Transmission Expansion Advisory Committee

August 7, 2014

V5 Posted 9/3/2014

Interregional Planning Update

EIPC non-grant 2014 Analysis

- 2014 Scenario Analysis - update
  - Scenario A - Update rollup case
  - Scenario B - Severe Heat and Drought
  - May – July - target assumptions and model builds
  - July Stakeholder WebEx
  - June – August - target analysis
  - Sept – Oct - target draft report
  - November - target Stakeholder WebEx

EIPC non-grant – Future Work

- Beyond 2014 discussions
  - Winter Scenario
  - Production Cost Analysis
  - DOE Congestion Report Support
  - Synergies between Planning Coordinator MOD standard activities and EIPC model building

Interregional Planning Studies (not including JCM)

- NCTPC - update
  - Study requested by NCUC
  - Reliability and Economic impact of BRA resources
  - Status: Reliability and Economic Studies
  - 2014 target completion
- PJM/MISO Joint Planning Study
  - Futures 1, 2, 3 analysis is complete
  - Stakeholder comments have been incorporated
  - 3 Proposals under further joint review - JOA metric B/C > 1.25
  - Further discussion of lessons learned
- Northeast Protocol Activities

New Service Queue Generation Update

System Impact Studies Completed

10/2/2013 – 7/1/2014

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

AEC Transmission Zone

Queue Number	Fuel Type	MWC (FTIR/FTWR)	MWE (NFTIR/NFTWR)
W3-175	natural gas	371	371
W4-015	natural gas	136	210
Y3-012	natural gas	0	7.5

AEP Transmission Zone

Queue Number	Fuel Type	MWC (FTIR/FTWR)	MWE (NFTIR/NFTWR)
V4-011	methane	3.2	3.2
X3-023	wind	7.8	60
Y2-050	natural gas	672	742
Y2-067	coal	12	12
Y3-023	methane	4.8	4.8
Y3-024	methane	3.2	3.2
Y3-025	methane	3.18	3.18
Y3-036	coal	36	36
Y3-037	coal	36	36
Y3-068	natural gas	525	525
Y3-097	storage	0	4

APS Transmission Zone

Queue Number	Fuel Type	MWC (FTIR/FTWR)	MWE (NFTIR/NFTWR)
T16	wind	6	30
T174	natural gas	900	930
Y2-088	natural gas	19.9	19.9
Y2-096	biomass	49.2	49.2

ATSI Transmission Zone

Queue Number	Fuel Type	MWC (FTIR/FTWR)	MWE (NFTIR/NFTWR)
W3-059A_AT6	wind	12.9	99
X1-027A_AT12	wind	65	500
Y1-015	natural gas	870	1000
Y1-069	natural gas	799	799
Z2-019	methane	0	0.85

ComEd Transmission Zone

Queue Number	Fuel Type	MWC (FTIR/FTWR)	MWE (NFTIR/NFTWR)
R16	wind	25.2	126
S36	wind	35	175
T143	wind	50	250
T148	wind	20	100
T99	wind	20	100
U3-021	natural gas	100	100
U4-027	natural gas	100	100
U4-033	natural gas	36	36
W2-048	wind	0	62.5
W3-046	wind	0	207.5
W4-005	wind	45.6	351
X1-087	methane	15.3	15.3
X2-022	wind	0	189

ComEd Transmission Zone

Queue Number	Fuel Type	MWC (FTIR/FTWR)	MWE (NFTIR/NFTWR)
Y2-113	natural gas	12.6	12.6
Y3-088	natural gas	20	20
Y3-089	natural gas	20	20
Y3-090	natural gas	20	20
Y3-091	natural gas	20	20
Z1-072	wind	10	0
Z1-073	wind	6	0
Z1-106	storage	0	20
Z1-107	storage	0	20
Z1-108	storage	0	20

DL Transmission Zone

Queue Number	Fuel Type	MWC (FTIR/FTWR)	MWE (NFTIR/NFTWR)
Y3-103	natural gas	97	205

DPL Transmission Zone

Queue Number	Fuel Type	MWC (FTIR/FTWR)	MWE (NFTIR/NFTWR)
Y3-033	wind	16.77	129
Y3-054	solar	4.56	12
Y3-058	solar	5.7	15
Z1-057	natural gas	15.9	0
Z1-099	natural gas	7	7
Z1-100	solar	4.162	0
Z1-101	solar	4.162	0
Z1-102	solar	4.162	0

DEOK Transmission Zone

Queue Number	Fuel Type	MWC (FTIR/FTWR)	MWE (NFTIR/NFTWR)
Y3-099	storage	0	2
Y3-100	storage	0	2
Z1-065	storage	0	6
Z1-080	storage	0	6

