New Service Queue Update 2018

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

Transmission Expansion Advisory Committee

September 13, 2018

System Impact Studies Completed

Merchant Transmission (MTX) Projects

Queue Number	Project Name	TO
Y3-092	Erie West 345kV	PENELEC
AD2-084	Cardiff 230kV	AEC

Long Term Firm Transmission Service (LTF) Projects

Queue Number	Path Name	MWs
AC1-056	PJM-AMIL	100
AC1-126	PJM-CPLE	25
AC1-127	PJM-CPLE	25
AC1-128	PJM-CPLE	25
AC1-129	PJM-CPLE	25
AC1-131	PJM-CPLE	50
AC1-132	PJM-CPLE	50
AC1-133	PJM-CPLE	100
AD1-021	PJM-LindenVFT	330

Generation Projects

By Transmission Owner

AEC Transmission Zone

Queue Number	Fuel Type	MWC	MWE	Transmission Owner
Z2-083	Natural Gas	74	74	AEC
AC2-050	Solar	3.8	10	AEC

AEP Transmission Zone

Queue Number	Fuel Type	MWC	MWE	Transmission Owner
AA2-070	Hydro	34	34	AEP
AB1-058	Coal	11	11	AEP
AB1-109	Coal	36	36	AEP
AB2-028	Wind	26	200	AEP
AB2-083	Solar	27.2	40	AEP
AB2-085	Solar	54.4	80	AEP
AB2-141	Natural Gas	388.6	394	AEP
AB2-170	Solar	49.4	130	AEP
AC1-001	Solar	54.4	80	AEP
AC1-038	Natural Gas	13	13	AEP

AEP Transmission Zone

Queue Number	Fuel Type	MWC	MWE	Transmission Owner
AC1-040	Solar	57	150	AEP
AC1-044	Natural Gas	550	550	AEP
AC1-051	Wind	7.8	60	AEP
AC1-072	Natural Gas	20	20	AEP
AC1-082	Solar	29	48	AEP
AC1-083	Solar	38	100	AEP
AC1-089	Solar	57	150	AEP
AC1-101	Solar	19	50	AEP
AC1-102	Solar	19	50	AEP
AC1-103	Natural Gas	1026	1050	AEP

AEP Transmission Zone

Queue Number	Fuel Type	MWC	MWE	Transmission Owner
AC1-122	Solar	40.7	60	AEP
AC1-123	Solar	13.7	20	AEP
AC1-152	Natural Gas	50	50	AEP
AC1-167	Solar	33.6	49.9	AEP
AC1-173	Wind	9.9	75.9	AEP
AC1-174	Solar	38	100	AEP
AC1-175	Solar	38	100	AEP
AC1-176	Wind	7.6	58.7	AEP
AC1-188	Solar	46.6	70	AEP
AC1-194	Solar	47.5	125	AEP

AEP Transmission Zone

Queue Number	Fuel Type	MWC	MWE	Transmission Owner
AC2-015	Solar	53.55	117	AEP
AC2-029	Solar	26.6	70	AEP
AC2-035	Solar	29.4	49	AEP
AC2-043	Solar	20	50	AEP
AC2-045	Solar	3.8	10	AEP
AC2-080	Wind	26	200	AEP
AC2-089	Solar	8.8	18.2	AEP
AC2-123	Solar	44.6	75	AEP
AC2-172	Natural Gas	12	17	AEP
AC2-176	Wind	16.9	150	AEP

APS Transmission Zone

Queue Number	Fuel Type	MWC	MWE	Transmission Owner
AB2-041	Wind	3.7	19.4	APS
AC1-003	Natural Gas	80	80	APS
AC1-021	Natural Gas	0	110	APS
AC1-055	Natural Gas	30	30	APS
AC1-073	Wind; Storage	5.8	16.3	APS
AC1-140	Coal	10	10	APS
AC2-021	Hydro	15	15	APS
AC2-142	Natural Gas	129.7	129.7	APS
AD1-060	Solar	5.7	15	APS

ATSI Transmission Zone

Queue Number	Fuel Type	MWC	MWE	Transmission Owner
Z1-035	Wind	2.34	18	ATSI
AC1-078	Solar	66	176	ATSI
AC1-181	Natural Gas	5	5	ATSI
AC2-195	Solar	62.1	99.96	ATSI

ComEd Transmission Zone

Queue Number	Fuel Type	MWC	MWE	Transmission Owner
AB2-191	Wind	8.4	20	ComEd
AC1-185	Natural Gas	48	48	ComEd
AC1-204	Natural Gas	1115.9	1200.9	ComEd
AD1-062	Storage	0	1	ComEd

Dayton Transmission Zone

Queue Number	Fuel Type	MWC	MWE	Transmission Owner
AB1-169	Natural Gas	1100	1150	Dayton
AC1-068	Solar	34	49.9	Dayton
AC1-069	Solar	34	49.9	Dayton
AC1-085	Solar	152	400	Dayton
AC1-165	Solar	33.6	49.9	Dayton
AC1-166	Solar	33.6	49.9	Dayton
AC1-212	Storage	1.9	19.9	Dayton
AC2-067	Solar	18.9	49.9	Dayton
AC2-068	Solar	7.6	20	Dayton

DEOK Transmission Zone

Queue Number	Fuel Type	MWC	MWE	Transmission Owner
AC1-182	Coal	20	20	DEOK
AC2-066	Solar	28.5	75	DEOK
AC2-088	Solar	38.4	70	DEOK
AD1-136	Solar	5.4	10	DEOK

DL Transmission Zone

Queue Number	Fuel Type	MWC	MWE	Transmission Owner
AD1-135	Solar	3.15	8.3	DL

Dominion Transmission Zone

Queue Number	Fuel Type	MWC	MWE	Transmission Owner
AB2-022	Solar	13	20	Dominion
AC1-034	Solar	42.75	75	Dominion
AC1-036	Solar	5.7	15	Dominion
AC1-042	Solar	15.96	42	Dominion
AC1-043	Solar	38	100	Dominion
AC1-054	Solar	44.5	65	Dominion
AC1-065	Solar	19	50	Dominion
AC1-075	Solar	38.3	60	Dominion
AC1-076	Solar	23.8	62.5	Dominion
AC1-080	Solar	12.8	20	Dominion

