

A large, white, lattice-structured transmission tower stands against a clear blue sky. Several high-voltage power lines are visible, extending from the tower towards the top corners of the frame. The tower is the central focus of the background image.

Transmission Expansion Advisory Committee Meeting

2011 Market Efficiency Analysis Results

July 7, 2011

- Power flow Cases
 - 2011 power flow case to represent today’s “as-is” system
 - 2015 RTEP power flow case to represent future system
 - MAPP and PATH are removed from all the RTEP cases
- Market Efficiency Runs

Study Year	2011	2014	2017	2020	2025
System Topology	2011 As-Is System Topology	2015 System Topology without MAPP, PATH, Susquehanna-Roseland, Mt. Storm-Doubs Reconductor	2015 System Topology without MAPP and PATH	2015 System Topology without MAPP and PATH	2015 System Topology without MAPP and PATH

- 2011 and 2014 Study Years
 - Compare Market Congestion for As-Is vs. Future topology
 - Estimates economic impact of future upgrades

- Future Study Years
 - Compare Market Congestion using expected topology for study year
 - Review results to identify future constraints causing significant congestion

Results for Congestion > \$5 million

2011 As-Is System Topology

2015 System Topology without MAPP, PATH, Susquehanna-Roseland, Mt. Storm-Doubs Reconnector

Constraint Name	Area	Type	Frequency (Hours)	Market Congestion (\$millions)	Frequency (Hours)	Market Congestion (\$millions)
AP SOUTH	PJM	INTERFACE	3,211	\$280	2740	\$228
Cloverdale 500kV to Lexington 500kV	AEP to DVP	500 kV	1,045	\$140	1063	\$152
5004/5005	PJM	INTERFACE	2,434	\$132	517	\$23
EASTERN	PJM	INTERFACE	713	\$61	1190	\$107
Black Oak - Bedington Interface	PJM	INTERFACE	148	\$25	217	\$34
Altoona 230kV to Bear Rock 230kV	PENELEC	LINE	732	\$23	4	\$0
Lexington 500kV to Dooks 500kV	DVP	500 kV	146	\$22	66	\$11
Juniata 230kV to Dauphin 230kV	PPL	LINE	158	\$21	84	\$11
Bedington 138kV to Harmony Junction Tap 138kV	AP	LINE	27	\$13	0	\$0
Altoona 230kV to Raystown 230kV	PENELEC	LINE	1,414	\$12	0	\$0
Mitchell 138kV to Elrama 138kV	AP to DLCO	LINE	1,917	\$11	1422	\$8
Tiltonsville 138kV to Windsor 138kV	AEP to AP	LINE	454	\$11	61	\$4
Homer City Station 230kV to Shelocta 230kV	PENELEC	LINE	2,149	\$8	0	\$0
WESTERN	PJM	INTERFACE	56	\$4	410	\$22
Clover 230kV to Clover 500kV	DVP	Transformer	148	\$3	359	\$9
Homer City Station 345kV to Homer City Station 230kV	PENELEC	Transformer	659	\$3	1406	\$6
Krendale 138kV to Seneca 138kV	AP to FE	LINE	73	\$0	1654	\$19
Total				\$783		\$657

Indicates Congestion reduced by at least \$5 million in simulation made with 2015 topology



