



# New Service Queue Update 2019

(Study reports located at: <http://www.pjm.com/planning.aspx>)

Transmission Expansion Advisory Committee

September 12, 2019

# System Impact Studies Completed



# Merchant Transmission Projects (MTX)

Queue Number	Project Name	TO
AD2-083	Larrabee 230kV	JCPL
AD2-084	Cardiff 230kV	AEC



# Long Term Firm Transmission Service Projects (LTF)

Queue Number	Project Name	MWs
AD2-098	PJM-WEC	4
AD1-092	AMIL-PJM	105
AD1-093	AMIL-PJM	180
AD1-094	AMIL-PJM	34
AD1-120	DUK-PJM	109
AD1-121	CPLE-PJM	109
AD1-122	PJM-DUK	130

# Generation Projects By Transmission Owner



# AEC Transmission Zone

<b>Queue Number</b>	<b>Fuel Type</b>	<b>MWC</b>	<b>MWE</b>
AE1-179	Solar	35	59.7
AE1-229	Solar	89	149.3
AE1-240	Solar	29	49.7
AE1-061	Storage	5	10
AE1-161	Storage	20	50
AE1-062	Storage	10	20
AE1-104	Offshore Wind	121.4	432
AE1-219	Solar	1.8	4.4
AE1-046	Solar	2	3



# AEC Transmission Zone

Queue Number	Fuel Type	MWC	MWE
AE1-218	Solar	0.82	2
AE1-115	Storage	10	20
AE2-272	Solar	1.4	0
AD2-052	Solar	6.7	10
AD2-064	Solar	0.53	1.26
AD2-065	Solar	2.19	5.22
AD2-135	Solar	0.6	1.62
AD1-019	Natural Gas	0	7.6



# AEP Transmission Zone

Queue Number	Fuel Type	MWC	MWE
AE1-021	Coal	11	11
AE1-050	Coal	18	18
AE1-090	Solar	21.56	50
AE1-091	Solar	46.93	110
AE1-102	Solar	15.6	26
AE1-170	Solar	63	150
AE1-212	Solar	53.3	90
AE1-039	Methane	0.8	0.8
AC2-016	Natural Gas	20	6
AE1-018	Solar	2.8	5
AC2-177	Wind	26	200
AC2-157	Solar	76	200
AB1-087	Natural Gas	550	575





# AEP Transmission Zone

Queue Number	Fuel Type	MWC	MWE
AB1-088	Natural Gas	550	575
AC2-111	Solar	30.4	80
AC2-038	Solar	12	20
AC2-044	Solar	7.6	20
AC1-141	Natural Gas	91	91
AD1-130	Solar	115	170
AC2-036	Solar	12	20
AD2-205	Storage	0	4
AC2-124	Solar	19	50
AC2-048	Solar	22.8	60
AC1-038	Natural Gas	13	13
AC2-172	Natural Gas	12	17



# APS Transmission Zone

Queue Number	Fuel Type	MWC	MWE
AE1-054	Storage	7.5	0
AE1-080	Natural Gas	80	50
AE1-101	Solar, Storage	100.5	150
AE1-132	Solar	51	85
AE1-086	Wind	0.6	5
AE1-147	Solar	12	20
AE1-188	Solar	12.6	20
AD2-113	Natural Gas	60.6	70
AD2-114	Natural Gas	400	410
AE2-125	Solar	8.28	13.8
AD2-108	Natural Gas	8	0
AD2-002	Natural Gas	20	20
AD2-192	Natural Gas	20	45



# APS Transmission Zone

Queue Number	Fuel Type	MWC	MWE
AD2-158	Solar	46.5	77.5
AD2-109	Natural Gas	12	4
AD2-180	Wind	15.08	110
AD2-157	Solar	42	100
AD2-009	Solar	48.1	70
AD1-061	Solar	7.6	20
AD1-018	Solar	7.6	20
AD1-083	Solar	60.1	100
AD1-069	Wind	11.76	80
AD1-155	Solar	37.2	75
AD1-085	Solar	12.3	20
AD1-099	Natural Gas	70	0