Dominion Transmission Zone

Queue Number	Fuel Type	MWC	MWE	Transmission Owner
AC1-086	Solar	123.7	180	Dominion
AC1-098	Solar	37.6	60	Dominion
AC1-099	Solar	12.6	20	Dominion
AC1-105	Solar	34.5	51	Dominion
AC1-107	Natural Gas	1600	1600	Dominion
AC1-120	Solar	39.6	60	Dominion
AC1-121	Solar	13.6	20	Dominion
AC1-134	Natural Gas	50	0	Dominion
AC1-143	Solar	41.2	60	Dominion
AC1-145	Solar	19	50	Dominion

Dominion Transmission Zone

Queue Number	Fuel Type	MWC	MWE	Transmission Owner
AC1-158	Solar	347.5	500	Dominion
AC1-159	Natural Gas	369.1	250.1	Dominion
AC1-161	Solar	168.2	240	Dominion
AC1-162	Solar	168.9	240	Dominion
AC1-164	Solar	220.8	320	Dominion
AC1-189	Solar	53.4	80	Dominion
AC1-191	Solar	53.4	80	Dominion
AC1-208	Solar	55.4	80	Dominion
AC1-216	Solar	54.8	97.9	Dominion
AC1-221	Solar	14.6	29.2	Dominion

Dominion Transmission Zone

Queue Number	Fuel Type	MWC	MWE	Transmission Owner
AC1-222	Solar	22.9	44.7	Dominion
AC2-012	Solar	57	150	Dominion
AC2-070	Solar	9.2	13	Dominion
AC2-071	Solar	13.3	20	Dominion
AC2-072	Solar	13.3	20	Dominion
AC2-073	Solar	13.3	20	Dominion
AC2-074	Solar	10.4	15.65	Dominion
AC2-078	Solar	22.8	60	Dominion
AC2-079	Solar	32.3	85	Dominion
AC2-100	Solar	33.6	50	Dominion

Dominion Transmission Zone

Queue Number	Fuel Type	MWC	MWE	Transmission Owner
AC2-102	Solar	30.4	80	Dominion
AC2-107	Solar	68.1	100	Dominion
AC2-110	Solar	7.6	20	Dominion
AC2-112	Solar	103.1	150	Dominion
AC2-113	Solar	13.3	20	Dominion
AC2-133	Natural Gas	20	20	Dominion
AC2-137	Solar	11.4	18.8	Dominion
AC2-138	Solar	4.8	10.8	Dominion
AC2-141	Solar	168.2	240	Dominion
AC2-161	Solar	13.2	20	Dominion

Dominion Transmission Zone

Queue Number	Fuel Type	MWC	MWE	Transmission Owner
AC2-162	Solar	13.2	20	Dominion
AC2-196	Solar	10	16.7	Dominion
AD1-048	Solar	13.3	20	Dominion
AD1-063	Solar	9	15	Dominion
AD1-084	Hydro	5.5	5.5	Dominion
AD1-144	Solar	9.7	15	Dominion
AD1-156	Solar	11.82	19.7	Dominion
AD1-157	Solar	9	15	Dominion

DPL Transmission Zone

Queue Number	Fuel Type	MWC	MWE	Transmission Owner
AC1-049	Solar	1.5	4	DPL
AC1-050	Solar	1.9	5	DPL
AC1-095	Solar	3.8	9.9	DPL
AC1-177	Biomass	4	4	DPL
AC1-190	Solar	35	50	DPL
AC1-213	Solar	3.2	5.3	DPL
AC1-229	Solar	3.8	10	DPL
AC2-023	Solar	26.5	45.8	DPL
AC2-186	Solar	3.8	10	DPL
AC2-187	Solar	7.6	20	DPL

DPL Transmission Zone

Queue Number	Fuel Type	MWC	MWE	Transmission Owner
AC2-188	Solar	7.6	20	DPL

EKPC Transmission Zone

Queue Number	Fuel Type	MWC	MWE	Transmission Owner
AC1-074	Solar	56	80	EKPC
AC2-075	Solar	13.3	20	EKPC

JCPL Transmission Zone

Queue Number	Fuel Type	MWC	MWE	Transmission Owner
AC1-029	Natural Gas	20	20	JCPL
AD1-028	Natural Gas	0	0.2	JCPL
AD1-059	Natural Gas	14.9	0	JCPL

MAIT Transmission Zone

Queue Number	Fuel Type	MWC	MWE	Transmission Owner
AC1-035	Natural Gas	30	30	MAIT

ME Transmission Zone

Queue Number	Fuel Type	MWC	MWE	Transmission Owner
AC1-048	Solar	13.3	35	ME
AC2-053	Solar	7.6	20	ME

ODEC Transmission Zone

Queue Number	Fuel Type	MWC	MWE	Transmission Owner
AC2-018	Natural Gas	8	60	ODEC

PECO Transmission Zone

Queue Number	Fuel Type	MWC	MWE	Transmission Owner
AB2-175	Nuclear	44	44	PECO
AC1-209	Solar	12.4	18	PECO

PENELEC Transmission Zone

Queue Number	Fuel Type	MWC	MWE	Transmission Owner
AA1-111	Natural Gas	463	463	PENELEC
AA2-133	Natural Gas	19.9	19.9	PENELEC
AB1-092	Natural Gas	17	41	PENELEC
AC1-108	Natural Gas	100	50	PENELEC
AC2-077	Natural Gas	20	20	PENELEC
AC2-122	Solar	19	50	PENELEC
AD1-108	Natural Gas	1.5	1.5	PENELEC
AD1-109	Natural Gas	1.1	1.1	PENELEC
AD1-110	Natural Gas	1.5	1.5	PENELEC
AD1-142	Natural Gas	1.1	1.1	PENELEC

PPL Transmission Zone

Queue Number	Fuel Type	MWC	MWE	Transmission Owner
AC1-071	Wind	8.74	67.25	PPL
AC1-087	Solar	3.8	10	PPL
AC1-151	Solar	7.6	20	PPL
AC2-092	Natural Gas	65	55	PPL
AC2-170	Solar	3	0	PPL

PSEG Transmission Zone

Queue Number	Fuel Type	MWC	MWE	Transmission Owner
Z1-116	Natural Gas	671	675	PSEG
Z2-002	Natural Gas	54	61	PSEG
AC2-009	Solar; Storage	0.1	0.59	PSEG
AD1-053	Solar	0	3	PSEG
AD1-054	Solar	0	1.5	PSEG
AD1-071	Solar	0.99	2.6	PSEG

