

PPA Transmission Project Updates to the Roll-up Case

PPA	Description	In Service Date	Purpose or Need
ISO-NE	Addition of a 1200 MW nominal, ± 300 kV, bipolar HVDC line from Des Cantons, Quebec to Franklin, New Hampshire <ul style="list-style-type: none"> o 47 miles from Des Cantons to US Border o 153 miles (includes ~8 miles UG) from US Border to Franklin) 	6/1/2017	Economic; Northern Pass Transmission
ISO-NE	Two 600 MW line commutated converters will be connected to the 230-kV bus at the Des Canton 735/230-kV Substation in Quebec, Canada	6/1/2017	Economic; Northern Pass Transmission
ISO-NE	Construct a 345 kV Substation in Franklin NH	6/1/2017	Economic; Northern Pass Transmission
ISO-NE	Two 600 MW line commutated converters will be connected to the 345-kV Franklin Substation	6/1/2017	Economic; Northern Pass Transmission
ISO-NE	Construct a 34 mile 345 kV ac line from Franklin Substation to Deerfield Substation	6/1/2017	Economic; Northern Pass Transmission
ISO-NE	Loop the 345-kV Line 391 in and out of Deerfield Substation and associated upgrades at the 345-kV Deerfield Substation	6/1/2017	Economic; Northern Pass Transmission
ISO-NE	Re-rate the following lines which could be achieved by removing the existing sag limitations and re-rating the lines to operate at 140 degrees C. <ul style="list-style-type: none"> o Line 326 re-rated to a minimum LTE rating of 1515 MVA § Scobie Pond to the Massachusetts Border o Line 373 re-rated to a minimum LTE rating of 1435 MVA o Line 391S re-rated to a minimum LTE rating of 1470 MVA 	6/1/2017	Economic; Northern Pass Transmission
ISO-NE	750 MVAR of reactive compensation at the 345-kV Franklin Substation, to be controlled by the NPT Operator <ul style="list-style-type: none"> o Consisting of filters and shunts o Franklin's non-filter capacitor banks, 350 MVAR, to be thyristor controlled. 	6/1/2017	Economic; Northern Pass Transmission
ISO-NE	210 MVAR of reactive compensation at the 345-kV Scobie Substation (3 * 60 MVAR, 1 * 30 MVAR), regulating between 1.0 and 1.045pu, to be controlled by NH LCC	6/1/2017	Economic; Northern Pass Transmission
ISO-NE	200 MVAR of reactive compensation at the 345-kV Deerfield Substation (4 * 50 MVAR), to be controlled by the SVC at Deerfield in timeframes consistent with the analyses presented in the report	6/1/2017	Economic; Northern Pass Transmission
ISO-NE	Two 345-kV 60 MVAR Reactors at the 345-kV Franklin Substation, to be controlled by the NPT Operator	6/1/2017	Economic; Northern Pass Transmission
ISO-NE	HVdc Converter Auxiliary Controller Input Function Based on Frequency Deviation Measured at 345-kV Franklin substation	6/1/2017	Economic; Northern Pass Transmission
ISO-NE	Doubling of the 345-kV Scobie Pond 9126 breaker	6/1/2017	Economic; Northern Pass Transmission
ISO-NE	Doubling of the 345-kV Scobie Pond 262 breaker	6/1/2017	Economic; Northern Pass Transmission
ISO-NE	One 345-kV 0/+400 MVAR SVC consisting of one MSC branch of 400 MVAR and 1 TCR branch rated at 400 MVAR at the 345-kV Deerfield Substation, regulating 1.03pu	6/1/2017	Economic; Northern Pass Transmission
ISO-NE	One 345-kV 0/+100 MVAR SVC consisting of one MSC branch of 100 MVAR and 1 TCR branch rated at 100 MVAR at the 345-kV Franklin station, regulating 1.033 pu	6/1/2017	Economic; Northern Pass Transmission
ISO-NE	The 326 line SPS summer thermal mode set point will be increased to 1515 MVA from 1429 MVA	6/1/2017	Economic; Northern Pass Transmission
NYISO	New 345 kV Transmission Project from Bus 137200 EDIC 345.00 to Bus 130753 FRASR345	6/1/2016	Marcy South Series Compensation
NYISO	New 345 kV Transmission Project from Bus 130750 COOPC345 to Bus 130753 FRASR345	6/1/2016	Marcy South Series Compensation
NYISO	New 345 KV Transmission Project from Bus 130750 COOPC345 to Bus 147833 MARCY T1	6/1/2016	Marcy South Series Compensation
NYISO	New 345 KV Transmission Project from Bus 125001 ROCK TAV to Bus 126297 RAMAPO	6/1/2016	2nd Rock Tavern - Ramapo 345 kV line
NYISO	New 345 KV Transmission Project from Bus 126283 GOTHLS N to Bus 126286 GOWANUSN	6/1/2016	Staten Island Un-bottling
NYISO	New 345 kV Transmission Project from Bus 126285 GOTHLS S to Bus 126287 GOWANUSS	6/1/2016	Staten Island Un-bottling
NYISO	New 345 kV Transmission Project from Bus 126286 GOWANUSN to Bus 126590 GOWANUS 41SR	6/1/2016	Staten Island Un-bottling
NYISO	New 345 kV Transmission Project from Bus 126286 GOWANUSN to Bus 126590 GOWANUS 41SR	6/1/2016	Staten Island Un-bottling
NYISO	New 345 kV Transmission Project from Bus 126287 GOWANUSS to Bus 126591 GOWANUS 42SR	6/1/2016	Staten Island Un-bottling
NYISO	New 345 kV Transmission Project from Bus 126287 GOWANUSS to Bus 126591 GOWANUS 42SR	6/1/2016	Staten Island Un-bottling
NYISO	New 345 kV Transmission Project from Bus 126590 GOWANUS 41SR to Bus 126645 FARRAGUT EAS	6/1/2016	Staten Island Un-bottling