Market Simulation Results – 2011 Generation and Load Scenario

Complete Results Data

2011 As-Is System Topology

2015 System Topology without MAPP,
PATH, Susquehanna-Roseland, Mt.
Storm-Doubs Reconductor

Constraint Name	Area	Type	Frequency (Hours)	Market Congestion (\$millions)	Frequency (Hours)	Market Congestion (\$millions)
AP SOUTH	PJM	INTERFACE	3,211	\$280	2740	\$228
Cloverdale 500kV to Lexington 500kV	AEP to DVP	500 kV	1,045	\$140	1063	\$152
5004/5005	PJM	INTERFACE	2,434	\$132	517	\$23
EASTERN	PJM	INTERFACE	713	\$61	1190	\$107
Black Oak - Bedington Interface	PJM	INTERFACE	148	\$25	217	\$34
Altoona 230kV to Bear Rock 230kV	PENELEC	LINE	732	\$23	4	\$0
Lexington 500kV to Dooms 500kV	DVP	500 kV	146	\$22	66	\$11
Juniata 230kV to Dauphin 230kV	PPL	LINE	158	\$21	84	\$11
Bedington 138kV to Harmony Junction Tap 138kV	AP	LINE	27	\$13	0	\$0
Altoona 230kV to Raystown 230kV	PENELEC	LINE	1,414	\$12	0	\$0
Mitchell 138kV to Elrama 138kV	AP to DLCO	LINE	1,917	\$11	1422	\$8
Tiltonsville 138kV to Windsor 138kV	AEP to AP	LINE	454	\$11	61	\$4
Homer City Station 230kV to Shelocta 230kV	PENELEC	LINE	2,149	\$8	0	\$0
WESTERN	PJM	INTERFACE	56	\$4	410	\$22
Clover 230kV to Clover 500kV	DVP	Transformer	148	\$3	359	\$9
Cedar Grove 230kV to Clifton 230kV	PSEG	LINE	3,180	\$3	0	\$0
Homer City Station 345kV to Homer City Station 230kV	PENELEC	Transformer	659	\$3	1406	\$6
Fredericksburg 230kV to Cranes Corner 230kV	DVP	LINE	12	\$2	9	\$1
CENTRAL	PJM	INTERFACE	146	\$2	159	\$4
Lewistown 230kV to Juniata 230kV	PENELEC to PPL	LINE	117	\$1	7	\$0
Dune Acres - Michigan City	PJM	INTERFACE	176	\$1	893	\$8
Keystone (PA) 500kV to Conemaugh 500kV	PJM	500 kV	38	\$1	0	\$0
Elrama 138kV to Mitchell 138kV	DLCO to AP	LINE	98	\$1	0	\$0
Dover Energy (NRG) 69kV to Kent 69kV	DP&L	LINE	227	\$1	223	\$1
Juniata 230kV to Cumberland 230kV	PPL	LINE	4	\$1	1	\$0
N Meshoppen 230kV to N Meshoppen 115kV	PENELEC	Transformer	177	\$0	2109	\$5
Streator Cayuga Ridge Wind Farm 345kV to Wilton CTR 345 345kV	CE	LINE	0	\$0	19	\$1
Krendale 138kV to Seneca 138kV	AP to FE	LINE	73	\$0	1654	\$19
Bayonne 138kV to Passaic Valley Sewerage Commission 138kV	PSEG	LINE	600	\$0	819	\$1
Dickerson Station "D" 230kV to 230kV	PEPCO to DVP	LINE	3	\$0	7	\$1
Total				\$783		\$657

Results for Congestion > \$5 million

			2011 As-Is System Topology		2015 System Topology without MAPP, PATH, Susquehanna-Roseland, Mt. Storm-Doubs Reconductor	
Constraint Name	Area	Type	Frequency (Hours)	Market Congestion (\$Millions)	Frequency (Hours)	Market Congestion (\$Millions)
AP SOUTH	PJM	INTERFACE	3621	\$449	3118	\$358
Cloverdale 500kV to Lexington 500kV	AEP to DVP	500 kV	1132	\$196	1151	\$206
5004/5005	PJM	INTERFACE	2594	\$195	705	\$44
EASTERN	PJM	INTERFACE	1242	\$130	1921	\$250
Black Oak - Bedington Interface	PJM	INTERFACE	550	\$100	811	\$164
Bedington 138kV to Harmony Junction Tap 138kV	AP	LINE	140	\$97	0	\$0
Altoona 230kV to Bear Rock 230kV	PENELEC	LINE	1257	\$53	1	\$0
Juniata 230kV to Dauphin 230kV	PPL	LINE	107	\$23	34	\$4
Lexington 500kV to Dooms 500kV	DVP	500 kV	107	\$19	76	\$11
Mitchell 138kV to Elrama 138kV	AP to DLCO	LINE	1566	\$14	1212	\$13
Tiltonsville 138kV to Windsor 138kV	AEP to AP	LINE	281	\$12	30	\$4
CENTRAL	PJM	INTERFACE	378	\$9	182	\$7
WESTERN	PJM	INTERFACE	38	\$3	183	\$15
Clover 230kV to Clover 500kV	DVP	Transformer	65	\$2	245	\$9
Krendale 138kV to Seneca 138kV	AP to FE	LINE	354	\$2	1915	\$26
Dune Acres - Michigan City	PJM	INTERFACE	154	\$1	779	\$11
N Meshoppen 230kV to N Meshoppen 115kV	PENELEC	Transformer	386	\$1	2081	\$8
COOPER 230kV to Peach Bottom 230kV	PECO	LINE	0	\$0	1006	\$15
Streator Cayuga Ridge Wind Farm 345kV to Wilton CTR	CE	LINE	7	\$0	130	\$8
Total				\$1,329		\$1,176