SMECO Transmission Zone

Queue Number	Fuel Type	MWC	MWE	Transmission Owner
AC2-101	Solar	12.35	32.5	SMECO
AC2-120	Solar	10.45	27.5	SMECO

Network Upgrades

AEP Transmission Zone

Upgrade Id	Project Description	Cost Estimate ($M)	Driver
n5488	Perform a sag study on the W4-004 - Madison 138 kV line.	0.09	AA2-148
n5573	AEP shall review and revise line protection settings at the Meadow Lake 345 kV switching station.	0.04	AB1-006
n5528	Install a new T-Line Cut in at the Desoto-Fall Creek 345 kV	2.2	AB2-028
n5529	Install 345 kV Revenue Metering at the new AB2-028 switching station	0.25	AB2-028
n5530	Install line protection and controls at the new 345 kV switching station.	0.3	AB2-028
n5304.1	Replace the Kammer wavetrap (2000 A) on the Kammer - George Washington 138 kV line	0.212	AB2-093

AEP Transmission Zone

Upgrade Id	Project Description	Cost Estimate ($M)	Driver
n5560	Kammer-Ormet #1 138kV T-Line modifications	0.8869	AB2-093
n5561	Kammer-Ormet #2 138kV T-Line modifications	0.6705	AB2-093
n5562	Install Fiber-Optic Transition Cable at Hannibal 138 kV substation	0.0601	AB2-093
n5563	Hannibal to IPP Fiber Interconnection installation	0.0425	AB2-093
n5557	Expand the George Washington 138 kV GIS Substation	2	AB2-141
n5558	Install 138 kV Revenue Metering at the George Washington substation	0.25	AB2-141

AEP Transmission Zone

Upgrade Id	Project Description	Cost Estimate ($M)	Driver
n5559	Install line protection and controls at the newly configured George Washington 138 kV GIS substation.	0.25	AB2-141
n5512	Adjust relay settings at the Delano 138 kV substation	0.05	AC1-001
n5513	Upgrade the 138 kV revenue meter if the installed meter for the AB2-083 is not adequate for the additional generation.	0.1	AC1-001
n5553	Expand Rockport 345 kV Substation	3	AC1-040
n5554	Install 345 kV Revenue Metering at the expanded Rockport substation	0.35	AC1-040
n5555	Install line protection and controls at the expanded Rockport 345 kV substation	0.5	AC1-040

AEP Transmission Zone

Upgrade Id	Project Description	Cost Estimate ($M)	Driver
n5556	Upgrade line protection and control settings at the Rockport 765 kV substation to coordinate with the expanded Rockport 345 kV substation	0.05	AC1-040
n5494	Upgrade 765 kV Revenue Metering at the new 765 kV switching station	0.2	AC1-044
n5495	Adjust relay settings at the New 765 kV Switching Station	0.1	AC1-044
n5567	Build New 69 kV AC1-051 Switching Station	2	AC1-051
n5568	Construct Greenwich-South Greenwich 69 kV T-Line Cut In	0.75	AC1-051
n5569	Construct Willard-Greenwich 69 kV T-Line Work	0.25	AC1-051

AEP Transmission Zone

Upgrade Id	Project Description	Cost Estimate ($M)	Driver
n5570	Construct Carrothers-Willard 69 kV T-Line Work	0.25	AC1-051
n5571	Install 69 kV Revenue Metering at the new AC1-051 substation	0.15	AC1-051
n5572	Expand Willard 69 kV Substation	1	AC1-051
n5928	Beatty Road 138kV Substation (AEP): Remote end relay changes for AC1-078 Substation on the 138kV London Line	0.25	AC1-078
n5589	Build a new 69 kV Switching Station	3.5	AC1-082
n5590	Install T-Line Cut In on the Ravenswood-Hemlock 69 kV line	0.7	AC1-082

AEP Transmission Zone

Upgrade Id	Project Description	Cost Estimate ($M)	Driver
n5591	Install 69 kV Revenue Metering at the new AC1-082 substation	0.2	AC1-082
n5592	Upgrade line protection and controls at the Ravenswood 69 kV substation to coordinate with the new 69 kV switching station.	0.2	AC1-082
n5593	Upgrade line protection and controls at the Hemlock 69 kV substation to coordinate with the new 69 kV switching station.	0.2	AC1-082
n5599	Build a New 138 kV AC1-083 Switching Station	5	AC1-083
n5600	Construct Smith Mountain-Bearskin 138 kV T-Line Cut In	1	AC1-083
n5601	Install 138 kV Revenue Metering at the new AC1-083	0.25	AC1-083

AEP Transmission Zone

Upgrade Id	Project Description	Cost Estimate ($M)	Driver
n5602	Install protection and controls at the new 138 kV switching station.	0.95	AC1-083
n5603	Upgrade line protection and controls at the Smith Mountain 138 kV substation to coordinate with the new 138 kV switching station.	0.25	AC1-083
n5578	Install 138 kV Revenue Metering at the Wildcat substation	0.25	AC1-089
n5579	Upgrade line protection and controls at the expanded Wildcat 138 kV substation.	0.25	AC1-089
n5580	Upgrade line protection and controls at the Hillsboro 138 kV substation.	0.25	AC1-089
n5581	Upgrade line protection and controls at the Kenton 138 kV substation.(This estimate needs to be confirmed by LGEE)	0.25	AC1-089

AEP Transmission Zone

Upgrade Id	Project Description	Cost Estimate ($M)	Driver
n5582	To accommodate the interconnection at the Wildcat 138 kV substation, the Wildcat substation will have to be expanded requiring two (2) additional 138 kV circuit breakers to physically configure the substation in a breaker and half bus arrangement (see Figure 2). Installation of associated protection and control equipment, 138 kV line risers, SCADA.	3	AC1-089
n5594	Build a new 138 kV Switching Station	5	AC1-101
n5595	Install T-Line Cut in at the Johns Creek-Excel 138 kV line	1	AC1-101
n5596	Install 138 kV Revenue Metering at the new substation	0.3	AC1-101
n5597	Upgrade line protection and controls at the Johns Creek 138 kV substation to coordinate with the new 138 kV switching station.	0.2	AC1-101

