2021 SAA Proposal Window to Support NJ OSW

Transmission Expansion Advisory Committee

August 9, 2022

Update

- PJM received feedback and questions after the July 18 TEAC
  - Included with the “2021 NJ OSW Window FAQ” posted on the Competitive Planning Process web page under 2021 SAA Proposal Window to Support NJ OSW
  - Continuing to evaluate feedback and, as necessary, reaching out to stakeholders to discuss feedback
- PJM will be posting detailed evaluation reports for each body of analysis that is summarized in material previously presented to the TEAC and included in the appendix
  - Reliability
  - Economic
  - Constructability
  - Financial

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Reliability Analysis Update

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Revision History

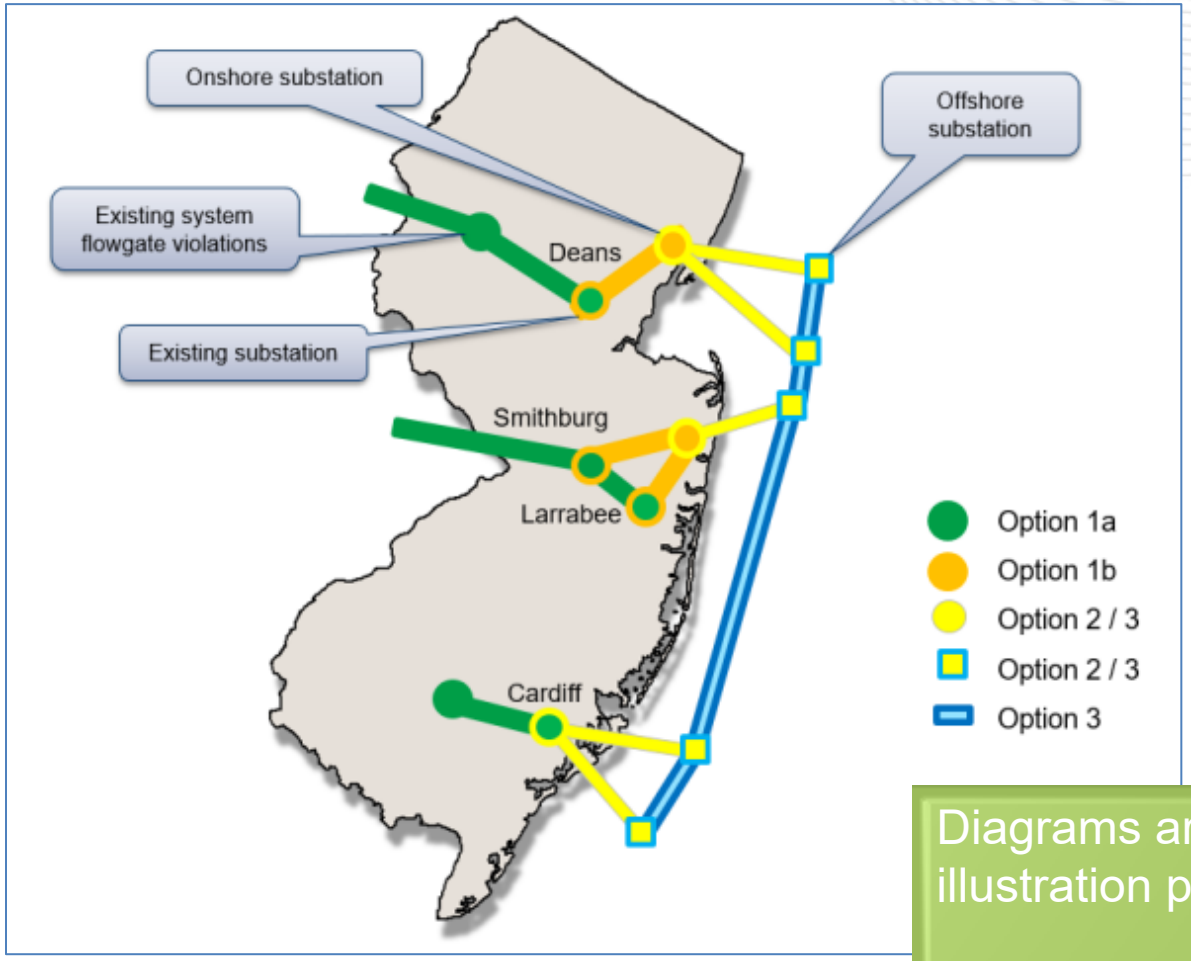
Version No.	Date	Description
1	8/4/2022	• Original slides posted
2	8/10/2022	• Revisions were made to slides 38-42 based on stakeholder feedback.

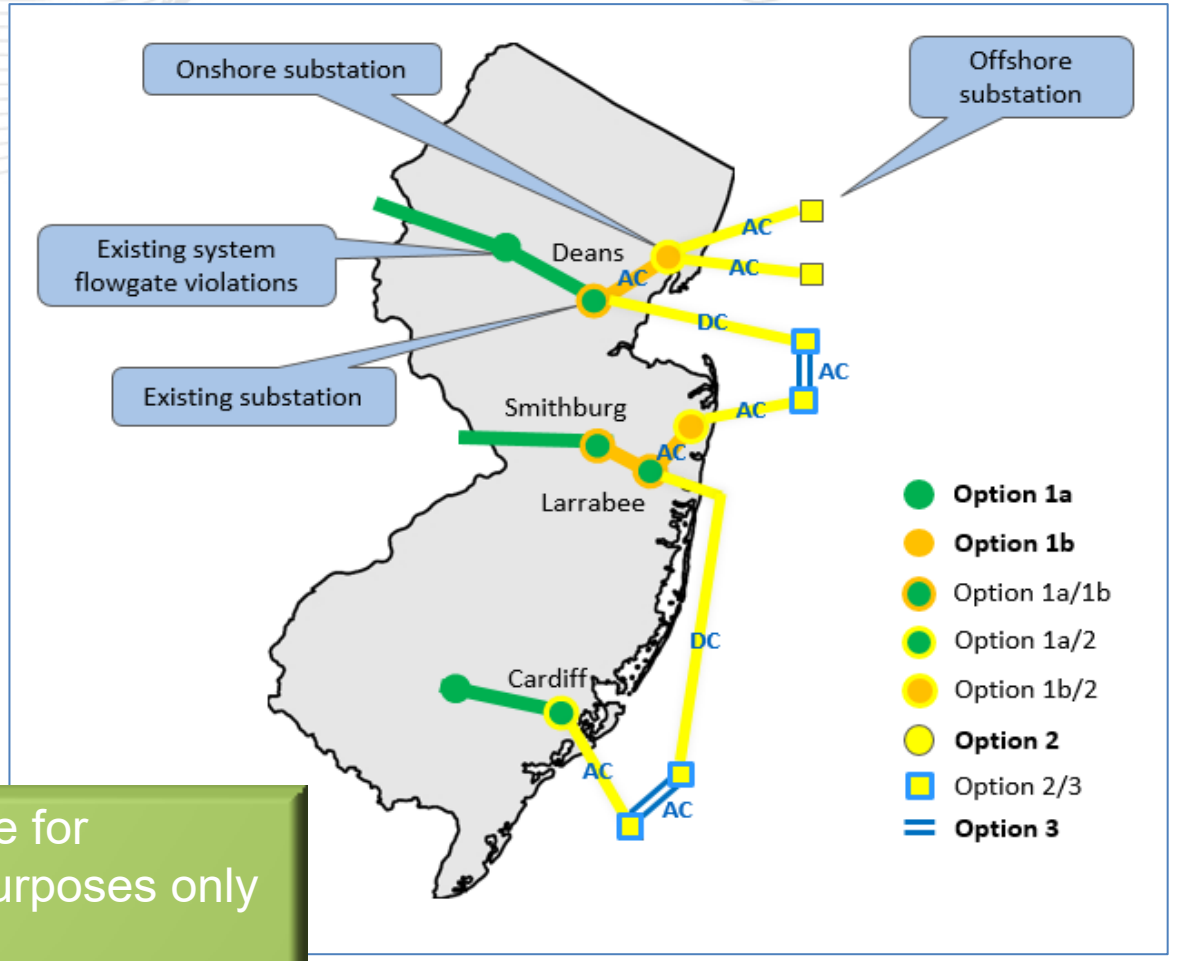
APPENDIX

Description of Options

- Option 1a, Onshore Upgrades on Existing Facilities
- Option 1b, Onshore New Transmission Connection Facilities
- Option 2, Offshore New Transmission Connection Facilities
- Option 3, Offshore Network

Project Overview – Potential Solution Options





Diagrams are for illustration purposes only

Reliability Analysis

Reliability Analysis for POI Scenarios

- PJM has completed initial reliability screening studies for 26 POI scenarios
- All POI scenarios include NJ BPU OSW Solicitations #1 and #2
  - Some POI scenarios examine variations of the Solicitation #2 POIs
- Over half of the POIs in the POI scenarios are alternative POIs that have been proposed as part of this SAA window
- The balance of reliability studies will be completed in July and August for selected scenarios with considerations of alternative Option 1a proposals

Reliability Analysis for POI Scenarios

- Initial reliability analysis focused on generator deliverability testing
  - Summer, winter & light load
  - Single contingency, common mode outages
- Onshore upgrade requirements were identified
  - Option 1a proposals that address violations
  - Incumbent Transmission Owner upgrades as needed to address violations due to injections that were not previously identified

Reliability Analysis for POI Scenarios

- In the following slides, each POI scenario has been color coded to differentiate between proposals when more than one proposing entity is included in a single POI scenario
- A number of the POI scenarios have additional Option 1b and/or Option 2 MW capability that is not being dispatched as part of this phase of the reliability analysis in order to not exceed the desired 6,400 MW
  - The benefits of any additional capability will be considered as part of the overall performance evaluation
- Other proposals not listed are still under consideration. The initial order of analysis is based on discussions with NJ BPU in order to get to a suite of representative scenarios

POI Scenarios - Option 1b Only

Scenario ID	Total (MW)	Proposing Entities	Option 1b Proposal IDs	Option 2 Proposal IDs	Excess Capacity (MW)	Alt POI New Freedom 500 kV (MW)	Default POI Cardiff 230 kV (MW)	Alt POI Half Acre 500 kV (MW)	Alt POI Lighthouse 500 kV (MW)	Default POI Smithburg 500 kV (MW)	Alt POI Atlantic 230 kV (MW)	Default POI Larrabee 230 kV (MW)	Alt POI Werner 230 kV (MW)
2a	6258	AE, JCPL	797 929.9 453.1-18,24,28-29	None	0		1510 1148			1200	1200	1200	
3	6458	AE, RILPOW, JCPL	797 127.8,9 490 376 453.9-11,16-17	None	200	1148	1510	2200				1200	400
12	6400	CNTLM	781	None	1110		1510		4890				
13	6400	CNTLM	629	None	710		1510		4890				
14	6400	RILPOW, JCPL	490 171 453.18-27,29	None	710		1510	2400		1690			800
18	6400	JCPL	453	None	0		1510			2490	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: Excess capacity represents additional transmission capability to the POI beyond the amounts being studied.

LEGEND
Alt POI = Alternative POI

POI Scenarios - Options 1b/2 (1 of 2)

Scenario ID	Total (MW)	Proposing Entities	Option 1b Proposal IDs	Option 2 Proposal IDs	Excess Capacity (MW)	Default POI Cardiff 230 kV (MW)	Alt POI Fresh Ponds 500 kV (MW)	Default POI Deans 500 kV (MW)	Alt POI Lighthouse 500 kV (MW)	Default POI Smithburg 500 kV (MW)	Alt POI Atlantic 230 kV (MW)	Default POI Larrabee 230 kV (MW)	Alt POI Neptune 230 kV (MW)
1.1	6310	COEDTR, ANBARD	None	990 574 831	400	1510		2400		1200		1200	
1.2	6310	COEDTR, PSEGRT	None	990 613	0	1510		1200		1200 1148		1200	
1.2a	6400	COEDTR, ANBARD	None	990 574	58	1510		1342		1200 1148		1200	
1.2b	6400	COEDTR, ATLPWR	None	990 210 172	1058	1510		1342		1200 1148		1200	
2c	6258	AE, JCPL, MAOD	797 929.9 453.1-18,24,28-29	551	0	1510 1148				1200	1200	1200	
4	6010	NEETMH	None	461 27	0	1510	3000						1500
4a	6400	NEETMH	None	461 27	758	1510	2242			1148			1500
5	6310	JCPL, MAOD	453	321	0	1510				2400	1200	1200	
6	6400	CNTLM	781	594	110	1510			4890				
7	6400	CNTLM	629	594	110	1510			4890				

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: Excess capacity represents additional transmission capability to the POI beyond the amounts being studied.

LEGEND

Alt POI = Alternative POI

POI Scenarios - Options 1b/2 (2 of 2)

Scenario ID	Total (MW)	Proposing Entities	Option 1b Proposal IDs	Option 2 Proposal IDs	Excess Capacity (MW)	Alt POI Reega 230 kV (MW)	Default POI Cardiff 230 kV (MW)	Alt POI Fresh Ponds 500 kV (MW)	Default POI Deans 500 kV (MW)	Default POI Smithburg 500 kV (MW)	Default POI Larrabee 230 kV (MW)	Alt POI Neptune 230 kV (MW)	Alt POI Sewaren 230 kV (MW)
10	6400	ANDBARD	None	882 841 921 131	258		1510		2290		1200		1400
11	6399	PSEGRT	None	683	459		1510		1247	1148	1247		1247
15	6400	NEETMH	None	250	1110		1510	4890					
16	6400	NEETMH	None	604 860	758	2658		3742					
16a	6400	NEETMH	None	860	758		1510	3742		1148			
17	6400	ATLPWR, NEETMH	None	210 172 15	510		1510		1890			3000	
19	6258	ATLPWR	None	210 172 769	0		1510		3600	1148			
20	6400	NEETMH	None	298 461	1200		1510	1342		1148		2400	
20a	6400	NEETMH, ANBARD	None	298 574	58		1510		1342	1148		2400	
20b	6400	NEETMH, ATLPWR	None	298 210 172	1058		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: Excess capacity represents additional transmission capability to the POI beyond the amounts being studied.

Alt POI = Alternative POI

Preliminary Scenario Cost Estimate Summaries
POI Scenarios - Option 1b Only

Scenario ID	Total (MW)	SAA (MW)	Proposing Entities	Option 1b Proposal IDs	Option 1b Cost Estimate ($M)	Option 2 Proposal IDs	Option 2 Cost Estimate ($M)	Option 1a Cost Estimate ($M)	TOTAL Cost Estimate ($M)	TOTAL Cost Estimate ($M/SAA MW)
2a	6258	4748	AE, JCPL	797 929.9 453.1-18,24,28-29	$233 $70 $377	None	$0	$863	$1,543	$0.32
3	6458	4948	AE, RILPOW, JCPL	797 127.8,9 490 376 453.9-11,16-17	$233 $225 $1,732 $68 $17	None	$0	$392	$2,667	$0.54
12	6400	4890	CNTLM	781	$1,772	None	$0	$271	$2,043	$0.42
13	6400	4890	CNTLM	629	$1,568	None	$0	$283	$1,851	$0.38
14	6400	4890	RILPOW, JCPL	490 171 453.18-27,29	$1,732 $109 $519	None	$0	$370	$2,730	$0.56
18	6400	4890	JCPL	453	$620	None	$0	$568	$1,189	$0.24

Preliminary Scenario Cost Estimate Summaries
POI Scenarios - Options 1b/2 (Table 1 of 2)

Scenario ID	Total (MW)	SAA (MW)	Proposing Entities	Option 1b Proposal IDs	Option 1b Cost Estimate ($M)	Option 2 Proposal IDs	Option 2 Cost Estimate ($M)	Option 1a Cost Estimate ($M)	TOTAL Cost Estimate ($M)	TOTAL Cost Estimate ($M/SAA MW)
1.1	6310	4800	COEDTR, ANBARD	None	$0	990 574 831	$2,747 $1,810 $1,877	$327	$6,761	$1.41
1.2	6310	3652	COEDTR, PSEGRT	None	$0	990 613	$3,317 $2,151	$360	$5,828	$1.60
1.2a	6400	3742	COEDTR, ANBARD	None	$0	990 574	$2,747 $1,810	$360	$4,917	$1.31
1.2b	6400	3742	COEDTR, ATLPWR	None	$0	990 210 172	$2,747 $2,024 $1,601	$360	$5,831	$1.56
2c	6258	4748	AE, JCPL, MAOD	797 929.9 453.1-18,24,28-29	$233 $70 $377	551	$4,411	$677	$5,768	$1.21
4	6010	4500	NEETMH	None	$0	461 27	$3,608 $1,477	$394	$5,479	$1.22
4a	6400	3742	NEETMH	None	$0	461 27	$3,608 $1,477	$387	$5,461	$1.46
5	6310	4800	JCPL, MAOD	453	$620	321	$5,726	$568	$6,914	$1.44
6	6400	4890	CNTLM	781	$1,772	594	$2,460	$271	$4,503	$0.92
7	6400	4890	CNTLM	629	$1,568	594	$2,460	$283	$4,311	$0.88

Preliminary Scenario Cost Estimate Summaries
POI Scenarios - Options 1b/2 (Table 2 of 2)

Scenario ID	Total (MW)	SAA (MW)	Proposing Entities	Option 1b Proposal IDs	Option 1b Cost Estimate ($M)	Option 2 Proposal IDs	Option 2 Cost Estimate ($M)	Option 1a Cost Estimate ($M)	TOTAL Cost Estimate ($M)	TOTAL Cost Estimate ($M/SAA MW)
10	6400	4890	ANDBARD	None	$0	882 841 921 131	$1,776 $1,794 $1,545 $1,648	$414	$7,165	$1.47
11	6399	3741	PSEGRT	None	$0	683	$7,181	$411	$7,592	$2.03
15	6400	4890	NEETMH	None	$0	250	$7,029	$311	$7,340	$1.50
16	6400	6400	NEETMH	None	$0	604 860	$2,943 $5,285	$519	$8,747	$1.37
16a	6400	3742	NEETMH	None	$0	860	$5,285	$327	$5,612	$1.50
17	6400	4890	ATLPWR, NEETMH	None	$0	210 172 15	$2,024 $1,601 $3,023	$780	$7,428	$1.52
19	6258	3600	ATLPWR	None	$0	210 172 769	$2,024 $1,601 $1,478	$324	$5,427	$1.51
20	6400	3742	NEETMH	None	$0	298 461	$2,662 $3,608	$594	$6,864	$1.83
20a	6400	3742	NEETMH, ANBARD	None	$0	298 574	$2,662 $1,810	$586	$5,058	$1.35
20b	6400	3742	NEETMH, ATLPWR	None	$0	298 210 172	$2,662 $2,024 $1,601	$586	$6,873	$1.84

Option 1a Proposals

- PJM has divided the Option 1a proposals into multiple geographical clusters to facilitate reviews
  - Northern NJ
  - Central NJ
  - Southern NJ
  - Southern NJ Border
  - PA-MD Border

Note: Details regarding the constituent proposals for the clusters is located in the Appendix

Overview Of Option 1a Proposals

- Option 1a proposals are 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)
- PJM received 45 Option 1a proposals as part of this window
- A number of the Option 1a proposals addressed similar sets of reliability violations and were grouped into one of three competitive proposal clusters in order to compare the proposals:
  - PA/MD Border Proposal Cluster
  - Central NJ Proposal Cluster
  - Southern NJ Proposal Cluster

Overview Of Option 1a Proposals

- Remaining Option 1a proposals each addressed a unique set of reliability violations
- Option 1a proposals included both conventional transmission solutions such as rebuilding or reconductoring an existing transmission line as well as installation of power flow controlling devices
  - PJM will generally prioritize consideration of conventional solutions over power flow controlling devices depending on the overall transmission capacity provided by and cost associated with the devices
- For upgrades to existing transmission facilities, PJM contacted the incumbent Transmission Owner to request a reliability solution and a corresponding project cost estimate

Overview Of Option 1a Proposals

- The initial set of Option 1a proposals that PJM used to perform reliability analysis screening of the scenarios involved:
  - Proposal 63 from the PA-MD Border Cluster
  - Proposals 180.1, 180.2, 180.5 and 180.6 from the Central NJ Cluster
  - Proposals 127.1 and 229 from the Southern NJ Border Cluster
- This initial selection was based on the cost and performance summaries provided in the next few slide slides

PA-MD Border Cluster Option 1a Proposals

- Eight proposals
- Proposal IDs 11 and 982 do not resolve all overloaded facilities
- Proposals have similar results for all scenarios
- Proposal 63 examined as part of initial reliability analysis screening for all scenarios

PA-MD Border Cluster Option 1a Proposals

Proposal ID	Entity	Proposal Name	Cost ($M)
203	CNTLM	Broad Creek - Robinson Run	$104
11	NEETMH	Wiley 1	$202
982	NEETMH	Wiley 2	$182
587	NEETMH	Wiley 3	$96
345	Transource	Peach Bottom - Conastone	$104
63	Transource	North Delta A	$110
296	Transource	North Delta B	$87
127	AE	Peach Bottom - Conastone	$201

			Option 1a Proposals							
Overloaded Facility	Rating (MVA)	Base	203	11*	982*	587	345	63	296	127
Peach Bottom - Conastone 500 kV	3700	127%	96%	109%	114%	96%	96%	86%	93%	84%
Peach Bottom - Furnace Run 500 kV	4323	102%	78%	77%	78%	77%	53%	78%	79%	96%
Furnace Run 500/230 kV 1 & 2	1348	116%	90%	92%	90%	90%	60%	90%	91%	< 100%
Furnace Run - Conastone 230 kV 1 & 2	1534	101%	78%	80%	78%	78%	51%	78%	79%	< 100%

* Project taps Peach Bottom - Conastone 500 kV and section connected to Peach Bottom is overloaded