# ATSI Transmission Zone

Queue Number	Fuel Type	MWC	MWE
AE1-079	Solar, Storage	13.5	19.9
AE1-183	Solar	12	20
AE1-237	Solar, Storage	13.5	19.9
AD2-120	Solar	50.4	120
AD2-163	Solar	120.7	180
AD1-103	Wind	65.052	500.4
AD1-026	Natural Gas	130	0
AD1-140	Solar	95.8	175
AC2-103	Wind	38.69	297.66
AD1-081	Solar	13.2	20
AD1-052	Natural Gas	26.3	38

Queue Number	Fuel Type	MWC	MWE
AE1-151	Natural Gas	9	9
AE2-070	Solar	1.7	4



# ComEd Transmission Zone

Queue Number	Fuel Type	MWC	MWE
AD1-148	Wind	49	0
AB2-096	Natural Gas	350	350
AB2-173	Natural Gas	28	16
AA2-039	Wind	19.5	150
AC1-214	Wind	19	79.4
AC1-168	Wind	10.2	78.65
AB1-122	Natural Gas	1150	1150
AC1-033	Wind	13.1	100.8



# ComEd Transmission Zone

Queue Number	Fuel Type	MWC	MWE
AB2-047	Wind	32.5	250
AB2-070	Wind	26	200
AB1-089	Natural Gas	550	575
AB1-090	Natural Gas	550	575
AB1-091	Natural Gas	550	575
AA2-030	Natural Gas	157	190
AA2-035	Natural Gas	1019.3	1019.3
AA2-107	Storage	0	20



# DAYTON Transmission Zone

Queue Number	Fuel Type	MWC	MWE
AE1-007	Solar	7.6	20
AE1-040	Solar	31.6	48
AE1-092	Solar	96.4	229.5



Queue Number	Fuel Type	MWC	MWE
AE1-120	Solar	44	0
AD2-151	Solar	42	100
AC1-182	Coal	20	20



# DUQUESNE Transmission Zone

Queue Number	Fuel Type	MWC	MWE
AE2-115	Solar	10.26	17.1
AE2-116	Solar	10.26	17.1
AE2-114	Solar	10.26	17.1



# DOMINION Transmission Zone

Queue Number	Fuel Type	MWC	MWE
AE1-085	Solar	50	75
AD2-008	Solar	16.4	52.1
AE1-149	Solar	60	100
AE1-206	Solar	180	300
AE1-249	Solar, Storage	40.1	70
AE1-074	Solar	13.3	20
AE1-103	Solar	21	50
AE1-124	Solar	13.3	20
AE1-174	Storage	2	5
AE1-175	Solar	13.3	19.9



# DOMINION Transmission Zone

Queue Number	Fuel Type	MWC	MWE
AE1-075	Solar	12.1	18
AE1-088	Storage	20	20
AE1-153	Solar	89.4	149
AE1-190	Solar	12	20
AE1-191	Solar	48	80
AE1-154	Solar	10	17
AE1-004	Solar	7.6	20
AE1-044	Solar	111.7933	200
AE1-084	Solar	49.8	83
AE1-035	Solar	13.4	20



# DOMINION Transmission Zone

Queue Number	Fuel Type	MWC	MWE
AE2-006	Solar	2.9	0
AE2-268	Solar	9.6	15
AE2-304	Solar	3.3	5
AE2-132	Natural Gas	17.7	0
AE2-155	Solar	3.5	5
AE2-134	Solar	16.5	0
AE2-225	Solar	12	20
AE2-229	Solar	9	15
AD2-043	Solar	30	65.5
AD2-033	Solar	78	130



# DOMINION Transmission Zone

Queue Number	Fuel Type	MWC	MWE
AD2-063	Solar	90	149.5
AD2-074	Solar	32.68	86
AD2-068	Solar	33	50
AD2-160	Solar	32.8	50
AC2-125	Natural Gas	14.9	19
AC2-126	Natural Gas	15	19
AC2-127	Natural Gas	8.2	19
AC2-128	Natural Gas	7.9	19
AC2-129	Natural Gas	7.4	19
AD1-152	Solar	48	80



# DOMINION Transmission Zone

Queue Number	Fuel Type	MWC	MWE
AD1-050	Solar	27.2	42
AD1-082	Solar	43.3	68
AD2-082	Solar	10.1	15
AD1-033	Solar	42	70
AD1-151	Solar	90	150
AD2-049	Storage	10	10
AD2-007	Solar	4.5	7.6
AD2-039	Solar	7.6	20
AD2-073	Solar	13.32	19.92
AD2-085	Solar	19.38	51