AEP Transmission Zone

Upgrade Id	Project Description	Cost Estimate ($M)	Driver
n5598	Upgrade line protection and controls at the Inez 138 kV substation to coordinate with the new 138 kV switching station.	0.2	AC1-101
n5540	Expand Nottingham 138 kV Substation	4.5	AC1-103
n5541	Install 138 kV Revenue Metering at the expanded Nottingham 138kV substation	0.25	AC1-103
n5542	Upgrade line protection and controls at the expanded Nottingham 138 kV substation.	0.4	AC1-103
n5543	Upgrade line protection and control settings at the Freebyrd 138 kV remote-end substation.	0.25	AC1-103
n5544	Upgrade line protection and control settings at the Yager 138 kV remote-end substation.	0.25	AC1-103

AEP Transmission Zone

Upgrade Id	Project Description	Cost Estimate ($M)	Driver
n5545	Upgrade line protection and control settings at the Holloway 138 kV remote-end substation.	0.25	AC1-103
n5546	Upgrade line protection and control settings at the Knox FE 138 kV substations to coordinate with the expanded Nottingham 138 kV substation. PJM will have to coordinate this upgrade with FE.	0.25	AC1-103
n5547	Upgrade line protection and control settings at the Brookside FE 138 kV substations to coordinate with the expanded Nottingham 138 kV substation. PJM will have to coordinate this upgrade with FE.	0.25	AC1-103
n5548	Upgrade line protection and control settings at the Longview FE 138 kV substations to coordinate with the expanded Nottingham 138 kV substation. PJM will have to coordinate this upgrade with FE.	0.25	AC1-103
n5549	Upgrade line protection and control settings at the Harmon FE 138 kV substations to coordinate with the expanded Nottingham 138 kV substation. PJM will have to coordinate this upgrade with FE.	0.25	AC1-103
n5626	Build a New 138 kV AC1-122/123 Switching Station	5	AC1-123

AEP Transmission Zone

Upgrade Id	Project Description	Cost Estimate ($M)	Driver
n5627	Construct Smith Mountain-Candlers Mountain 138 kV T-Line Cut In	1	AC1-123
n5628	Install 138 kV Revenue Metering at the new AC1-122/123	0.25	AC1-123
n5629	Install protection and controls at the new 138 kV switching station.	0.25	AC1-123
n5630	Upgrade line protection and controls at the Smith Mountain 138 kV substation to coordinate with the new 138 kV switching station.	0.25	AC1-123
n5631	Upgrade line protection and controls at the Opossum Creek 138 kV substation to coordinate with the new 138 kV switching station.	0.25	AC1-123
n5640	Expand Mark Center 69 kV Substation	0.7	AC1-167

AEP Transmission Zone

Upgrade Id	Project Description	Cost Estimate ($M)	Driver
n5641	Install 69 kV Revenue Metering at Mark Center 69 kV Substation	0.2	AC1-167
n5642	Upgrade line protection and controls at the expanded Mark Center 69 kV substation.	0.2	AC1-167
n5648	Upgrade 138 kV Revenue Metering at Logtown 138 kV Substation	0.1	AC1-173
n5653	Expand Losantville 345 kV substation	3	AC1-174
n5654	Install 138 kV Revenue Metering at the Losantville 345 kV substation	0.35	AC1-174
n5655	Upgrade line protection and controls at the expanded Losantville 345 kV substation.	0.35	AC1-174

AEP Transmission Zone

Upgrade Id	Project Description	Cost Estimate ($M)	Driver
n5656	Upgrade line protection and control settings at the Desoto 345 kV substation to coordinate with the expanded Losantville 345 kV substation.	0.05	AC1-174
n5657	Upgrade line protection and control settings at the Tanners Creek 345 kV substation to coordinate with the expanded Losantville 345 kV substation.	0.05	AC1-174
n5668	Construct a new 138 kV Switching Station	5	AC1-188
n5669	Install Rio-Lick 138 kV T-Line Cut In	1	AC1-188
n5670	Upgrade 138 kV Revenue Metering at the new AC1-188 switching station	0.25	AC1-188
n5671	Upgrade line protection and controls at the Sporn 138 kV substation to coordinate with the new 138 kV switching station.	0.25	AC1-188

AEP Transmission Zone

Upgrade Id	Project Description	Cost Estimate ($M)	Driver
n5672	Upgrade line protection and controls at the Lick 138 kV substation to coordinate with the new 138 kV switching station.	0.25	AC1-188
n5673	Upgrade line protection and controls at the Addison 138 kV substation to coordinate with the new 138 kV switching station.	0.25	AC1-188
n5674	Expand the Elk 138 kV Substation	5	AC1-194
n5675	Elk-Poston 138 kV circuit Cut Into Elk substation	0.5	AC1-194
n5676	Install 138 kV Revenue Metering at Elk substation	0.25	AC1-194
n5677	Upgrade line protection and controls at the Poston 138 kV substation to coordinate with the expanded Elk 138 kV substation.	0.25	AC1-194

AEP Transmission Zone

Upgrade Id	Project Description	Cost Estimate ($M)	Driver
n5678	Upgrade line protection and controls at the Corwin 138 kV substation to coordinate with the expanded Elk 138 kV substation.	0.25	AC1-194
n4057	Perform a sag study on the UnivPark - Olive 345 kV line	0.26	AC1-204
n5699	Build a new 138 kV Switching Station with required Protection and Controls	5.95	AC2-015
n5700	Construct Howard - Chatfield 138 kV T-Line Cut In	1	AC2-015
n5701	Install 138 kV Revenue Metering at the new AC2-015 substation	0.25	AC2-015
n5702	Upgrade line protection and controls at the Chatfield 138 kV substation to coordinate with the new 138 kV switching station.	0.25	AC2-015

AEP Transmission Zone

Upgrade Id	Project Description	Cost Estimate ($M)	Driver
n5703	Upgrade line protection and controls at the Howard 138 kV substation to coordinate with the new 138 kV switching station.	0.25	AC2-015
n5704	Upgrade line protection and controls at the Melmore 138 kV substation to coordinate with the new 138 kV switching station.	0.25	AC2-015
n5705	Install one 138 kV Circuit Breaker at the Circleville 138 kV Substation	1.5	AC2-029
n5706	Install 138 kV Revenue Metering at Circleville 138 kV substation	0.25	AC2-029
n5707	Upgrade line protection and controls at the Circleville 138 kV substation.	0.25	AC2-029
n5708	Build a new 69 kV Switching Station with Protection and Controls	4.35	AC2-035