Central NJ Cluster Option 1a Proposals

- Five proposals
- All proposals effective at relieving overloaded facilities
- Proposal 44.1 actual cost according to PSEG would be $73.3M
- Proposals 180.1, 180.2, 180.5 and 180.6 examined as part of initial reliability analysis screening for all scenarios

Proposal IDs	Entity	Brief Description	Cost ($M)
44.1	NEETMH	Reconductor Deans-Brunswick 230 kV	$4.68
180.1, 180.2	PSEG	Brunswick to Deans & Deans Subprojects	$50.54
103	CNTLM	New Old York 500/230 kV substation	$75.60
17.14, 17.15	JCPL	Upgrade Windsor-Clarksville 230 kV	$4.00
180.5, 180.6	PSEG	Windsor to Clarksville Subproject	$5.77

Proposal IDs	Overloaded Facilities	Performance
44.1	Deans-Brunswick 230 kV	Lowers loading to 81%
180.1, 180.2	Deans-Brunswick 230 kV	Lower loading to 91%
103	Deans-Brunswick 230 kV Windsor-Clarksville 230 kV Clarksville-Lawrence 230 kV	Lowers loading to 88% Lowers loading to 78% Lowers loading to 65%
17.14, 17.15	Windsor-Clarksville 230 kV	Lowers loading to 63%
180.5, 180.6	Windsor-Clarksville 230 kV	Lowers loading to 49%

Southern NJ Border Cluster Option 1a Proposals

- Four proposals
- All proposals effective at relieving overloaded facilities
- Proposal IDs 419 and 884 do not resolve all overloaded facilities
- Proposals 127.1 and 229 examined as part of initial reliability analysis screening for all scenarios

IDs	Entity	Brief Description	Cost ($M)
127.1	AE	Reconductor Richmond-Waneeta 230 kV	$16.00
229	CNTLM	One additional Hope Creek-Silver Run 230 kV submarine cables and rerate plus upgrade line	$61.20
894	PSEG	One additional Hope Creek-Silver Run 230 kV submarine cable	$71.92
419	Transource	New Bridgeport-Claymont 230 kV DE river crossing	$193.07

IDs	Overloaded Facilities Addressed	Performance
127.1	Richmond-Waneeta 230 kV	Lowers loading to 72%
229	Hope Creek-LS Power Cable East 230 kV 1 & 2 LS Power Cable East-LS Power Silver Run 230 kV	Lowers loading to 78% Lowers loading to 78%
894	Hope Creek-LS Power Cable East 230 kV 1 & 2 LS Power Cable East-LS Power Silver Run 230 kV	Lowers loading to 63% Still overloaded at 107%
419	Hope Creek-LS Power Cable East 230 kV 1 & 2 LS Power Cable East-LS Power Silver Run 230 kV Richmond-Waneeta 230 kV	Lowers loading to 91% Lowers loading to 97% Lowers loading to 84% Causes new overload on Bridgeport-Mickleton 230 kV

Overview Of Option 1a Reliability Analysis

- PJM has completed a reliability analysis screening of the identified scenarios to identify the relative magnitude of the onshore upgrade requirements for each scenario, and to support the development of a comparative framework for the scenarios under evaluation that considered both the offshore and onshore transmission needs
- The reliability analysis screening focused primarily on the 2028 generator deliverability test (winter, summer and light load)
- A final comprehensive reliability analysis and performance evaluation will be performed for the final selected scenario(s) and consider other Option 1a proposals in the competitive proposals clusters that were not part of the initial set of onshore upgrades selected in the reliability analysis screening

Economic Analysis

Economic Analysis Overview

- PJM worked with the NJBPU to create OSW transmission scenarios involving various combinations of the submitted Option1b and Option 2 proposals.

- Each 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.

- Energy market simulations focused on estimating the impact of selected OSW transmission scenarios on key New Jersey market metrics.
  - Note: At NJ BPU request the results were expanded to also include Pennsylvania zones.

Modeling Approach

- PJM analysis utilized a production cost simulation tool, PROMOD, to perform energy market simulations
  - Incorporates extensive modeling details, including generating unit operating characteristics, transmission grid topology and constraints to provide nodal locational marginal price (LMP) forecasting, zonal load payments, and other estimated economic outputs for NJ areas.

- 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 currently used for the 2020/21 Long-Term Window for Market Efficiency analyses.

- For each selected scenario PJM created a “Change Case” by adding to the Base Case the combination of the selected transmission package along with the corresponding OSW generation injection it supported.

Economic Analysis Outputs

- PJM provided the following PROMOD outputs from the energy market simulations for the base case and all scenario cases to the NJ BPU:
  - Estimated Load LMPs and Gross Load Payments for load serving entities of interest to the NJ BPU.
  - The generation LMPs and energy market value of New Jersey's OSW generation being evaluated at the POIs.
  - Simulated OSW unit energy and curtailments of New Jersey's OSW generation being evaluated.
  - Estimated emissions in New Jersey.
  - PJM-wide production costs.

- Note: At the time of this report there were no Capacity Market simulations completed. Results will be shared as soon as available.

Analysis Status – Option 1b Only

Scenarios	Scenario Type	Energy Market Simulations Status
2a	1b	Complete
3	1b	Complete
12	1b	Complete
13	1b	Complete
14	1b	Complete
18	1b	Complete

- Key takeaways
  - There are some differences, but not 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 curtailment
    - Highest annual curtailment is 28,788 MWh, or 0.13% of total annual generation.
- Simulation outputs for completed scenarios can be found in Appendix E – Energy Market Results Option 1b Only Proposals.

Optional Upgrades from Energy Market Simulations - Option 1b

- For the scenarios listed below, PJM also tested additional upgrades, market efficiency only.
- These additional market efficiency upgrades were added to the corresponding scenarios to test if they mitigate unsolved (or shifted) congestion.
  - Results presented in Appendix E only include the reliability upgrades.
- These additional upgrades are optional, not required for reliability
  - Final decision to include them or not stays with NJ BPU.

Scenario Name	Scenario Type	Additional Upgrades	Estimated Cost
2a	1b	East Windsor-Smithburg 230 kV	$75 million

Analysis Status - Option 1b/2

Scenario	Scenario Type	Energy Market Simulations Status
1.2	1b/2	Complete
1.2a	1b/2	Complete
4	1b/2	Complete
4a	1b/2	Complete
5	1b/2	Complete
6	1b/2	Complete
7	1b/2	Complete
10	1b/2	Complete
11	1b/2	Complete
15	1b/2	Complete
16	1b/2	Complete
16a	1b/2	Complete
17	1b/2	Complete
19	1b/2	Complete
20	1b/2	Complete
20a	1b/2	Complete

- Key takeaways
  - There are some differences, but not significant
    - The largest difference in NJ Load Payments between two scenarios is 0.43%.
    - The largest difference in POI Annual Average LMP is 4.22%.
  - Some scenarios result in curtailment
    - Highest annual curtailment is 92,899 MWh, or 0.41% of total annual generation.
- Simulation outputs for completed scenarios can be found in Appendix E – Energy Market Results Option 1b/2 Proposals.

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

- For the scenarios listed below, PJM also tested additional upgrades, market efficiency only.
- These additional market efficiency upgrades were added to the corresponding scenarios to test if they mitigate unsolved (or shifted) congestion.
  - Results presented in Appendix E only include the reliability upgrades.
- These additional upgrades are optional, not required for reliability
  - Final decision to include them or not stays with NJ BPU.

Scenario Name	Scenario Type	Additional Upgrades	Estimated Cost
1.2	1b/2	East Windsor-Smithburg 230 kV Smithburg-Deans 500kV	$75 million $13.2 million
1.2a	1b/2	East Windsor-Smithburg 230 kV Smithburg-Deans 500kV	$75 million $13.2 million
20	1b/2	East Windsor-Smithburg 230 kV	$75 million
20a	1b/2	East Windsor-Smithburg 230 kV	$75 million

IARR Analysis

IARR Analysis Results

- Analysis to determine Incremental Auction Revenue Rights (IARRs) was conducted using the current process for RTEP Incremental Rights-Eligible Required Transmission Enhancements described in PJM Manual 6, Section 4.9.2.
- Analysis used the current operation/market model to perform the Simultaneous Feasibility Test.
  - All requested annual Auction Revenue Rights (ARRs) were modeled.
  - Model and current limiting facilities are posted on PJM website:
    https://www.pjm.com/markets-and-operations/ftr
- Proposals analyzed: #63, #296, #203, #345, #587.
- No available IARRs were found for the analyzed proposals.
  - For details see Appendix F - Incremental Auction Revenue Rights (IARRs) Process and Preliminary Results

Constructability Evaluation

Overview of Onshore Option1b only Proposals

Proposing Entity	Proposals	Description of Project	Injections (MW)	Landing Pt	Cost
ACE_Exelon	797 (transition vault, cables to Cardiff) 734 (add New Freedom, reduce Deans inject) 127 (add NF, eliminate Smithburg inject) 929 (add Orchard, eliminate Smithburg inject)	(797) New transition vault connecting 275 kV offshore cables and onshore 275 kV cables, new 275 kV UG transmission line to new 275-230 kV substation near Cardiff to accommodate the injection of 1200 MW at Cardiff. Various upgrades to existing facilities to accommodate additional 490 or 1148 MW at NF or 1148MW at Orchard. Major construction includes a second Cardiff-Orchard 230, rebuild Cardiff-New freedom 230 and expansion of Cardiff substation (230)	1200 at Cardiff, 490 -1148 at New Freedom and 1148 Orchard	Great Egg Harbor, near Cardiff, ~8 miles from Cardiff	$758 (734) $200M (127) $775M (929) $233M (797 ACE)
JCPL	453 (1b partial only)	Various upgrade to existing facilities and some new line construction to support injections at a future substation adjacent to Larrabee and injections at existing Smithburg and Atlantic substations. Major upgrades include expansion of Smithburg (500kV) and new UG circuits to Larrabee converter station (converter station is not included in JCPL proposal)	Smith 1342, Larrabee 1200, Atlantic 1200, Smith	*assumes 1b soln near Sea Girt	$660M
LSP Central Transmission (1b only) Clean Energy Gateway	781, 294	Construction of new POI onshore substation Lighthouse to receive AC cables from OSW platforms. Three additional substations, Crossroads(230/500kV), Gateway (500kV), Wells Landing (230/500kV) to interconnect to Larrabee 230 Station, Deans E. Windsor 500, Hunters Glen -Trenton 230 and Devils Brook Trenton 230. Reactive compensation is provided between Lighthouse and Gateway switching station. Includes OH/UG options. Alternatives support 4200MW or 6000 MW of injection	Alternate POI Lighthouse sub near Sea Girt	Sea Girt National Guard Training Ctr (Larrabee)	$1,7B (781 Soln A) $1.6 B (294)
LSP Central Transmission (1b only) Clean Energy Gateway	629, 72, 627	Construction of new POI onshore substation Lighthouse to receive AC cables from OSW platforms. Three new substations, Crossroads, (500kV), Garden View (500) and Old York (500/230) to interconnect to Larrabee 230, Smithburg 500, E Windsor 230, Deans 500, New Freedom-E Windsor (500), Williams-Mansfield 230 and Burlington-Crosswicks 230. Includes OH/UG construction options. Alternatives support 4200or 6000 MW of injection.	Alternate POI Lighthouse sub near Sea Girt	Sea Girt National Guard Training Ctr (Larrabee)	$1.6 B (629) $1.8B (72) $1.4B (627)
Rise Light & Power Outerbridge Renewable Connector	582(Base Offer 1-1200MW) 490 (Base Offer 2-2400MW) 376 (Addl Offer A 400MW) 171 (Addl Offer B 800MW)	One or two 1200 MW HVDC lines from Werner to Half-Acre sub (near Monroe to tap into the Deans-E Windsor line and shore station, option to inject up to 400 or 800 MW direct at Werner from 275kV AC wind generators	Deans 1200+ 1200 (via Deans East Windsor 500kV), 800 at Werner =3200MWs	Werner Site Raritan Bay, South Amboy, industrial waterfront landing point	$1B (582) $1B (490) $68M (376) $109M (171)

Option 1b Only Constructability Matrix – Environmental Risks

Proposal ID	Proposing Entity	Project Title	Permitting/Routing/Siting	ROW/Land Acquisition	Notes
797	ACE	ACE 05	**Medium-High**	**Low**	Green Acres impact, Pinelands permit required
453	JCPL	JCPL Option 1b	**Medium**	**Low**	Green Acres impact
781, 294	LSPG	Clean Energy Gateway - Solution A	**Medium**	**Low**	Green Acres impact
629, 627	LSPG	Clean Energy Gateway - Solution B	**Medium**	**Medium**	Green Acres impact, New line assumes use of incumbent line ROW
72	LSPG	Clean Energy Gateway - Solution B-Alt	**Medium**	**Medium**	Green Acres impact, New line assumes use of incumbent line ROW
171, 376	RILPOW	Additional Offer B - 800MW Proposal	**Low**	**Low**	
490, 582	RILPOW	Base Offer 2 - 2400MW Proposal	**Medium**	**Medium**	Green Acres impact, Railroad ROW required

Option 1b Only Constructability Matrix – Engineering & Construction

Proposal ID	Proposing Entity	Project Title	Engineering	Construction	Materials & Equipment	Notes
797	ACE	ACE 05	Low	Low	Low	
453	JCPL	JCPL Option 1b	Low	Low	Low	
781, 294	LSPG	Clean Energy Gateway - Solution A	Low	Low	Low	
629, 627	LSPG	Clean Energy Gateway - Solution B	Low	Medium	Low	Crossroads-Smithburg DCT OH line construction requires removal & rebuild of incumbent line. Crossroads-Gardenview OH line requires removal & retirement of incumbent line.
72	LSPG	Clean Energy Gateway - Solution B-Alt	Low	Medium	Low	Crossroads-Smithburg DCT OH line construction requires removal & rebuild of incumbent line. Crossroads-Gardenview OH line requires removal & retirement of incumbent line.
171, 376	RILPOW	Additional Offer B - 800MW Proposal	Low	Low	Low	
490, 582	RILPOW	Base Offer 2 - 2400MW Proposal	Low	Medium	Low	Construction in RR ROW & utility crossings

Overview of Onshore/Offshore Option 1b/2 Proposals

Proposing Entity	Proposals	Description of Project	Injections (MW)	Landing Pt	Cost	Offshore Cables	Option 3	OSW Gen Connection
Anbaric - Boardwalk Power	831, 841, 574	1-1400 MW, 400kV DC circuits to Deans	Deans	Keyport (Deans)	$2B	400kV DC	(400kV DC) NC	66kV
Anbaric - Boardwalk Power	944, 802, 183, 131	1-1400 MW, 400kV DC circuits to Sewaren	Sewaren	Perth Amboy/ alt Buckeye Port Reading	$1.9-2B	400kV DC	(400kV DC) NC	66kV
Anbaric - Boardwalk Power	921, 285	1-1400 MW, 400kV DC circuits to Larrabee	Larrabee	Bay Head (Larrabee)	$1.9B	400kV DC	(400kV DC) NC	66kV
Anbaric - Boardwalk Power	145, 882, 568	1-1148 MW, 400kV DC circuits to Deans (OW2), 1-1510 MW, 400kV DC to Deans (AS1)	Deans	Bay Head (Larrabee) Perth Amboy (Sewaren)	$2.0-2.3B	400kV DC	(400kV DC) NC	66kV
Atlantic Power Transmission (Blackstone)	210, 172, 769	Three lines 320kV DC, 1200MWs each, converter station outside of Deans.	Deans 1200+ 1200+1200=3600	Raritan Bay, South Amboy adjacent to former Werner generating station	$2B (210) single ckt $1.6B (172) second ckt $1.5B (769) third ckt	320kV DC	future	66kV
Con Ed Clean Link New Jersey	990	Base case - 2-1200 MW, 320kV HVDC lines, in UG ducts 1 ckt to Larrabee and 1 ckt to Smithburg with ability to substitute one of both circuits to Deans.	Larrabee(1200MW), Smithburg (1200MW) and Deans optional (1200 or 2400MW)	Sea Girt (Larrabee)	$2.75B Larrabee and Smithburg Alt 1 Ckt $1.86B Deans Alt $3.14B Larr and Deans Alt $3.32B Smithburg and Deans Alt $3.7B 2 Ckts at Deans	320kV DC	66 kV AC ties	66kV
LSP Central Transmission (Option 2 only) Clean Energy Gateway	594	Two (2) 345kV offshore substations and eight (8) 345kV submarine cables that connect to the LSP onshore station.	Alt POI Lighthouse near Sea Girt	Sea Girt National Guard Training Ctr (Larrabee)	594 ($2B)	345kV AC/alt 275kV AC	none	345kV
MAOD (EDFR,Shell)	431, 551, 321	3 proposals for 2, 3 or 4 1200MW, 320kV DC circuits to Larrabee converter station. Larrabee converter station is included in MAOD proposal. Include 1 platform per circuit.	Smith 1200, Larrabee 1200, Atlantic 1200, Smith +1200	Sea Girt National (Larrabee/ Atlantic/ Smithburg)	$3B (431) Prop1 $4.4B (551) Prop2 $5.7B (321) Prop3 $2.4M per mile addl sub cable	320kV DC	320 kV HVDC ties (NO)	66kV
Next Era (Options 1b/2-3)	461, 860, 250 (Deans)	2-1500MW, 400kV DC circuits to Deans, alternate for 3 or 4 circuits to achieve 4500 MW or 6000 MW. One offshore platform for each circuit.	Alt POI Fresh Ponds near Deans 3000, 4500, 6000	Raritan Bay (Deans),	$3.6 B (461), $5.2B (860), $7.1B (250), $738M (359)	400kV DC	230kV AC ties (NO)	66kV
Next Era (Options 1b/2-3)	27, 298, 15 (Oceanview)	1 or 2-1500MW, 400kV DC circuits to Oceanview or 2-1200MW circuits. One offshore platform for each circuit.	Alt POI Neptune near Ocean View 1500, 2400, 3000	Asbury Park (Oceanview)	$1.5B (27), $2.7 (298), $3.0B (15), $738M (359)	400kV DC	230kV AC ties (NO)	66kV
Next Era (Options 1b/2-3)	604(Cardiff)	1-1500MW, 400kV DC circuit and 1-1200MW, 400kV DC circuit to Cardiff.	Alt POI Reega near Cardiff 2700	Absecon Bay (Cardiff)	$3.0B (604) $738M (359)	400kV DC	230kV AC ties (NO)	66kV
PSEGRT Coastal Wind Link	397, 214, 613, 230	1-1200 MW, 320 kV or 1-1400MW, 400 kV DC circuit from offshore platform, to either Sewaren or Larrabee.	Sewaren 1200/1400, Larrabee1200/1400	Sea Girt (Larrabee),South Amboy (Deans),Keasbey (Sewaren)	Sewaren $2.3B (397)/$2.4B (214) Larrabee $2.2B (613)/$2.3B (230)	320 or 400kV DC	N/A	275kV
PSEGRT Coastal Wind Link	208, 871	2-1400MW, 400kV DC circuits from offshore platforms, to Sewaren and Larrabee or Sewaren and Deans.	Sewaren 1400, Larrabee 1400 Deans 1400	Sea Girt (Larrabee),South Amboy (Deans),Keasbey (Sewaren)	$4.7B (208) $4.8B (871)	320 or 400kV DC	275 kV HVAC ties (NC)	275kV
PSEGRT Coastal Wind Link	683	3-1400MW, 400kV DC circuits from offshore platforms, to Sewaren, Larrabee and Deans.	Sewaren 1400, Larrabee 1400 Deans 1400	Sea Girt (Larrabee),South Amboy (Deans), Keasbey (Sewaren)	$7.2B (683)	320 or 400kV DC	275 kV HVAC ties (NC)	275kV