# DOMINION Transmission Zone

Queue Number	Fuel Type	MWC	MWE
AD2-215	Solar	9.8	15
AD2-030	Solar	13.1	19.8
AD2-097	Natural Gas	11	66
AD2-164	Natural Gas	26.7	26.7
AE1-027	Solar	13.1	20
AE1-028	Solar	7.6	12
AE1-098	Solar	10.4	15.7
AE1-099	Solar	10.4	15.7
AD2-021	Solar	1.3	1.2
AB2-188	Solar	14	20





# DOMINION Transmission Zone

Queue Number	Fuel Type	MWC	MWE
AD1-105	Solar	45.43	77
AC2-131	Natural Gas	14.3	14
AC2-132	Natural Gas	8.8	11
AD1-078	Solar	12.6	20
AD1-087	Solar	48.3	71
AD1-088	Solar	75.2	110.5
AD1-025	Solar	94.2	150
AD1-041	Solar	30	50
AD1-055	Solar	15.9	20
AB2-099	Solar	3.5	5



# DOMINION Transmission Zone

Queue Number	Fuel Type	MWC	MWE
AD2-044	Solar	1.5	3.2
AD1-058	Solar	36.6	45.9
AD1-115	Solar	19	50
AD1-131	Solar	8.3	20
AD1-160	Solar	6.6	15.7
AB2-072	Solar	12.2	18
AB2-186	Solar	3.5	5
AB2-035	Solar	2.1	3
AD1-044	Solar	12	20
AD1-045	Solar	12	20



# DOMINION Transmission Zone

Queue Number	Fuel Type	MWC	MWE
AD1-046	Solar	6.7	11.2
AB2-088	Solar	2.7	4
AC2-165	Solar	57	99.9
AC2-130	Coal	13.2	14
AC2-083	Solar	13.4	20
AE1-088	Storage	20	20
AC2-084	Solar	40.2	60
AE1-155	Solar	76.2	127

Queue Number	Fuel Type	MWC	MWE
AE1-107	Solar	31	53.1
AE1-167	Solar	6	11.09
AE1-038	Solar	8.4	20
AD2-045	Solar	12.2	20
AD2-076	Solar	18.62	49
AD2-059	Storage	0.24	0.993
AD1-145	Methane	9.6	9.6
AD1-146	Solar	3.8	10

Queue Number	Fuel Type	MWC	MWE
AE1-247	Solar, Storage	137.1	205
AE1-143	Solar, Storage	64.163	96
AE1-144	Solar, Storage	80.2	120
AE1-246	Solar, Storage	80.7	120
AD2-036	Solar	40	60
AD2-048	Solar	46.7	70
AD2-072	Solar	63.75	95



# Essential Power Transmission Zone

Queue Number	Fuel Type	MWC	MWE
AE2-061	Natural Gas	7	0
AD2-167	Natural Gas	52	90



# JCPL Transmission Zone

Queue Number	Fuel Type	MWC	MWE
AE1-238	Offshore Wind	225	816
AE1-060	Storage	0	19.8
AE1-203	Storage	0	8.8
AE1-142	Solar	8.2	20
AE1-244	Storage	0	19.8
AE1-243	Storage	0	20
AE2-057	Solar	0.5	1
AE2-081	Solar	1.57	3.2
AE2-056	Solar	1.6	3

Queue Number	Fuel Type	MWC	MWE
AD2-070	Solar	3.2	7.5
AD2-213	Storage	0	20
AD2-026	Solar	4.1	0
AD2-165	Natural Gas, Storage	40	105
AD2-210	Storage	0	2
AE1-156	Solar	4.1	7.6
AE1-081	Solar	0.96	2.3
AE1-036	Natural Gas, Other	9	0
AD1-113	Natural Gas	75	35





# METED Transmission Zone

Queue Number	Fuel Type	MWC	MWE
AE1-138	Solar	13.2	22
AE1-139	Solar	39	65
AE1-185	Solar	12.6	20
AE1-187	Solar	12.6	20
AE1-196	Solar	12.6	20
AE1-129	Solar	47	79.6
AE1-131	Solar	39	65