JCPL Transmission Zone

Queue Number	Fuel Type	MWC (FTIR/FTWR)	MWE (NFTIR/NFTWR)
Y2-078	natural gas	20	20
Y2-079	natural gas	200	200
Z1-050	hydro	20	20

ODEC Transmission Zone

Queue Number	Fuel Type	MWC (FTIR/FTWR)	MWE (NFTIR/NFTWR)
Y3-102	natural gas	135	135
Z1-041	natural gas	2	2

PECO Transmission Zone

Queue Number	Fuel Type	MWC (FTIR/FTWR)	MWE (NFTIR/NFTWR)
W2-014	oil	2	2
X4-027	natural gas	35	12
Y3-043	natural gas	760	760

Penelec Transmission Zone

Queue Number	Fuel Type	MWC (FTIR/FTWR)	MWE (NFTIR/NFTWR)
W3-099	wind	13	100
Y2-042	natural gas	18.3	18.3
Y2-055	natural gas	29	29

PPL Transmission Zone

Queue Number	Fuel Type	MWC (FTIR/FTWR)	MWE (NFTIR/NFTWR)
Y2-015	natural gas	337	344
Y2-063	natural gas	337	344
Y2-089	natural gas	370	370
Y3-041	wind	8	62
Y3-104	storage	0	20
Z1-098	storage	0	20

PSEG Transmission Zone

Queue Number	Fuel Type	MWC (FTIR/FTWR)	MWE (NFTIR/NFTWR)
X4-044	natural gas	9.9	17.9
Y1-026	natural gas	160	160
Y2-081	solar	1.9	5
Y2-105	natural gas	50	50
Y3-026	solar	3.8	10
Y3-027	solar	2.28	6
Y3-044	natural gas	5	5
Y3-045	natural gas	5	5
Y3-046	natural gas	6	6
Y3-048	natural gas	3	2
Y3-050	natural gas	21	24
Y3-051	natural gas	4	47
Y3-052	natural gas	10	50

PSEG Transmission Zone

Queue Number	Fuel Type	MWC (FTIR/FTWR)	MWE (NFTIR/NFTWR)
Y3-053	natural gas	13	40
Y3-087	solar	1.44	3.8
Y3-107	natural gas	45	35
Z1-082	storage	0	1
Z1-096	solar	2.98	7.84

System Upgrades for New Service Requests
10/1/2013 – 7/1/2014

(Construction Status located at: http:///planning/rtep-upgrades-status/construct-status.aspx)

AEP Transmission Zone

Upgrade ID	Description	Cost Estimate (M)	Driver
n3960	Construct new 345kV (Stemple) station switchyard	13.15	Y2-050
n4035	Willard Station Fiber Optic Option: Protection and Relaying Cost	0.27	X3-023
n4036	SCADA will also be required in the following facilities: Greenwich 69 kV station, General Electric Tiffin 69 kV station, and Tiffin Tap 69 kV station. Estimated Cost (2013 Dollars): $750,000	0.75	X3-023
n4076	Upgrade relaying at Fostoria Central 345kV substation including replacing one existing relay on the Bay Shore circuit and adding a second transfer trip carrier relay for interfacing with carrier equipment and remote FirstEnergy terminal. Also replace existing Fostoria Central - Bay Shore 345kV metering on 345kV Bayshore circuit to FirstEnergy.	0.18	Y1-069
n4193	Replace the George Washington 138/69 kV Transformer #2	1.94	Y3-068
n4194	Rebuild 5.83 miles of the Glendale - Brues 69 kV line.	3.68	Y3-068
n4195	Rebuild 5.02 miles of the DILLES-SHADYSID 69 kV line	5.80	Y3-068
n4196	Rebuild 4.14 miles of the Tilton – Windsor 138 kV line	3.10	Y3-068

AEP Transmission Zone

Upgrade ID	Description	Cost Estimate (M)	Driver
n4200	Install two (2) new 138 kV circuit breakers to connect the proposed generation. SCADA, 138 kV revenue metering, and associated equipment will also need to be installed.	1.57	Y3-068
n4201	Line protections and controls at the existing George Washington 138 kV station will need to be upgraded.	0.12	Y3-068
n4204	Replace "I" and "K" CBs at Geo Washington Substation	1.60	Y3-068
n4205	Replace the George Washington 138/69 kV TR #2	1.94	Y3-068
n4206	Rebuild the entire 5.83 mile section of DILLES - SHADYSID 69 kV line	5.80	Y3-068
n4207	Rebuild the entire 5.02 mile section of Glendale- Brues 69 kV	3.68	Y3-068
n4208	Rebuild entire 4.14 miles of the Tilton – Windsor 138 kV line - (ACSR 556.5 26/7 Dove conductor section 1)	3.10	Y3-068
n4211	Construct and cut in 0.75 miles of new 345kV transmission line	2.66	Y2-050