Option 1b/2 Constructability Matrix – Environmental Risks

Proposal IDs	Proposing Entity	Project Title	Offshore Permitting/Routing/Siting	Onshore Permitting/Routing/Siting	Onshore ROW/Land Acquisition	Landfall Risks	Independent Evaluation Notes
568	Anbaric	Deans to Atlantic Shores 1	Medium	Medium	Low	Medium	BOEM Permits required, Green Acres onshore, Congested Raritan Bay route
574	Anbaric	Deans to Atlantic Shores 3	Medium	Medium	Low	Medium	BOEM Permits required, Green Acres onshore, Congested Raritan Bay route
841	Anbaric	Deans to Hudson South 1	Medium	Medium	Low	Medium	BOEM Permits required, Green Acres onshore, Congested Raritan Bay route
831	Anbaric	Deans to Hudson South 2	Medium	Medium	Low	Medium	BOEM Permits required, Green Acres onshore, Congested Raritan Bay route
882, 145	Anbaric	Deans to Ocean Wind 2	Medium	Medium	Low	Medium	BOEM Permits required, Green Acres onshore, Congested Raritan Bay route
921, 285	Anbaric	Larrabee to Atlantic Shores 2	Medium	Low	Low	Low	BOEM Permits required
183, 131	Anbaric	Sewaren to Atlantic Shores 3	Medium	Medium	Low	Medium	BOEM Permits required, Green Acres onshore, Congested Raritan Bay route
944, 802	Anbaric	Sewaren to Hudson South 2	Medium	Medium	Low	Medium	BOEM Permits required, Green Acres onshore, Congested Raritan Bay route
137	Anbaric	Atlantic Shores 2 to Atlantic Shores 1 Interlink	Medium	N/A	N/A	N/A	BOEM Permits required
896	Anbaric	Atlantic Shores 2 to Atlantic Shores 3 Interlink	Medium	N/A	N/A	N/A	BOEM Permits required
243	Anbaric	Atlantic Shores 2 to Ocean Wind 2 Interlink	Medium	N/A	N/A	N/A	BOEM Permits required
889	Anbaric	Hudson South 1 to Atlantic Shores 3 Interlink	Medium	N/A	N/A	N/A	BOEM Permits required
428	Anbaric	Hudson South 1 to Hudson South 2 Interlink	Medium	N/A	N/A	N/A	BOEM Permits required
748	Anbaric	Hudson South 2 to Atlantic Shores 2 Interlink	Medium	N/A	N/A	N/A	BOEM Permits required
248	Anbaric	Ocean Wind 2 to Atlantic Shores 1 Interlink	Medium	N/A	N/A	N/A	BOEM Permits required
210	APT	APT First 1200MW	Medium	Medium	Medium	Medium	BOEM Permits required, Green Acres onshore, Railroad ROW required, Congested Raritan Bay route
172	APT	APT Second 1200MW	Medium	Medium	Medium	Medium	BOEM Permits required, Green Acres onshore, Railroad ROW required, Congested Raritan Bay route
769	APT	APT Third 1200MW	Medium	Medium	Medium	Medium	BOEM Permits required, Green Acres onshore, Railroad ROW required, Congested Raritan Bay route
990	CONED	Clean Link New Jersey	Medium	Medium	Low	Low	BOEM Permits required, Green Acres onshore
594	LSPG	Clean Energy Gateway - Offshore	Medium	N/A	N/A	Low	BOEM Permits required
431	MAOD	Option 2 MAOD Proposal 1	Medium	Medium	Low	Low	BOEM Permits required, Green Acres onshore
551	MAOD	Option 2 MAOD Proposal 2	Medium	Medium	Low	Low	BOEM Permits required, Green Acres onshore
321	MAOD	Option 2 MAOD Proposal 3	Medium	Medium	Low	Low	BOEM Permits required, Green Acres onshore
359	NEETMH	Platform Connections	Medium	N/A	N/A	N/A	BOEM Permits required
604	NEETMH	Cardiff 2,700 MW DC Injection	Medium	Medium-High	Low	Low	BOEM Permits required, Green Acres onshore, Pinelands permit required
250, 461, 860	NEETMH	Deans 6,000 MW DC Injection	Medium	High	Low	Medium	BOEM Permits required, Onshore Converter parcel located on State Park, Congested Raritan Bay route
15, 27, 298	NEETMH	Oceanview 3,000 MW DC Injection	Medium	Medium	Medium	Medium	BOEM Permits required, Green Acres onshore, Asbury Park Beach Landfall, Public ROW easements require
683, 397, 214, 613,230, 871, 208	PSEG/Orsted	Sewaren/Deans/Larrabee Tri Collector	Medium	Medium	Low	Medium	BOEM Permits required, Green Acres onshore, Congested Raritan Bay route

Option 1b/2 Constructability Matrix – Engineering & Construction

Proposal ID	Proposing Entity	Project Title	Onshore Engineering	Offshore Engineering	Onshore Construction	Offshore Construction	Materials & Equipment	Independent Evaluation Notes
568	Anbaric	Deans to Atlantic Shores 1	Low	Low	Low	Medium	Medium	Offshore HVDC construction; 400 kV HVDC system supply concerns
574	Anbaric	Deans to Atlantic Shores 3	Low	Low	Low	Medium	Medium	Offshore HVDC construction; 400 kV HVDC system supply concerns
841	Anbaric	Deans to Hudson South 1	Low	Low	Low	Medium	Medium	Offshore HVDC construction; 400 kV HVDC system supply concerns
831	Anbaric	Deans to Hudson South 2	Low	Low	Low	Medium	Medium	Offshore HVDC construction; 400 kV HVDC system supply concerns
882, 145	Anbaric	Deans to Ocean Wind 2	Low	Low	Low	Medium	Medium	Offshore HVDC construction; 400 kV HVDC system supply concerns
921, 285	Anbaric	Larrabee to Atlantic Shores 2	Low	Low	Low	Medium	Medium	Offshore HVDC construction; 400 kV HVDC system supply concerns
183, 131	Anbaric	Sewaren to Atlantic Shores 3	Low	Low	Low	Medium	Medium	Offshore HVDC construction; 400 kV HVDC system supply concerns
944, 802	Anbaric	Sewaren to Hudson South 2	Low	Low	Low	Medium	Medium	Offshore HVDC construction; 400 kV HVDC system supply concerns
137	Anbaric	Atlantic Shores 2 to Atlantic Shores 1 Interlink	N/A	Low	N/A	Medium	Low	Offshore HVDC construction;
896	Anbaric	Atlantic Shores 2 to Atlantic Shores 3 Interlink	N/A	Low	N/A	Medium	Low	Offshore HVDC construction
243	Anbaric	Atlantic Shores 2 to Ocean Wind 2 Interlink	N/A	Low	N/A	Medium	Low	Offshore HVDC construction
889	Anbaric	Hudson South 1 to Atlantic Shores 3 Interlink	N/A	Low	N/A	Medium	Low	Offshore HVDC construction
428	Anbaric	Hudson South 1 to Hudson South 2 Interlink	N/A	Low	N/A	Medium	Low	Offshore HVDC construction
748	Anbaric	Hudson South 2 to Atlantic Shores 2 Interlink	N/A	Low	N/A	Medium	Low	Offshore HVDC construction
248	Anbaric	Ocean Wind 2 to Atlantic Shores 1 Interlink	N/A	Low	N/A	Medium	Low	Offshore HVDC construction
210	APT	APT First 1200MW	Low	Low	Medium	Medium	Medium	Construction in RR ROW & utility crossings, Offshore HVDC construction & materials
172	APT	APT Second 1200MW	Low	Low	Medium	Medium	Medium	Construction in RR ROW & utility crossings, Offshore HVDC construction & materials
769	APT	APT Third 1200MW	Low	Low	Medium	Medium	Medium	Construction in RR ROW & utility crossings, Offshore HVDC construction & materials
990	CONED	Clean Link New Jersey	Low	Low	Medium	Medium	Medium	Offshore HVDC construction & materials, onshore UG cable construction
594	LSPG	Clean Energy Gateway - Offshore	N/A	Medium	N/A	Low	Low	Reactive compensation concerns, No transformation for offshore wind gen
431	MAOD	Option 2 MAOD Proposal 1	Low	Low	Low	Medium	Medium	Offshore HVDC construction; 400 kV HVDC system supply concerns
551	MAOD	Option 2 MAOD Proposal 2	Low	Low	Low	Medium	Medium	Offshore HVDC construction; 400 kV HVDC system supply concerns
321	MAOD	Option 2 MAOD Proposal 3	Low	Low	Low	Medium	Medium	Offshore HVDC construction; 400 kV HVDC system supply concerns
359	NEETMH	Platform Connections	N/A	Low	N/A	Low	Low	
604	NEETMH	Cardiff 2,700 MW DC Injection	Low	Low	Low	Medium	Medium	Offshore HVDC construction; 400 kV HVDC system supply concerns
250, 461, 860	NEETMH	Deans 6,000 MW DC Injection	Low	Low	Low	Medium	Medium	Offshore HVDC construction; 400 kV HVDC system supply concerns
15, 27, 298	NEETMH	Oceanview 3,000 MW DC Injection	Low	Low	Medium	Medium	Medium	Offshore HVDC construction, Public ROW conflicts; 400 kV HVDC system supply concerns
683, 397, 214, 613,230, 871, 208	PSEG/Orsted	Sewaren/Deans/Larrabee Tri Collector	Low	Low	Low	Medium	Medium	Offshore HVDC construction; 400 kV HVDC system supply concerns

Option 1a Constructability Matrix – Environmental Risks

Proposal ID	Proposing Entity	Project Title	Permitting/Routing/Siting	ROW/Land Acquisition	Notes
975	ACE	ACE 01	Medium-High	Low	Green Acres impact, Pinelands permit required
734	ACE	ACE 02	Medium-High	Low	Green Acres impact, Pinelands permit required
127	ACE	ACE 03	Medium-High	Low	Green Acres impact, Pinelands permit required
929	ACE	ACE 04	Medium-High	Low	Green Acres impact, Pinelands permit required
17	JCPL	JCPL Option 1a	Medium-High	Low	Green Acres impact, Pinelands permit required
203	LSPG	Broad Creek - Robinson Run	Medium	Medium	Multi-state permitting required (MD, PA), New DCT lines assume use of incumbent line ROW
103	LSPG	Old York 230/500kV	Low	Low	
229	LSPG	Silver Run Upgrade	Medium	Low	USACE Section 10 Permits required, Multi-state permitting required (NJ, DE)
158	NEETMH	Combinations	Medium-High	Low	Multi-state permitting required (PA, NJ, DE), No environmental plan provided
793	NEETMH	Upgrades for Cardiff 2700 MW	Medium-High	Low	Green Acres impact, Pinelands permit required, No environmental plan provided
651, 44, 315	NEETMH	Upgrades for Deans 6000 MW	Medium-High	Low	Green Acres impact, No environmental plan provided
331, 520, 878	NEETMH	Upgrades for Oceanview 3000 MW	Medium-High	Medium	Green Acres impact, No environmental plan provided, 2 new lines assume use of incumbent line ROW
982	NEETMH	Wiley Rd 500 kV -Wheeler 500/230 kV	Medium	Low	Multi-state permitting required (MD, PA)
11	NEETMH	Wiley Rd 500/230 kV -Wheeler 500/230 kV	Medium	Medium	Multi-state permitting required (MD, PA), New line assumes use of incumbent line ROW
587	NEETMH	Wiley Rd-Conastone 500 kV	Medium	Low	Multi-state permitting required (MD, PA)
180	PSEG	Central Jersey Grid Upgrades	Medium	Low	Green Acres impact
894	PSEG	South Jersey Grid Upgrade	Medium	Low	USACE Section 10 Permits required, Multi-state permitting required (NJ, DE)
419	Transource	Claymont - Bridgeport	Medium	Low	USACE Section 10 Permits required, Multi-state permitting required (NJ, DE)
63	Transource	North Delta Option A	Medium	Medium	Multi-state permitting required (MD, PA), New DCT lines assume use of incumbent line ROW
296	Transource	North Delta Option B	Medium	Medium	Multi-state permitting required (MD, PA), New line assumes use of incumbent line ROW
345	Transource	Peach Bottom - Conastone	Medium	Low	Multi-state permitting required (MD, PA)

Option 1a Constructability Matrix – Engineering & Construction

Proposal ID	Proposing Entity	Project Title	Engineering	Construction	Materials & Equipment	Notes
975	ACE	ACE 01	Low	Low	Low	
734	ACE	ACE 02	Low	Low	Low	
127	ACE	ACE 03	Low	Low	Low	
929	ACE	ACE 04	Low	Low	Low	
17	JCPL	JCPL Option 1a	Low	Low	Low	
203	LSPG	Broad Creek - Robinson Run	Low	Medium	Low	New DCT line construction requires demolition/rebuild of incumbent line (LSPG work)
103	LSPG	Old York 230/500kV	Low	Low	Low	
229	LSPG	Silver Run Upgrade	Low	Medium	Low	Submarine Cable construction
158	NEETMH	Combinations	Low	Medium	Low	Proposed Red Lion expansion conflicts with incumbent lines/structures (incumbent work)
793	NEETMH	Upgrades for Cardiff 2700 MW	Low	Low	Low	
651, 44, 315	NEETMH	Upgrades for Deans 6000 MW	Low	Low	Low	
331, 520, 878	NEETMH	Upgrades for Oceanview 3000 MW	Low	Medium	Low	2 new lines construction require retirement of incumbent line (incumbent work)
982	NEETMH	Wiley Rd 500 kV -Wheeler 500/230 kV	Low	Low	Low	
11	NEETMH	Wiley Rd 500/230 kV -Wheeler 500/230 kV	Low	Medium	Low	New line construction requires retirement of incumbent line (NEETMH work)
587	NEETMH	Wiley Rd-Conastone 500 kV	Low	Low	Low	
180	PSEG	Central Jersey Grid Upgrades	Low	Low	Low	
894	PSEG	South Jersey Grid Upgrade	Low	Medium	Low	Submarine Cable construction
419	Transource	Claymont - Bridgeport	Low	Medium	Low	Submarine Cable construction
63	Transource	North Delta Option A	Low	Medium	Low	New DCT line construction requires demolition/rebuild of incumbent line. Assumes use of AEP BOLD DCT construction (incumbent work)
296	Transource	North Delta Option B	Low	Medium	Low	New line construction requires retirement/rebuild of incumbent line (incumbent work)
345	Transource	Peach Bottom - Conastone	Low	Low	Low	

Financial Analysis

Financial Analysis - Key Observations

- **Project Cost:** Option 1A and 3 proposals are typically around or under $100M in capital cost, while option 1B and 2 proposals range from half a billion to ~$7B, depending on the MW of offshore wind injection.

- **Cost Containment:** Eight out of thirteen proposers offer some form of capping mechanism. Option 1B, 2, and 3 proposals tend to offer multiple caps, including proposer cost cap, ROE cap, equity cap etc., while option 1A proposals have little to no containment.

- **Comparative Analysis:** Well-capped proposals tend to have significantly lower cost overrun and other downside risks, such as high financing cost, compared to uncapped proposals. However, depending on the magnitude of project cost and base case revenue requirement, there may be a trade off between cost and risk levels.

Cost Containment Summary by Developer[1]

Category	Anbaric	NEETMH	LS Power[3] (1B&2)	PSEG-Orsted[4] (2&3)	MAOD	RILPOW[5]	ConEd	APT[6]
Project Cost Cap ($2021)	~$2B (125-130% of bid cost)	$84M-$7B	$1.5-2.2B	$7B	$3.4-6.6B (115% of bid cost)	$28M-1.3B (materials & equip only)	$824M (soft cap, 30% of bid cost)	
ATRR Cap			Capped for first 10 yrs					Capped for entire 40-yrs
ROE Cap (inclusive of adders)	8.5%	9.8%	8.95%	9.9% Capped for first 15 yrs		9.75% Capped for first 6 yrs		
Equity Ratio Cap	45%	40% (1A) 30%[2] (2&3)	40%	48.35%		50%		
O&M Cap		Capped for first 15 yrs						
Exceptions	Taxes, AFUDC, Escalation, Force Majeure, SOW change	AFUDC, Force Majeure, SOW change	Force Majeure, SOW change	Debt, Taxes, AFUDC, Escalation, Force Majeure, SOW change	Taxes, AFUDC, Escalation, Force Majeure, SOW change	Taxes, AFUDC, Escalation, Force Majeure, SOW change	Cost of Debt, ROW, Force Majeure, SOW change	Force Majeure, SOW/cable length change
Other Mechanism	ROE to be increased or reduced based on actual project cost and schedule delays	Seek recovery of Depreciation and Cost of Debt if actual project cost exceeds cap	If actual costs in any given year are lower than TRR Cap, the difference is rolled forward	Project cost cap subject to change based on inflation, foreign exchange rates; ROE to be increased if actual cost is lower	Open to alternatives, e.g., multiple-tier cost allocation structure with higher hard cap		Seek reduced ROE on overspent portion of cost. Sharing mechanism only effective when cost is 5% higher than bid amount.	Cost cap subject to change based on foreign exchange rates and commodity price fluctuations

Note: (1) AE, Transource,JCPL,PSEG,PPL proposals are not included in this table due to lack of cost containment.
(2) NEETMH option 2 & 3 proposals offer a soft equity cap of 30% - stated as a target.
(3) Only LS Power option 1B & 2 proposals offer the caps above, option 1A proposals capped only project cost.
(4) PSEG-Orsted only offers the above cost containment for #683, a combined option 2 and 3 proposal.
(5) RILPOW only offers project cost cap for #171 and 490.
(6) APT's ATRR cap increases by 0.5% annually, based on the first COD year RR cap.

Modeling Assumptions

For fair comparison, the following standardizing assumptions are used in revenue requirement modelling for all proposals.

Rates	Assumption(s)
Federal Tax Rate	21%
State Tax Rate (NJ)	9%
Effective/Blended Tax Rate	28.11%
Property Tax Rate *(if property tax $ not provided)*	0.20% of Rate Base
PJM Discount Rate	7.24%
Inflation Rate	2.5%

Project Dates	Assumption(s)
Earliest Capital Spend Start Date	4/1/2023
Capital Spend Start Date for Later Phases *(if not specified)*	Assume 1/1 in the first year where capex is given *(before shifting)*
Shifting Method	Date-shifting will maintain the original proposal's phased structure *(if any).*

Modeling Period	Assumption(s)
One Model Year	12-month period *(instead of calendar year)*
AFUDC Accumulation Period	From capital spend start to in-service date
Cost Recovery Period	The project's initial investment's useful life *(not including extended ongoing capex life)*

Book Depreciation: Straight-line depreciation method is used for all proposals, assuming no salvage value or removal cost.

AFUDC: AFUDC is calculated based on the proposed WACC, accumulating from capital spend start date to the project's online date (separately calculated by project phase, if applicable).

O&M/A&G: Modeled based on bidders' provided O&M/A&G forecast for the useful life of the project.

- *In cases of conflicting source files, the O&M/A&G provided in the bidders' revenue requirement buildup workbooks are used.*
- *In cases of incomplete data, e.g., LS Power only provides O&M/A&G for 50 years while its projects have useful lives of 65-68 years, O&M/A&G costs are escalated based on the O&M escalation rate (~2%) provided by the bidder.*

Property Tax: Modeled based on bidders' provided property tax forecast for the useful life of the project.

- *In cases where property tax is not provided, it's modeled as 0.2% of the ending rate base in each modeling period.*

Scenario Modeling

- To evaluate cost overrun and financing risks, consultants modeled **base case** and **6 different scenarios** for each proposal.
- **Some variables are interdependent**, e.g., certain developers state that changes in project capex and/or equity % may result in lower or higher ROE.
- All components of the downside scenario are modeled individually, in order to assess the impact of each standalone variable.

#	Scenario	Variable	Description
1	Base Case	None	Model the proposal as submitted by developer
2	ROE 12%	Single Variable	Return on Equity raised to 12% for all periods *(unless capped)*
3	Project Cost +25%	Single Variable *(changes to capex may affect ROE for some developers)*	Proposer's project cost increased by 25% for all periods *(unless capped at lower cost)*
4	O&M +50%	Single Variable	O&M expense increased by 50% for all periods *(unless capped)*
5	Cost of Debt 6%	Single Variable	Cost of Debt raised to 6% for all periods *(unless capped)*
6	Equity 50%	Single Variable *(changes to Debt-to-Equity ratio may affect ROE for some developers)*	Equity thickness set to 50% for all periods *(unless capped)*
7	Downside *(includes all changes above)*	Multiple Variables *(changes to capex and equity % may affect ROE for some developers)*	Proposer's project cost +25% *(unless capped at lower cost)* O&M +50% *(unless capped)* ROE 12% *(unless capped)* COD 6% *(unless capped)* Equity 50% *(unless capped)*

Proposals Modeled

Based on PJM inputs, the following proposals are modeled individually and then combined into one "pairing", where applicable.

Option	Proposer	PJM ID
1A	LS Power	203
	NEETMH	587
	ACE	127
	Transource	63
	Transource	296
	Transource	345
1B	ACE	929 & 797
	JCPL	453
	RILPOW	171 & 490
	LS Power	629
	LS Power	781
	LS Power	627
	LS Power	294

Option	Proposer	PJM ID
1B+2	JCPL; MAOD	453 ; 321 (op.2)
	LS Power	627 ; 594 (op.2)
	LS Power	294 ; 594 (op.2)
1B/2	Anbaric	831 & 841 & 921 & 131
	Anbaric	831 & 841 & 921
	APT	210 & 172 & 769
	ConEd	990 (Larrabee & Smithburg)
	ConEd	990 (Deans x2)
	NEETMH	860
	NEETMH	461 & 27
	PSEG-Orsted	683
	PSEG-Orsted	871
3	Anbaric	428
	Anbaric	748
	Anbaric	889
	Anbaric	896
	NEETMH	359
2/3	MAOD**	321
	PSEG-Orsted**	683
	PSEG-Orsted**	871

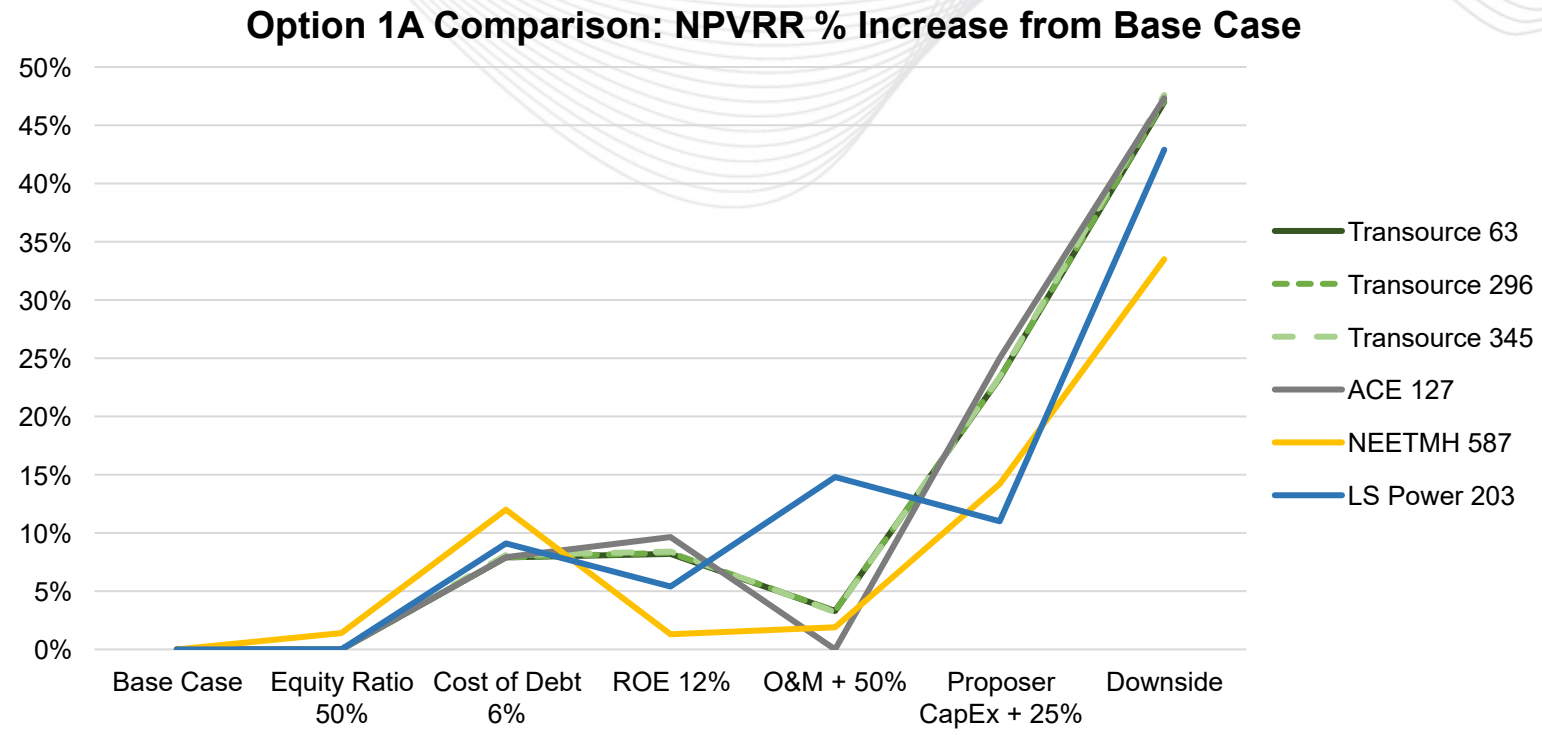
Note: (1) Refer to later slides for Option 1A, 1B, and 2 pairing details.
(2) PSEG-Orsted and MAOD option 2 proposals include offshore interlinks.