# METED Transmission Zone

Queue Number	Fuel Type	MWC	MWE
AE1-006	Solar	7.6	20
AD2-035	Natural Gas	14	38.9
AD2-115	Solar	13	20
AD2-116	Solar	13	20
AD2-117	Solar	7.7	15
AD2-166	Natural Gas	89.8	75
AD1-020	Solar, Storage	53.6	100

<b>Queue Number</b>	<b>Fuel Type</b>	<b>MWC</b>	<b>MWE</b>
AE2-010	Natural Gas	3	29
AE1-221	Natural Gas	14	0
AD1-097	Natural Gas	34.8	67



# PENELEC Transmission Zone

Queue Number	Fuel Type	MWC	MWE
AE1-123	Natural Gas	18	18
AE1-053	Storage	10	0
AE1-116	Storage	4.5	0
AE1-128	Solar	72	120
AE1-160	Solar	12.7	20
AE1-071	Solar	62.1	100.1
AD2-133	Wind	18	100.33
AD1-154	Natural Gas	20	20



# PEPCO Transmission Zone

Queue Number	Fuel Type	MWC	MWE
AE1-012	Solar	0.2268	0.54
AE1-013	Solar	0.378	0.9
AE1-015	Solar	0.567	1.35
AE1-016	Solar	0.4536	1.08
AD2-058	Solar	2.38	5.6
AD2-199	Solar	1.26	3
AD1-114	Natural Gas	75	75
AD1-153	Solar	1.0488	2.76

Queue Number	Fuel Type	MWC	MWE
AE1-051	Storage	10	0
AE1-058	Hydro	250	500
AE1-059	Hydro	250	500
AE1-181	Solar	27	45
AE1-182	Solar	6	10
AE1-225	Solar	9.4	19.8
AE1-226	Solar	9.4	19.8
AE1-127	Solar	20	45



# PPL Transmission Zone

Queue Number	Fuel Type	MWC	MWE
AE1-202	Storage	0	4
AE2-273	Solar	0.4	0
AE2-274	Solar	0.4	0
AD1-037	Natural Gas	86.6	39.8
AB1-108	Natural Gas	485	485
AD1-143	Storage, Wind	11.84	90
AD1-065	Wind	25.84	175.8



# PSEG Transmission Zone

Queue Number	Fuel Type	MWC	MWE
AE2-064	Solar	1.09	2.6
AE2-065	Solar	0.76	1.8
AE2-097	Solar	0	2
AE2-100	Solar	0	2.3
AE2-143	Solar, Storage	0	3.905
AE2-144	Solar, Storage	0	4.03
AE2-165	Solar	1.092	2.6
AE2-213	Solar, Storage	1.1025	3.145





# PSEG Transmission Zone

Queue Number	Fuel Type	MWC	MWE
AE2-018	Solar	2.3333	3.5
AE2-163	Solar	0.42	1
AE2-164	Solar	0.588	1.4
AD2-171	Natural Gas	700	700
AE1-041	Solar, Storage	0.2	1.1
AD2-042	Solar	5	13.2
AD2-027	Solar	3.8	10



# SMECO Transmission Zone

Queue Number	Fuel Type	MWC	MWE
AE1-231	Solar, Storage	9.4	20

# Network Upgrades



# AEC Transmission Zone

Upgrade ID	Project Description	Cost Estimate (\$M)	Driver
n2194	Add terminal equipment at Mickleton 230kv sub to provide a bus position for the IA customer's 230kv line to the Q90 site	0.862	Q90
n2195	construct a 230kv direct connect line from the Mickleton 230kv sub to the POI on existing ROW owned by ACE Company.	3.500	Q90



# AEP Transmission Zone

Upgrade ID	Project Description	Cost Estimate (\$M)	Driver
n0930	Buchanan Hydro-Niles - Construct the new 69kV Interconnection Substation for T111	0.056	T111
n0931	Buchanan Hydro - Niles - Construct the 69kV double circuit loop between the Buchanan Hydro - Niles circuit and new interconnection substation	0.000	T111
n0932	Buchanan Hydro - Niles - Tie in the 69kV loop into the circuit	0.000	T111
n0933	Buchanan Hydro - Niles - Upgrade line relays at AEP Niles 69kV station	0.383	T111
n0934	Buchanan Hydro - Niles - Upgrade line relays at AEP Buchanan Hydro 69kV station	0.400	T111
n3038	Remote end work at Dunkirk. Replace relay.	0.276	U1-059
n3039	Remote end work at East Lima. Replace relay.	0.264	U1-059
n3961	Install 345kV revenue metering at new switchyard	2.290	Y2-050
n3962	Remote end work at Canton Central Station	0.060	Y2-050
n3963	Remote end relay work at Tidd Station	0.060	Y2-050
n4731	Add a 2nd Benton 345/138 kV transformer	3.500	J572 (MISO Project)