Indicates Congestion reduced by at least \$5 million in simulation made with 2015 topology



Preliminary Market Simulation Results – 2014 Generation and Load Scenario

Complete Results Data

Complete Results Data			2011 As-Is System Topology		2015 System Topology without MAPP, PATH, Susquehanna-Roseland, Mt. Storm-Doubs Reconductor	
Constraint Name	Area	Type	Frequency (Hours)	Market Congestion (\$Millions)	Frequency (Hours)	Market Congestion (\$Millions)
AP SOUTH	PJM	INTERFACE	3621	\$449	3118	\$358
Cloverdale 500kV to Lexington 500kV	AEP to DVP	500 kV	1132	\$196	1151	\$206
5004/5005	PJM	INTERFACE	2594	\$195	705	\$44
EASTERN	PJM	INTERFACE	1242	\$130	1921	\$250
Black Oak - Bedington Interface	PJM	INTERFACE	550	\$100	811	\$164
Bedington 138kV to Harmony Junction Tap 138kV	AP	LINE	140	\$97	0	\$0
Altoona 230kV to Bear Rock 230kV	PENELEC	LINE	1257	\$53	1	\$0
Juniata 230kV to Dauphin 230kV	PPL	LINE	107	\$23	34	\$4
Lexington 500kV to Dooms 500kV	DVP	500 kV	107	\$19	76	\$11
Mitchell 138kV to Elrama 138kV	AP to DLCO	LINE	1566	\$14	1212	\$13
Tiltonsville 138kV to Windsor 138kV	AEP to AP	LINE	281	\$12	30	\$4
CENTRAL	PJM	INTERFACE	378	\$9	182	\$7
Keystone (PA) 500kV to Conemaugh 500kV	PJM	500 kV	91	\$5	0	\$0
WESTERN	PJM	INTERFACE	38	\$3	183	\$15
Homer City Station 345kV to Homer City Station 230kV	PENELEC	Transformer	1012	\$3	1269	\$5
Altoona 230kV to Raystown 230kV	PENELEC	LINE	247	\$2	0	\$0
Homer City Station 230kV to Shelocta 230kV	PENELEC	LINE	437	\$2	0	\$0
Clover 230kV to Clover 500kV	DVP	Transformer	65	\$2	245	\$9
Cedar Grove 230kV to Clifton 230kV	PSEG	LINE	2186	\$2	0	\$0
Fredericksburg 230kV to Cranes Comer 230kV	DVP	LINE	12	\$2	25	\$4
Krendale 138kV to Seneca 138kV	AP to FE	LINE	354	\$2	1915	\$26
Dune Acres - Michigan City	PJM	INTERFACE	154	\$1	779	\$11
Dover Energy (NRG) 69kV to Kent 69kV	DP&L	LINE	291	\$1	301	\$1
N Meshoppen 230kV to N Meshoppen 115kV	PENELEC	Transformer	386	\$1	2081	\$8
Bayonne 138kV to Passaic Valley Sewerage Commission	PSEG	LINE	592	\$1	1066	\$4
Dickerson Station "D" 230kV to 230kV	PEPCO to DVP	LINE	3	\$1	3	\$0
Wylie Ridge 500kV to Wylie Ridge 345kV	AP	Transformer	178	\$1	0	\$0
Brunner Island 230kV to Yorkana 230kV	PPL to METED	LINE	4	\$1	0	\$0
COOPER 230kV to Peach Bottom 230kV	PECO	LINE	0	\$0	1006	\$15
Streator Cayuga Ridge Wind Farm 345kV to Pontiac Midp	CE	LINE	0	\$0	58	\$5
Streator Cayuga Ridge Wind Farm 345kV to Wilton CTR	CE	LINE	7	\$0	130	\$8
Total				\$1,329		\$1,176