AEP Transmission Zone

Upgrade Id	Project Description	Cost Estimate ($M)	Driver
n5709	Construct Lick-Firebrick 69 kV T-Line Cut In	0.7	AC2-035
n5710	Install 69 kV Revenue Metering at the new AC2-035 substation	0.2	AC2-035
n5711	Upgrade line protection and controls at the Lick 69 kV substation to coordinate with the new 69 kV switching station	0.2	AC2-035
n5712	Upgrade line protection and controls at the Firebrick 69 kV substation to coordinate with the new 69 kV switching station.	0.2	AC2-035
n5730	Build a new 138 kV Switching Station	5.95	AC2-043
n5731	Construct West Millersport-South Baltimore 138 kV T-Line Cut In	1	AC2-043

AEP Transmission Zone

Upgrade Id	Project Description	Cost Estimate ($M)	Driver
n5732	Install 138 kV Revenue Metering at the new AC2-043 substation	0.25	AC2-043
n5733	Upgrade line protection and controls at the West Millersport 138 kV substation.	0.25	AC2-043
n5734	Upgrade line protection and control settings at the South Baltimore 138 kV substation.	0.25	AC2-043
n5735	Build a new 345 kV Switching Station	9.25	AC2-080
n5736	Construct Olive – Reynolds (NIPSCO) 345 kV T-Line Cut In	1.2	AC2-080
n5737	Install 345 kV Revenue Metering at new AC2-080 substation	0.35	AC2-080

AEP Transmission Zone

Upgrade Id	Project Description	Cost Estimate ($M)	Driver
n5738	Upgrade line protection and controls at the Olive 345 kV substation.	0.35	AC2-080
n5742	Expand Jacksons Ferry 138 kV Substation	1.5	AC2-123
n5743	Install 138 kV Revenue Metering at Jackson Ferry	0.25	AC2-123
n5744	Upgrade line protection and controls at the Jacksons Ferry 138kV substation	0.25	AC2-123
n5968	Install one 138 kV Circuit Breaker at the Jay 138 kV Substation and associated equipment, including upgrades to line protection and controls.	1.25	AC2-176
n5312.3	Replace the wavetrap at Segreto substation	0.4	MISO

AEP Transmission Zone

Upgrade Id	Project Description	Cost Estimate ($M)	Driver
n5487	Rebuild depending on the existing structure, approximately 22 miles of Cook – Benton Harbor 345 kV line.	40	MISO
n5961	Replace Twin Brach substation Line Riser	0.2	MISO
n5962	An engineering study will need to be conducted to determine if the relay thermal limit settings at Twin Branch can be adjusted. A new relay package will be required if the relay thermal settings cannot be adjusted	0.625	MISO
n5967	A sag study will be required on the 19.33 mile AEP section of line to mitigate the overload. Depending on the sag study results, cost for the upgrade is expected to be between $78,000 (no remediation required just sag study) or $39.0 million (complete line rebuild required)	0.078	MISO
n5533	Replace B13250 line trap, line tuner, coax, line relays, and carrier set at Richland Substation	0.3381	V2-006
n5034	Build a new Sullivan - Reynolds 765 kV line.	464	X3-028

AEP Transmission Zone

Upgrade Id	Project Description	Cost Estimate ($M)	Driver
n5035	Upgrade wave trap at Dumont on the Dumont - X1-020 765 kV line.	1	X3-028
n5469	Reconductor the Trimble - Clifty 345 kV line with a high temperature conductor and upgrade any necessary terminal equipment.	17.4	X3-028

APS Transmission Zone

Upgrade Id	Project Description	Cost Estimate ($M)	Driver
n5909	Upgrade Z-70 Elwyn breaker at Dravosburg 138 kV substation from a 50 kA breaker to a 63 kA breaker. Time estimate is 8-12 months.	0.4	AA2-161
n5958	Adjust Remote Relay and Metering Settings at the Leadsville 138 kV substations.	0.0308	AC1-073
n5575	Construct AD1-060 Line Tap, Install 2 34.5 kV Line Switches, Install Single 34.5 kV Tap Switch, and Provide Revenue Metering Package	0.0625	AD1-060
n5576	Adjust Remote End Relay Settings at Milnor and Mercersburg Substations	0.0127	AD1-060
n5905	Glen Falls-McAlpin 138 kV Line – Replace Tower #87 w/ one (1) steel pole, single circuit, dead-end structure	0.3	AA2-119
n5906	Glen Falls-Waldo Run/Glen Falls -Fairview 138kV lines – Replace Tower #1 w/ two (2) steel pole, single circuit, tangent structures	0.35	AA2-119

APS Transmission Zone

Upgrade Id	Project Description	Cost Estimate ($M)	Driver
n5947	North Longview 500 kV Substation: Adjust remote end relaying and metering settings.	0.0127	AC1-140
n4335	Upgrade relay and carrier equipment at 115kV Potter substation	0.28	Z1-069

ATSI Transmission Zone

Upgrade Id	Project Description	Cost Estimate ($M)	Driver
n5925	Install a 138kV three breaker ring bus on the London-Beatty (AEP) line for interconnection with AC1-078.	4.89	AC1-078
n5926	Loop the Beatty-London 138kV circuit into the proposed 3-breaker ring bus.	0.51	AC1-078
n5927	London - Replace Beatty 138kV line relaying for new AC1-078 line.	0.27	AC1-078
n5552	Reconductor the AB2-131 Tap - Galion 138 kV line and replace substation conductor at Galion.	8.8063	AC2-195
n5490	Reconductor 2.0 miles of the Lallendorf - Bayshore 345 kV line with bundled 795 ACSS, reconductor Lallendorf line drops, and replaces Lallendorf terminal rod gaps with arrestors. New ratings to be 1743/2278 MVA SN/SE	2.0893	MISO