# APS Transmission Zone

Upgrade ID	Project Description	Cost Estimate (\$M)	Driver
n1057	Albright - Modify relay and control setting changes	0.046	U2-061
n1058	William - Modify relay and control setting changes	0.045	U2-061
n1059	Roth Rock - Perform design and engineering for communication cable between existing Albright/William substation and new Roth Roch substaton	0.011	U2-061
n1593	Leadsville - Cut the Pruntytown-Loughs Lane 138kV circuit approx. 6.1 miles from Loughs Lane substation and loop the line through the Leadsville 138kV substation, 0.1 mile, 954 kcmil ACSR conductor	0.192	P59
n2140	Option to Build: Provide design review and construction oversight for the construction of the Mount St Mary's substation. Loop the Catoctin – Taneytown 2 34.5kV line into the new station.	0.250	W1-116
n2141	Install anti-islanding (transfer trip) facilities at Catoctin substation	0.130	W1-116
n2142	Install anti-islanding (transfer trip) facilities at Carroll substation	0.130	W1-116
n2143	Install anti-islanding (transfer trip) facilities at Taneytown 2 substation.	0.260	W1-116
n2146	Expand Frostburg#1 substation. Extend 138kV bus, install 1-138kV breaker, 3-138kV disconnect swithes, 138kV metering, arresters, line traps and CVTIs.	1.553	U2-073
n2196	Install transfer trip facilities to Cross School switching station at Albright switching station	0.040	N47
n2197	Install transfer trip facilities to Cross School switching station at Black Oak switching station	0.040	N47

Upgrade ID	Project Description	Cost Estimate (\$M)	Driver
n2198	Construct line tap to new switching station, Cross School	0.150	N47
n2199	Cross School switching station option to build	0.290	N47
n3141	Upgrade the line risers and replace the replace the relaying and metering.	0.280	W1-078
n3142	Increase line loadability	2.140	W1-078
n3143	Replace risers with HT conductor and connectors.	0.090	W1-078
n3144	Increase loadability (MTEP #3186 & PJM W1-078) by adding new 954 kcmil ACSS conductors (bundled)	1.900	W1-078
n3508	Replace the Ridgeley 'A' 34.5kV breaker	0.100	U2-073
n4607	Install a wave trap on the tap to Tennessee Gas to support new anti-islanding scheme in the area.	0.000	Z1-069
n4947	Loop the Tidd – Wylie Ridge 345 kV transmission line to Abby Lane three breaker substation. Install a loop, approximately 700' in length, consisting of two steel deadend and two steel angle structures with concrete foundations.	1.560	AA2-121
n4948	Install line relaying equipment on the Tidd 345 kV line in Wylie Ridge substation including associated carrier and transfer-trip equipment.	0.190	AA2-121
n4950	Adjust remote end relaying and metering settings at Ronco 500kV Substation.	0.013	AA2-139