Option 1A (Peach Bottom – Conastone): Base Case NPVRR Comparison

Note: Only proposals related to Peach Bottom – Conastone upgrades are shown in this graph.c

- Among the six 1A proposals above, **Transource #296 (North Delta B)** has the lowest cost, while **ACE #127** has the highest cost.
- Base case NPVRR for all six proposals include “work by other” costs related to Peach Bottom – Conastone upgrades.
- This option 1A group has a relatively tight cost range ($99M), compared to other option groups.

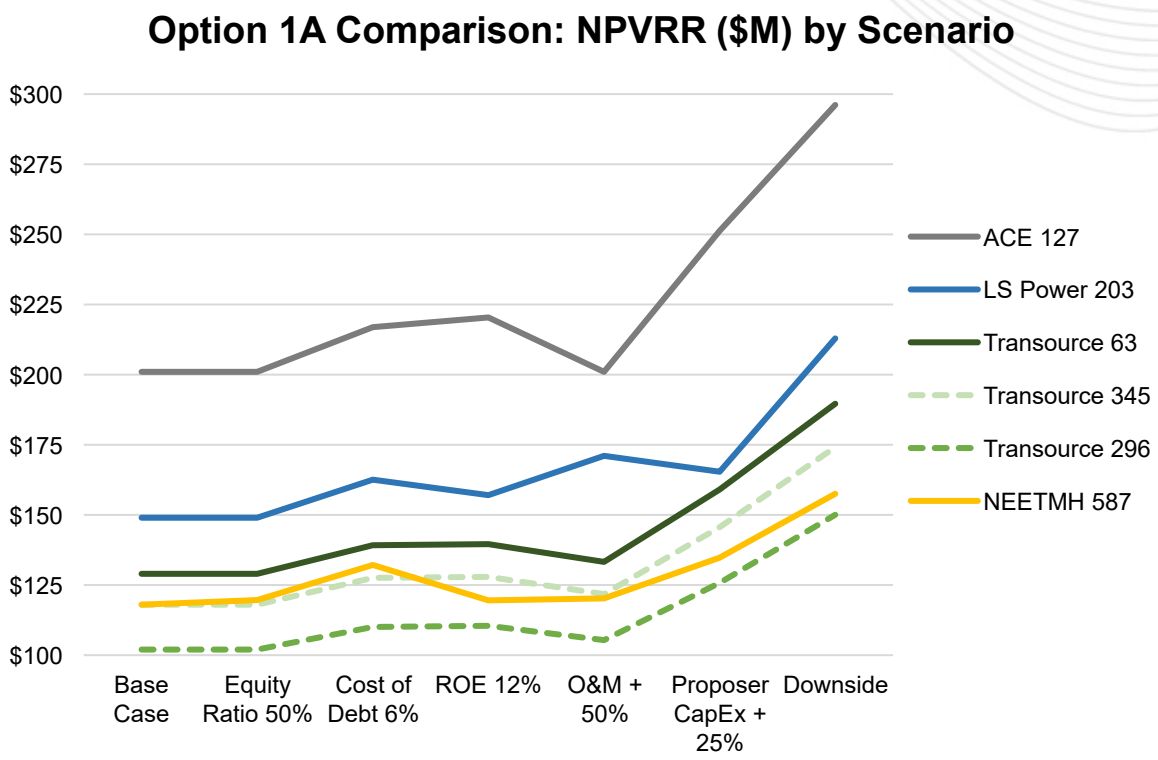
Option 1A (Peach Bottom – Conastone): Scenario Performance

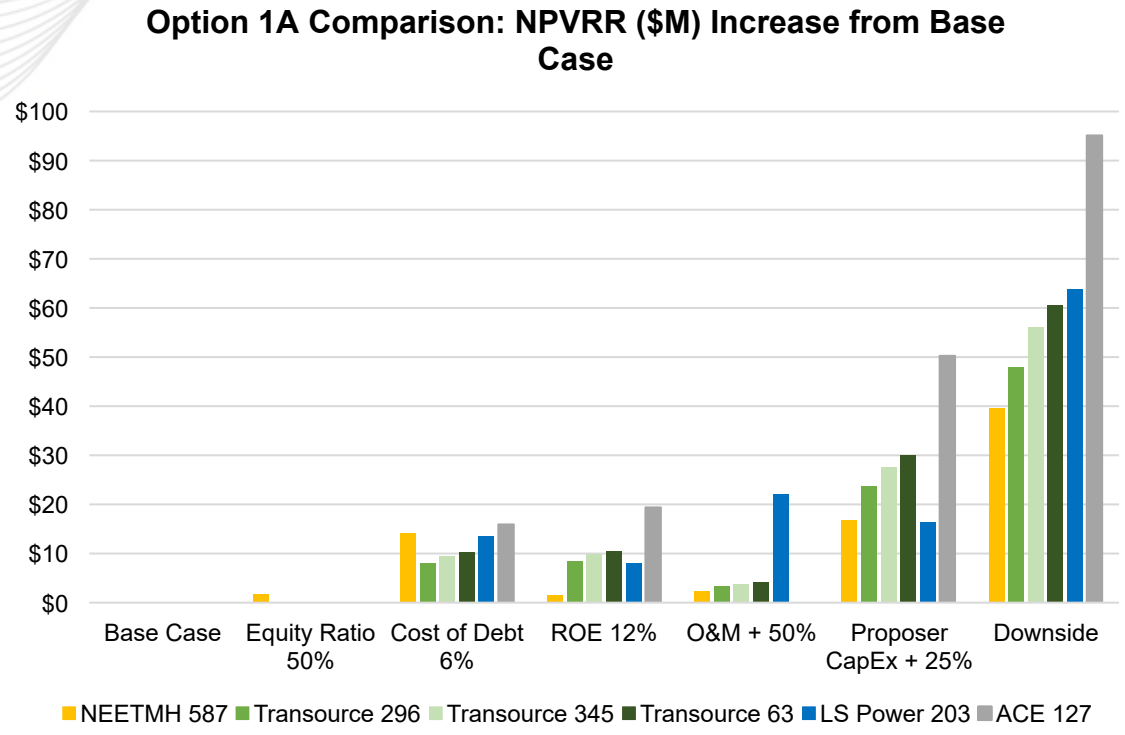


Note: ACE #127 has zero increase in O&M +50% scenario because the proposal does not include any O&M/A&G.

- **NEETMH #587** proposal has the lowest risk levels in high ROE, high O&M, and downside scenarios, due to effective ROE and O&M caps. Cost overrun risks are also mitigated since NEETMH will forego equity return on costs exceeding its cost cap.
- **LS Power #203**'s hard cost cap is the most effective in limiting revenue requirement % increase under high capex scenario. However, the proposal has a large O&M balance relative to project cost, resulting in its high risk under O&M +50% scenario.
- Both **Transource** and **ACE** have no capping mechanisms, exposing ratepayers to cost overrun and financing risks.

Option 1A (Peach Bottom – Conastone): Scenario Performance





Note: ACE #127 has zero increase in O&M +50% scenario because the proposal does not include any O&M/A&G.

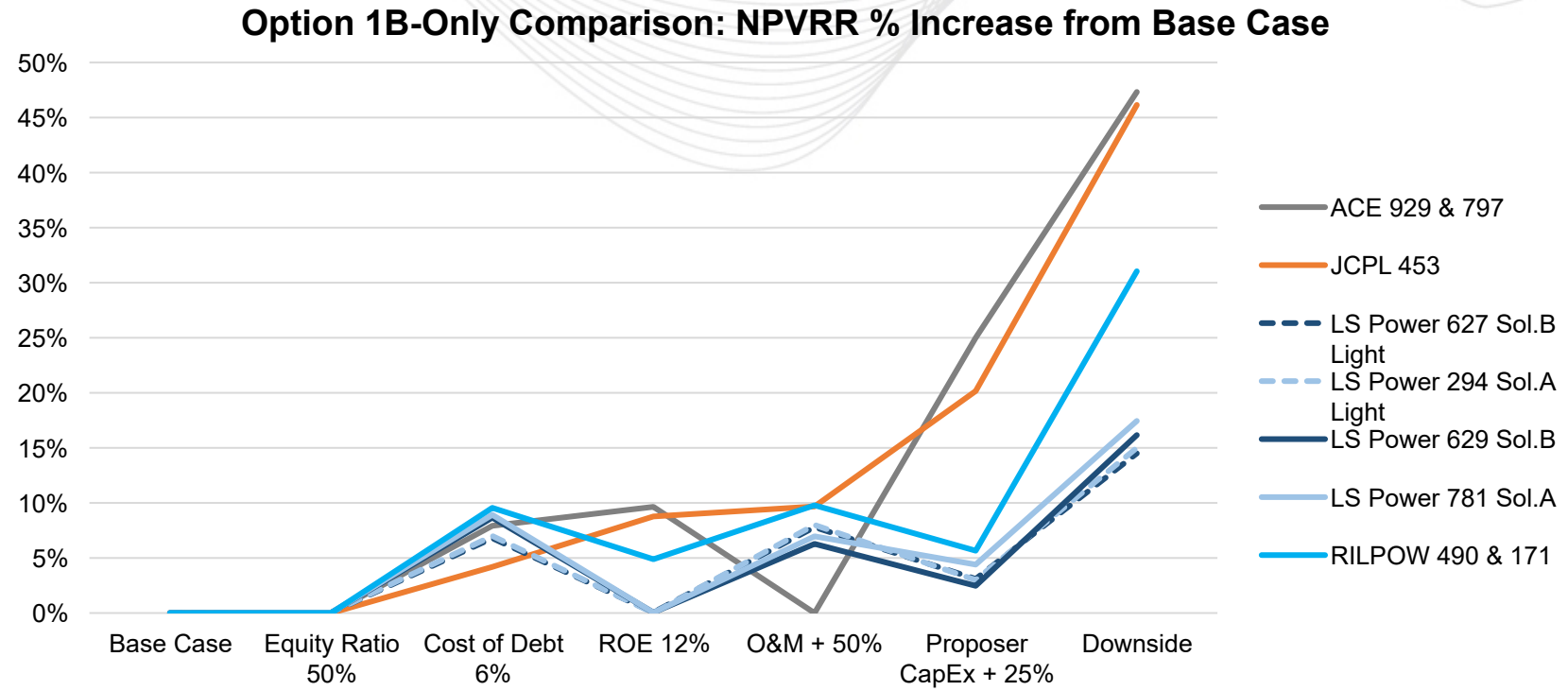
- Despite having no capping mechanisms, **Transource #296** still have relatively low $ increase in NPVRR, due to its low project cost compared to others. **LS Power #203**, on the contrary, has the most effective capex cap, but still results in 2nd highest overall revenue requirement due to its high base case cost.
- **NEETMH #587** has the lowest NPVRR $ increase in high ROE, high O&M, and downside scenarios.
- With highest base costs and lack of capping, **ACE #127** results in highest $ increase in almost all scenarios.

Option 1B-Only: Base Case NPVRR Comparison

Note: OSW injection MW are provided by PJM.

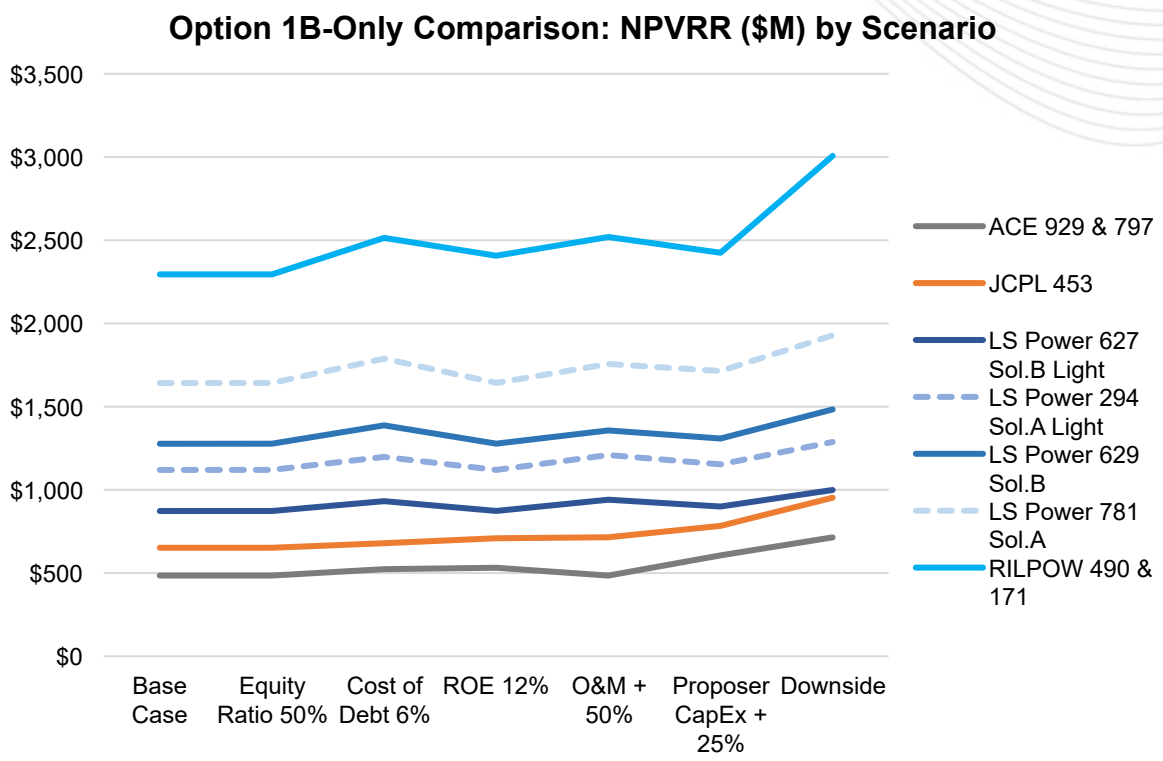
- Among 1B proposals, **ACE** appears to have the lowest base case NPVRR, followed by **JCPL**.
  - *Note the RR results only cover proposer capex, which may significantly understate the overall project cost of ACE's proposed solution ($506M in "work by others").*
- **LS Power**'s base case cost-of-service are notably higher compared to the utilities, despite its ability to accommodate more OSW injection.
- **Rise Light** has the highest cost per unit ($mil/MW) while JCPL has the lowest.

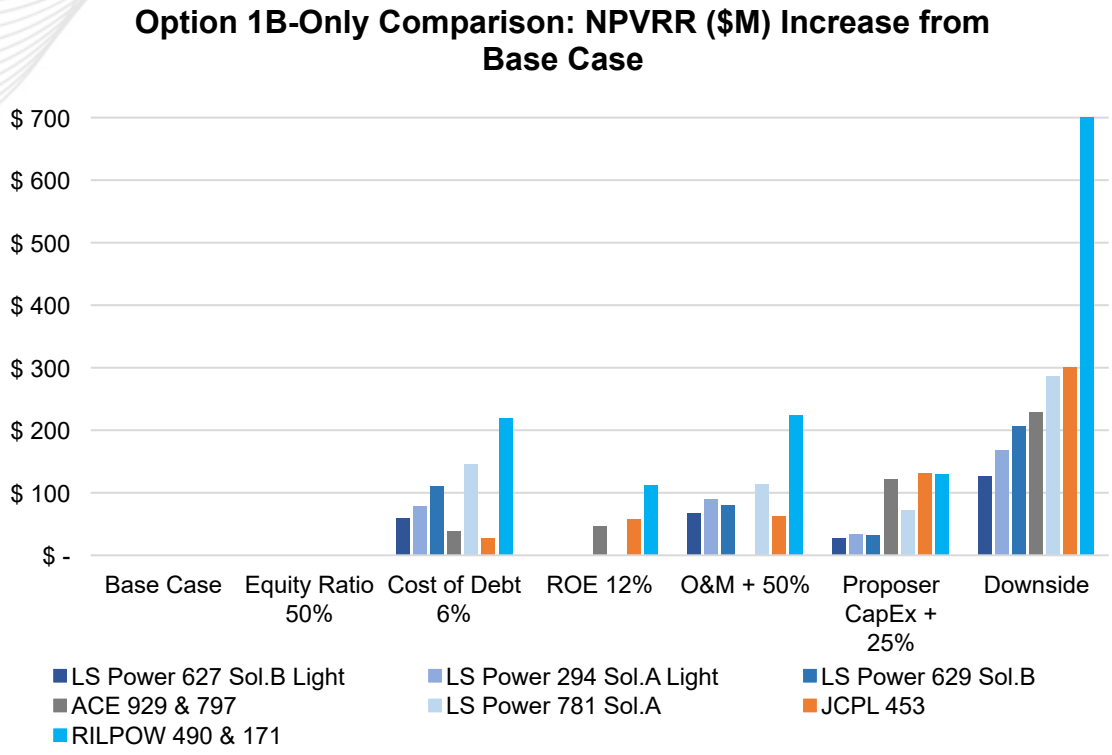
Option 1B-Only: Scenario Performance



- The least cost proposals (in base case) – **ACE** and **JCPL**, are much more exposed to capital and maintenance cost overrun risks due to lack of cost caps.
  - *In the O&M +50% scenario, ACE % increase is 0% because the proposals assumed negligible O&M/A&G.*
- **LS Power**'s capping mechanisms are the most effective under almost all scenarios.
- **Rise Light**'s partial cost caps, which focus on "material & equipment" costs, successfully reduced capex overrun risk.

Option 1B-Only: Scenario Performance





Note: ACE has zero increase in O&M +50% scenario because the proposal does not include any O&M/A&G.

- Despite **ACE** and **JCPL's** low base case costs, both developers expose ratepayers to higher NPVRR $ increase in capex overrun and downside scenarios.
- **LS Power** proposals, though all well-capped with similar scenario performance in terms of % increase, the NPVRR $ increase for full solutions A and B are notably higher compared to the "light" versions.

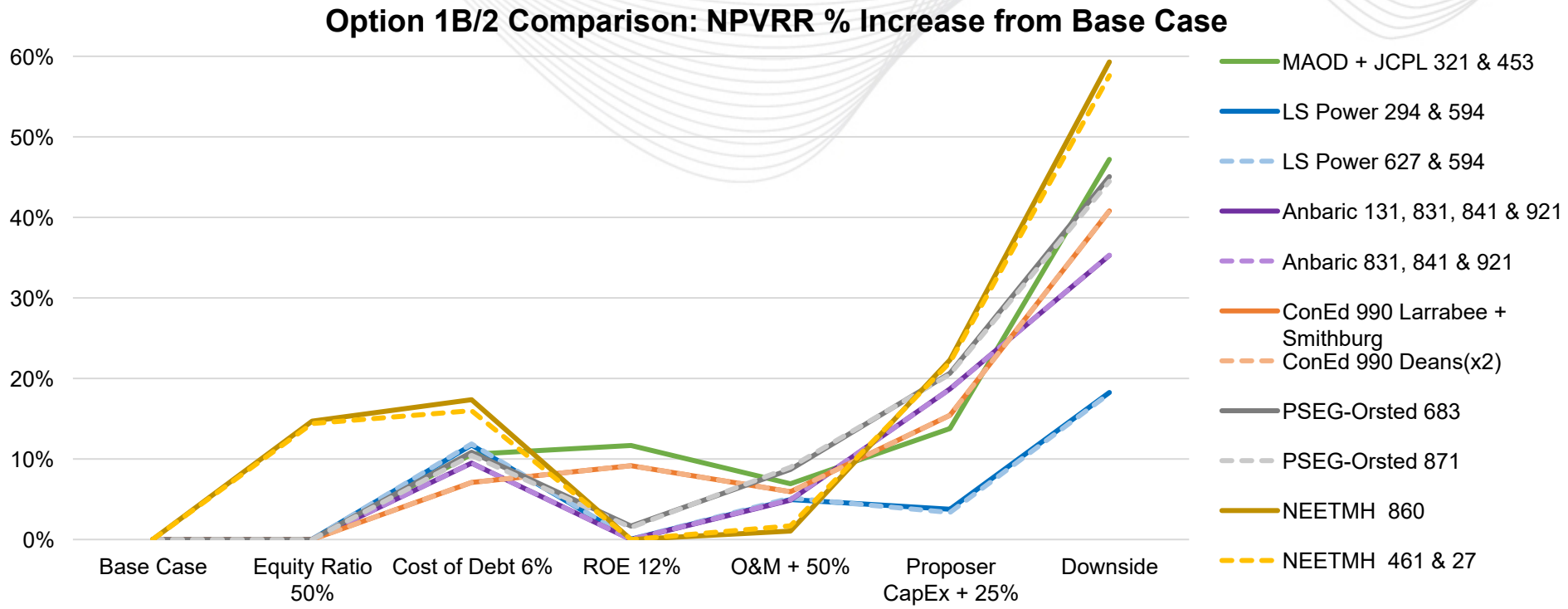
Option 1B/2: Base Case NPVRR Comparison

Note: OSW injection MW are provided by PJM.