ComEd Transmission Zone

Upgrade Id	Project Description	Cost Estimate ($M)	Driver
n5696	Modify Relay and Control in association with TSS98 Nevada construction at Goodings Grove 345 kV substation	0.258	AA1-018
n5697	Modify Relay and Control in association with TSS98 Nevada construction at Powerton 345 kV substation	0.258	AA1-018
n5698	Install Fiber work associated with TSS98 Nevada construction	3.456	AA1-018
n5647	Review the relay settings and update record drawings at Mendota Hills 138 kV substation	0.02	AB2-191
n5915	Reconductor the Elwood - Goodings Grove 'B' 345 kV line, upgrade the station conductor at both line terminals, and upgrade the line circuit breaker at Goodings Grove.	23	AC1-204
n5916	Reconductor the Elwood - Goodings Grove 'R' 345 kV line, upgrade the station conductor at both line terminals, and upgrade the line circuit breaker at Goodings Grove.	23	AC1-204

ComEd Transmission Zone

Upgrade Id	Project Description	Cost Estimate ($M)	Driver
n5917	Reconductor the E Frankfort - Crete 345 kV line.	10	AC1-204
n5918	Upgrade station conductor on the Kendall - Lockport 'B' 345 kV line.	0.9	AC1-204
n5171.1	All existing 138kV circuit breakers at Kewanee are 3-cycle devices with achievable clearing time of 6/11 cycles. Relay upgrade on line L6101 will be required to support this clearing time.	0.14	U4-027
n5171.2	All existing 138kV circuit breakers at Kewanee are 3-cycle devices with achievable clearing time of 6/11 cycles. Relay upgrade on line L7411 will be required to support this clearing time.	0.14	U4-027
n5171.3	All existing 138kV circuit breakers at Kewanee are 3-cycle devices with achievable clearing time of 6/11 cycles. Relay upgrade on line L7421 will be required to support this clearing time.	0.14	U4-027
n5171.4	All existing 138kV circuit breakers at Kewanee are 3-cycle devices with achievable clearing time of 6/11 cycles. Relay upgrade on line L7423 will be required to support this clearing time.	0.14	U4-027

ComEd Transmission Zone

Upgrade Id	Project Description	Cost Estimate ($M)	Driver
n5171.5	All existing 138kV circuit breakers at Kewanee are 3-cycle devices with achievable clearing time of 6/11 cycles. Relay upgrade on line L94301 will be required to support this clearing time.	0.14	U4-027
n5171.6	All existing 138kV circuit breakers at Kewanee are 3-cycle devices with achievable clearing time of 6/11 cycles. Relay upgrade on line segment of L15508 from Kewanee to U4-027 (new line number 7408)	0.14	U4-027
n5173	Add high-speed backup relaying and associated communications to 138kV line Kewanee to U4-027 (7408)	2.8	U4-027
n5479	Construct TSS 188 Mt. Pulaski on Brokaw-Lanesville Line 2107 (Engineering Oversight only)	1.67	W2-048
n5480	Cut in 2107 Line into TSS 188 Mt. Pulaski	1.381	W2-048
n5481	Relay and Communications oversight for Brokaw and Lanesville	0.1	W2-048

ComEd Transmission Zone

Upgrade Id	Project Description	Cost Estimate ($M)	Driver
n5903	Engineering for realignment of antennas at Brokaw and Lanesville substations, and adding microwave radio and JMUX fiber optic at Mount Pulaski TSS 188	0.132	W2-048

Dayton Transmission Zone

Upgrade Id	Project Description	Cost Estimate ($M)	Driver
n5892	Atlanta 69 kV Substation: Install new 69 kV ring bus including 3 circuit breakers, metering, protection and control, and SCADA upgrades	1.5	AC1-068
n5933	Replace a full tension takeoff structure and upgrade the conductor leaving Adkins sub on the Adkins-Beatty 345 kV line.	0.4	AC1-068
n5893	Atlanta 69 kV Substation: Expand 69 kV ring bus with an additional circuit breaker bay, metering, protection and control, and SCADA upgrades	0.83	AC1-069
n5692	AC1-085 Interconnection Switchyard Tie-In to Stuart-Clinton 345 kV Line	1.29	AC1-085
n5896	Install new 3 breaker ring interconnection switchyard for the AC1-085 project	6.05	AC1-085
n5897	Upgrade Stuart 345 kV line relaying at Clinton Substation	0.1	AC1-085

Dayton Transmission Zone

Upgrade Id	Project Description	Cost Estimate ($M)	Driver
n5898	Upgrade Clinton 345 kV line relaying at Stuart Substation	0.1	AC1-085
n5894	Atlanta 69 kV Substation: Expand 69 kV ring bus with an additional circuit breaker bay, metering, protection and control, and SCADA upgrades	0.83	AC1-165
n5895	Atlanta 69 kV Substation: Expand 69 kV ring bus with an additional circuit breaker bay, metering, protection and control, and SCADA upgrades	0.83	AC1-166
n5518	Tap the Camden-Crystal 69 kV line section and install a three-way phase switch to interconnect the AC2-067 Project. (One switch covering the generator lead line is considered an Attachment Facility).	0.064	AC2-067
n5519	Tap the Camden-Crystal 69 kV line section and install a three-way phase switch to interconnect the AC2-067 project. (Two network switches of the three-way switch are considered Non-Direct Connection Facilities).	0.128	AC2-067
n5520	Modify protection system at Crystal Substation	0.1	AC2-067

Dayton Transmission Zone

Upgrade Id	Project Description	Cost Estimate ($M)	Driver
n5521	Modify protection system at Hutchings Substation	0.1	AC2-067

Dominion Transmission Zone

Upgrade Id	Project Description	Cost Estimate ($M)	Driver
n5476	Build a three breaker ring bus at Harts Mill substation	4.7214	AB1-081
n5477	Install power Line Carrier communication at Hathaway - Tarboro line #80 and 55	0.8108	AB1-081
n5478	Install Transmission structure at Heartsease DP - Anaconda line # 80, to loop line #80 into and out of Harts Mill substation	1.0388	AB1-081
n5496	Modify transfer trip equipment at Thelma and Lakeview 230 kV substations	0.12	AB1-132
n5475	Transfer trip equipment at Carolina, Clubhouse, and Emporia substations	0.14703	AB1-173
n5624	Install new transmission structures, as well as 2 switches and one wave trap at the new AB2-040 substation	1.44	AB2-040

