek - Robinson Run Transmission Project includes: ○ A new Broad Creek 500/230 kV substation that will include a six (6) position breaker and a half arrangement 230 kV yard connected to a three (3) position ring bus configuration 500 kV yard via two (2) transformers. ○ The 230 kV portion of the substation will interconnect the Graceton - Bagley #1 230 kV transmission line and the Graceton - Bagley #2 230 kV transmission line. ○ The 500 kV portion of the substation will connect to the new three (3) position ring bus configuration 500 kV Robinson Run Switching Station via a new 500 kV transmission line. • The 500 kV transmission line will be built in the existing corridor that contains the Graceton – Cooper 230 kV transmission line and the Conastone - Peach Bottom 500 kV transmission line. ○ Graceton - Cooper 230 kV line to be replaced with a double circuit 500/230 kV transmission line.

		• The 500kV transmission line will terminate at the new Robinson Run Switching Station and the 230kV transmission line will continue on to the Cooper Substation.
345	New 500 kV Peach Bottom - Conastone Line	• Build a new 17.23 mile 500 kV line from Peach Bottom station (PECO) to Conastone station (BG&E). • Major equipment upgrades include the installation of 2 breakers at Peach Bottom 500 kV and 1 breaker at Conastone 500 kV to terminate the proposed line.

587	Wiley Rd – Conastone 500 kV Project	• Wiley Rd – Conastone 500 kV Project using adjacent ROW
		• Project Components
		  ○ New Wiley Rd 500 kV substation with ring bus configuration with 3 positions (3 CB).
		  ○ New Wiley Rd - Conastone 500 kV OH.
		  ○ Two Phase Shifting Transformers (PST) at Hope Creek 230 kV substation to prevent downstream overload on Hope-Creek LS Power Ckt. 1 and Ckt. 2
		  ○ Loop in existing Peach Bottom - Delta 500 kV OH line circuit into NEETMA proposed Wiley 500 kV sub, use existing conductors on the section Peach Bottom - Wiley Rd.

Document Revision History

9/19/2022 – V1: original version posted

11/04/2022 – V2: Updated to included capacity market analysis.