- **Among 1B and 2 combined proposals, PSEG-Orsted has the highest unit cost, as measured by $million/MW, while LS Power solutions have the lowest unit costs, followed by NEETMH.**
- ConEd's "Deans double circuit" project cost is 24% higher than ConEd's "Larrabee and Smithburg" proposal (both for 2400MW injection).
- Both LS Power option 1B proposals #627 and #294 are the "Light" versions, which accommodate up to 4200MW OSW injection.
- MAOD and PSEG-Orsted's original option 2 proposals include offshore interlinks. For fairness of comparison, the interlink costs have been removed from the option 1B/2 analysis and separately evaluated as option 3 solutions.

Note: APT proposes a pre-determined revenue requirement approach instead of standard cost recovery, the base case NPVRR above is calculated using APT's ATRR schedule.

Option 1B/2: Scenario Performance

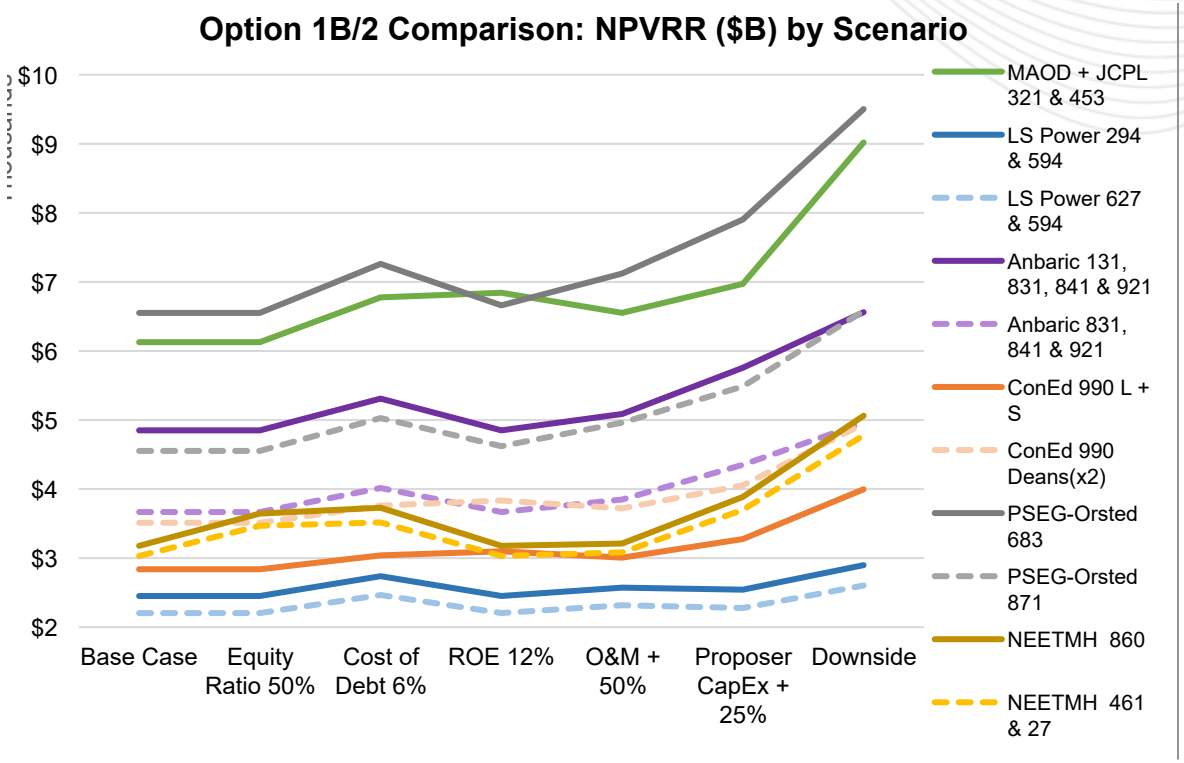


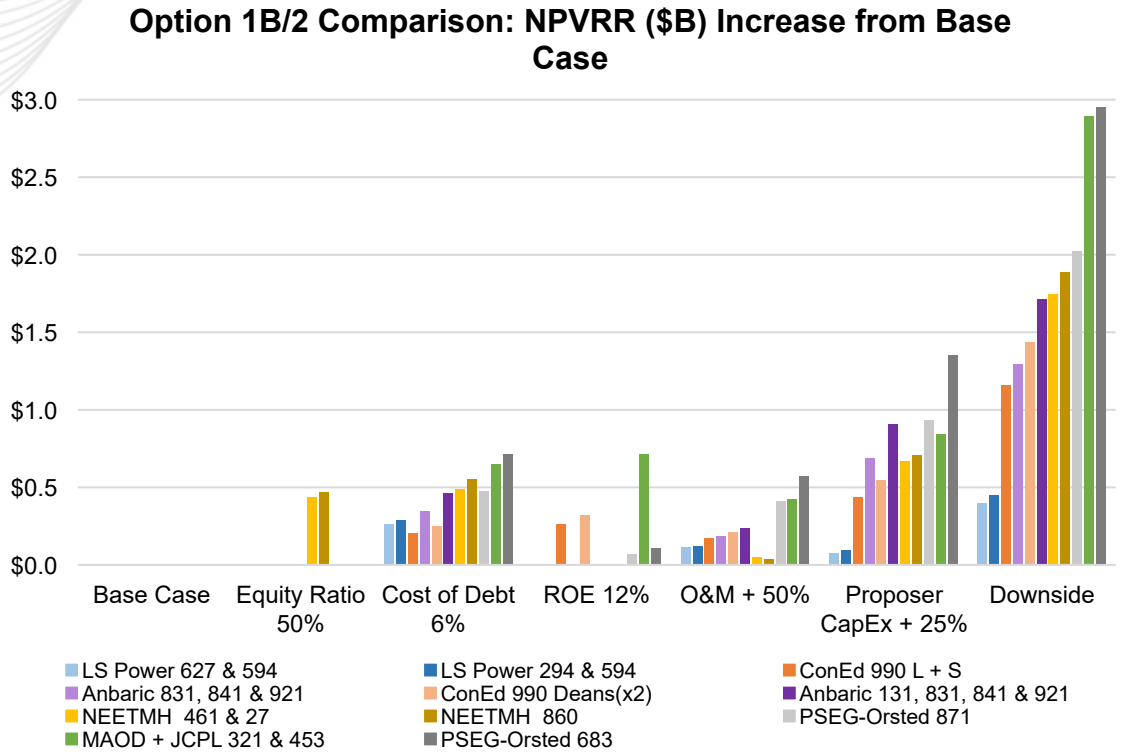
Note: Scenarios are not shown for the APT proposal due to its pre-determined cost recovery approach.

- **LS Power 1B+2** combined solutions have the most effective capping mechanisms in this group. The risks to ratepayers are mitigated in each standalone scenario as well as the Downside scenario.
- **MAOD*** proposed a 15% hard cap on project capex, which effectively limited cost overrun risk on the combined MAOD+JCPL solution. However, the overall Downside risks are still high due to lack of other capping mechanisms on financing costs, O&M, etc.
- **NEETMH** is successful in limiting O&M and ROE risks, but much less effective in containing capital costs, equity ratio, and cost of debt since most NEETMH's caps are soft caps/targets (not binding).
- **Anbaric** and **PSEG-Orsted** solutions have similar performance under most scenarios, Anbaric is more effective in containing capex.
- **ConEd** only offers to cap project costs via a sharing mechanism (30%) that was practiced in NYISO.

*Note: *MAOD proposed an alternative multi-tiered capping mechanism not shown in this graph (details were not included in original proposal).*

Option 1B/2: Scenario Performance





Note: Scenarios are not shown for the APT proposal due to its pre-determined cost recovery approach.

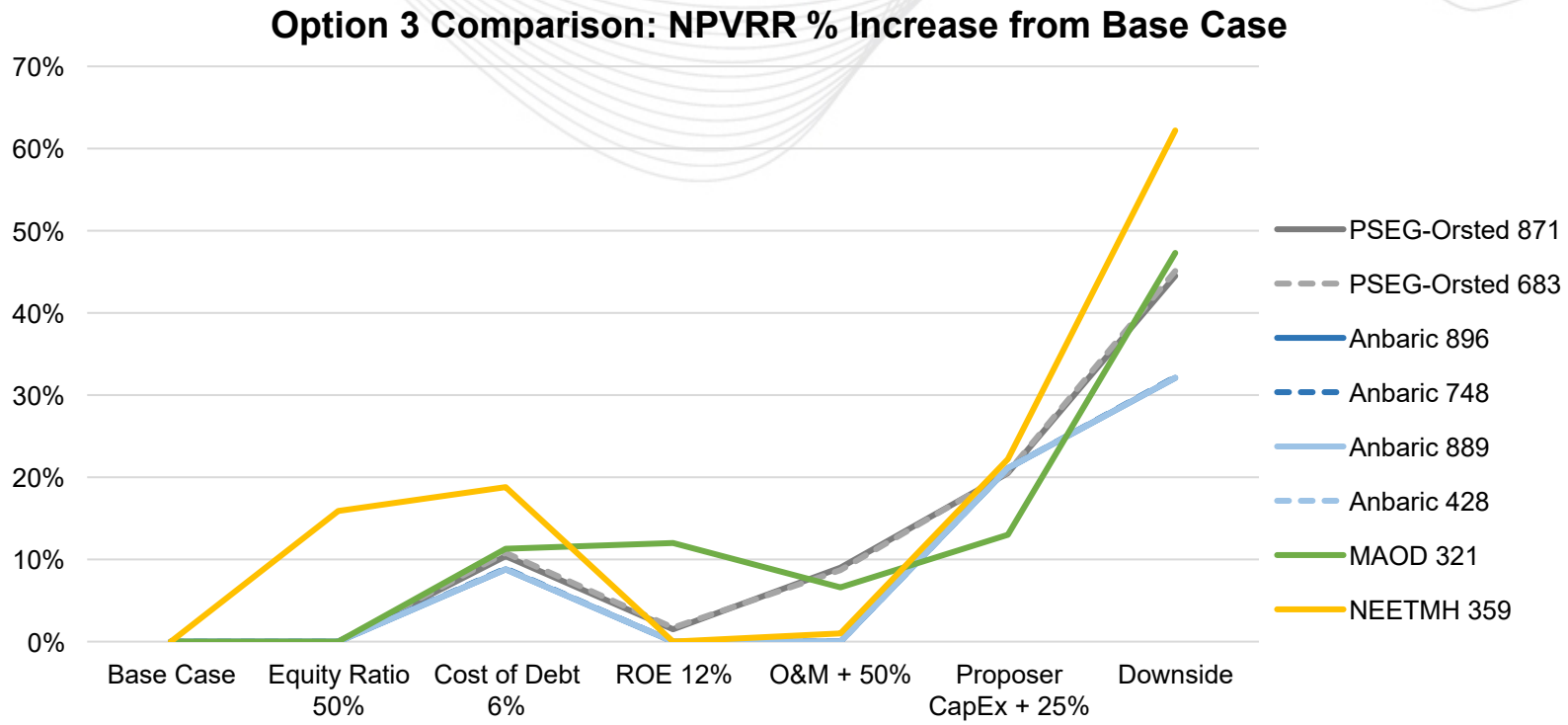
- **LS Power** proposals have the lowest NPVRR $ increase and % increase in the CapEx +25% and downside scenarios, due to low base case costs and multiple, effective caps.
- **MAOD** and **PSEG-Orsted #683** have the highest base case costs and two of the highest NPVRR $ increase in most scenarios.
- Due to low base case costs, **NEETMH**'s total NPVRR in all scenarios are below median, despite ineffective caps.

Option 3: Base Case NPVRR Comparison

- Only four developers proposed offshore interlinks: **Anbaric** and NEETMH submitted independent option 3 proposals, while **MAOD** and **PSEG-Orsted** have interlinks imbedded in their option 2 proposals.
  - Each developer proposed links to connect different offshore platforms, including Hudson South and Atlantic Shores call area.

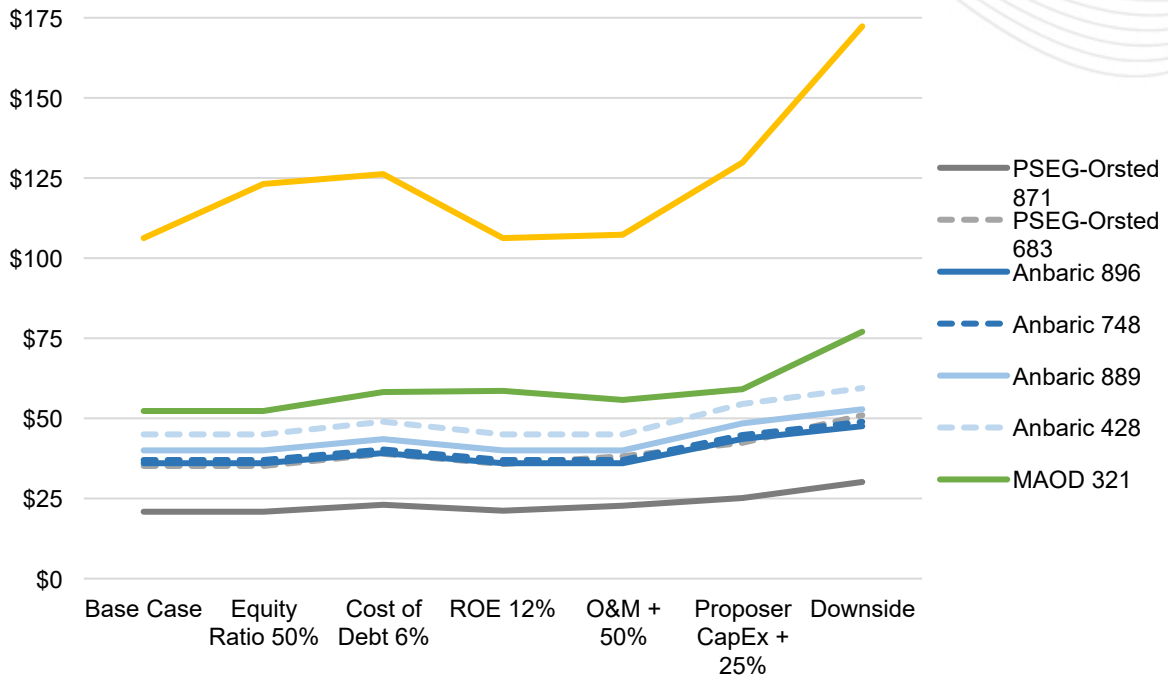
- **NEETMH** connections have notably higher costs per link, compared to other developers.
- **PSEG-Orsted** appears to have the lowest cost per link, however more details may be required for a thorough comparison.

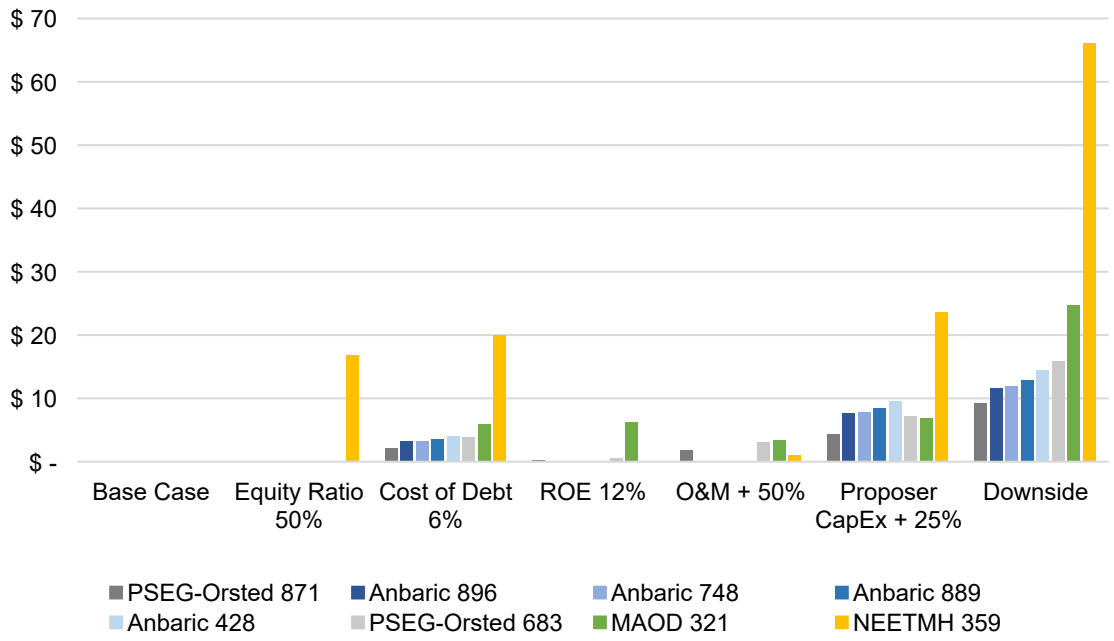
Option 3: Scenario Performance



- Option 3 proposals' scenario performance are similar to their option 2 counterparts:
  - **Anbaric** and **PSEG-Orsted** capping mechanisms are comparable, where Anbaric is more effective in mitigating overall downside risks.
  - **MAOD's** 15% hard cap on capital costs is the most effective in reducing cost overrun risks.
  - **NEETMH** proposals are less effective in capping capital costs and equity%.

Option 3: Scenario Performance





Note: NPVRR per interlink is shown in the graphics above, each proposal may have multiple links.

- Though **Anbaric** proposals have slightly stronger caps, **PSEG-Orsted #871** shows lowest NPVRR $ increase due to its low base case costs.
- **NEETMH #359** is highly levered at 70% debt, resulting in significant risk under high equity% and cost of debt 6% scenarios, in terms of both NPVRR $ increase and % increase from base case. Cost overrun and downside risks are also considerable due to ineffective caps and large base case project costs.

Legal Review of Cost Commitment

Cost Containment – Legal Language

PROPOSING ENTITY	Proposed Legal Language Complete?	RISK LEVEL ASSOCIATED WITH: Delay in DEA Negotiation	Third Party Challenges
Anbaric Development Partners, LLC 131, 145, 183, 285, 568, 574, 802, 831, 841, 882, 921, 944, 137, 243, 248, 428, 748, 889, 896	**Yes**	**Medium**	**Medium**
	• Proposer provided draft legal language for insertion into Schedule E; certain terms may require clarification • ROE cap; Proposer commits to ROE reduction if it doesn't achieve COD by projected in-service date; in-service date not yet defined • Capped equity structure; Proposer can be relieved of its capped equity structure commitment if it cannot obtain financing		
Atlantic Power Transmission LLC 172, 210, 769	**Yes**	**Medium**	**Medium**
	• Proposer provided draft legal language for insertion into Schedule E; certain important terms are undefined • ATRR is based on an increasing, fixed amount for each service year of the 40-year service period	• Each of the Fixed ATRRs will be subject to a one-time adjustment applying an Adjustment Factor; Adjustment Factor not yet defined • Proposer reserves the right to seek costs in excess of ATRR; unclear how this provision would be audited	• Schedule guarantees to be mutually agreed upon by the BPU and developer's vendors at a future time • Insufficient details on the components on the basis of base rate to fully evaluate the exclusions • No ROE cap • No capped equity structure

PROPOSING ENTITY	Proposed Legal Language Complete?	RISK LEVEL ASSOCIATED WITH: Delay in DEA Negotiation	Third Party Challenges
Con Edison 990	**No** • Proposer did not submit draft legal language for insertion in Schedule E; rather provided a summary of its proposal	**Medium** • Proposer bases "soft cap" mechanism on tariff language that has been approved for NYISO but not PJM • Certain proposed excluded costs are not clearly defined	**Medium** • No ROE cap • No capped equity structure • No schedule guarantee
LS Power Grid Mid-Atlantic, LLC (1) 72, 294, 627, 629, 781, 594	**Yes** • Proposer provided draft legal language for insertion into Schedule E; although certain terms may require clarification, language is similar language used in prior PJM DEAs	**Low**	**Low** • Proposer includes clear proposals for cost caps, ROE cap, equity structure cap and schedules
LS Power Grid Mid-Atlantic, LLC (2) 103, 203	**Yes** • Proposer provided draft legal language for insertion into Schedule E; although certain terms may require clarification, language is similar language used in prior PJM DEAs	**Low**	**Low** • Proposer includes clear proposals for cost caps, ROE cap, equity structure cap and schedules

PROPOSING ENTITY	Proposed Legal Language Complete?	RISK LEVEL ASSOCIATED WITH: Delay in DEA Negotiation	Third Party Challenges
Mid-Atlantic Offshore Development 321, 431, 551	**Yes**	**Low** • Includes a 15% cap on construction costs • No ROE cap	**Medium** • No capped equity structure • No schedule guarantee
NextEra Energy Transmission MidAtlantic Holdings, LLC (1) 11, 587, 982	**Yes** • Proposer provided draft legal language for insertion into Schedule E; certain terms may require clarification • ROE cap for life of project; capped equity structure for first 15 years	**Low** • No schedule guarantee • During construction and for one year after, Proposer will seek authorization to use 100% debt structure for purposes of accruing AFUDC	**Medium**
NextEra Energy Transmission MidAtlantic Holdings, LLC (2) 15, 27, 250, 298, 461, 604, 860, 359	**Yes** • Proposer provided draft legal language for insertion into Schedule E; certain terms may require clarification • Proposer proposes to recover a return on projects that exceed the cost cap at a lower ROE	**Medium** • Proposal contains a number of unique elements as compared to other proposals ((Debt Expense Cap, Annual O&M Cost Cap, Stranded Asset Mitigation, and adjustments to the Cap for multiple project awards, platform relocation and control centers)	**Medium**

PROPOSING ENTITY	Proposed Legal Language Complete?	RISK LEVEL ASSOCIATED WITH: Delay in DEA Negotiation	Third Party Challenges
PSEG/Orsted 208, 214, 230, 397, 613, 683, 871	**Yes**	**Medium**	**Medium**
	• Proposer provided draft legal language for insertion into Schedule E; certain terms may require clarification • Proposer proposes to make positive and negative adjustments construction cost cap based on changes in foreign exchange rates	• Proposer includes broader definition of force majeure to account for things like PJM/BPU/BOEM action or delay • Proposer seeks flexibility to change other aspects of the formula rate if FERC does not approve its requested ROE • ROE cap; capped equity structure	
Rise Light & Power / Outbridge Renewable Connector (1) 171, 376, 490, 582	**Yes**	**Medium**	**Medium**
	• Proposer provided draft legal language for insertion into Schedule E; however, the language is confusing and will require clarification	• Legal language suggests that the only cost elements covered by the cost cap are materials and equipment • ROE cap (applies for six years); capped equity structure	
Rise Light & Power / Outbridge Renewable Connector (2) 21	**Yes**	**Low**	**Medium**
	• Proposer provided draft legal language for insertion into Schedule E; certain terms may require clarification	• No proposed cost cap; proposed ROE cap and capped equity structure	

Next Steps

- PJM has shared all of its analysis completed to date with NJBPU
- NJBPU will complete its independent evaluation of the proposals and make its recommendation to the NJ Board of Commissioners for approval in October
- PJM and NJBPU will consider feedback and update findings where appropriate and provide an update at the August or September TEAC.