NYISO	New 345 kV Transmission Project from Bus 126591 GOWANUS 42SR to Bus 126644 FARRAGUT WES	6/1/2016	Staten Island Un-bottling
PJM	Remove the Carolina 22 SPS to include relay logic changes, minor control wiring, relay resets and SCADA programming upon completion of project	5/1/2016	Overload of Eatons Ferry - Carolina 115 kV
PJM	Replace the Blooming Grove 230 kV breaker 'Peckville'	11/30/2016	Overstress the Blooming Grove 230 kV breaker 'Peckville'
PJM	Upgrade the 69 kV bus at Laurel	6/1/2015	Overload of the Carlls Corner - Laurel 69 kV line
PJM	Shawville Substation: Relocate 230 kV and 115 kV controls from the generating station building to new control building	12/1/2014	Need to relocate substation control equipment due to generation deactivation

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PJM	Armstrong Substation: Relocate 138 kV controls from the generating station building to new control building	12/31/2014	Need to relocate substation control equipment due to generation deactivation
PJM	Albright Substation: Install a new control building in the switchyard and relocate controls and SCADA equipment from the generating station building to the new control center	12/1/2014	Need to relocate substation control equipment due to generation deactivation
PJM	Rivesville Switching Station: Relocate controls and SCADA equipment from the generating station building to new control building	6/1/2014	Need to relocate substation control equipment due to generation deactivation
PJM	Install two 115 kV breakers at Chestnut Hill and remove sag limitations on the Pumphrey - Frederick Rd 115 kV circuits 110527 and 110528 to obtain a 125 deg. Celsius rating (161/210 MVA)	6/1/2017	Loss of more than 300 MW load
PJM	Install an SPS to trip approximately 19 MW load at Green St. and Concord	6/1/2014	b1086 delay
PJM	Increase Rating of Eddystone #205 138kV Breaker	6/1/2017	Overstress of the Eddystone 138 kV breaker 205
PJM	Increase Rating of Eddystone #415 138kV Breaker	6/1/2017	Overstress of the Eddystone 138 kV breaker 415
PJM	Rebuild and reconductor 2.6 miles of the Sunbury - Dauphin 69 kV circuit	5/31/2017	Overload of the Sunbury - Dauphin 69 kV circuit
PJM	Add a 2nd 150 MVA 230/69 kV transformer at Springfield	5/31/2018	Overload of the Elroy 138/69 kV and Springfield 230/69 kV transformers
PJM	50 MVAR shunt reactor at Mickleton 230 kV and relocate Mickleton #1 230 69 kV transformer	6/1/2016	Normal high voltage limits exceeded
PJM	+150/-100 MVAR SVC at Cedar 230 kV	6/1/2016	Normal high voltage limits exceeded
PJM	Install a 300 MVAR reactor at Dequene 345 kV	12/1/2016	Normal high voltage limits exceeded
PJM	Replace existing 150 MVAR reactor at Amos 765 kV substation on Amos - N. Proctorville - Hanging Rock with 300 MVAR reactor	6/1/2016	Normal high voltage limits exceeded
PJM	Install 765 kV reactor breaker at Dumont 765 kV substation on the Dumont - Wilton Center line	12/1/2015	Normal high voltage limits exceeded
PJM	Install 765 kV reactor breaker at Marysville 765 kV substation on the Marysville - Maliszewski line	6/1/2015	Normal high voltage limits exceeded
PJM	Change transformer tap settings for the Baker 765/345 kV transformer	6/1/2016	Normal high voltage limits exceeded
PJM	260 MVAR reactor at West Wharton 230 kV	4/1/2015	Normal high voltage limits exceeded
PJM	50 MVAR reactor at Buckingham 230 kV	12/31/2017	Normal high voltage limits exceeded
PJM	150 MVAR shunt reactor at Alburdis 500 kV	6/1/2016	Normal high voltage limits exceeded
PJM	100 MVAR shunt reactor at Elimsport 230 kV	6/1/2016	Normal high voltage limits exceeded
PJM	50 MVAR reactor at Saddlebrook 230 kV	6/1/2015	Normal high voltage limits exceeded
PJM	50 MVAR reactor at Athenia 230 kV	6/1/2015	Normal high voltage limits exceeded
PJM	50 MVAR reactor at Bergen 230 kV	6/1/2015	Normal high voltage limits exceeded
PJM	50 MVAR reactor at Hudson 230 kV	6/1/2015	Normal high voltage limits exceeded
PJM	Two 50 MVAR reactors at Stanley Tce 230 kV	6/1/2015	Normal high voltage limits exceeded
PJM	50 MVAR reactor at West Orange 230 kV	6/1/2015	Normal high voltage limits exceeded
PJM	50 MVAR reactor at Aldene 230 kV	6/1/2015	Normal high voltage limits exceeded
PJM	150 MVAR reactor at Camden 230 kV	6/1/2015	Normal high voltage limits exceeded
PJM	150 MVAR reactor at Gloucester 230 kV	6/1/2015	Normal high voltage limits exceeded
PJM	50 MVAR reactor at Clarksville 230 kV	6/1/2015	Normal high voltage limits exceeded
PJM	50 MVAR reactor at Hinchmans 230 kV	6/1/2015	Normal high voltage limits exceeded
PJM	50 MVAR reactor at Beaver Brook 230 kV	6/1/2015	Normal high voltage limits exceeded
PJM	50 MVAR reactor at Cox's Corner 230 kV	6/1/2015	Normal high voltage limits exceeded
