

A large, white, lattice-structured transmission tower stands against a clear blue sky. Several high-voltage power lines stretch across the frame from the tower towards the right. The background is a solid, bright blue sky.

Transmission Expansion Advisory Committee Meeting

2011 Market Efficiency Analysis Update

October 5, 2011

- Project review updates
 - COMED Area
 - Dominion and AEP Areas
 - PPL, METED, and PENELEC Areas

Market Efficiency Projects

COMED AREA

COMED Area Proposed Projects

Project Number	Description	Expected ISD	Voltage	Estimated Costs (\$ millions)	Benefit/Cost
MEP-A-1	Byron-Cherry Valley-Pleasant Valley 345 KV	2016	345	112.5	0.75
MEP-A-2	Byron-Pleasant Valley 345 KV	2016	345	105	0.96
MEP-A-3	Cherry Valley - Pleasant Valley 345 KV	2016	345	67.5	2.74
MEP-A-4	Byron - Charter Grove- Wayne 345 KV, Charter Grove 345/138 KV TX.	2016	345	275	0.24
MEP-A-5	Byron - Wayne 345 KV	2016	345	175	0.41

MEP-A-3 project moves congestion to Byron-Cherry Valley 345 KV Ckt.

- Summary
 - Independent Cost Estimates comparable to initial cost estimates
 - Coordination with Light Load study
 - Add additional upgrades and rerun
 - Coordination with Regional Planning Process Task Force (RPPTF) developments

Market Efficiency Projects

Dominion and AEP Area



Dominion and AEP Area Proposed Upgrades (Table 1 of 3)

Project Number	Description	Expected ISD	Voltage	Estimated Costs (\$ millions)	Benefit/Cost	15 year Net Present Value of Benefit (Below 500 KV method) (\$ millions)	15 year Net Present Value of Benefit (Regional method) (\$ millions)
MEP-A-9	Install a 500/345 kV transformer at Bath County station and construct a 345 kV line from Kanawha River station to Bath County station.	2017	345	\$260.5	4.03	\$1,639.1	\$128.5
MEP-A-10	Install two 500/345 kV transformers at Bath County station and construct 345 kV line from Kanawha River station to Bath County station.	2017	345	\$275	4.36	\$1,869.6	\$618.9
MEP-A-11	Install two 500/345 kV transformers at Bath County station and construct a double circuit 345 kV line from Kanawha River station to Bath County station.	2017	345	\$386.2	3.90	\$2,349.1	(\$3.3)
MEP-B-1	Install a 765/500 kV transformer at Joshua Falls station and construct an approximately 85-mile 500 kV line from Joshua Falls station to the existing Doods - Elmont 500 kV line. Construct an approximately 30-mile 500 kV line from the Doods - Elmont 500 KV line to Ladysmith station. Split the Doods - Elmont 500 kV line to create separate Joshua Falls - Elmont and Doods - Ladysmith 500 kV circuits.	2017	500	\$300	(0.13)	\$956.1	(\$61)
MEP-B-2	Install a 765/500 kV transformer at Joshua Falls station and construct a new 500 kV station on the existing Doods - Elmont 500 kV line. Construct an approximately 85-mile 500 kV line from Joshua Falls station to the new station. Construct an approximately 30-mile 500 kV line from the new station to Ladysmith station.	2017	500	\$330	(0.13)	\$1024.7	(\$66.8)
MEP-B-3	Install a 765/500 kV transformer at Joshua Falls station and construct an approximately 50-mile 500 kV line from Joshua Falls station to Clover station.	2017	500	\$170	(0.07)	\$349.5	(\$17.3)



2011 Market Efficiency Analysis Results

Dominion and AEP Area Proposed Upgrades (Table 2 of 3)

Project Number	Description	Expected ISD	Voltage	Estimated Costs (\$ millions)	Benefit/Cost	15 year Net Present Value of Benefit (Below 500 KV method) (\$ millions)	15 year Net Present Value of Benefit (Regional method) (\$ millions)
MEP-B-4	Project MEP-B-1 and MEP-B-3	2017	500	\$410	(0.03)	\$971.9	(\$18)
MEP-B-5	Project MEP-B-2 and MEP-B-3	2017	500	\$440	(0.25)	\$897.1	(\$173)
MEP-B-7	Install a 765/500 kV transformer at Joshua Falls station and construct a 500 kV line from Joshua Falls to Cunningham Station.	2017	500	\$375	0.01	\$393.2	\$3.2
MEP-B-8	Install a 765/230 kV transformer at Joshua Falls Station and construct a 230 kV line from Joshua Falls to Midlothian Station via Buckingham Station.	2017	230	\$220	1.07	\$366.5	\$7.6
MEP-B-9	Install a 765/230 kV transformer at Joshua Falls station and construct a 230 kV double circuit line from Joshua Falls to Midlothian station via Buckingham Station.	2017	230	\$280	1.88	\$822.4	(\$78.7)
MEP-B-10	Install a 765/345kV transformer at Joshua Falls Station, Install a new 500/345 kV transformer at both Doods and Morrisville stations. Construct an approximately 133-mile 345 kV line from Joshua Falls to Doods to Morrisville stations.	2017	345	\$533	1.68	\$1,395.4	\$205.9