APS Transmission Zone

Upgrade ID	Description	Cost Estimate (M)	Driver
n4176	Construct a 34.5kV 3 breaker ring bus switching station.	2.98	Y2-096
n4177	Line Loop: Loop 34.5kV Line into proposed Metropolitan Court Switching Station.	0.10	Y2-096
n4178	Install anti-islanding (transfer trip) facilities at Fredrick A substation	0.17	Y2-096
n4179	Install anti-islanding (transfer trip) facilities at Lime Kiln substation	0.17	Y2-096
n4180	Install anti-islanding (transfer trip) facilities at Ballenger Creek substation	0.32	Y2-096
n4181	A fiber optic digital channel between Ballenger Creek & Lime Kiln and the new Metropolitan Court interconnect substation is required. (Est 2.2 miles ADSS)	0.28	y2-096
n4182	Ballenger Creek - Detention Center 34.5kV Line: Reconductor 0.01 miles of 34.5kV line and parallel 0.03 miles of underground cable.	0.10	Y2-096
n4216	Provide revenue metering equipment in Developer's Generation Substation.	0.11	Y2-096

ATSI Transmission Zone

Upgrade ID	Description	Cost Estimate (M)	Driver
n4046	Cedar Street-New Castle (Z-100) 138kV - Reconductor New Castle to Ellwood Steel Tap Section (3.11 Miles) with 795 kcmil ACSS. Reconductor the Cedar Street-New Castle (Z-100) 138kV line - New Castle to Ellwood Steel Tap Section - replacing the existing 795 kcmil ACSR conductor with new 795 kcmil ACSS conductor. The line section length is approximately 3.11 miles. Includes associated modifications at New Castle substation.	2.09	Y1-015
n4087	Replace overdutied 138kV circuit breaker 50 at Bruce Mansfield substation	0.94	Y3-103
n4088	Replace overdutied 138kV circuit breaker 54 at Bruce Mansfield substation	0.94	Y3-103
n4089	Replace overdutied 138kV circuit breaker 34 at Bruce Mansfield substation	0.94	Y3-103
n4090	Replace overdutied 138kV circuit breaker 38 at Bruce Mansfield substation	0.94	Y3-103
n4091	Replace overdutied 138kV circuit breaker 27 at Bruce Mansfield substation	0.94	Y3-103

ATSI Transmission Zone

Upgrade ID	Description	Cost Estimate (M)	Driver
n4092	Replace overdutied 138kV circuit breaker 65 at Bruce Mansfield substation	0.94	Y3-103
n4093	Replace overdutied 138kV circuit breaker 30 at Bruce Mansfield substation	0.94	Y3-103
n4094	Replace overdutied 138kV circuit breaker 19 at Bruce Mansfield substation	0.94	Y3-103
n4095	Replace overdutied 138kV circuit breaker 8 at Bruce Mansfield substation	0.94	Y3-103
n4096	Replace overdutied 138kV circuit breaker 23 at Bruce Mansfield substation	0.94	Y3-103
n4097	Replace overdutied 138kV circuit breaker 12 at Bruce Mansfield substation	0.94	Y3-103
n4098	Replace overdutied 138kV circuit breaker 61 at Bruce Mansfield substation	0.94	Y3-103
n4099	Replace overdutied 138kV circuit breaker 57 at Bruce Mansfield substation	0.94	Y3-103

ATSI Transmission Zone

Upgrade ID	Description	Cost Estimate (M)	Driver
n4100	Replace overdutied 138kV circuit breaker 46 at Bruce Mansfield substation	0.94	Y3-103
n4145	Replace overdutied circuit breaker B-26 with a circuit breaker rated for 63kA interrupting capability.	0.21	Y1-015
n4146	Replace 138kV breaker B-30 with 63kA breaker.	0.20	Y1-015

BGE Transmission Zone

Upgrade ID	Description	Cost Estimate	Driver
n4121.2	Replace 2 disconnect switches, 2 circuit breakers, and 1 line trap at Conastone	1.80	Y3-043

ComEd Transmission Zone

Upgrade ID	Description	Cost Estimate	Driver
n1832.1	Relay and SCADA modifications	0.36	S36
n1832.2	Relay and SCADA modifications	0.60	S36
n1832.3	Relay and SCADA modifications	0.14	S36
n2130	Install new 345kV bus tie circuit breaker at TSS 900 Elwood Energy Center	5.00	W4-005
n3995	345kV transmission line tie-in	2.00	W3-046
n3996	Install 345kV three breaker ring bus	15.00	W3-046
n3997	Remote-end relay upgrade	1.00	W3-046
n3998	345kV transmission line tie-in	2.00	W4-005
n3999	Install 345kV three breaker ring bus	15.00	W4-005
n4000	Remote-end relay upgrade	1.00	W4-005
n4001	Install an extra three 345kV breakers at TSS 92 Mt. Pulaski substation	9.00	X2-022
n4199	The upgrade is to install a new transformer.	30.00	W4-005