PJM	Add two 100 MVAR reactors at Dickerson Station H and two 100 MVAR reactors at Brighton 230 kV substation	6/1/2016	Real time high voltage issue
PJM	Loop in the Meadow Lake - Olive 345 kV circuit into Reynolds 765/345 kV station	6/1/2018	Overload of Meadow Lake - Reynolds 345 kV
PJM	Reconductor from Lake Lynn - West Run 138 kV	12/1/2014	Overload of Lake Lynn - West Run 138 kV
PJM	Replace the Erie South 115 kV breaker 'French #2' with 40kA breaker	6/1/2014	Overstress of the Erie South 115 kV breaker French #2
PJM	Upgrade the bus and jumpers with 750 MCM copper conductor at Green County 69kV substation	6/1/2018	Overload of Greensburg - Green County 69 kV
PJM	Increase the maximum operating temperature of the North Springfield - South Springfield 69 kV line to 167 degrees Fahrenheit	6/1/2015	Overload of the North Springfield - South Springfield 69 kV
PJM	Increase the maximum operating temperature of the Loretto - Sulphur Creek 69 kV line to 167 degrees Fahrenheit	6/1/2015	Overload of the Loretto - Sulphur Creek 69 kV
PJM	Increase the maximum operating temperature of the South Springfield - Loretto 69 kV line to 167 degrees Fahrenheit	6/1/2015	Overload of the Loretto - South Springfield 69 kV
PJM	Construct 8.8 miles of 69 kV line between the Cave City and Bon Ayr distribution substations. Operate this line normally open	12/1/2013	Low voltage at Parkway 69 kV and Goodnight 69 kV

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PJM	Construct 8.6 miles of 69 kV line between the Mercer County Industrial and Van Arsdell distribution substation. Construct a new 69 kV switching station adjacent to Bonds Bill Substation. Loop NorthSpringfield - Van Arsdell 69 kV line through South Anders	12/1/2013	Low voltage at Mercer County Industrial 69 kV bus during normal conditions and non-convergent solution during outage of line and generation unit
PJM	Construct a new 69 kv switching station ("South Anderson") adjacent to the LGE/KU Bonds Mill substation	12/1/2013	Low voltage at Mercer County Industrial 69 kV bus during normal conditions and non-convergent solution during outage of line and generation unit
PJM	Loop the North Springfield - Van Arsdell 69 kV line through South Anderson. Terminate the existing 69 kV to the LGE/KU Bonds Mill substation at South Anderson and establish a second 69 kV from S. Anderson to the LGE/KU Bonds Mill sub	12/1/2013	Low voltage at Mercer County Industrial 69 kV bus during normal conditions and non-convergent solution during outage of line and generation unit
PJM	Construct 0.12 miles of 69 kV line from South Anderson to the Powell Taylor distribution substation and serve this substation radially from South Anderson	12/1/2013	Low voltage at Mercer County Industrial 69 kV bus during normal conditions and non-convergent solution during outage of line and generation unit
PJM	Increase the size of the existing HT Adams 69 kV, 7.2 MVAR capacitor bank to 14.28 MVAR	12/1/2013	Low voltage at Mercer County Industrial 69 kV bus during normal conditions and non-convergent solution during outage of line and generation unit
PJM	Increase the size of the existing Hunt Farm Junction 69 kV, 8.2 MVAR capacitor bank to 16.33 MVAR	12/1/2013	Low voltage at Mercer County Industrial 69 kV bus during normal conditions and non-convergent solution during outage of line and generation unit
PJM	Construct 10.9 miles of 69 kV line between the Owen County substation and the Keith distribution substation. Operate the existing Penn - Keith 69 kV line normally - open	6/1/2014	Low voltage at Keith and Penn 69 kV buses
PJM	Construct 2.7 miles of 69 kV line between the Fox Hollow substation and the Parkway distribution substations. Serve the Parkway #1 and #2 distribution substations radially from Fox Hollow. Operate the Cave City - Bon Ayr 69 kV line normally - closed	6/1/2014	Low voltage at Parkway 69 kV bus
PJM	Increase the maximum operating temperature of the Helechawa - Sublett 69 kV line to 167 degrees Fahrenheit	6/1/2014	Overload of Helechawa - Sublett 69 kV line
PJM	Install a 69 kV, 15.31 MVAR capacitor bank at the Perryville substation	6/1/2014	Low voltage at Van Arsdell 69 kV bus
PJM	Install a 69 kV, 25.51 MVAR capacitor bank at the Veechdale substation	6/1/2014	Low voltage at Veechdale 69 kV bus
PJM	Change the CT setting on circuit breaker N35 - 804 at Dale Station to at least 800 amps to increase the relay loadability on the Dale - Three Forks 138 kV line to at least 282 MVA	6/1/2014	Overload of Dale - Three Forks 138 kV line
PJM	Rebuild the existing Cynthiana - Headquarters 69 kV line using 556.5 MCM ACSR conductor and operate this line normally closed	12/1/2015	Low voltage at Millersburg and Reid Village 69 kV buses; Low voltage at Millersburg and Headquarters 69 kV buses
PJM	Remove the existing 1200 - amp line traps at JK Smith and Dale associated with the JK Smith - Dale 138 kV line	12/1/2015	Overload of JK Smith - Dale 138 kV line