# APS Transmission Zone

Upgrade ID	Project Description	Cost Estimate (\$M)	Driver
n5107.1	Cumberland Substation: Replace Ridgeley 138 kV breaker, replace Ridgely 138 kV line and bus side disconnect switches, replace Ridgeley terminal wave trap and breaker risers	0.470	AB1-065
n5107.2	Ridgely Substation: Replace Cumberland 138 kV line and bus side disconnect switches, replace Cumberland terminal wave trap and breaker risers	0.210	AB1-065
n5107.3	Reconductor approximately 1 mile of the Ridgeley – Cumberland 138 kV line with 795 kcmil ACSS	1.250	AB1-065
n5412	Fiber cable - FirstEnergy Install estimated 15-miles of ADSS fiber for backhaul of SCADA communications at Abby Lane substation.	1.830	AA2-121
n5514	Doubs Substation – Install (1) 230kV motor-operated air-breaker switch (MOABS) and remove wave trap and line tuner on Eastalco exit (Line #205). Replace line relaying and install ADSS (All-Dielectric Self-Supporting) fiber cable for new AB2-129 connection.	0.430	AB2-129
n5515	Doubs Substation – Reconfigure and re-energize the last span into Doubs Substation on the Doubs-Eastalco (Line #205) 230kV line terminal.	0.710	AB2-129
n5934	Construct 500 kV three breaker ring bus substation. Cut and loop in the 500 kV Wylie Ridge-Harrison line and install new tie line to new generation. (At Strope Road Substation)	14.720	AB1-069
n5935	Strope Road substation (OTB) - Project Management, Engineering oversight, Testing & Commissioning, and transfer of operation for AB1-069 3-Breaker 500 kV ring bus Substation.	1.310	AB1-069
n5948	Install and upgrade relays/controls and install fiber interface for new AC1-097 fiber or optical ground wire (“OPGW”) at the Hatfield Substation	0.340	AC1-097
n5949	Hatfield Substation – Fiber Work inside the Substation – For Optical Ground Wire (“OPGW”) construction, install fiber cable runs to represent All-Dielectric Self-Supporting (“ADSS”) cable extension from substation control house to the telecommunication line structure	0.050	AC1-097
n5957	OTB, Construct three-breaker 345 kV ring bus at Abby Lane substation.	0.670	AA2-121





# BGE Transmission Zone

Upgrade ID	Project Description	Cost Estimate (\$M)	Driver
n4906	Upgrade the wire drops to the high side circuit switcher. Change the tap settings on the Pumphrey breakers B31 & B32 current transformers to correspond to 3000 amps and adjust relays to accommodate. Reset 6 additional relays and change out an auxiliary	0.150	AA2-054



# ComEd Transmission Zone

Upgrade ID	Project Description	Cost Estimate (\$M)	Driver
n2087	Replace line trap on Burnham-Munster 345kV line at TSS 177 Burnham	0.100	V3-052
n2089	Reconductor approx 12.5 miles of 345kV Line 6607 and upgrade terminal equipment to match. Same as b1773	10.000	V3-052
n2090	Reconductor approx 9.2 miles and replace relays on 138kV line 12204. Same as b1775	7.200	V3-052
n2091	Reconductor approximately 2 miles of 345kV line 0403, replace substation conductor	2.100	V4-006
n2093	Reconductor approximately 11.5 miles of 138kV line 12205, replace substation conductor, replace line trap. Same as b1777	8.850	V4-006
n2094	Reconductor 7.7 miles of 138kV line 11106, replace line trap	6.100	V4-006
n5950	Replace 4 splices on the Frankfort—University Park North 345 kV line	1.636	AC1-223



# DEOK Transmission Zone

Upgrade ID	Project Description	Cost Estimate (\$M)	Driver
n3244	Zimmer substation relays	0.016	V3-045
n3245	Spurlock substation relays	0.016	V3-045
n4324	Replace 138 kV disconnect switch 866 in Pierce Substation with a 3000 Ampere rated switch.	0.075	Y3-064
n4325	Replace 138 kV circuit breaker 922 in Beckjord Substation with a 3000 Ampere rated breaker.	0.399	Y3-064



# DOMINION Transmission Zone

Upgrade ID	Project Description	Cost Estimate (\$M)	Driver
n1487	Arnolds Corner - Replace 2 existing hydraulic three phase reclosers, 340 R169 and 340 R140 with 2 three phase electronic reclosers with transfer trip capability	0.089	T78
n1506	Shackleford - Replace 3 existing single phase hydraulic reclosers, 303R79, with a 3 phase electronic recloser 303R453 with transfer trip	0.100	T79
n3027	Construct Attachment Line to Customer Wind Farm Bus	0.410	W1-029
n3028	Create 3 breaker ring bus substation to be name SWAMP at Interconnection Customer Property along Winfall - Suffolk 230 kV line	2.930	W1-029
n3029	Build necessary 230 kV transmission lines to loop in and out the Winfall - Suffolk 230 kV line to new Swamp substation	0.530	W1-029
n3030	Purchase and install dual (2) SEL 421-5 transmission panel.	0.100	W1-029
n3031	Purchase and install dual (2) SEL 421-5 transmission panel.	0.100	W1-029
n3670	replace six poles, add two poles and upgrade approximately one mile of OH conductor to 477 aluminum.	0.240	Y1-086
n4784	Construct new Rocky Forge 230kV (3) three breaker ring bus switching station	6.759	AA1-038
n4785	Re-arrange the Lexington – Low Moor 230kV line #2084 in order to loop it into the new Rocky Forge switching station	0.919	AA1-038
n4786	Remote protection and communication changes to allow for interconnection of the proposed generating facility	0.081	AA1-038
n5142	Install new relay panel at Old Church substation	0.066	AB1-027
n5143	Old Church - Build circuit #474 extension for 4 miles	0.975	AB1-027