DEOK Transmission Zone

Upgrade ID	Description	Cost Estimate	Driver
n4018	Installation of interconnection metering, communications, protection and control upgrades to Beckjord circuit breaker 906 necessary to accommodate connection of the new facilities	0.23	Y3-099

DL Transmission Zone

Upgrade ID	Description	Cost Estimate	Driver
n4085	Install three-breaker loop 138kV substation, relaying, metering, RTU, SCADA and other miscellaneous supporting equipment	2.44	Y3-103
n4086	Replace overdutied 138kV circuit breaker Z-37 at Raccoon substation	0.44	Y3-103

DPL Transmission Zone

Upgrade ID	Description	Cost Estimate	Driver
n4140	Construct a 69 kV three-breaker ring bus substation, inclusive of a terminal position for the queue project on the Chestertown - Millington 69 kV line.	2.00	Y3-033
n4141	Cut circuit 6773 and loop into and out of the new substation. Install two (2) self-supporting steel poles with anchor bolt foundations, post construction tangent structures, and short span to DPL substation.	1.00	Y3-033

ME Transmission Zone

Upgrade ID	Description	Cost Estimate	Driver
n4122	Rebuild the 9.5 mile line with 3x 1590 ACSR.	61.75	Y3-043

PECO Transmission Zone

Upgrade ID	Description	Cost Estimate	Driver
n4121.1	Replace 5 disconnect switches, 2 circuit breakers, and 1 line trap at Peach Bottom.	3.50	Y3-043

PPL Transmission Zone

Upgrade ID	Description	Cost Estimate	Driver
n3904	Protection system modifications.	0.25	Y2-015
n3906	Replace wave trap and protective relays.	0.25	Y2-015
n3908	Rebuild the Eldred-Frackville 230kV line using double 1590 ACSR conductor (12 miles)	34.62	Y2-015
n3909	Replace the substation conductors with 1590 ACSR. Replace two breakers, 4 switches and associated equipment with 3000amp rated equipment.	4.00	Y2-015
n3910	Replace the substation conductors with 1590 ACSR. Replace two breakers, 4 switches and associated equipment with 3000amp rated equipment.	3.00	Y2-015
n3968	Upgrade the line described in N3562 to be triple bundled 1590 ACSR.	1.81	Y2-089
n3969	Upgrade the equipment described in N3563 to be rated for 4000A	0.43	Y2-089
n4119	Build 0.15 mile 69kV line between the Stanton-Sullivan Trail 69kV line and Y3-104	1.44	Y3-104
n4120	Install DTT equipment	0.26	Y3-104

PPL Transmission Zone

Upgrade ID	Description	Cost Estimate	Driver
n4123	Construct a line, approximately 1000 feet long, connecting Y3-041 to the Peckville-Jackson 69kV line and two MOLBAB switches.	1.26	Y3-041
n4124	Install transfer trip equipment	0.27	Y3-041
n4125	Install transfer trip equipment	0.23	Y3-041
n4126	Install transfer trip equipment	0.24	Y3-041
n4127	Install transfer trip equipment	0.28	Y3-041

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2014 RTEP Proposal Window 1

2014 RTEP Status & Timeline

2014 RTEP Status

- RTEP Proposal Window #1
  - Closed, scope included baseline N-1, generator deliverability, load deliverability, N-1-1 thermal
  - Recommend solutions in September & October 2014
- RTEP Proposal Window #2
  - Anticipated scope to include voltage analysis, light load analysis and TO criteria violations
  - Recommend solutions in October & November 2014
- 2022 (Year 8) Case and Analysis
  - Initial case complete this month, analysis to follow
- PJM Board Approval of 2014 RTEP
  - Anticipated November 2014
  - Anticipated December 2014