PJM	Increase the maximum operating temperature of the Glendale - Hodgenville 69 kV line to 212 degrees Fahrenheit	6/1/2015	Overload of Glendale - Hodgenville 69 kV line
PJM	Increase the maximum operating temperature of the Fayette - Davis 69 kV line to 248 degrees Fahrenheit	6/1/2017	Overload of Fayette - Davis 69 kV line
PJM	Increase the maximum operating temperature of the Boone - Boone Distribution 69 kV line to 302 degrees Fahrenheit	6/1/2015	Overload of Boone - Boone Distribution 69 kV line
PJM	Increase the maximum operating temperature of the West Bardstown Junction - West Bardstown 69 kV line to 284 degrees Fahrenheit	6/1/2015	Overload of West Bardstown Junction - West Bardstwon 69 kV line
PJM	Increase the maximum operating temperature of the Magnolia - Summersville 69 kV line to 167 degrees Fahrenheit	6/1/2015	Overload of Magnolia - Summersville 69 kV line
PJM	Increase the maximum operating temperature of the Bacon Creek - Liberty Church 69 kV line to 212 degrees Fahrenheit	6/1/2015	Overload of Librty Church - Bacon Creek 69 kV line
PJM	Increase the maximum operating temperature of the Headquarters - Millersburg Junction 69 kV line to 167 degrees Fahrenheit	6/1/2015	Overload of Headquarters - Millersburg Junction 69 kV line
PJM	Increase the maximum operating temperature of the JK Smith - Dale 138 kV line to 275 degrees Fahrenheit	6/1/2015	Overload of JK Smith- Dale 138 kV line
PJM	Increase the maximum operating temperature of the Elizabethtown - Tunnel Hill 69 kV line to 284 degrees Fahrenheit	6/1/2015	Overload of Elizabethtown - Tunnel Hill 69 kV line
PJM	Install a 69 kV, 28.06 MVAR capacitor bank at the Owen County substation	6/1/2017	Low voltage at Keith 69 kV bus; Low voltage at Clay Village 69 kV bus
PJM	Install a 69 kV, 14.29 MVAR capacitor bank at the Magoffin County substation	12/1/2017	Low voltage at Jenny Wiley 69 kV bus
PJM	Increase the maximum operating temperature of the South Corbin - Bacon Creek 69 kV line to 212 degrees Fahrenheit	6/1/2018	Overload of Bacon Creek - South Corbin 69 kV line
PJM	Increase the size of the existing Cedar Grove 69 kV, 10.8 MVAR capacitor bank to 20.41 MVAR	6/1/2018	Low voltage at Pleasant Grove 69 kV bus
PJM	Upgrade the 4/0 copper bus and jumpers at the Nelson County substation associated with the Nelson County - West Bardstown Junction 69 kV line using 500 MCM copper or equivalent equipment	6/1/2018	Overload of Nelson County - West Bardstown Junction 69 kV line
PJM	Increase the Zone 3 distance relay setting at Barren County associated with the Barren County - Horse Cave Tap 69 kV line to at least 85 MVA	6/1/2018	Overload of Barren County - Horse Cave Tap 69 kV line

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PJM	Replace the East Springfield 138kV breaker 211-B-63 with 40kA	6/1/2018	Overstress of the East Springfield 138 kV breaker '211-B-63'
PJM	Replace Churchtown 69kV breaker 'D'	6/1/2015	Overstress of Churchtown 69 kV 'D' breaker
PJM	Replace the East Windsor 230 kV breaker 'E1' with 63kA breaker	6/1/2016	Overstress of the East Windsor 230 kV breaker E1
PJM	Wreck and rebuild approximately 1.3 miles of existing 230 kV line between Cochran Mill - X4-039 Switching Station	11/1/2015	Overload of Pleasant View - X4-039 Switching Station 230 kV
PJM	Convert the Shingletown 230kV bus into a 6 breaker ring bus	6/1/2018	Low voltage and voltage drop violations at Moshannon, Elko, Milesburg, Dale Summit, Carbon Center, and Quehanna 230kV buses
PJM	Replace 138 kV bus tie 1-2 circuit breaker, station conductor, relays, and a wave trap at TSS 55 Hegewisch substation	3/1/2015	Overload of Hegewisch 138kV
PJM	Reconductor 1.4 miles of 138 kV line 0112, Kickapoo Creek - LaSalle County 138kV line	12/31/2015	Overload of Kickapoo -LaSalle County 138kV line
PJM	Replace the East Akron 138kV breaker 36-B-46 with 40kA	6/1/2018	Overstress of the East Akron 138 kV breaker '36-B-46'
PJM	Replace the Brambleton 230 kV breaker '209502' with 63kA breaker	6/1/2016	Overstress of the Brambleton 230 kV breaker 20902
PJM	Replace the Brambleton 230 kV breaker '213702' with 63kA breaker	6/1/2016	Overstress of the Brambleton 230 kV breaker 213702
PJM	Replace the Brambleton 230 kV breaker 'H302' with 63kA breaker	6/1/2016	Overstress of the Brambleton 230 kV breaker H302
PJM	Install 75 MVAR capacitor at the Erie East 230 kV substation	6/1/2018	Several voltage magnitude and voltage drop violations in Erie East vicinity
PJM	Upgrade the Chalk Point - T133TAP 230 kV Ck. 1 (23063) and Ckt. 2 (23065) to 1200 MVA ACCR	6/1/2018	Overload of Chalk Point - T133TAP 230 kV Ckts. 1 and 2
PJM	Build a 2nd Loudoun - Brambleton 500 kV line within the existing ROW. The Loudoun - Brambleton 230 kV line will be relocated as an underbuild on the new 500 kV line	6/1/2018	Overload of Loudoun 500/230 kV #1 and #2