Dominion and AEP Area Proposed Upgrades (Table 3 of 3)

New Projects

Project Number	Description	Expected ISD	Voltage	Estimated Costs (\$ millions)	Benefit/Cost	15 year Net Present Value of Benefit (Below 500 KV method) (\$ millions)	15 year Net Present Value of Benefit (Regional method) (\$ millions)
MEP-B-11	Rebuild of Cloverdale-Lexington 500 KV Line	2017	500	\$100*	14.76	\$3,608	\$2,304
MEP-B-12	New Axton-Person-Clover 500 KV line, New 765/500 KV transformer at Axton	2017	500	\$250	0.98	\$1,387	\$381
MEP-B-13	Install a 765/230 kV transformer at Joshua Falls station, construct a 230 kV double circuit line from Joshua Falls to Buckingham Station, construct a 230 KV single circuit line from Buckingham to Midlothian.	2017	230	\$250	2.76	\$1,078	\$384

*Conservative cost estimate

- Independent Cost Review completed
 - Independent costs for Bath County-Kanawha River projects (MEP-A-9, 10,11) higher than original proposed costs.
 - Difference of around \$150 million
 - Further review only necessary if projects to be recommended

- 15 Proposed Projects studied in Dominion/AEP Area
 - Projects proposed by PJM and members
 - Optimal project decided based on following :
 - Market Benefits and Cost
 - Reliability Benefits
 - Ageing Infrastructure needs

Cloverdale – Lexington 500 KV Line upgrade (MEP-B-11) is optimal project

- Largest Benefit/Cost ratio
- Provides Reliability benefits
- Project addresses aging infrastructure needs

Incremental Results - Including Cloverdale –Lexington 500 KV upgrade

Project Number	Description	Expected ISD	Voltage	Estimated Costs (\$ millions)	Benefit/Cost	15 year Net Present Value of Benefit (Below 500 KV method) (\$ millions)	15 year Net Present Value of Benefit (Regional method) (\$ millions)
MEP-A-10	Install two 500/345 kV transformers at Bath County station and construct 345 kV line from Kanawha River station to Bath County station.	2017	345	\$275	0.96	\$590.6	\$17
MEP-B-9	Install a 765/230 kV transformer at Joshua Falls station and construct a 230 kV double circuit line from Joshua Falls to Midlothian station via Buckingham Station.	2017	230	\$280	0.86	\$377.1	(\$309)
MEP-B-10	Install a 765/345kV transformer at Joshua Falls Station, Install a new 500/345 kV transformer at both Dooms and Morrisville stations. Construct an approximately 133-mile 345 kV line from Joshua Falls to Dooms to Morrisville stations.	2017	345	\$533	0.67	\$558.2	(\$231)
MEP-B-12	New Axton-Person-Clover 500 KV line, New 765/500 KV transformer at Axton	2017	500	\$250	(0.73)	\$541.6	(\$284.1)
MEP-B-13	Install a 765/230 kV transformer at Joshua Falls station, construct a 230 kV double circuit line from Joshua Falls to Buckingham Station, construct a 230 KV single circuit line from Buckingham to Midlothian.	2017	500	\$250	0.88	\$343.89	(\$245.7)

- Next Steps

- Complete Cloverdale-Lexington 500 KV Line Upgrade analysis

- Determine main driver for project (Markets, Reliability, or both)
- Run sensitivity analysis on results of Cloverdale-Lexington upgrade around key input assumptions.
- Provide zonal summary results
- Possible recommendation to Board in December

Market Efficiency Projects

METED, PPL, PENELEC Area

METED, PPL, PENELEC Area Proposed Projects

Project Number	Description	Expected ISD	Voltage	Estimated Costs (\$ millions)	Benefit/Cost
MEP-A-6	New Hunterstown 500 kV Tx, New single circuit 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	2016	230	99.4	1.09
MEP-A-7	Two new Hunterstown 500 kV Tx, New Double circuit 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	2016	230	134.1	0.74
MEP-A-8	New 230 kV transmission line from Keystone to Shawville	2015	230	137.5	0.34
MEP-B-6	New 500/230 Transformer at Hunterstown with a new Hunterstown to Jackson 230 kV circuit plus a new 230/115 transformer at Hunterstown.	2016	230	75	0.85

- Independent Cost Review completed
 - Costs comparable for all projects except Keystone-Shawville (MEP-A-8)
 - Independent cost estimate about \$24 million higher than original cost estimate.
 - Project has low benefit/cost ratio and will not be recommended anyway.

- Next Steps
 - Further analysis and updated results based on Light Load analysis and updated base upgrades.