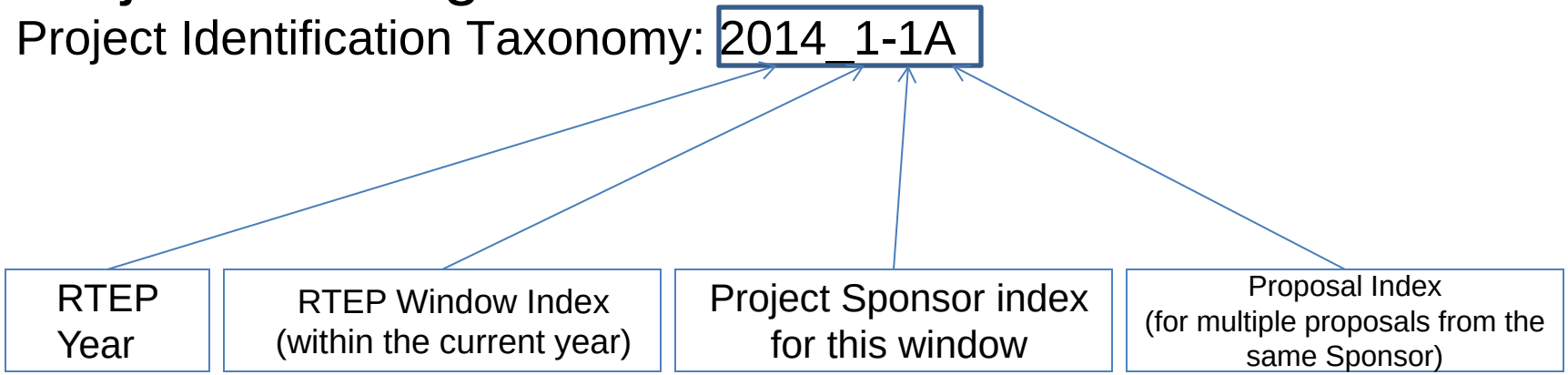
Reliability Analysis Update

2014 RTEP Proposal Window #1 Update

2014 RTEP Proposal Window #1

- Window opened on 6/27/2014
- Closed on 7/28/2014

- Project Naming Convention
- Project Identification Taxonomy: 2014_1-1A



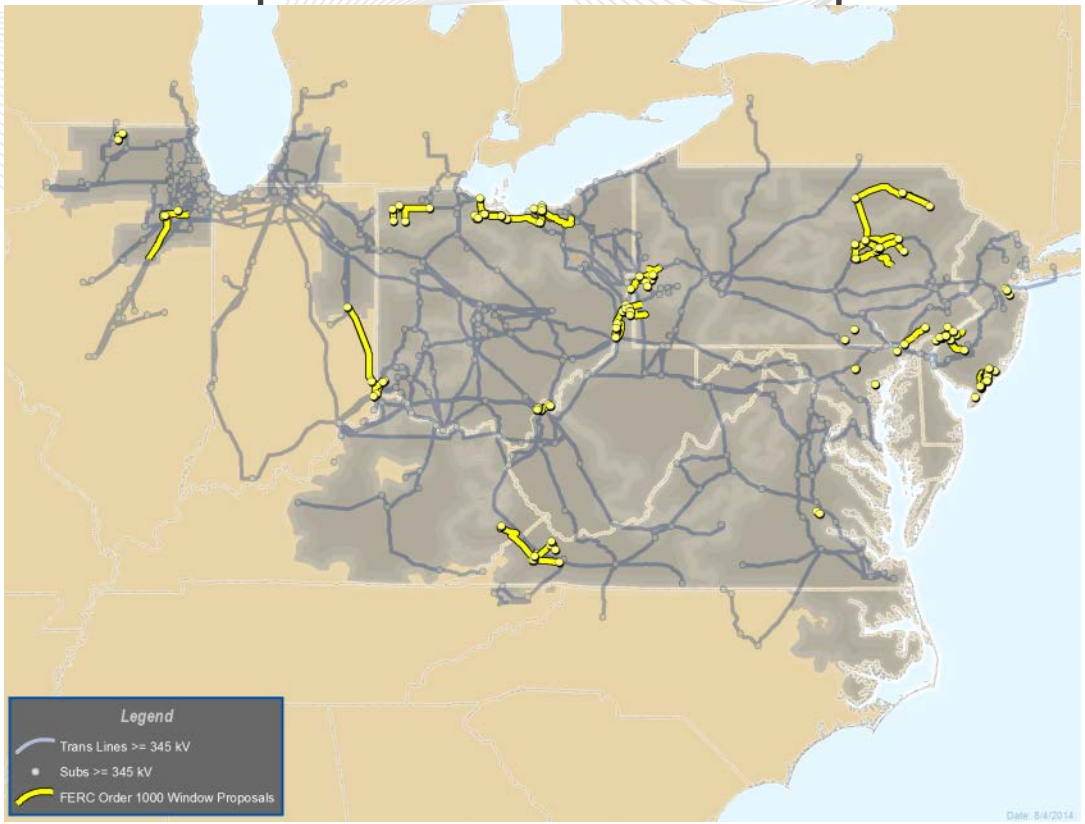
Transmission Owner Upgrade

- Transmission Owner Upgrade is a Defined Term

- *"Transmission Owner Upgrade" shall mean an upgrade to a Transmission Owner's own transmission facilities, which is an improvement to, addition to, or replacement of a part of, an existing facility and is not an entirely new transmission facility.*