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Reliability Analysis Update

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Revision History

Version No.	Date	Description
1	7/14/2022	• Original slides posted
2	7/22/2022	• Corrected entity description for APT on slide 36. • Added line item for scenario 14 on slide 26. • Revised note on slides 27 and 29, added scenario 14 to slides 107, 108 and 109. • Updated slides 47 and 89 for option 1a PB-Cona upgrade.

Appendices

- Appendix A – Proposal Window Background
- Appendix B – Options 1a Proposals
- Appendix C – Option 1b Only Proposals
- Appendix D – Options 1b/2 and 3 Proposals
- Appendix E – Energy Market Simulations Results
- Appendix F – IARR Analysis Process and Results
- Appendix G – Cost Commitment Financial Analysis Background
- Appendix H – Cost Containment – Legal Review

Appendix A – Proposal Window Background

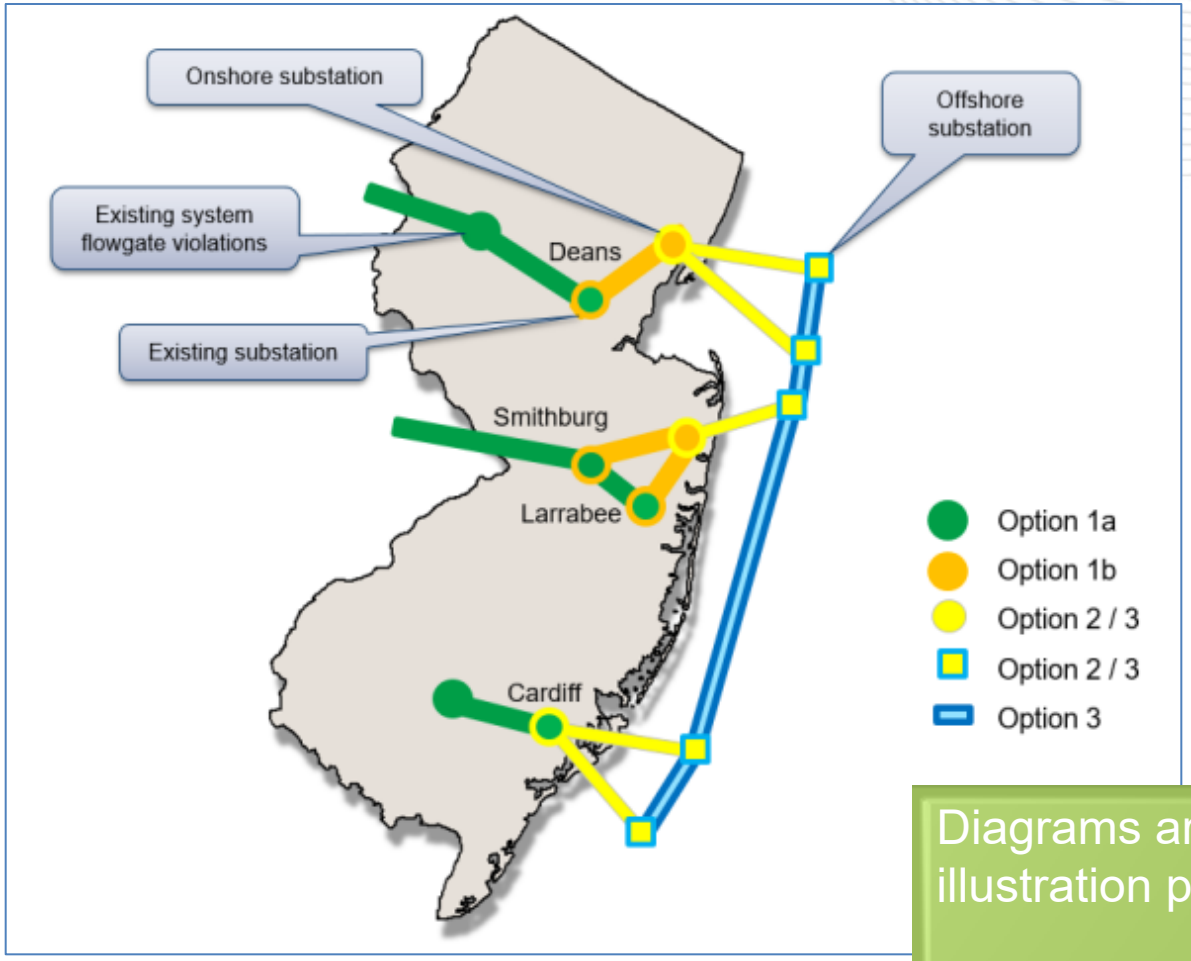
2021 SAA Proposal Window Scope

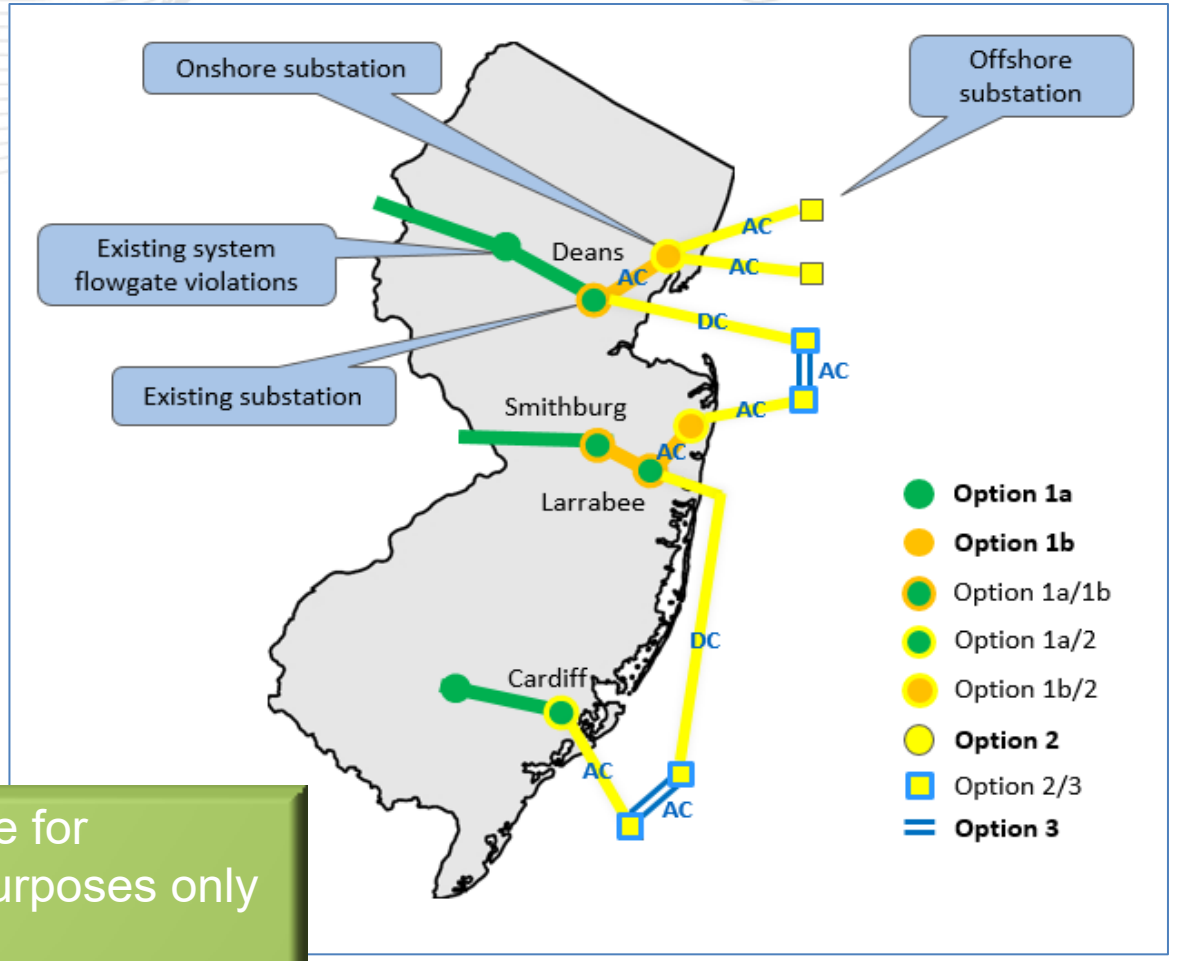
- Following a request from New Jersey BPU, PJM opened an RTEP proposal window to solicit submissions to build the necessary transmission to meet New Jersey's goal of facilitating the delivery of a total of 7,500 MW of offshore wind through 2035
  - Schedule
    - Open Window April 15, 2021
    - Close Window September 17, 2021

Description of Options

- Option 1a, Onshore Upgrades on Existing Facilities
- Option 1b, Onshore New Transmission Connection Facilities
- Option 2, Offshore New Transmission Connection Facilities
- Option 3, Offshore Network

Project Overview – Potential Solution Options





Diagrams are for illustration purposes only

NJBPU OSW Solicitation Schedule

Solicitation	Capability Target (MW)	Capability Awarded	Issue Date	Submittal Date	Award Date	Estimated Commercial Operation Date
1	1,100[(1)]	1,100	Q3 2018	Q4 2018	Q2 2019	2024-25
2	1,200-2400[(2)]	2,658	Q3 2020	Q4 2020	Q2 2021	2027-29
3	1,200	N/A	Q3 2022	Q4 2022	Q2 2023	2030
4	1,200	N/A	Q2 2024	Q3 2024	Q1 2025	2031
5	1,342	N/A	Q2 2026	Q3 2026	Q1 2027	2033

(1) NJBPU Solicitation Award - June, 2019
(2) NJBPU Solicitation Award - June, 2021
https://www.njcleanenergy.com/renewable-energy/programs/nj-offshore-wind/solicitations

Changes to Offshore Wind Injection Assumptions

Default POIs and Injection Amounts		Prior to June 30, 2021		After June 30, 2021	
Solicitation	POI	Awarded MW	Modelled* MW	Awarded MW	Modelled* MW
1	Oyster Creek 230 kV	1100	816*	1100	816*
1	BL England 138 kV		432*		432*
2	Cardiff 230 kV		900	1510	1510
2	Smithburg 500 kV		1200	1148	1148
3-5	Deans 500 kV		3100		2542
3-5	Larrabee		1200		1200
TOTAL		**1100**	**7648**	**3758**	**7648**

* Solicitation #1 modeled MW per awarded queue position.

Current Status to Review 2021 SAA Proposal Window for NJ OSW

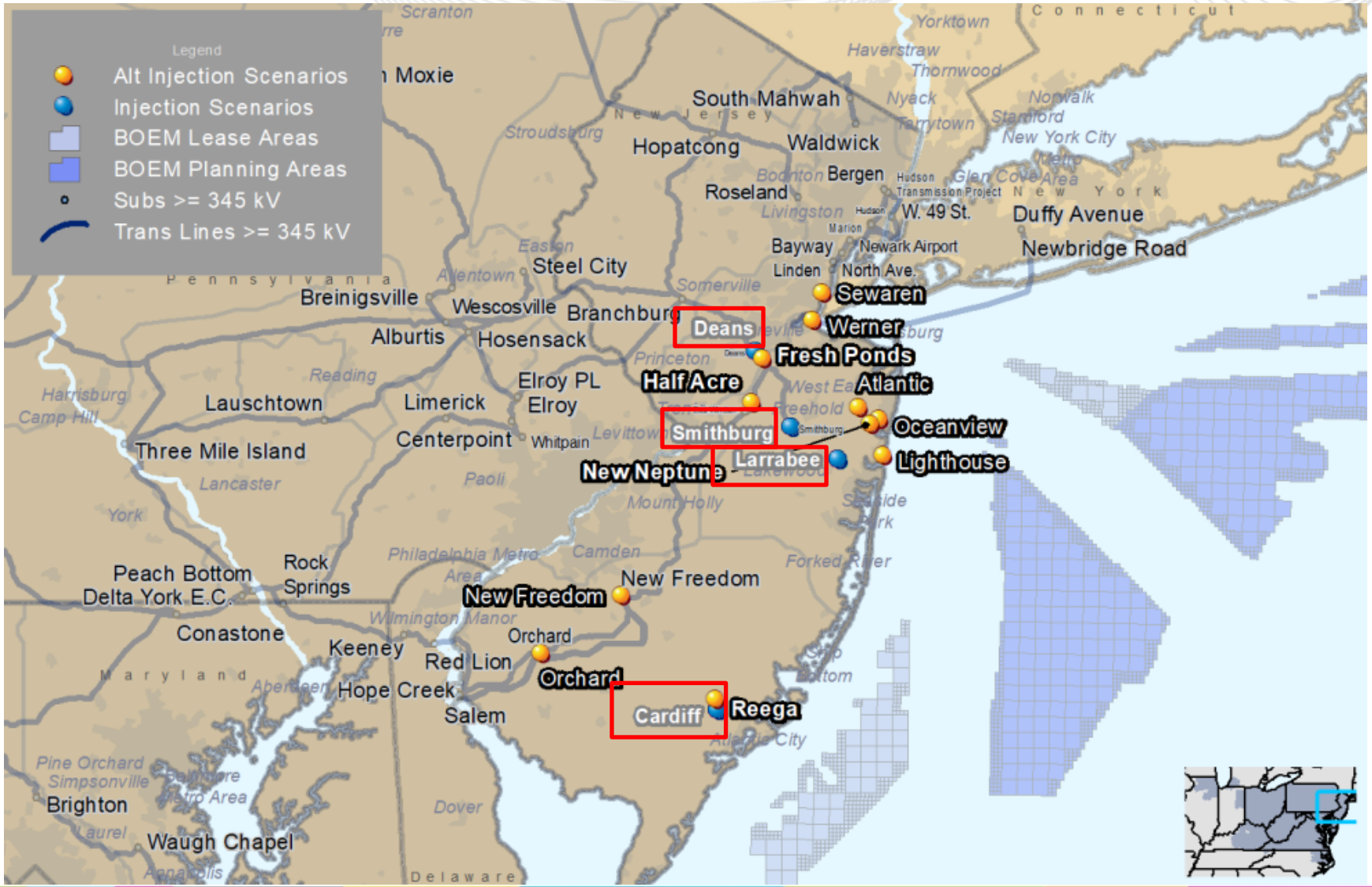
- Proposal evaluations are ongoing and additional details are expected to be available for the November TEAC
- Total number of individual proposals received: 80
- Total number of proposals with Cost Commitment provisions: 57

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

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

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

Default and Alternate Injection Locations



Alternative Points of Injection

- **New Substations**
  - **Reega** 230 kV substation that taps Cardiff-New Freedom 230 kV
  - **Neptune** 230 kV substation that taps Oceanview-Larrabee 230 kV and Oceanview-Atlantic 230 kV
  - **Fresh Ponds** 500 kV substation that taps Deans-Windsor 500 kV and Deans-Smithburg 500 kV
  - **Half Acre** 500 kV substation that taps Deans-Windsor 500 kV
  - **Lighthouse** 500 kV substation at the shore that connects to a new Crossroads 500/230 kV substation near Larrabee 230 kV
- **Existing Substations**
  - **Atlantic** 230 kV, Oceanview 230 kV, Sewaren 230 kV, **Werner** 230 kV, New Freedom 230 kV, Orchard 500 kV

Appendix B - Options 1a Proposal Clusters

Option 1a Proposals

- PJM has divided the Option 1a proposals into multiple geographical clusters to facilitate reviews
  - Northern NJ
  - Central NJ
  - Southern NJ
  - Southern NJ Border
  - PA-MD Border

Option 1a Proposals: Northern NJ Cluster

IDs	Brief Description	Location	TO Zone	Cost Estimate($M)
180.3, 180.4, 180.7	Linden & Bergen Subprojects	Northern NJ	PSEG	30.45
44.2, 44.3 or 651.7, 651.8 or 315.3, 315.4	New Aldene PAR Upgrade Bergen 138 kV bus section	Northern NJ	PSEG	18
651.4	Reconductor Pierson Ave H-Metuchen 230 kV	Northern NJ	PSEG	1

Option 1a Proposals: Central NJ Cluster

IDs	Brief Description	Location	TO Zone	Cost Estimate($M)
17.11, 17.18	Add third Smithburg 500/230 kV	Central NJ	JCPL	17.52
331.1, 331.11, 331.12 or 878.1, 878.3, 878.4	Build new Atlantic-Smithburg 230 kV	Central NJ	JCPL	81.04
44.4 or 315.5 or 878.7	Eliminate contingencies that derate Smithburg-East Windsor 230 kV winter rating	Central NJ	JCPL	5
17.8, 17.9, 17.10	Local 34.5 kV upgrades	Central NJ	JCPL	15.02
520.1, 520.4, 520.5	New Atlantic-Oceanview 230 kV; loop in existing Larrabee-Oceanview 230 kV into Atlantic 230 kV	Central NJ	JCPL	21.983
331.15, 331.16 or 878.8, 878.9	New Larrabee-Oceanview 230 kV	Central NJ	JCPL	61.97
17.4, 17.5, 17.6	New Smithburg-East Windsor 500 kV line	Central NJ	JCPL	174.11

Option 1a Proposals: Central NJ Cluster

IDs	Brief Description	Location	TO Zone	Cost Estimate($M)
651.6	Put Smithburg 500/230 kV spare transformer in service	Central NJ	JCPL	11.51
331.4, 331.5	Reconductor Atlantic-Smithburg 230 kV	Central NJ	JCPL	32.38
331.2, 331.3	Reconductor Larrabee-Smithburg 230 kV 1 & 2	Central NJ	JCPL	30.56
331.7	Reconductor Raritan River-Kilmer 230 kV	Central NJ	JCPL	7.91
331.10	Reconductor Smithburg-East Windsor 230 kV	Central NJ	JCPL	5
331.8, 331.9	Reconductor Windsor-East Windsor 230 kV 1 & 2	Central NJ	JCPL	6.86
17.17	Upgrade Hopewell-Lawrence 230 kV	Central NJ	JCPL	3.13
17.1, 17.2, 17.3, 17.12, 17.13, 17.21	Upgrade Oyster Creek-Manitou 230 kV 1 & 2	Central NJ	JCPL	46.06

Option 1a Proposals: Central NJ Cluster

IDs	Brief Description	Location	TO Zone	Cost Estimate($M)
793.3, 793.4	Upgrade Oyster Creek-Manitou 230 kV 1 & 2	Central NJ	JCPL	10
17.7	Upgrade Smithburg-Deans 500 kV	Central NJ	JCPL	13.24
21	Werner 230 kV BESS	Central NJ	JCPL	167.94
158.1 or 651.3	Reconductor Gilbert-Springfield 230 kV	Central NJ	JCPL/PPL	15.53
330	Reconductor Gilbert-Springfield 230 kV	Central NJ	JCPL/PPL	0.38
315.2 or 331.6 or 651.2 or 878.2	Reconductor Windsor-Clarksville 230 kV	Central NJ	JCPL/PSEG	10.09
17.14, 17.15	Upgrade Windsor-Clarksville 230 kV	Central NJ	JCPL/PSEG	3.81
180.5, 180.6	Windsor to Clarksville Subproject	Central NJ	JCPL/PSEG	5.77