PJM	Change the existing CT ratios of the existing equipment along Bearskin - Smith Mountain 138kV circuit	6/1/2015	Overload of the Bearskin - Smith Mountain 138kV circuit
PJM	Change the existing CT ratios of the existing equipment along East Danville-Banister 138kV circuit	6/1/2015	Overload of the East Danville-Banister 138kV circuit
PJM	Replace the Turner 138 kV breaker 'D' with 63 kA rated breaker	6/1/2014	Overstress of the Turner 138 kV breaker D
PJM	Replace the North Newark 138 kV breaker 'P' with 63 kA rated breaker	6/1/2014	Overstress of the North Newark 138 kV breaker P
PJM	Replace the Sporn 345 kV breaker 'DD' with 63 kA rated breaker	6/1/2014	Overstress of the Sporn 345 kV breaker DD
PJM	Replace the Sporn 345 kV breaker 'DD2' with 63 kA rated breaker	6/1/2014	Overstress of the Sporn 345 kV breaker DD2
PJM	Replace the Muskingum 345 kV breaker 'SE'	6/1/2014	Overstress of the Muskingum 345 kV breaker SE
PJM	Replace the East Lima 138 kV breaker 'E1' with 63 kA rated breaker	6/1/2014	Overstress of the East Lima 138 kV breaker E1
PJM	Replace the Delco 138 kV breaker 'R' with 63 kA rated breaker	6/1/2014	Overstress of the Delco 138 kV breaker R
PJM	Replace the Sporn 345 kV breaker 'AA2' with 63 kA rated breaker	6/1/2014	Overstress of the Sporn 345 kV breaker AA2
PJM	Replace the Sporn 345 kV breaker 'CC' with 63 kA rated breaker	6/1/2014	Overstress of the Sporn 345 kV breaker CC
PJM	Replace the Sporn 345 kV breaker 'CC2' with 63 kA rated breaker	6/1/2014	Overstress of the Sporn 345 kV breaker CC2
PJM	Replace the Astor 138 kV breaker '102' with 63 kA rated breaker	6/1/2014	Overstress of the Astor 138 kV breaker 102
PJM	Replace the Muskingum 345 kV breaker 'SH'	6/1/2014	Overstress of the Muskingum 345 kV breaker SH
PJM	Replace the Muskingum 345 kV breaker 'SI'	6/1/2014	Overstress of the Muskingum 345 kV breaker SI
PJM	Replace the Hyatt 138 kV breaker '105N' with 63 kA rated breaker	6/1/2014	Overstress of the Hyatt 138 kV breaker 105N
PJM	Replace the Muskingum 345 kV breaker 'SG'	6/1/2014	Overstress of the Muskingum 345 kV breaker SG
PJM	Replace the Hyatt 138 kV breaker '101C' with 63 kA rated breaker	6/1/2014	Overstress of the Hyatt 138 kV breaker 101C
PJM	Replace the Hyatt 138 kV breaker '104N' with 63 kA rated breaker	6/1/2014	Overstress of the Hyatt 138 kV breaker 104N
PJM	Replace the Hyatt 138 kV breaker '104S' with 63 kA rated breaker	6/1/2014	Overstress of the Hyatt 138 kV breaker 104S
PJM	Replace the Sporn 345 kV breaker 'CC1' with 63 kA rated breaker	6/1/2014	Overstress of the Sporn 345 kV breaker CC1
PJM	Reconductor the Harmony - Chapel St 138 kV circuit	6/1/2018	Overload of Harmony - Chapel St 138 kV
PJM	Build a new Camp Small 115 kV station and install 30 MVAR capacitor	6/1/2018	Voltage drop violations in the Mays Chapel, Texas and Gwynnbrook 115 kV vicinity
PJM	Install a tie breaker at Mays Chapel 115 kV substation	6/1/2018	Voltage drop violations in the Mays Chapel, Texas and Gwynnbrook 115 kV vicinity
PJM	Replace the Beaumeade 230 kV breaker '2079T2116' with 63kA rated breaker	6/1/2018	Overstress the Beaumeade 230 kV breaker '2079T2116'
PJM	Replace the Beaumeade 230 kV breaker '2079T2130' with 63kA rated breaker	6/1/2018	Overstress the Beaumeade 230 kV breaker '2079T2130'
PJM	Replace the Beaumeade 230 kV breaker '208192' with 63kA rated breaker	6/1/2018	Overstress the Beaumeade 230 kV breaker '208192'
PJM	Replace the Beaumeade 230 kV breaker '209592' with 63kA rated breaker	6/1/2018	Overstress the Beaumeade 230 kV breaker '209592'
PJM	Replace the Beaumeade 230 kV breaker '211692' with 63kA rated breaker	6/1/2018	Overstress the Beaumeade 230 kV breaker '211692'
PJM	Replace the Beaumeade 230 kV breaker '227T2130' with 63kA rated breaker	6/1/2018	Overstress the Beaumeade 230 kV breaker '227T2130'
PJM	Replace the Beaumeade 230 kV breaker '274T2130' with 63kA rated breaker	6/1/2018	Overstress the Beaumeade 230 kV breaker '274T2130'
PJM	Replace the Beaumeade 230 kV breaker '227T2095' with 63kA rated breaker	6/1/2018	Overstress the Beaumeade 230 kV breaker '227T2095'

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PJM	Replace the Pleasant View 230 kV breaker '203T274' with 63kA rated breaker	6/1/2018	Overstress the Pleasant View 230 kV breaker '203T274'
PJM	Rebuild Stanton-Providence 69 kV 2&3 9.5 miles with 795 SCSR	11/30/2017	Overload of Jenkins - Scranton #1 and #2 69 kV resulting in load loss greater than 120 MW
PJM	Reconductor 7 miles of the Lackawanna - Providence 69 kV #1 and #2 with 795 ACSR	11/30/2017	Overload of Jenkins - Scranton #1 and #2 69 kV resulting in load loss greater than 120 MW
PJM	Rebuild SUB2 Tap 1 (Lackawanna - Scranton 1) 69 kV 1.5 miles 556 ACSR	11/30/2017	Overload of Jenkins - Scranton #1 and #2 69 kV resulting in load loss greater than 120 MW