Dominion Transmission Zone

Upgrade Id	Project Description	Cost Estimate ($M)	Driver
n5625	Upgrade protection and communication to allow for interconnection of the AB2-040 generating facilities	0.91	AB2-040
n5482	Reconductor 0.14 miles of conductor to 550MVA for line # 259 between Chesterfield and Basin	0.25	AB2-051
n5483	Replace wave trap at Elmont and Ladysmith substations	0.7	AB2-051
n5484	Replace circuit breaker number 210512 with 50kA breaker	0.3	AB2-051
n5644	Install two breakers and new connection point at Chesapeake substation	1.44	AB2-051
n5645	Raise four 115 kV lines outside of the Chesapeake substation and replace a 230 kV line span	5.413	AB2-051

Dominion Transmission Zone

Upgrade Id	Project Description	Cost Estimate ($M)	Driver
n5646	Install protection and communication equipment to support queue AB2-051 at Greenwich and Yadlkin 230 kV substations	0.096	AB2-051
n5719	Queue AB2-059 switching station: Build new three (3) CB ring switchyard	5.263	AB2-059
n5720	Hathaway-Harts Mill 115 kV Transmission Line termination into AB2-059 Interconnection Yard	2.9337	AB2-059
n5721	Modify remote relaying at Hathaway Substation	0.0644	AB2-059
n5722	Modify remote relaying at the Harts Mill Substation	0.0361	AB2-059
n5715	Queue AB2-060 switching station: Build new three (3) CB ring switchyard	4.7757	AB2-060

Dominion Transmission Zone

Upgrade Id	Project Description	Cost Estimate ($M)	Driver
n5716	Chase City-Gary 115 kV Transmission Line termination into AB2-060 Interconnection Yard	1.6825	AB2-060
n5717	Chase City Substation: Remote relaying modifications	0.1659	AB2-060
n5718	Lunenburg Substation: Remote relaying modifications	0.0588	AB2-060
n5651	Install new transmission structures, as well as 2 switches and one wave trap at the new AB2-040 substation	1.663	AB2-062
n5652	Upgrade protection and communication equipment to allow for interconnection of the AB2-062 generating facilities	0.142	AB2-062
n5714	Modify Chickahominy - Elmont 500kV line #557 and Chesterfield - Lanexa 115kV line #92 to be relocated near Chickahominy substation	2.55	AB2-068

Dominion Transmission Zone

Upgrade Id	Project Description	Cost Estimate ($M)	Driver
n5664	Install transmission structure to loop line #36 into Queue AB2-077 / 078 / 079 switching station	1.482	AB2-077
n5665	Build three breaker ring bus at AB2-077 / 078 / 079 switching station	5.175	AB2-077
n5666	Upgrade protection and communication for interconnection of Queue AB2-077 / 078 / 079	0.98	AB2-077
n5491	System Protection Work on the Beechwood - Palmer Springs 115 kV line, to accommodate AB2-089	0.095	AB2-089
n5492	Install transmission Structure in-line with the Beechwood - Palmer Springs 115 kV line transmission line to allow the proposed interconnection station to be interconnected to the transmission system	0.5	AB2-089
n5493	Construct one span od attachment line between the generation substation and the new AB2-089 Switching Substation, Establish new 115kV AB2-089 switching substation and install all metering and associated protection equipment at the generation substation.	3.05	AB2-089

Dominion Transmission Zone

Upgrade Id	Project Description	Cost Estimate ($M)	Driver
n5649	Complete all required upgrades to the Chase City 115/34.5kV substation to accommodate AB2-090 including: Install an 84MVA 115-34.5kV transformer and a high side circuit switcher off of the 115kV bus # 4 Install a new distribution breaker and distribution bay including necessary circuit protection equipment on the new feeder Install accompanying load-break disconnects and a 4800kVAR capacitor bank on the new bus. Install bus PTs, station service and IC panel to support the interconnection.	4.8753	AB2-090
n5650	Complete all work required to overbuild the existing circuit #920 with new 477AL 34.5kV circuit from Chase City Substation, approximately 2.2 miles to the Point of Interconnection on IC's property.	1.1838	AB2-090
n5614	Build a three breaker ring at the new AB2-134 substation	6.573	AB2-134
n5615	Install transmission structure to loop line #212 into and out of new AB2-134 substation	1.784	AB2-134

Dominion Transmission Zone

Upgrade Id	Project Description	Cost Estimate ($M)	Driver
n5616	Upgrade relay protection and communication to allow for interconnection of the AB2-134 generating facilities	0.113	AB2-134
n5623	Install System Protection at the North Anna, South Anna, and Louisa Pumping Stations to accommodate the AB2-158 Interconnection	0.0812	AB2-158
n5620	Build a three breaker ring at the new AB2-169 substation	5.448	AB2-169
n5621	Install Transmission structure to loop line #189 into and out of new AB2-169 substation	1.337	AB2-169
n5622	Upgrade protection and communication to allow for interconnection of the AB2-169 generating facilities	0.208	AB2-169
n5497	Build a new AB2-174 switching station	5.5	AB2-174

Dominion Transmission Zone

Upgrade Id	Project Description	Cost Estimate ($M)	Driver
n5498	Install a dead end construction at the new AB2-174 switching station	0.8	AB2-174
n5499	Replace transfer trip equipment at the Carolina and Clubhouse 115 kV substations	0.12	AB2-174
n5500	Install a new transformer at the Clubhouse substation	9	AB2-174
n5939	Install Metering and associated protection equipment at the AC1-080 generation Substation	0.6	AC1-080
n5940	Build 115 kV attachment line from the AC1-080 Switching Substation to the POI	0.5	AC1-080
n5941	Build New AC1-080three breaker ring bus Switching Substation (interconnection substation)	5.6	AC1-080

Dominion Transmission Zone

Upgrade Id	Project Description	Cost Estimate ($M)	Driver
n5942	Install Transmission structure in line with Perth - Hickory Grove 115kV transmission line to allow the proposed AC1-080 interconnection switching station to be interconnected with the transmission system	1	AC1-080
n5943	Install Metering and associated protection equipment at the generation Substation	0.6	AC1-121
n5944	Build 115 kV attachment line from the AC1-121 Switching Substation to the POI	0.5	AC1-121
n5945	Build New AC1-121 three breaker ring bus Switching Substation (interconnection substation)	5.6	AC1-121
n5946	Install Transmission structure in line with Mitchell-Mountain Run 115kV transmission line to allow the proposed interconnection switching station to be interconnected with the transmission system	0.6	AC1-121
n5966	Expand the ring bus by installing circuit breaker at Spotsylvania substation	3.5	AC1-158