Option 1a Proposals: Central NJ Cluster

IDs	Brief Description	Location	TO Zone	Cost Estimate($M)
180.1, 180.2	Brunswick to Deans & Deans Subprojects	Central NJ	PSEG	50.54
651.5	Increase Deans 500/230 kV #3 rating	Central NJ	PSEG	8.36
17.16	Reconductor Clarksville-Lawrence 230 kV	Central NJ	PSEG	32.10
44.1 or 315.1 or 651.1	Reconductor Deans-Brunswick 230 kV	Central NJ	PSEG	4.68
103	New Old York 500/230 kV substation	Central NJ	JCPL/PSEG	75.63
331.13, 331.14 or 520.2, 520.3 or 878.5, 878.6	Add PAR Red Oak-Raritan River 230 kV 1 & 2	Central NJ	PSEG/JCPL	30
17.19, 17.20	Upgrade Lake Nelson I-Middlesex 230 kV	Central NJ	PSEG/JCPL	5.09

Option 1a Proposals: Southern NJ Cluster

IDs	Brief Description	Location	TO Zone	Cost Estimate($M)
793.7, 793.10	Add PAR on Cardiff-Cedar 230 kV at Cardiff	Southern NJ	AE	19.03
127.8 or 734.9 or 929.9 or 975.9	Rebuild Cardiff 230 kV substation	Southern NJ	AE	70.10
793.1, 793.2	Reconductor Cardiff-Lewis 138 kV 1 & 2	Southern NJ	AE	5.27
793.8	Replace Cardiff 230/138 kV	Southern NJ	AE	10
793.9	Replace Cardiff 230/69 kV	Southern NJ	AE	10
127.1 or 734.1 or 929.1 or 975.1	Upgrade Cardiff-Lewis 138 kV	Southern NJ	AE	0.1
127.2 or 734.2 or 929.2 or 975.2	Upgrade Lewis No. 2-Lewis No. 1 138 kV	Southern NJ	AE	0.5
929.12	Upgrade Orchard 500/230 kV substation	Southern NJ	AE	38.22

Option 1a Proposals: Southern NJ Cluster

IDs	Brief Description	Location	TO Zone	Cost Estimate($M)
793.5, 793.6	Add PAR on New Freedom-Hilltop 230 kV at New Freedom	Southern NJ	PSEG	15
127.9 or 734.10 or 929.9	Rebuild Cardiff-New Freedom 230 kV as DCTL	Southern NJ	PSEG/AE	154.66
127.3 or 734.3 or 929.3 or 975.3	Upgrade Cardiff-New Freedom 230 kV	Southern NJ	PSEG/AE	0.3

Option 1a Proposals: Southern NJ Border Cluster

IDs	Brief Description	Location	TO Zone	Cost Estimate($M)
158.3	Red Lion 500 kV substation upgrade	Southern NJ Border	DPL	5
734.7 or 929.7 or 975.7	Install Smart Wire on Richmond-Waneeta 230 kV	Southern NJ Border	PECO	4.7
127.10 or 929.10	Reconductor Richmond-Waneeta 230 kV	Southern NJ Border	PECO	16
158.2	Reconductor Richmond-Waneeta 230 kV	Southern NJ Border	PECO	4.15
11.11, 11.12 or 793.11, 793.12	Add two PARs at Hope Creek 230 kV	Southern NJ Border	PSEG/SRE	30
419	New Bridgeport-Claymont 230 kV DE river crossing	Southern NJ Border	PSEG/SRE	193.07
894	One additional Hope Creek-Silver Run 230 kV submarine cable	Southern NJ Border	PSEG/SRE	71.92
229	One additional Hope Creek-Silver Run 230 kV submarine cables and rerate plus upgrade line	Southern NJ Border	PSEG/SRE	61.20

Option 1a Proposals: PA-MD Border Cluster

IDs	Brief Description	Location	TO Zone	Cost Estimate($M)
11.1-11.4, 11.7-11.12	1A-Wiley1	PA-MD Border	PECO/BGE	202.06
982.1-982.6 982.9-982.12	1A-Wiley2	PA-MD Border	PECO/BGE	181.92
587.1,587.2, 587.5-587.7	1A-Wiley3	PA-MD Border	PECO/BGE	96.44
203	Broad Creek to Robinson Run Project	PA-MD Border	PECO/BGE	104.18
63	North Delta Option A	PA-MD Border	PECO/BGE	109.68
296	North Delta Option B	PA-MD Border	PECO/BGE	87.02

Option 1a Proposals: PA-MD Border Cluster

IDs	Brief Description	Location	TO Zone	Cost Estimate($M)
127.4-127.6, 127.11 or 734.4-734.6, 734.11 or 929.4-929.6, 929.11 or 975.4-975.6, 975.11 127.7 or 734.8 or 929.8 or 975.8 Incumbent TO Incumbent TO	Reconductor Peach Bottom-Conastone 500 kV Reconductor Peach Bottom - Furnace Run 500 kV Replace Furnace Run 500/230 kV Transformers 1 & 2 Reconductor Furnace Run-Conastone 230 kV 1 & 2	PA-MD Border	PECO/BGE	201.10
345.1-345.3	Second Peach Bottom-Conastone 500 kV	PA-MD Border	PECO/BGE	104.29

Appendix C - Option 1b Only Proposals

Option 1b- Proposal Overview
ACE #797

- **Proposal Description:**

  Build new transition vault connecting 275 kV offshore cables (1200MW) and 275 kV onshore cables, build new 275 kV transmission lines between transition vault and new 275-230 kV substation near Cardiff, and build new 275-230 kV substation near Cardiff connected to existing substation at Cardiff

- **Upgrade/Greenfield:** Greenfield
- **Points of Injection:** Cardiff (1200MW)
- **Project Cost:** $243M
- **Project In Service Date:** 2Q2028
- **Landfall location:** Great Egg Harbor
- **Interactions with other proposals:** #127, 929, 975
- **Cost commitment:** No

- **Proposal Description:**
  Upgrade/Expansion of Smithburg Substation and East Windsor Substation
  New Larrabee Converter – Smithburg 500kV Lines - 2 Circuits

- **Upgrade/Greenfield:** Upgrade and Greenfield components
- **Points of Injection:** Smithburg (1342MW), Larrabee (1200MW), Atlantic (1200MW)
- **Project Cost:** $660M
- **Project In Service Date:** 2027- 2032, work phased to solicitation schedule
- **Landfall location:** NA
- **Interactions with other proposals:** 431, 551, 321
- **Cost commitment:** No

- **Proposal Description:**
  Multiple Scenarios onshore to accommodate injections up to 6000MWs
  500 kV HVAC OH/UG cable, 4 new 500kV substations, multiple transmission line cut-ins
  450 Mvar dynamic reactive control
- **Points of Injection:** Alternate POI that extends to Deans-Windsor, Larrabee and/or Smithburg, Windsor
- **Project Cost:** $1.7-2.2B
- **Project In Service Date:** 1Q2028-1Q2030
- **Landfall location:** Sea Girt
- **Offshore Lease Areas targeted:** NY Bight Hudson South, OW2/AS1
- **Interactions with other proposals:** #594
- **Cost commitment:** Yes
  Capping project cost, transmission revenue, ROE, Equity Percentage
  Exceptions: Force Majeure, Scope change

Option 1b- Proposal Overview
Rise Light #582, 490, 376, 171, 21

- **Proposal Description:**
  One or two 1200 MW 320kV HVDC lines from Werner to new converter station
  Tie into existing Deans-East Windsor line and shore station and battery
  Option to inject up to 400 or 800 MW 275kV AC direct at Werner

- **Upgrade/Greenfield:** Greenfield
- **Points of Injection:** Werner, Tie into Deans-East Windsor
- **Project Cost:** $1b-1.8B
- **Project In Service Date:** 1Q2028
- **Landfall location:** Werner, Raritan Bay
- **Interactions with other proposals:** NA
- **Cost commitment:** Yes
  Capping partial project costs, ROE, Equity percentage
  Exceptions: Taxes, AFUDC, Escalation, Force Majeure, Scope change

Appendix D - Options 1b, 2 and 3 Proposals

Option 1b/2 Proposals Overview

Anbaric #841, 831, 574, 944, 802, 183, 921, 802, 131, 145, 882, 568

- **Proposal Description (include AC/DC, Voltage, MW Capability)**
  8 options to inject power into Deans, Sewaren and Larrabee
  1400MW per ckt, +/-400kV HVDC for Solicitation #3-5
  Circuits for Solicitation #2 OSW projects sized to meet award amount
- **Points of Injection:** Deans, Sewaren, Larrabee
- **Project Cost:** $2B - $10B+
- **Project In Service Date:** 3Q2027-1Q2033
- **Landfall location:** Keyport (Deans), Bay Head (Larrabee), Perth Amboy (Sewaren)
- **Offshore Lease Areas targeted:** NY Bight Hudson South, OW2/AS1
- **Interactions with other proposals:** 428, 889, 748, 896, 243, 258, 137
- **Cost commitment:** Yes
  Capping Project cost, ROE, Equity
  Exceptions: Taxes, AFUDC, Escalation, Force Majeure, Scope change

Option 3 Proposals Overview
Anbaric # 428, 889, 748, 896, 243, 258, 137

- **Proposal Description:**
  7 options for HVDC Platform Interlinks
  700MW capacity, +/-400kV HVDC

- **Points of Injection:** NA
- **Project Cost:** $66-105M (for a single interlink)
- **Project In Service Date:** 2033
- **Landfall location:** NA
- **Offshore Lease Areas targeted:** NY Bight Hudson South, OW2/AS1
- **Interactions with other proposals:** 841, 831, 574, 944, 802, 183, 921, 802, 131, 145, 882, 568
- **Cost commitment:** Yes
  Capping project cost, ROE, Equity percentage,
  Exceptions: Taxes, AFUDC, Escalation, Force Majeure, Scope change

Options 1b/2 – Proposals Overview
APT #210, 172, 769

- **Proposal Description:**
  First, Second, Third submarine circuits, 1,200 MW, +/-320kV HVDC
  Offshore 1235MW Converter Station and Supporting Platform
  Onshore 1200 MW Converter Station
  Onshore Transmission - UG construction shore to converter station
- **Points of Injection:** Deans 500kV - 1200, 2400 or 3600MW
- **Project Cost Project Cost:** 1st 1200MW-$2B, 2nd 1200MW-$1.6B, 3rd 1200MW $1.5B
- **Project In Service Date:** 1st 1Q2030, 2nd 1Q2031, 3rd, 1Q2031
- **Landfall location:** Raritan Bay near existing retired generating power station
- **Offshore Lease Areas targeted:** NY Bight Hudson South/North, OW2/AS1
- **Interactions with other proposals:** 210 is base proposal, 172 and 769 options can be combined with base
- **Cost commitment:** Yes
  Fixed Revenue Requirement, Cost cap subject to initial adjustment for change based on foreign exchange rates and commodity price fluctuations
  Exceptions:, Force Majeure, Scope/cable length change

Options 1b/2 and 3 – Proposal Overview

ConEd #990

- **Proposal Description:**
  Base case – 2-1200 MW 320kV HVDC lines, 1 circuit to Larrabee and 1 circuit to Smithburg
  Ability to extend to Deans.
  Ability to connect platforms via AC cables

- **Points of Injection:** Larrabee(1200MW), Smithburg (1200MW) and Deans optional (1200MW)
- **Project Cost:** $1.3B-$5.2B
- **Project In Service Date:** 2Q2028
- **Landfall location:** Sea Girt
- **Offshore Lease Areas targeted:** NY Bight Hudson South, OW2/AS1
- **Interactions with other proposals:** NA
- **Cost commitment:** Yes
  Capping project cost (Soft cap)
  Exceptions: Cost of Debt, ROW, Force Majeure, Scope change

Option 2 - Proposal
LSP # 594 Overview

- **Proposal Description:**
  2-platforms each with 4-345 kV AC cables to shore, expandable to 6 cables.
  4,000 MW (option for 6,000 MW)

- **Points of Injection:** NA
- **Project Cost:** $2.5B
- **Project In Service Date:** 2Q2029
- **Landfall location:** NA
- **Offshore Lease Areas targeted:** NY Bight Hudson South, OW2/AS1
- **Interactions with other proposals:** #781, 294, 629, 72, 627
- **Cost commitment:** Yes
  Capping project cost, transmission revenue, ROE, Equity Percentage
  Exceptions: Force Majeure, Scope change

Options 1b/2 and 3 Proposal Overview
MAOD #321, 431, 551

- **Proposal Description:**

  3 proposals to bring 2400, 3600 or 4800 MW via Larrabee converter station. Four offshore 1200MW +/-320kV HVDC submarine cables to four offshore platforms, includes normally open ties between platforms, includes the converter station platforms
- **Points of Injection:** Larrabee, Smithburg, Atlantic
- **Project Cost:** 2400MW-$3B, 3600MW $4.41B, 4800MW $5.72B
- **Project In Service Date:** 1st Ckt – 4Q2029, 2nd CKT 4Q2030, 4th Ckt 4Q3032
- **Landfall location:** Sea Girt
- **Offshore Lease Areas targeted:** NY Bight Hudson South, OW2/AS1
- **Interactions with other proposals:** NA
- **Cost commitment:** Yes

  Capping Capital Cost

  Exceptions: Taxes, AFUDC, Escalation, Force Majeure, Scope change

Options 1b/2 - Proposal Overview

NEET #461, 860, 250, 44, 315, 651, 27, 298, 15, 520, 878, 331, 604, 793

- **Proposal Description:**
- 7 options to inject power into Deans, Neptune (new station near existing Oceanview) and Cardiff
- 1500MW +/-400kV HVDC circuits
  Offshore 1500 MW VSC Converter Station and Supporting Platform
  Onshore/offshore 1500 MW VSC Converter Stations
- **Points of Injection:** Deans (3000, 4500, 6000MW), Oceanview (1500, 2400, 3000MW), Cardiff (2700MW)
- **Project Cost:** $1.5-7.1B
- **Project In Service Date:** 4Q2027-2Q2029
- **Landfall location:** Raritan Bay, Asbury Park, Absecon Beach
- **Offshore Lease Areas targeted:** NY Bight Hudson South, OW2/AS1
- **Interactions with other proposals:** 359
- **Cost commitment:** Yes
  Capping project cost, ROE, Equity percentage, O&M
  Exceptions: AFUDC, Force Majeure, Scope change

- **Proposal Description:**
- 4 Options for 800 MVA 230kV AC Platform links

- **Points of Injection:** NA
- **Project Cost:** $7-356M
- **Project In Service Date:**
- **Landfall location:** NA
- **Offshore Lease Areas targeted:** NA
- **Interactions with other proposals:** 461, 860, 250, 44, 315,651, 27, 298, 15, 520, 878, 331, 604, 793
- **Cost commitment:** Yes

  Capping project cost, ROE, Equity percentage, O&M

  Exceptions: AFUDC, Force Majeure, Scope change

Options 1b/2 and 3 – Proposal Overview
PSEGRT #208, 214, 397, 230, 613, 683, 871

- **Proposal Description:**
  Multiple options ranging from 1200MW up to 4200MW,
  320 kV HVDC or 400kV HVDC
  with interlinks, normally closed for multiple platforms

- **Points of Injection:** Sewaren (1200/1400MW), Larrabee (1200/1400MW), Deans (1400MW)
- **Project Cost:** $2.5-9B
- **Project In Service Date:** 4Q2029-4Q2032
- **Landfall location:** Sea Girt, Key Port
- **Offshore Lease Areas targeted:** NY Bight Hudson South, OW2/AS1
- **Interactions with other proposals:** NA
- **Cost commitment:** Yes
  Capping project cost, ROE, equity percentage
  Exceptions: Debt, Taxes, AFUDC, Escalation, Force Majeure, SOW change

Appendix E – Energy Market Simulations Results

Appendix E – Energy Market Simulation Results

Option 1b Only Proposals

Option 1b Proposals Results: OSW POI Summary, Production Cost, Emissions

OSW Scenario Summary

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

PJM Production Cost ($Million)

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

NJ Emissions (Metric Tons)

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

Option 1b Proposals Results: Load Payments

Zonal Annual Gross Load Payment ($Million)

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

Option 1b Proposals Results: LMPs

Zonal Load-Weighted LMPs ($/MWh)

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

Appendix E – Energy Market Results

Option 1b/2 Proposals

Option 1b/2 Proposals Results: OSW POI Summary

OSW Scenario Summary

Scenario	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
4	23,356,955	702	$730.70	$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	23,316,594	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
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

Option 1b/2 Proposals Results: Production Cost, Emissions

PJM Production Cost ($Million)

Scenarios	PJM Production Cost ($M)
1.2	$ 18,867.37
1.2a	$ 18,858.77
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	$ 18,858.38
20a	$ 18,857.74

NJ Emissions (Metric Tons)

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
4	2,551	1,462	7,129,594
4a	2,551	1,465	7,151,385
5	2,554	1,466	7,149,926
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

Option 1b/2 Proposals Results: Load Payments

Zonal Annual Gross Load Payment ($Million)

Scenario	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	$555	$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
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	$465	$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	$821	$1,574	$51	$2,791	$1,675	$1,145	$464	$2,265	$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

Option 1b/2 Proposals Results: LMP

Zonal Load-Weighted LMPs ($/MWh)

Scenario	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
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

Appendix F
Incremental Auction Revenue Rights (IARRs) Process and Preliminary Results

Background

- NJ BPU Incremental Auction Revenue Rights (IARRs) are determined using the current process for Regional Transmission Expansion Plan (RTEP) Incremental Rights-Eligible Required Transmission Enhancements.

- 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, and this process is performed on annual basis for all IARR-eligible RTEP projects.

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 constraint most relieved by the RTEP upgrade.

- PJM determines an eligible path and evaluates if IARRs could be awarded:
  - Source: aggregate pnode up to ten generator buses.
  - Sink: zone
  - MWs

IARR Analysis Assumptions

- Based on the current operation/market model.
- IARR Analysis utilizes Simultaneous Feasibility Test
  - All requested annual Auction Revenue Rights (ARRs) are modeled as generation at source points and load at sink points.
- Model and current limiting facilities are posted on PJM website:
  - https://www.pjm.com/markets-and-operations/ftr
- Additional information on IARR evaluation is described in the PJM Manual 6, Section 4.9.2, and this process is performed on annual basis for all IARR-eligible.

IARR Analysis Steps

- Identifying constraint most relieved by upgrades
  - Peach Bottom – Conastone

- Determining an eligible IARR path:
  - Source: Hunterstown, Westport, Wagner, Calvert Cliffs
  - Sink: BGE

- Calculating the IARR capability:
  - Transfer capability before upgrades
  - Transfer capability after upgrades
  - The difference

Proposals Analyzed

- Proposal #63 - North Delta Option A (Double Circuit)
- Proposal #296 - North Delta Option B (Series Reactor)
- Proposal #203 - The Broad Creek - Robinson Run Transmission Project
- Proposal #345 - New 500 kV Peach Bottom - Conastone Line
- Proposal #587 - Wiley Rd – Conastone 500 kV Project

IARR Analysis Conclusion – Limiting Facilities

- Example of limiting facilities

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

- The completed limiting facility list:
  - https://pjm.com/-/media/markets-ops/ftr/iarr-limiting-facilities.ashx
  - Update annually

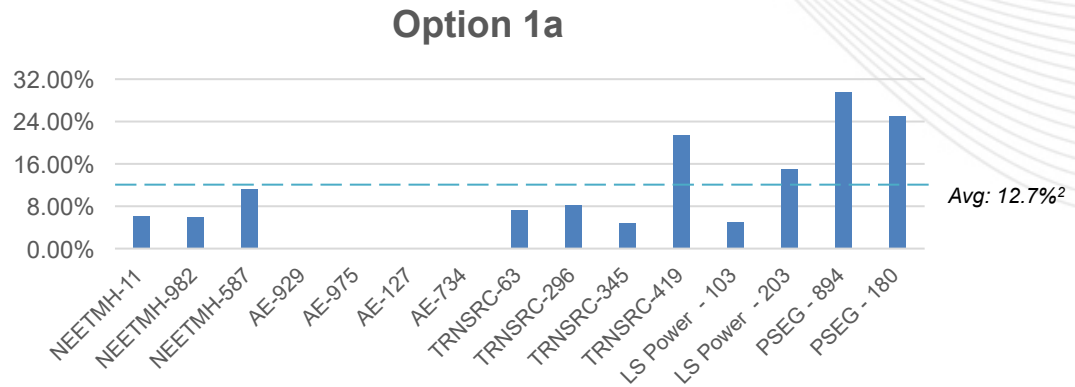
IARR Analysis Conclusion

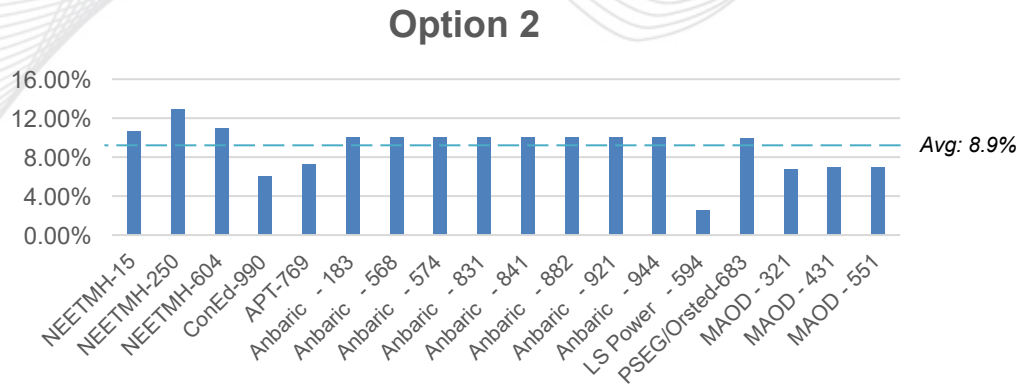
- No available IARRs were found for any of the proposals analyzed.