PJM	Rebuild SUB2 Tap 2 (Lackawanna - Scranton 1) 69 kV 1.6 miles 556 ACSR	11/30/2017	Overload of Jenkins - Scranton #1 and #2 69 kV resulting in load loss greater than 120 MW
PJM	Create Providence - Scranton 69 kV #1 and #2, 3.5 miles with 795 ACSR	11/30/2017	Overload of Jenkins - Scranton #1 and #2 69 kV resulting in load loss greater than 120 MW
PJM	Rebuild Providence 69 kV switchyard	11/30/2017	Overload of Jenkins - Scranton #1 and #2 69 kV resulting in load loss greater than 120 MW
PJM	Install 2 - 10.8 MVAR capacitors at EYNO 69 kV	11/30/2017	Overload of Jenkins - Scranton #1 and #2 69 kV resulting in load loss greater than 120 MW
PJM	Rebuild Stanton 230 kV yard	11/30/2017	Overload of Jenkins - Scranton #1 and #2 69 kV resulting in load loss greater than 120 MW
PJM	Install two 56.4 MVAR capacitor banks at the Melmore 138 kV station in Ohio	6/1/2018	Voltage drop violations at Fremont, Tiffin and neighboring 138 KV buses
PJM	Convert Hogan-Mullin 34.5 kV line to 138 kV, establish 138 kV line btw Jones Creek and Strawton, rebuild existing Mullin-Elwood 34.5 kV and terminate line into Strawton station, retire Mullin station	6/1/2018	Local voltage collapse of 138 kV system in Alexandria area
PJM	Rebuild the 3/0 ACSR portion of the Hadley - Kroemer Tap 69 kV line utilizing 795 ACSR conductor	6/1/2014	Overload of Hadley - Kroemer 69 kV line
PJM	Install a 44 MVAR 138 kV capacitor at the Hempfield 139 kV substation	6/1/2018	Low voltage at Brackenridge, Eastgate, Edgewater, Hempfield, Luxor, Loyalhanna, North Greensburg, Stone Spring Jct, North Oakford, South Oakford and Youngwood 138 kV buses
PJM	Replace a relay at McDowell 138 kV substation	6/1/2018	Overload of Shanango - McDowell 138 kV line
PJM	Build the 2nd Summer Shade EKPC - Summer Shade TVA 161 kV circuit	6/1/2018	Voltage drop violation at Barren County and Summer Shade 161 kV buses
PJM	Install a 138 kV Red-Blue bus tie with underground cable and a line 15913 CB at Highland Park	6/1/2018	Overload of Waukegan - Lake Hurst 138 kV Blue line (L1606)
PJM	Reconductor 0.125 miles of the East Frankfort - Mokena 138 kV line L6604	6/1/2018	Overload of East Frankfort - Mokena 138 kV Red line
PJM	Replace Ridgeland 138 kV bus tie CB and underground cable at TSS 192 Ridgeland 138 kV substation	6/1/2018	Overload of Ridgeland 138 kV bus tie
PJM	Reconductor 7.5 miles of Waukegan - Gurnee 138 kV line L1607	6/1/2018	Overload of Waukegan - Gurnee 138 kV Blue line
PJM	Reconductor 0.33 miles of 138 kV underground cable on the Sawyer - Crawford 138 kV Blue line (L1324)	6/1/2018	Overload of Sawyer - Crawford 138 kV Blue line
PJM	Install all 69kV lines to interconnect Plainfield, Greenbrook, and Bridgewater stations and establish the 69kV network	6/1/2018	Voltage magnitude and drop violations at Front St, Plainfield and South Second St.
PJM	Install two 18MVAR capacitors at Plainfield and S. Second St substation	6/1/2018	Voltage magnitude and drop violations at Front St, Plainfield and South Second St.
PJM	Install a second four (4) breaker 69kV ring bus at Bridgewater Switching Station	6/1/2018	Voltage magnitude and drop violations at Front St, Plainfield and South Second St.
PJM	Install a 300 MVAR shunt reactor at AEP's Wyoming 765 kV station	6/1/2018	High voltage conditions in the Wyoming area
PJM	Replace the Oak Grove 138 kV breaker 'OG1' with 63 kA breakers	6/1/2018	Overstress the Oak Grove 138 kV breaker 'OG1'
PJM	Replace the Oak Grove 138 kV breaker 'OG2' with 63 kA breakers	6/1/2018	Overstress the Oak Grove 138 kV breaker 'OG2'
PJM	Replace the Oak Grove 138 kV breaker 'OG3' with 63 kA breakers	6/1/2018	Overstress the Oak Grove 138 kV breaker 'OG3'
PJM	Replace the Oak Grove 138 kV breaker 'OG4' with 63 kA breakers	6/1/2018	Overstress the Oak Grove 138 kV breaker 'OG4'
PJM	Replace the Oak Grove 138 kV breaker 'OG5' with 63 kA breakers	6/1/2018	Overstress the Oak Grove 138 kV breaker 'OG5'
PJM	Replace the Oak Grove 138 kV breaker 'OG6' with 63 kA breakers	6/1/2018	Overstress the Oak Grove 138 kV breaker 'OG6'
PJM	Replace the Ridgeley 138 kV breaker 'RC1' with a 40 kA rated breaker	6/1/2018	Overstress the Ridgeley 138 kV breaker 'RC1'
PJM	Install breaker and a half 138 kV substation (Waldo Run) with 4 breakers to accommodate service to MarkWest Sherwood Facility including metering which is cut into Glen Falls-Lamberton 138 kV line	12/31/2014	Low voltage and voltage drop violations at Sherwood, West Union, Varner, Mountwood and Lamberton 138 kV buses
PJM	Install a 70 MVAR SVC at the new WaldoRun 138 kV substation	12/31/2014	Low voltage and voltage drop violations at Sherwood, West Union, Varner, Mountwood and Lamberton 138 kV buses
PJM	Install two 31.7 MVAR capacitors at the new WaldoRun 138 kV substation	12/31/2014	Low voltage and voltage drop violations at Sherwood, West Union, Varner, Mountwood and Lamberton 138 kV buses