RTEP Upgrades responsible for Congestion Reduction 2011 and 2014 Simulations

Constraints with at least \$5 million Congestion Reduction and RTEP Upgrade(s) responsible for reduction

Constraint Name	RTEP Upgrade Most Responsible for Reduction
AP SOUTH	Various RTEP Upgrades and Loop Flow
5004/5005	Jacks Mountain Upgrade (6/2014)
Bedington 138kV to Harmony Junction Tap 138kV	Bedington-Harmony Jct. Reconductor (TBD)
Altoona 230kV to Bear Rock 230kV	Upgrade Conemaugh 500/230 KV transformer and new line from Conemaugh-Seward 230 KV (6/2014)
Juniata 230kV to Dauphin 230kV	Upgrade Conemaugh 500/230 KV transformer and new line from Conemaugh-Seward 230 KV (6/2014)
Lexington 500kV to Dooms 500kV	Replace both Wave Traps on Dooms-Lexington 500 KV (6/2012)
Tiltonsville 138kV to Windsor 138kV	
Altoona 230kV to Raystown 230kV	Upgrade Conemaugh 500/230 KV transformer and new line from Conemaugh-Seward 230 KV (6/2014)
Homer City Station 230kV to Shelocta 230kV	



Market Simulation Results

2014, 2017, and 2020 Load and Generation Scenarios

			2014 Study Year		2017 Study Year		2020 Study Year	
			2015 System Topology without MAPP, PATH, Susquehanna-Roseland, Mt. Storm-Doubs Reconductor		2015 System Topology without MAPP and PATH		2015 System Topology without MAPP and PATH	
Constraint Name	Area	Type	Frequency (Hours)	Market Congestion (\$millions)	Frequency (Hours)	Market Congestion (\$millions)	Frequency (Hours)	Market Congestion (\$millions)
Results for Congestion >\$5 million for any Study Year								
AP SOUTH	PJM	INTERFACE	3118	\$358	2465	\$313	2058	\$278
EASTERN	PJM	INTERFACE	1921	\$250	54	\$7	41	\$10
Cloverdale 500kV to Lexington 500kV	AEP to DVP	500 kV	1151	\$206	1214	\$292	1147	\$264
Black Oak - Bedington Interface	PJM	INTERFACE	811	\$164	988	\$274	735	\$187
5004/5005	PJM	INTERFACE	705	\$44	2080	\$303	2009	\$320
Krendale 138kV to Seneca 138kV	AP to FE	LINE	1915	\$26	2031	\$40	2516	\$60
WESTERN	PJM	INTERFACE	183	\$15	270	\$102	437	\$142
COOPER 230kV to Peach Bottom 230kV	PECO	LINE	1006	\$15	984	\$27	1486	\$43
Mitchell 138kV to Elrama 138kV	AP to DLCO	LINE	1212	\$13	1298	\$26	711	\$6
Lexington 500kV to Dooms 500kV	DVP	500 kV	76	\$11	81	\$22	39	\$10
Dune Acres - Michigan City	PJM	INTERFACE	779	\$11	332	\$3	231	\$2
Clover 230kV to Clover 500kV	DVP	Transformer	245	\$9	343	\$20	85	\$5
N Meshoppen 230kV to N Meshoppen 115kV	PENELEC	Transformer	2081	\$8	2513	\$20	2241	\$21
Streator Cayuga Ridge Wind Farm 345kV to Wilton CTR	CE	LINE	130	\$8	132	\$13	247	\$33
CENTRAL	PJM	INTERFACE	182	\$7	153	\$10	451	\$44
Streator Cayuga Ridge Wind Farm 345kV to Pontiac Midp	CE	LINE	58	\$5	57	\$7	73	\$8
Fredericksburg 230kV to Cranes Corner 230kV	DVP	LINE	25	\$4	39	\$10	40	\$7
Bayonne 138kV to Passaic Valley Sewerage Commission	PSEG	LINE	1066	\$4	1847	\$6	1910	\$6
Altoona 230kV to Bear Rock 230kV	PENELEC	LINE	1	\$0	97	\$19	152	\$25
Bristers 500kV to Ox 500kV	DVP	500 kV	0	\$0	0	\$0	37	\$18
Pleasant View 500kV to Pleasant View 230kV	DVP	Transformer	0	\$0	0	\$0	5	\$10
Halifax (VA) 115kV to Mt Laurel 115kV	DVP	LINE	4	\$0	32	\$15	48	\$14
Meadow Brook 500kV to Meadow Brook 138kV	AP	Transformer	0	\$0	0	\$0	5	\$11
Total				\$1,176		\$1,546		\$1,536