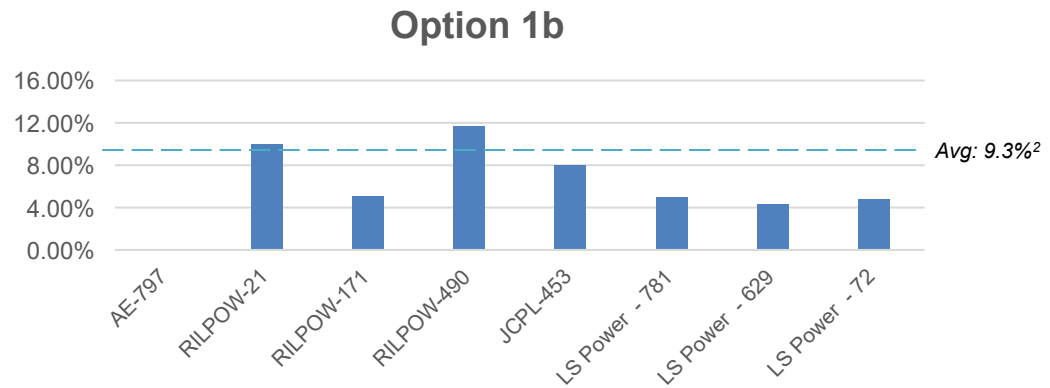
- Analysis based on the current operation/market model and on the current annual requested Auction Revenue Rights (ARRs)

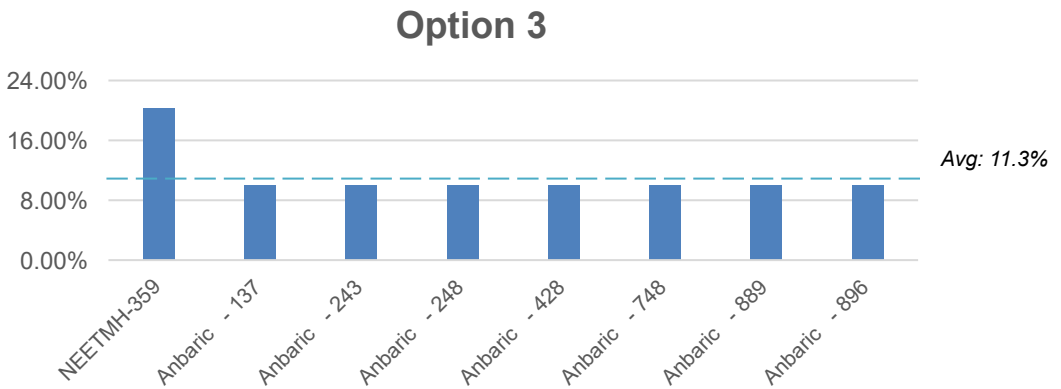
Appendix G – Cost Commitment Financial Analysis Background

Appendix G – Contingency[1]









- **Average contingency % across all proposals is 10.6%** (excluding work by others)
  - PSEG, Transource, and NEETMH are the only developers with > 20% contingency % (only specific proposals)
- **Option 1a proposals have the widest range** compared to other options: 0% (AE) – 29.5% (PSEG #894)
  - Higher contingency % by PSEG #894 and TRNSRC # 419 likely driven by higher risks from installing submarine cables
- **Anbaric' s contingency level, 10%, is consistent across all proposals**, while other proposers' contingency % vary by option and proposal
- **AE is the only proposer with zero contingency cost**

Note: (1) Contingency % is calculated as: [Contingency from Proposer] / ([Total Proposer Capex] – [Contingency from Proposer])
(2) Excludes AE proposals which have no contingency listed

Appendix G – Option 1A Proposals Modeled

Developer	Project ID	Component	Cost Cap	Component Current-year costs ($M)							PB-CONA Total
LS Power	203	1. Broad Creek 230/500kV Substation 2. Robinson Run 500kV Switching Station 3. Broad Creek - Robinson Run 230/500kV Transmission Line 4. Graceton - Bagley #1 230kV Interconnection 5. Graceton - Bagley #2 230kV Interconnection 6. Delta Power Plant - Peach Bottom 500kV Interconnection	Yes (red components only)	57.578	11.81	32.262	0.69	0.69	1.15		104.18
Transource	63	All	No	1.551	76.266	28.741	1.559	1.559			109.676
Transource	296	All	No	54.03	24.259	2.616	2.616	3.5			87.021
Transource	345	All	No	86.758	4.682	12.854					104.294
NEETMH	587	1. Wiley Rd Substation 500 kV 2. Wiley Rd - Conastone 500 kV OH 5. Conastone 500kV Substation Upgrade 6. Loop in existing Peach Bottom - Delta 500 kV OH line circuit into NEETMA...	Yes (red components only)	40.788	43.57	6.08	3	3			96.438
ACE	127	4. Upgrade Peach Bottom-Conastone 500 kV line 5. Upgrade Peach Bottom South substation 6. Upgrade Conastone substation 7. Upgrade Peach Bottom-Furnace Run 500 kV line 11. Upgrade Peach Bottom North substation **PJM identified Incumbent Upgrade: Replace Furnace Run 500/230 kV Transformers 1 & 2** **PJM identified Incumbent Upgrade: Reconductor Furnace Run-Conastone 230 kV 1 & 2**	No	36.289	49.598	2.078	23	0.13	**50**	**40**	201.095

Appendix G – Option 1B Only & Option 1B/2 Proposals Modeled

							Red Text indicates Proposing Entity Injections Black Text indicates Other Entity injections			Injections >6400 MW Negative if <6400 MW	Use for $/MW Calculation	
#	Developer	Option 1a	Option 1b	Option 2	Option 3	CRA Comments/Questions	Cardiff (Sol#2) (1510 MW)	Smithburg (Sol#2) (1148 MW)	Solicitations 3,4&5 (3742 MW)	Unused MW	Total Used MW	Groups
Pairing 1	**AE**	No Option 1a pairings except for AE(929)	AE (929, 797)		No Option 3 pairings	Combine AE Option 1a (#929) and Option 1b (#797) to allow 1148 MW and 1510 MW injections at Cardiff from Transition Vault. 2658 MW Total	2658	Moved	0	-3742	2658	**Option 1b Only Group. No Offshore Component**
Pairing 2	**JCPL**		JCPL (453)			Allows transfer from Larrabee CS to Smithburg 2490MW, to Larrabee1200 MW, to Atlantic1200 MW. 4890 MW Total	1510	2490	2400	0	4890	
Pairing 3	**RILPOW**		RILPOW (171 & 490)			Combine Base Offer 2 - 2400MW into Deans (#490) and Additional Offer B - 800 MW into Werner (#171). 3200 MW Total	1510	1148	3200	-542	3200	
Pairing 4	**LS Power**		LS Power (629) LS Power (781) LS Power (627) LS Power (294)			Four Separate LS Power Option 1Bs - 629, and 781. Two options to allow transfer of 6000 MW from Lighthouse. Two options for transfer of 4200 MW from Lighthouse.	1510 1510 1510 1510	Moved Moved 1148 1148	4890 4890 3742 3742	1110 710 458 458	4890 4890 3742 3742	
Pairing 5	**JCPL-MAOD**		JCPL (453)	MAOD (321)		Combine JCPL 1b (#453) and MAOD option 2 proposal 3 (#321) to inject 2400 MW at Smithburg, 1200 MW at Larrabee, and 1200 MW at Atlantic.	1510	2400	2400	-90	4800	**Option 1b/2 and 2 combinations for full solutions**
Pairing 6	**LS Power**		LS Power (627) LS Power (294)	LS Power (594)		2 Pairings of LS Power Option 1b (#627, #294) and Option 2 (#594) - i.e. #627 & 594, #s 294 & 594, for 4000 MW injections each at Lighthouse.	1510 1510	1148 1148	3742 3742	258 258	3742 3742	
Pairing 7	**Anbaric**		Anbaric (831, 841, 921, 131) Anbaric (831, 841, 921)			First Anbaric Option 2 combo (#s 831, 841, 921, & 131) for 2800 MW injection at Deans, 1200 MW at Larrabee, 1400 MW at Sewaren. 5400 MW Total. Second Anbaric Option 2 combo ((#s 831, 841, 921) for 2800 MW injection at Deans, and 1200 MW at Larrabee.	1510 1510	1148 1148	4890 3742	510 258	4890 3742	
Pairing 8	**APT**		APT (210, 172, & 769)			Combine APT First, Second, and Third (#s 210, 172, & 769) for 3600MW injection at Deans.	1510	1148 1200	3600	-142	3600	
Pairing 9	**ConEd**		ConEd (990) ConEd-Lite (990)			Injection of 2400 MW at Larrabee & Deans, or Deans (x2) Injection of 2400 MW at Larrabee & Smithburg, or Smithburg & Deans	1510 1510	1148 1200	2400 1200	-1342 -2490	2400 2400	
Pairing 10	**NEETMH**		NEETMH(860) NEETMH(461 & 27)			NEETMH Option 2 (#860) for injection of 4500 MW injection at Deans NEETMH Option 2s (#s 461, and 27) for 3000 MW at Deans, and 1500 MW at Oceanview	1510 1510	1148 1148	3742 3742	758 758	3742 3742	
Pairing 11	**PSEG-Orsted**		PSEG-Orsted (683) PSEG-Orsted (871)			2 Separate PSEG-Orsted scenarios. (#683) Provides 1400 MW injections each at Sewaren, Deans and Larrabee for 4200 MW total. (#871) 1400 MW injections each at Sewaren and Deans for 2800 MW total	1510 1510	1148 1148	3742 2800	458 -942	3742 2800	

Appendix H – Cost Containment – Legal Review

- **Cost Containment Elements:**
  - will not seek recovery through its ATRR of any Construction Costs in excess of the Construction Cost Cap Amount
  - ROE cap of 8.5%, incentive adders waived, for the life of the project (subject to adjustment)
  - capped capital structure with equity component no greater than 45% (subject to modification)
  - no schedule guarantee
- **Potential DEA Negotiation Delays:**
  - developer can be relieved of its capped equity structure commitment if it cannot obtain financing with the proposed capital structure
  - developer commits to ROE reduction if the project doesn't achieve COD by the projected in-service date (up to a maximum 30 basis points reduction); projected in-service date not yet defined by developer
  - excluded costs include, among other things, costs related to or resulting from Force Majeure or permitting delays or injunctive action by a court
    - Force Majeure is not defined by developer;
    - Unclear whether a permitting delay would result in an ROE reduction per the schedule guarantee
- **Potential Third Party Challenges:**
  - developer can be relieved of its capped equity structure commitment if "capital market conditions do not remain normal"
  - developer can seek to increase ROE cap if actual Construction Costs are less than Indexed Bid Construction Costs (50 basis point adder to the ROE for each 10% the Construction Costs are below Indexed Bid Construction Costs)

- **Cost Containment Elements:**
  - each Project's ATRR will be a fixed amount for each Service Year of the Transmission Service Term (40-year period) ("Fixed ATRR") (increased by 0.5% each year to account for projected increases in O&M)
  - before rate recovery begins, each of the Fixed ATRRs will be subject to a one-time adjustment applying an Adjustment Factor
  - developer can seek costs above the Fixed ATRR
  - no ROE or equity structure caps
  - undefined schedule guarantee
- **Potential DEA Negotiation Delays:**
  - Adjustment Factor to be applied to the Fixed ATRRs prior to rate recovery is based on a formula that has yet to be proposed
  - schedule guarantees to be mutually agreed upon by the BPU and developer's vendors at a future time
  - ATRR is a stated amount, but then APT reserves the right to seek costs in excess that are related to an Uncontrollable Force; unclear how PJM/APT would audit this provision
- **Potential Third Party Challenges:**
  - potential legal challenge depending on ROE and d/e ratio developer seeks for project
  - rate is not based on actual costs plus a FERC-approved return, but rather a fixed rate
  - rate increases year-by-year, which is atypical for rate recovery
  - rate recovery to begin on transmission service start date, regardless of whether any OSW generators have commenced commercial operations

- **Cost Containment Elements:**
  - Fixed Cost Cap for specified costs
  - Soft Cap of 30%; developer will forgo rate recovery of that percentage of capital costs in excess of the soft Cost Cap (i.e., its share of “certain potential cost overruns” will be set at 30%)
  - no ROE or equity structure caps
  - no schedule guarantee
- **Potential DEA Negotiation Delays:**
  - developer provided a summary of its cost commitment proposal, but did not provide proposed legal language for Schedule E to the DEA
  - the Soft Cap concept is based on a mechanism set forth in NYISO OATT; not yet approved or analyzed for PJM
  - some events developer claims would be out if its control are not clearly defined
  - costs associated with network upgrades excluded from cap
  - no schedule guarantee proposed
- **Potential Third Party Challenges:**
  - potential legal challenge depending on ROE and d/e ratio developer seeks for project

LS Power Overview (1 of 2)

 # 72, 294, 594, 627, 629, 781

- **Cost Containment Elements:**
  - includes both a Binding Project Cost Cap and a Binding Annual Revenue Requirement Cap
  - for the first 10 years of project operations, developer will not seek recovery of or on any Project Costs in excess of an amount equal to the lesser of: (i) the Binding Project Cost Cap Amount or (ii) the aggregate amount of actual Project Costs associated with the Project
  - ROE capped at 8.95% (inclusive adder) to apply to the initial investment for the life of the project; cap subject to up to 30 basis point reduction for schedule delays
  - equity capped at no more than 40%; cap to apply to the initial investment for the life of the project
  - Guaranteed completion dates for various project phases (subject to extension due to Uncontrollable Force or FM)
- **Potential DEA Negotiation Delays:**
  - developer includes as an Uncontrollable Force “a requirement to place any segment of the Project underground that was identified as above ground in the Proposal” – atypical as compared to other proposals
- **Potential Third Party Challenges:**
  - developer’s proposal is unique in that it includes both a Binding Project Cost Cap and a Binding ATRR Cap

LS Power Overview (2 of 2)

 # 103, 203

- **Cost Containment Elements:**
  - developer will not seek recovery of or on any Project Costs in excess of an amount equal to the lesser of: (i) the Binding Project Cost Cap Amount or (ii) the aggregate amount of actual Project Costs associated with the Project
  - no ROE or equity structure caps
  - no schedule guarantee
- **Potential DEA Negotiation Delays:**
  - no schedule guarantee proposed
- **Potential Third Party Challenges:**
  - potential legal challenges depending on ROE and d/e ratio developer seeks for the project

- **Cost Containment Elements:**
  - developer will not seek recovery of any Construction Costs in excess of an amount equal to the lesser of (i) the Construction Cost Cap Amount or (ii) the aggregate amount of actual Construction Costs
    - developer is offering a 15% cap on construction costs
  - no ROE or equity structure caps
  - no schedule guarantee
- **Potential DEA Negotiation Delays:**
  - no schedule guarantee proposed
  - O&M costs are excluded from the cap (atypical compared to the other proposals)
  - developer reserves right to adjust cost estimate and associated cost containment cap if cable location is adjusted
- **Potential Third Party Challenges:**
  - potential legal challenge depending on ROE and d/e ratio developer seeks for project

NEETMH Overview (1 of 2)

 # 11, 587, 982

- **Cost Containment Elements:**
  - Project Costs that exceed 100% of the Project Cost Cap will earn a 0% equity return. Developer will be allowed to recover the associated depreciation and debt cost
    - Project Cost Cap is a defined number for each project ID with escalation capped at 2% a year
  - ROE capped for the life of the project at the lower of: (i) 9.80%, inclusive of adders/incentives or (ii) FERC-approved ROE, inclusive of adders/incentives
  - Capital structure cap:
    - During construction and for one year after, developer will seek authorization to use 100% debt structure for purposes of accruing AFUDC
    - Following end of one-year post-construction period, developer will seek a maximum equity thickness of 40% equity for the first 15 years of the Project
  - No schedule guarantee
- **Potential DEA Negotiation Delays:**
  - no schedule guarantee proposed
- **Potential Third Party Challenges:**
  - potential legal challenges regarding the request to use 100% debt structure for purposes of accruing AFUDC

- **Cost Containment Elements:**
  - developer proposes to recover a return on projects that exceed the Project Cost Cap at a lower ROE
    - Project Costs between 100% and 125% of the Project Cost Cap less depreciation, will earn the Minimum ROE (7.84%)
    - Project Costs that exceed 125% of the Project Cost Cap will earn a 5% equity return
  - excluded costs include those related to uncontrollable forces (typical as compared to other developers) and construction AFUDC
  - ROE capped for the life of the project at the lower of: (i) 9.80%, inclusive of adders/incentives or (ii) FERC-approved ROE, inclusive of adders/incentives
    - If the Earned ROE is less than the ROE Floor, Designated Entity shall recover a revenue requirement adjustment through its formula rate sufficient to produce an Earned ROE equal to the ROE Floor
  - during construction and for one year after, developer will seek authorization to use 100% debt structure for purposes of accruing AFUDC
  - guaranteed in-service date of 6/31/29 (subject to extension due to an Uncontrollable Force)
    - For every year of delay beyond the Guaranteed Completion Date, 2% of the Project Cost Cap amount, less depreciation, will earn the Minimum ROE for up to 3 years post in-service date
  - Several unique elements including:
    - Debt Expense Cap
    - Annual O&M Cost Cap
    - Stranded asset mitigation proposal
    - Multiple project award cap reduction
    - Platform relocation cap adjustment
    - Control center option cap adjustment

- **Potential DEA Negotiation Delays:**
  - Developer's proposal is complicated and contains a number unique elements (Debt Expense Cap, Annual O&M Cost Cap, Stranded Asset Mitigation, and adjustments to the Cap for multiple project awards, platform relocation and control centers)
  - The complexity of the proposal, and the fact that some of the elements are unclear, could potentially increase the negotiation time for the DEA
- **Potential Third Party Challenges:**
  - Potential legal challenges over the various caps; given that the proposal is more complex, it seems more likely to lead to lead to questions/challenges

- **Cost Containment Elements:**
  - developer will not seek recovery of any Construction Costs in an amount equal to the lesser of: (i) the Construction Cost Cap Amount or (ii) the aggregate amount of actual Construction Costs associated with the Project
  - proposed ROE cap of 9.9%; designated entity will not file for a change to the ROE for at least 15 years
    - If FERC requires adjustment to the ROE, designated entity reserves the right to make adjustments pursuant to FPA section 205 to other components of its Formula Rate
    - If actual Construction Costs are less than the Construction Cost Cap, designated entity will receive an additional ROE incentive of 5 basis points for every 1% in savings below the cap, subject to a maximum ROE cap that is no higher than 10.75%
  - capital structure:
    - during construction: 48.35% equity and 51.65% debt
    - as of project's availability date: actual capital structure shall be used in the formula rate; the designated entity to maintain an actual capital structure of up to 48.35% equity
  - Schedule guarantee:
    - construction to be completed by no later than 12/31/29; such date may be extended due to Force Majeure
    - definition of Force Majeure expanded as compared to *pro forma* DEA to include material modifications to the schedule, routing or scope of work resulting from a PJM, BPU or BOEM action or order; delay by PJM/BPU in the schedule for awarding a project past 7/29/22; change in law; imposition of construction standards for OSW transmission infrastructure that are beyond industry standards; court orders; denial or delay of any application related to a permit, license or approval to the extent such denial interferes with the DE's performance under the agreement
      - These events are also included in the definition of Uncontrollable Events
    - Developer agrees to forego recovery of AFUDC with respect to Construction Costs incurred following the Guaranteed Availability Date until such time as the Project is available to receive AC infeed from an offshore generation resource

- **Potential DEA Negotiation Delays:**
  - proposed formula to calculate Construction Cost Cap Amount provides for an adjustment to the cost cap based on foreign exchange rate; could be difficult to predict amount of adjustment
  - poor wording in proposed language describing how the Construction Cost Cap Amount will be calculated; need to seek clarification from developer (minor concern)
- **Potential Third Party Challenges:**
  - potential legal challenges given that developer seeks flexibility to change other aspects of the formula rate if FERC does not approve its ROE

RILPOW Overview (1 of 2)

 # 21

- **Cost Containment Elements:**
  - no binding cost cap
  - proposed ROE cap, inclusive of FERC-granted equity incentives, at 9.75%
    - Cap applies for six years beginning when the facility is turned over to PJM's operational control
  - proposed 50% cap on the equity component of capital structure for original operational life of the project
  - no schedule guarantee
- **Potential DEA Negotiation Delays:**
  - not a true cost cap; no proposed cost cap, only proposed ROE and d/e structure caps
  - lack of schedule guarantee
- **Potential Third Party Challenges:**
  - see above

RILPOW Overview (2 of 2)

 # 171, 376, 490, 582

- **Cost Containment Elements:**
  - developer commits to a cap (referred to as the "Aggregate Construction Cost Cap") whereby it will cap capital costs for the procurement of specified pieces of equipment
    - the cost cap can be increased due to Uncontrollable Forces
    - developer will seek recovery through its ATRR for all costs not subject to the Aggregate Construction Cost Cap Amount, including but not limited to the Excluded Costs
  - proposed ROE cap, inclusive of FERC-granted equity incentives, at 9.75%; cap applies for 6 years
  - proposed 50% cap on the equity component of capital structure for original operational life of the project
  - no schedule guarantee
- **Potential DEA Negotiation Delays:**
  - developer proposes a cap on "construction capital costs," yet seems to be stating that the cap is limited to procurement of specified pieces of equipment. The project-specific summary sheets also suggest that the only cost elements covered by the cost cap are materials and equipment. If this is accurate, it seems that this would be a significant limitation on the cost cap
  - lack of schedule guarantee
- **Potential Third Party Challenges:**
  - It appears that any costs not specifically related to the procurement of specified project components are not part of the cost cap. Could open up the costs included in the ATRR to legal challenges