PJM	Build a new London - Tangy 138 kV line	6/1/2014	Bus voltage and magnitude problems at East Springfield 138 kV and London 138 kV busses
PJM	Build a new East Springfield - London #2 138 kV line	6/1/2014	Bus voltage and magnitude problems at East Springfield 138 kV and London 138 kV busses
PJM	PSEG Northern NJ 345 kV Project	6/1/2015	Short Circuit TEAC 11/7/2013

PPA Transmission Project Updates to the Roll-up Case

PPA	Description	In Service Date	Purpose or Need
PJM	Convert the Bergen - Marion 138 kV path to double circuit 345 kV	6/1/2015	Support the PSEG Northern NJ 345 kV Project
PJM	Convert the Bergen - Homestead "F" 138 kV circuit to 345 kV and any associated substation upgrades	6/1/2015	Support the PSEG Northern NJ 345 kV Project
PJM	Convert the Bergen - North Bergen "E" 138 kV circuit to 345 kV and any associated substation upgrades	6/1/2015	Support the PSEG Northern NJ 345 kV Project
PJM	Convert the North Bergen - Homestead "E" 138 kV circuit to 345 kV and any associated substation upgrades	6/1/2015	Support the PSEG Northern NJ 345 kV Project
PJM	Convert the Homestead - Marion "E" 138 kV circuit to 345 kV and any associated substation upgrades	6/1/2015	Support the PSEG Northern NJ 345 kV Project
PJM	Convert the Homestead - Marion "F" 138 kV circuit to 345 kV and any associated substation upgrades	6/1/2015	Support the PSEG Northern NJ 345 kV Project
PJM	Convert the Marion - Bayonne 138 kV path to double circuit 345 kV	6/1/2015	Support the PSEG Northern NJ 345 kV Project
PJM	Convert the Marion - Bayonne "L" 138 kV circuit to 345 kV and any associated substation upgrades	6/1/2015	Support the PSEG Northern NJ 345 kV Project
PJM	Convert the Marion - Bayonne "C" 138 kV circuit to 345 kV and any associated substation upgrades	6/1/2015	Support the PSEG Northern NJ 345 kV Project
PJM	Convert the Bayonne - PVSC 138 kV path to double circuit 345 kV	6/1/2015	Support the PSEG Northern NJ 345 kV Project
PJM	Convert the Bayone - PVSC "I" 138 kV circuit to 345 kV and any associated substation upgrades	6/1/2015	Support the PSEG Northern NJ 345 kV Project
PJM	Construct a new Bayone - PVSC 345 kV circuit and any associated substation upgrades	6/1/2015	Support the PSEG Northern NJ 345 kV Project
PJM	Convert the PVSC - North Ave 138 kV path to double circuit 345 kV	6/1/2015	Support the PSEG Northern NJ 345 kV Project
PJM	Convert the PVSC - North Ave "E" 138 kV circuit to 345 kV and any associated substation upgrades	6/1/2015	Support the PSEG Northern NJ 345 kV Project
PJM	Construct a new PVSC - North Ave 345 kV circuit and any associated substation upgrades	6/1/2015	Support the PSEG Northern NJ 345 kV Project
PJM	Construct a new North Ave - Airport 345 kV circuit and any associated substation upgrades	6/1/2015	Support the PSEG Northern NJ 345 kV Project
PJM	Relocate the underground portion of North Ave - Linden "T" 138 kV circuit to Bayway, convert it to 345 kV, and any associated substation upgrades	6/1/2015	Support the PSEG Northern NJ 345 kV Project
PJM	Construct a new Airport - Bayway 345 kV circuit and any associated substation upgrades	6/1/2015	Support the PSEG Northern NJ 345 kV Project
PJM	Convert the Bayway - Linden 138 kV path to double circuit 345 kV	6/1/2015	Support the PSEG Northern NJ 345 kV Project
PJM	Relocate the overhead portion of Linden - North Ave "T" 138 kV circuit to Bayway, convert it to 345 kV, and any associated substation upgrades	6/1/2015	Support the PSEG Northern NJ 345 kV Project
PJM	Convert the Bayway - Linden "X" 138 kV circuit to 345 kV and any associated substation upgrades	6/1/2015	Support the PSEG Northern NJ 345 kV Project
PJM	Convert the Bayway - Linden "Z" 138 kV circuit to 345 kV and any associated substation upgrades	6/1/2015	Support the PSEG Northern NJ 345 kV Project
PJM	Relocate Farragut - Hudson "B" and "C" 345 kV circuits to Marion 345 kV and any associated substation upgrades	6/1/2015	Support the PSEG Northern NJ 345 kV Project
PJM	Relocate the Hudson 2 generation to inject into the 345 kV at Marion and any associated upgrades	6/1/2015	Support the PSEG Northern NJ 345 kV Project
PJM	New Bergen 345/230 kV transformer and any associated substation upgrades	6/1/2015	Short Circuit TEAC 11/7/2013
PJM	New Bergen 345/138 kV transformer #1 and any associated substation upgrades	6/1/2015	Short Circuit TEAC 11/7/2013
PJM	New Bergen 345/138 kV transformer #2 and any associated substation upgrades	6/1/2015	Short Circuit TEAC 11/7/2013
PJM	New Bayway 345/138 kV transformer #1 and any associated substation upgrades	6/1/2015	Short Circuit TEAC 11/7/2013
PJM	New Bayway 345/138 kV transformer #2 and any associated substation upgrades	6/1/2015	Short Circuit TEAC 11/7/2013