Indicates Congestion costs of at least \$20 million in study year 2014, 2017, or 2020.



Market Simulation Results

2014, 2017, and 2020 Load and Generation Scenarios

Complete Results Data

			2014 Study Year		2017 Study Year		2020 Study Year	
			2015 System Topology without MAPP, PATH, Susquehanna-Roseland, Mt. Storm-Doubs Reconductor		2015 System Topology without MAPP and PATH		2015 System Topology without MAPP and PATH	
Constraint Name	Area	Type	Frequency (Hours)	Market Congestion (\$millions)	Frequency (Hours)	Market Congestion (\$millions)	Frequency (Hours)	Market Congestion (\$millions)
AP SOUTH	PJM	INTERFACE	3118	\$358	2465	\$313	2058	\$278
EASTERN	PJM	INTERFACE	1921	\$250	54	\$7	41	\$10
Cloverdale 500kV to Lexington 500kV	AEP to DVP	500 kV	1151	\$206	1214	\$292	1147	\$264
Black Oak - Bedington Interface	PJM	INTERFACE	811	\$164	988	\$274	735	\$187
5004/5005	PJM	INTERFACE	705	\$44	2080	\$303	2009	\$320
Krendale 138kV to Seneca 138kV	AP to FE	LINE	1915	\$26	2031	\$40	2516	\$60
WESTERN	PJM	INTERFACE	183	\$15	270	\$102	437	\$142
COOPER 230kV to Peach Bottom 230kV	PECO	LINE	1006	\$15	984	\$27	1486	\$43
Mitchell 138kV to Elrama 138kV	AP to DLCO	LINE	1212	\$13	1298	\$26	711	\$6
Lexington 500kV to Dooms 500kV	DVP	500 kV	76	\$11	81	\$22	39	\$10
Dune Acres - Michigan City	PJM	INTERFACE	779	\$11	332	\$3	231	\$2
Clover 230kV to Clover 500kV	DVP	Transformer	245	\$9	343	\$20	85	\$5
N Meshoppen 230kV to N Meshoppen 115kV	PENELEC	Transformer	2081	\$8	2513	\$20	2241	\$21
Streator Cayuga Ridge Wind Farm 345kV to Wilton CTR	CE	LINE	130	\$8	132	\$13	247	\$33
CENTRAL	PJM	INTERFACE	182	\$7	153	\$10	451	\$44
Homer City Station 345kV to Homer City Station 230kV	PENELEC	Transformer	1269	\$5	742	\$5	773	\$4
Streator Cayuga Ridge Wind Farm 345kV to Pontiac Midp	CE	LINE	58	\$5	57	\$7	73	\$8
Juniata 230kV to Dauphin 230kV	PPL	LINE	34	\$4	5	\$1	0	\$0
Tiltonsville 138kV to Windsor 138kV	AEP to AP	LINE	30	\$4	37	\$1	26	\$1
Fredericksburg 230kV to Cranes Corner 230kV	DVP	LINE	25	\$4	39	\$10	40	\$7
Bayonne 138kV to Passaic Valley Sewerage Commission	PSEG	LINE	1066	\$4	1847	\$6	1910	\$6
Dover Energy (NRG) 69kV to Kent 69kV	DP&L	LINE	301	\$1	403	\$2	506	\$2
Altoona 230kV to Bear Rock 230kV	PENELEC	LINE	1	\$0	97	\$19	152	\$25
Dickerson Station "D" 230kV to 230kV	PEPCO to DVP	LINE	3	\$0	0	\$0	6	\$1
Elrama 138kV to Mitchell 138kV	DLCO to AP	LINE	2	\$0	39	\$1	0	\$0
Bristers 500kV to Ox 500kV	DVP	500 kV	0	\$0	0	\$0	37	\$18
Pleasant View 500kV to Pleasant View 230kV	DVP	Transformer	0	\$0	0	\$0	5	\$10
Halifax (VA) 115kV to Mt Laurel 115kV	DVP	LINE	4	\$0	32	\$15	48	\$14
Roseland 230kV to Cedar Grove 230kV	PSEG	LINE	49	\$0	119	\$4	99	\$0
Peach Bottom 500kV to Limerick 500kV	PJM	500 kV	0	\$0	0	\$0	2	\$1
Vienna 69kV to Vienna 69kV	DP&L	LINE	0	\$0	0	\$0	5	\$2
Meadow Brook 500kV to Meadow Brook 138kV	AP	Transformer	0	\$0	0	\$0	5	\$11
Daleville 230kV to Bradford 230kV	PECO	LINE	7	\$0	16	\$2	20	\$1
Total				\$1,176		\$1,546		\$1,536