2014 RTEP Proposal Window #1 Proposals

- Approximately 50 individual facilities with reliability criteria violations
  - Approximately 112 flow gates are addressed
- 15 proposing entities
- 106 proposals
  - 46 Transmission Owner Upgrades
    - Cost range of $0.02M to $139.2M
  - 60 Greenfield Projects
    - Cost range of $10.2M to $1,367.00M
- 18 target TO zones
- Proposals span 10 States
  - DE, IL, IN, KY, MD, NJ, OH, PA, VA, WV



Greenfield Projects

- Proposing Entity: ITC
  - P2014_1-11C: Build Freemont-Avery 138 kV line with series compensation ($97.4M)
  - P2014_1-11B: Build Fremont - Avery 138 kV double ckt line and reconductor Freemont-West Freemont 138 kV line ($107M)

- Proposing Entity: Northeast Transmission Development
  - P2014_1-14K: Approximately 5-mile 345 kV transmission line from Lake Avenue 345 kV substation to a new 345 kV switching station ("Case") on the Avon Lake-Juniper 345 kV Line ($32.5M)

ATSI Transmission Zone – Greenfield Projects

- Proposing Entity: PPL
  - P2014_1-7H: Build one new single ckt 138 kV line, Midway-Richland ($66.1M)
  - P2014_1-7G: Build one new 345kV line, built single-circuit, from Davis-Besse to Carlisle to Avon, and Build one new double circuit 138kV line, built double-circuit, from Avon to Black River ($279.5M)

- Proposing Entity: Transource
  - P2014_1-3G: Construct 24 miles of new double circuit 345 kV line between a new proposed 345/138 kV station adjacent to FirstEnergy's West Freemont station and the First Energy under development Hayes station. The project will include a new 345/69 kV station where the new 345 kV lines intersect the FirstEnergy Castalia-Bellevue 69 kV line ($67.3M)

ATSI Transmission Zone – Greenfield Projects

- Proposing Entity: Transource
  - P2014_1-3C: Construct approximately 5 miles of new, double circuit 345 kV line to connect the FirstEnergy proposed Lake Avenue station to a new substation west of the existing Lorain station. This new substation will tie into the existing Avon - Juniper 345 kV circuit, the Avon Lake – Crestwood – Fowles 138 kV circuit, and the Carlisle - Lorain 138 kV circuit ($52.4M)
  - P2014_1-3B: Construct approximately 6 miles of new, double circuit 345 kV line to connect the FirstEnergy proposed Lake Avenue station to a new substation south of the existing Lorain station. This new substation will tie into the existing Avon Lake – Crestwood – Fowles 138 kV circuit and the Avon Lake – Lorain – Slater – Crystal – Fowles 138 kV circuit, both owned by FirstEnergy ($38.3M)

ATSI Transmission Zone – Greenfield Projects

- Proposing Entity: Transource
  - P2014_1-3F: Construct approximately 24 miles of new single circuit 345 kV line between the existing AEP Fremont 138 kV station and the under development FirstEnergy Hayes 345 kV station. Expand the existing Fremont 138 kV station to accommodate the new 345 kV line termination and a new 345/138 kV transformer. Construct a new 138 kV line between the Fremont 138 kV station and existing FirstEnergy West Fremont 138 kV station. The project will include a new 345/69 kV station where the new 345 kV lines intersect the FirstEnergy Castalia-Bellevue 69 kV line ($64.9M)
  - P2014_1-3E: Construct approximately 7 miles of new single circuit 138 kV line the existing customer owned City of Bryan station and the FirstEnergy's existing Stryker station ($10.2M)
  - P2014_1-3D: Construct approximately 17 miles of new single circuit 138 kV line between AEP's existing Lockwood Road station and FirstEnergy's existing Stryker station ($19M)