PJM	New Linden 345/230 kV transformer and any associated substation upgrades	6/1/2015	Short Circuit TEAC 11/7/2013
PJM	New Linden 230/138 kV transformer and any associated substation upgrades	6/1/2015	Short Circuit TEAC 11/7/2013
PJM	Install two reactors at Tosco 230 kV	6/1/2014	Overstress of the Tosco 230kV GIS breakers 5-10
PJM	Replace the Tosco 138kV breaker 'CB1/2 (CBT)' with 63kA	6/1/2014	Overstress of the Tosco 230kV 'CB1/2(CBT)'
PJM	Replace the Cabot 138kV breaker 'C9-KISKI VLY' with 63kA	6/1/2014	Overstress of the Cabot 138kV breaker 'C9-KISKI VLY'
PJM	Install +250/-100 MVAR SVC at the Erie South 230 kV station	6/1/2018	Several voltage magnitude and voltage drop violations in the Erie vicinity
PJM	Install three 230 kV breakers on the 230 kV side of the Lewistown #1, #2 and #3 transformers	6/1/2018	Voltage drop violations in Lewistown vicinity
PJM	Construct new underground 230 kV line from Glebe to Station C, rebuild Glebe Substation, construct 230 kV high-side bus at Station C with option to install 800 MVA PAR	6/1/2018	Various overloads in vicinity of Franconia, Van Dorn, Ox, N. Potomac Yards, N. Alexandria, S. Carlyle
PJM	Willow - Eureka 138 kV line: reconductor 0.26 mile of 4/0 CU with 336 ACSS, new rating on the line will be 163/197 MVA (SN/SE)	6/1/2017	Overload of Willow - Eureka 138 kV line
PJM	Tidd - Mahans Lake 138 kV line: completion of sag study will increase rating to 191/250 MVA (SN/SE)	6/1/2017	Overload of Tidd - Mahans Lane 138 kV line
PJM	Replace wave trap and protective relays at Montour	6/1/2017	Overload of Montour - Susquehanna T10 230 kV line; Sunbury transformer 22
PJM	Install a 2nd Sunbury 900MVA 500-230kV transformer and associated equipment.	6/1/2017	Overload of Sunbury 500/230 kV #4
PJM	Rebuild the 7-mile 345 kV line between Meadow Lake and Reynolds 345 kV stations	6/1/2017	Overload of Meadow Lake - Reynolds 345 kV line
PJM	Construct a new 115 kV line from Central City West to Bedford North	6/1/2018	Bus voltage and magnitude problems at East Springfield 138 kV and London 138 kV busses

PPA Transmission Project Updates to the Roll-up Case

PPA	Description	In Service Date	Purpose or Need
PJM	Replace the Charles 138 kV breaker '919' with 63 kA	6/1/2018	Overstress of the Charles 138 kV breaker '919'
PJM	Upgrade the 4/0 copper bus and jumpers at the Denny substation associated with the Denny - Gregory Road Jct. 69 kV line using 500 MCM copper or equivalent equipment	6/1/2019	Overload of the Denny - Gregory Road Jct. 69 kV line
PJM	Rebuild the existing West Bardstown Jct. - West Bardstown 69 kV line using 556.5 MCM ACSR conductor	12/1/2018	Low voltage at the Deatsville 69 kV bus
PJM	Replace the existing Bullitt County 161/69 kV, 100 MVA transformer with a 150 MVA transformer	12/1/2018	Overload of the Bullitt County 161/69 kV, 100 MVA transformer
PJM	Reconductor the Albion - Albion Z 69 kV line and replace the existing tower structures	6/1/2018	Overload of Albion - Albion Z 69 kV line
PJM	Replace 24 115 kV wood h-frames with 230 kV Dominion pole H-frame structures on the Clubhouse - Purdy 115 kV line	6/1/2014	Overload of Clubhouse - Purdy 115 kV
PJM	Replace Hanover 230 kV substation line switches with 3000A switches	5/1/2016	Overload of Elmont - Four Rivers 230 kV
PJM	Replace wave traps at Four River 230 kV and Elmont 230 kV substations with 3000A wave traps	5/1/2016	Overload of Elmont - Four Rivers 230 kV
PJM	Wreck and rebuild existing Remington CT - Warrenton 230 kV (approx. 12 miles) as a double-circuit 230 kV line	6/1/2017	Loading on radial Remington CT - Warrenton 230 kV line is projected to exceed 100 MW; Existing load on NOVEC's radial Gainesville - Wheeler 115 kV line exceeds 110 MW; Loss of Gainesville Substation results in over 300 MW of load shed
PJM	Construct a new 230 kV line approximately 6 miles from NOVEC's Wheeler Substation to new 230 kV switching station in Vint Hill area	6/1/2017	Loading on radial Remington CT - Warrenton 230 kV line is projected to exceed 100 MW; Existing load on NOVEC's radial Gainesville - Wheeler 115 kV line exceeds 110 MW; Loss of Gainesville Substation results in over 300 MW of load shed
PJM	Convert NOVEC's Gainesville - Wheeler line (approximately 6 miles) to 230 kV	6/1/2017	Loading on radial Remington CT - Warrenton 230 kV line is projected to exceed 100 MW; Existing load on NOVEC's radial Gainesville - Wheeler 115 kV line exceeds 110 MW; Loss of Gainesville Substation results in over 300 MW of load shed
PJM	Bypass Gainesville and utilize Gainesville - Loudoun 230 kV to complete a Vint Hill - Wheeler - Loudoun 230 kV networked line	6/1/2017	Loading on radial Remington CT - Warrenton 230 kV line is projected to exceed 100 MW; Existing load on NOVEC's radial Gainesville - Wheeler 115 kV line exceeds 110 MW; Loss of Gainesville Substation results in over 300 MW of load shed