Constraints with at least \$20 million of Simulated Future Congestion

Constraint Name	Observations
AP SOUTH	Future new generation and Mt.Storm-Doubs Reconductor slightly reduces congestion.
EASTERN	Susquehanna-Roseland 500 KV upgrade significantly reduces congestion
Cloverdale 500kV to Lexington 500kV	Future new generation slightly reduces congestion.
Black Oak - Bedington Interface	Future new generation slightly reduces congestion.
5004/5005	Congestion increases each study year
Krendale 138kV to Seneca 138kV	Congestion slightly increases each study year. Will monitor in future analysis.
WESTERN	Congestion increases each study year
COOPER 230kV to Peach Bottom 230kV	Congestion slightly increases each study year. Will monitor in future analysis.
Mitchell 138kV to Elrama 138kV	Congestion goes down in 2020 study year
Lexington 500kV to Dooms 500kV	Congestion goes down in 2020 study year
Clover 230kV to Clover 500kV	Congestion goes down in 2020 study year
N Meshoppen 230kV to N Meshoppen 115kV	Congestion remains constant in later study years
Streator Cayuga Ridge Wind Farm 345kV to Wilton CTR	Congestion slightly increases each study year. Will monitor in future analysis.
CENTRAL	Congestion slightly increases each study year. Will monitor in future analysis.
Altoona 230kV to Bear Rock 230kV	Congestion slightly increases each study year. Will monitor in future analysis.

- **No Candidates for Acceleration**
 - Impractical for upgrades to be accelerated for constraints that show a significant reduction in congestion between 2011 and 2014.
- **Congestion slightly decreases between 2017 and 2020 study years.**
 - New generation helps congestion
- **Continued West to East Transfers keep congestion levels higher over time.**
- **2010 Market Efficiency Proposed Projects could relieve some congestion-causing constraints for future study years.**



Long Rang Congestion Projection for Study Year 2025

Informational only and not used in Benefit/Cost Analysis.