Dominion Transmission Zone

Upgrade Id	Project Description	Cost Estimate ($M)	Driver
n5938	Wreck and rebuild the Waller – Lightfoot 230 KV line to a rating of 1047 MVA	15.2	AC1-159
n5606	Line #2018 Chesapeake-Greenwich 230 kV: wreck and rebuild the line of 11 miles to increase its line rating to 1047 MVA (normal), 1047 MVA (emergency), and 1204 MVA (load dump). A Va CPCN is required.	26.5	AC2-012
n5607	Line #2114 Elk Run – Gainsville 230 kV: reconductor the line of 21 miles increase its line rating to 1203 MVA (normal), 1203 MVA (emergency), and 1383 MVA (load dump).	28	AC2-102
n5612	Line #153 AC1-076 Tap – Paytes DP 115 kV: wreck and rebuild the line of 3 miles to increase its line rating to 262 MVA (normal), 287 MVA (emergency), and 349 MVA (load dump). A Va CPCN is required.	6.5	AC2-102
n5613	4ALTVSTA-05OTTER 138 kV line (AEP upgrade) – Rebuild/Reconductor 0.9 miles conductor section. Estimated Cost: $1.8 Million	1.8	AC2-107

Dominion Transmission Zone

Upgrade Id	Project Description	Cost Estimate ($M)	Driver
n5609	Line #576 Midlothian – North Anna 500 kV: wreck and rebuild the line of 41 miles increase its line rating to 4453 MVA (normal), 4453 MVA (emergency), and 5121 MVA (load dump).	123.39	AC2-141

EKPC Transmission Zone

Upgrade Id	Project Description	Cost Estimate ($M)	Driver
n5929	Build 138kv switching station at Jacksonville Tap including associated transmission line work	3.2	AC1-074
n5930	Adjust remote, relaying, and metering settings at Jacksonville 138kV Sub	0.05	AC1-074
n5931	Adjust remote, relaying, and metering settings at Renaker 138kV Sub	0.05	AC1-074

ME Transmission Zone

Upgrade Id	Project Description	Cost Estimate ($M)	Driver
n5667	Install breaker, disconnect switches, CVT's and installation of relays/controls, and install fiber interface for new AC1-048 & AC2-053 fiber or OPGW. Fiber Work - Install in-sub fiber runs.	1.18	AC1-048

ITCI Transmission Zone

Upgrade Id	Project Description	Cost Estimate ($M)	Driver
n4377	Construct Transmission line from Covert Station to Segreto Station	1.5	T94

JCPL Transmission Zone

Upgrade Id	Project Description	Cost Estimate ($M)	Driver
n3647	Install current limiting reactors at Raritan River Substation on the Neptune Line	2.28	W4-009

PENELEC Transmission Zone

Upgrade Id	Project Description	Cost Estimate ($M)	Driver
n5739	Replace the existing breaker and wave trap at East Towanda 115 kV sub, and replacing the wave trap at the North Meshoppen 115kV Sub	0.2428	AA1-111
n5740	Stability Reinforcement for AA1-111: Install a 230-345kV transformer between the proposed AA1-111 interconnection switchyard and the NYSEG Q496 interconnection switchyard	12.5726	AA1-111
n5516	Oversight for splicing, terminating, and testing fiber for Direct Transfer Trip (DTT) at the AA2-133 Point of Interconnection	0.11	AA2-133
n5741	Install a 230kV PAR on the Dunkirk-S. Ripley 230 kV line	15	Y3-092
n4332	Upgrade carrier equipment and install DTT on the 115kV Niles Valley line. Utilize existing equipment on Everts Drive (future Mainesburg) line to receive breaker status from Mainesburg breaker.	0.16	Z1-069
n4333	Install anti-islanding scheme at Mainesburg to transmit breaker open status of the Mansfield 115kV line breaker.	0.09	Z1-069

PENELEC Transmission Zone

Upgrade Id	Project Description	Cost Estimate ($M)	Driver
n4334	Install anti-islanding scheme at Pierce Brook to transmit breaker open status of the Potter 115kV line breaker.	0.09	Z1-069
n5605	Install second 115 kV bus tie breaker at Hooversville and relocate the Ralphton 115 kV line	3.827	AC2-122

PPL Transmission Zone

Upgrade Id	Project Description	Cost Estimate ($M)	Driver
n5960	Relay Modification Work to accommodate the AA1-077 uprate	0.0384	AA1-077
n5900	Construct one (1) new standard four bay BAAH 230kV switchyard	14.919	AC1-071
n5901	Modify Relay settings at Lackawanna Substation	0.204	AC1-071
n5902	Modify Relay settings at Paupack Substation	0.204	AC1-071
n5924	All work associated with break and cut-in of the Lackawanna - Paupack 230kV line to interconnect the new AC1-071 BAAH substation with the transmission system	4.5	AC1-071
n5904	Modify Relay Settings at Hauto Substation	0.0256	AC1-087

PPL Transmission Zone

Upgrade Id	Project Description	Cost Estimate ($M)	Driver
n5963	Relay and Protection Work to accommodate the AC1-151 project	0.179	AC1-151
n5964	Tap the Harwood - Berwick 69kV line and route line to the AC1-151 POI	0.96	AC1-151
n5965	Provide and commission metering to be installed at Interconnection Customer substation	0.067	AC1-151
n5643	Relay Modification Work to Accommodate AC2-092	0.0256	AC2-092

PSEG Transmission Zone

Upgrade Id	Project Description	Cost Estimate ($M)	Driver
n4276	Reimbursement for b2955. These costs are based upon the New Service Customer's needs to reconfigure one span of the VFT to Warinanco U-2273 circuit to remove a clearance issue.	0.21	Z1-116
n5564	Reconductor the Williams-Cedar Grove 230 kV Line with 1590 ACSS	19.092	AD2-018
n5565	Reconductor Roseland-Cedar Grove 230 kV Line with 1590 ACSS	18.698	AD2-019

Revision History

- V1 – 9/06/2018 – Original Slides Posted
- V2 – 9/10/2018 – Updated Slides 6 through 34 to correct the content that was listed under the “Fuel Type” column.