Upgrade ID	Project Description	Cost Estimate (\$M)	Driver
n1036	Raritan River - Replace G1047E breaker at the 230kV Substation	0.060	R11
n1037	Raritan River - Replace G1047F breaker at the 230kV Substation	0.060	R11
n1038	Raritan River - Replace T1034E breaker at the 230kV Substation	0.060	R11
n3001	A riser pole will be on the west side of Route 33 and tap the existing three phase with new conductors from pole #JC 87-1 MPNA53. 12kV primary metering will be installed at the riser pole.	0.058	W1-032
n3002	replace relays and associated equipment with a SEL-351 electronic relays for the Transformer breaker at the Manalapan substation. Add bi-directional LTC control.	0.043	W1-032
n3003	Replace relays and associated equipment with a SEL-351 electronic relays for the #47351 distribution circuit at the Manalapan substation	0.034	W1-032
n3004	replace relays and associated equipment with a SEL-351 electronic relays for the #47350 distribution circuit at the Manalapan substation.	0.034	W1-032
n3014	Install a new riser pole and tap the existing circuit for the POI. Install 12kV metering at new riser pole and communication equipment. Install fuses on the Morris Park #27052 12kV circuit	0.051	W1-127
n3015	Replace existing electromechanical relays with SEL-351 relay on distribution circuit #27052 at the Morris Park substation	0.074	W1-127
n3016	Install bi-directional LTC on the transformer at the Morris Park substation	0.009	W1-127
n3017	1) Replace existing electromechanical relays with SEL-351 relay on distribution circuit #27051 at the Morris Park substation	0.074	W1-127
n3019	Add SEL-351A reclosing relay to W75 34.5 kV circuit breaker	0.051	W1-129
n3590	Add one 230kV CB at Raritan River 230kV sub to accommodate the direct connection of an underground 230kV transmission line for the W4-009 generation project. Cost includes engineering oversight and	2.800	W4-009



# PENELEC Transmission Zone

Upgrade ID	Project Description	Cost Estimate (\$M)	Driver
n2170	Add a 115kV line terminal to the Krayn Substation for the Highland #2 developer substation.	0.290	R32
n2171	Install new RFL-9745 DTT transmitter to transmit Rachel Hill Sub– Krayn exit breaker status to R32 (Highland #2)	0.075	R32
n2172	Install new RFL-9745 DTT transmitter to transmit Hilltop Hill Sub– Krayn exit breaker status to R32 (Highland #2)	0.075	R32
n2173	Salix Sub - Install new SEL-2505 or SEL-2506 to transmit MOAB status to R32 (Highland #2).	0.063	R32
n2174	Fiber - An SEL-2505, RFL-9745 (for Rachel Hill Bkr Status); second RFL-9745(for HilltopBkr Status) is to be installed to implement the logic to trip #2 Generation	0.025	R32
n2175	Engineering Oversight and Commissioning Support of the Interconnection Customer substation including support of protective relay installation	0.064	R32



# PSEG Transmission Zone

<b>Upgrade ID</b>	<b>Project Description</b>	<b>Cost Estimate (\$M)</b>	<b>Driver</b>
n3678	Install two breakers (13H and 23H) on the high side of two 230/138kV autotransformers.	3.000	T107
n4793	Install a new 63 kA breaker into existing bus position at the Sewaren 230 kV substation along with the associated disconnect switches, equipment and structures.	6.480	Z2-089
n5177	Reconductor 3 spans (2 structures) of the Roseland-Williams 230kV Line with 1590 ACSS conductor.	0.570	AB2-020
n5411	New 26kV tap connection to the Gloucester 26kV (Q121) circuit	0.200	AC1-010

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