Transmission Owner Upgrades

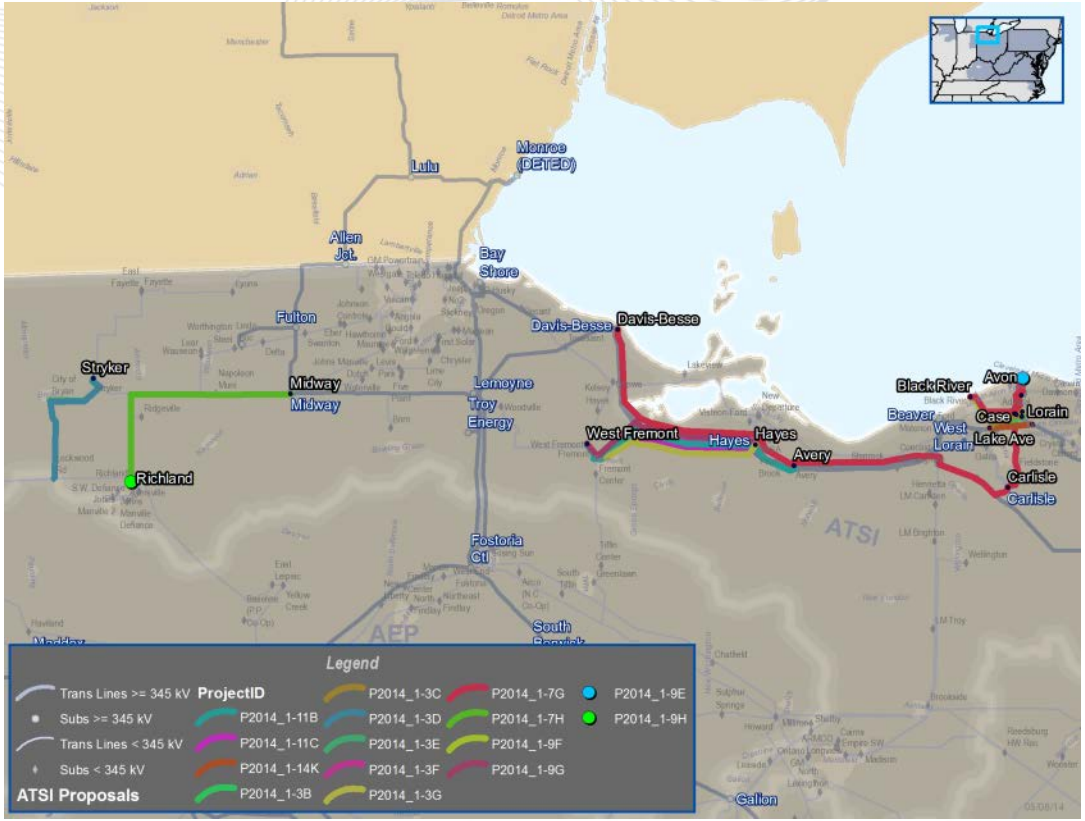
- Proposing Entity: First Energy
  - P2014_1-9H: Close normally open switch A13404 to create a Richland J Bus - Richland K Bus 138kV line ($0.02M)
  - P2014_1-9G: Construct second 138kV line between West Fremont and Hayes substation on open tower position of the West Fremont - Groton - Hayes 138kV line ($7.4M)
  - P2014_1-9F: Reconductor the Black River-Lorain 138kV line and upgrade Black River and Lorain substation terminal end equipment ($9.6M)
  - P2014_1-9E: At Avon substation, replace the existing 345/138kV 448MVA #92 transformer with a 560MVA unit ($5.4M)

ATSI Transmission Zone

- Proposals:
  - 11 Greenfield Projects
  - 4 Transmission Owner Upgrades

- Consideration:
  - The proposed Transmission Owner Upgrades address the reliability criteria violations in the ATSI zone.

- Next Steps
  - Evaluate the effectiveness of the 4 proposed Transmission Owner Upgrades



AE Transmission Zone – Greenfield Projects

Greenfield Projects

- Proposing Entity: PSEG
  - P2014_1-15C: Build a new 230 kV line from Dennis-Cardiff with a tap at BL England, include one new 230/138 kV transformer at BL England ($225M)
  - P2014_1-15B: Build a new 230 kV line from BL England-Cardiff including 1 138/230 kV transformer at BL England ($134M)
  - P2014_1-15A: Build a new 138 kV line from BL England-Cardiff including 1 138/230 kV transformer at Cardiff ($98M)

- Proposing Entity: Northeast Transmission Development
  - P2014_1-14I: Approximately 13.7 mile 138 kV transmission line from BL England 138 kV substation to Cardiff 138 kV substation ($51.6M)

AE Transmission Zone – Greenfield Projects

- Proposing Entity: PHI
  - P2014_1-12A: New BL England-Lewis 138 kV line ($54.675M)

- Proposing Entity: PPL
  - P2014_1-7D: Build one new 230 kV line, single ckt, Dennis-BL England and BL England-Cardiff ($128.6M)
  - P2014_1-7C: Build one new 230 kV line, single ckt, from BL England-Cardiff ($69.1M)
  - P2014_1-7B: Build 2 new 138 kV lines double ckt from BL England-Cardiff ($73.2M)
  - P2014_1-7A: Build new 138 kV line from BL England-Cardiff ($61.8M)