			2025 Study Year	
Congestion over \$20 million			2015 System Topology without MAPP and PATH	
Constraint Name	Area	Type	Frequency (Hours)	Market Congestion (\$millions)
Black Oak - Bedington Interface	PJM	INTERFACE	2403	\$936
AP SOUTH	PJM	INTERFACE	3271	\$668
Cloverdale 500kV to Lexington 500kV	AEP to DVP	500 kV	1297	\$417
Streator Cayuga Ridge Wind Farm 345kV to Wilton CTR 3	CE	LINE	1838	\$335
5004/5005	PJM	INTERFACE	1841	\$331
Pleasant View 500kV to Pleasant View 230kV	DVP	Transformer	56	\$255
Altoona 230kV to Bear Rock 230kV	PENELEC	LINE	633	\$101
Krendale 138kV to Seneca 138kV	AP to FE	LINE	2758	\$87
WESTERN	PJM	INTERFACE	282	\$66
Meadow Brook 500kV to Meadow Brook 138kV	AP	Transformer	28	\$45
Clover 230kV to Clover 500kV	DVP	Transformer	588	\$42
COOPER 230kV to Peach Bottom 230kV	PECO	LINE	1058	\$37
Franconia 230kV to Van Dom 230kV	DVP	LINE	15	\$33
Lexington 500kV to Doods 500kV	DVP	500 kV	106	\$29
CENTRAL	PJM	INTERFACE	212	\$24
Halifax (VA) 115kV to Mt Laurel 115kV	DVP	LINE	53	\$23
N Meshoppen 230kV to N Meshoppen 115kV	PENELEC	Transformer	1865	\$22
Total				\$3,627

- Review 2010 Projects from Appendix A
- Consider upgrades to relieve congestion causing constraints
- Independent review currently being conducted to confirm costs for several 2010 Market Efficiency Proposed Projects
 - Three Scopes of Work for different project areas
 - COMED Area
 - PPL, METED, and PENELEC Areas
 - Dominion and AEP Areas

COMED Area Proposed Projects

COMED Area Proposed Projects	Company Proposing Project	Expected ISD*	Expected Costs (\$ millions)
Byron-Cherry Valley-Pleasant Valley 345 KV	LS Power	6/1/2015	112.5
Byron-Pleasant Valley 345 KV	LS Power	6/1/2015	105
Cherry Valley - Pleasant Valley 345 KV	LS Power	6/1/2015	67.5
Byron - Charter Grove- Wayne 345 KV, Charter Grove 345/138 KV TX.	COMED	6/1/2015	275
Byron - Wayne 345 KV	LS Power	6/1/2015	175
Reconductor Woodstock-Marengo 138 kV	COMED	1/16/2012	8.85

*Expected ISA and Estimated Costs developed by company proposing project.

METED, PPL, PENELEC Area Proposed Projects

	Company Proposing Project	Expected ISD*	Expected Costs (\$ millions)
METED, PPL, and PENELEC Area Proposed Projects			
Liberty East Project Single - Hunterstown 500 kV TX, New Single Hunterstown-Conewago 230 kV line, New Conewago 230 kV substation connecting the Jackson – Three Mile Island 230 kV and West Shore - Brunner Island 230 kV transmission lines near their intersection in York County	LS Power	6/1/2015	125
Liberty East Project Double - Hunterstown 500 kV TX, New Double Hunterstown-Conewago 230 kV line, New Conewago 230 kV substation connecting the Jackson – Three Mile Island 230 kV and West Shore - Brunner Island 230 kV transmission lines near their intersection in York County	LS Power	6/1/2015	147.5

Dominion and AEP Area Proposed Upgrades

	Company Proposing Project	Expected ISD*	Expected Costs (\$ millions)
Dominion and AEP Area Proposed Projects			
New Single Kanawa River-Bath County 345 KV line, Bath County 500/345 kV TX	LS Power	6/1/2015	215
New Double Kanawa River-Bath County 345 KV line, Bath County 500/345 kV TX	LS Power	6/1/2015	290

*Expected ISA and Estimated Costs developed by company proposing project.