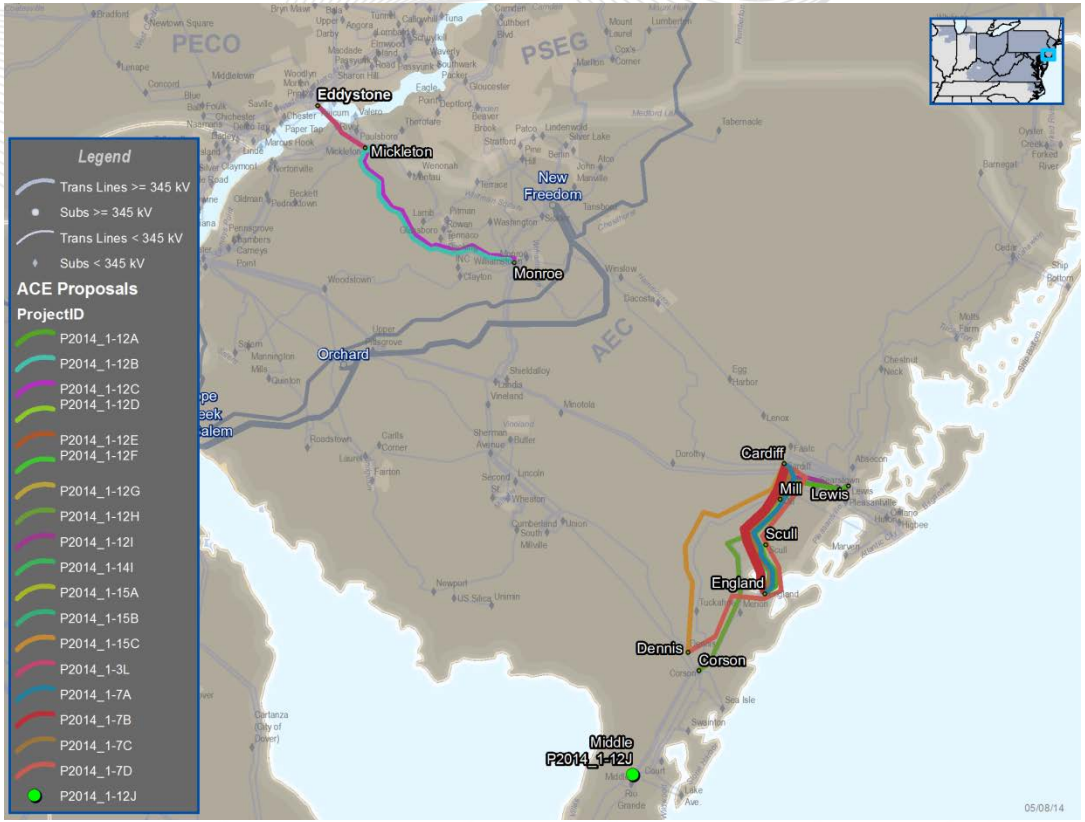
Transmission Owner Upgrades

- Proposing Entity: PHI
  - P2014_1-12J: Replace Middle 138/69 kV transformer with 225 MVA nameplate transformer ($7.98M)
  - P2014_1-12I: Rebuild #1 Mill - #1 Lewis 138 kV ($9.256M)
  - P2014_1-12H: Rebuild #1 BL England - Corson 138 kV ($15.806M)
  - P2014_1-12G: Reconductor #1 Scull - BL England 138 kV ($3.956M)
  - P2014_1-12F: Reconductor #2 Scull - #2 Mill 138 kV ($9.079M)
  - P2014_1-12E: Reconductor #2 Scull - #2 BL England 138 kV ($14.645)
  - P2014_1-12D: Reconductor #1 Scull - #1 Mill 138 kV ($4.204M)
  - P2014_1-12C: Reconductor of #2 Mickleton-Monroe 230 kV ($4.18M)
  - P2014_1-12B: Rebuild of #1 Mickleton-Monroe 230 kV ($37.49M)

AE Transmission Zone

- Proposals:
  - 9 Greenfield Projects
  - 9 Transmission Owner Upgrades

- Next Steps:
  - Evaluate the Transmission Owner Upgrades in the Mickleton – Monroe area that are not related to the BL England generation



Greenfield Projects

- Proposing Entity: Northeast Transmission Development
  - P2014_1-14H1: Approximately 26-mile 138 kV transmission line from Clinch River 138 kV substation to a new 138 kV switching station ("West Fork") on the Richlands-Whitewood 138 kV Line + second ckt Clinch River-West Fork ($53.8M)
  - P2014_1-14H: Approximately 26-mile 138 kV transmission line from Clinch River 138 kV substation to a new 138 kV switching station ("West Fork") on the Richlands-Whitewood 138 kV Line ($46M)
  - P2014_1-14D: Approximately 9-mile 138 kV transmission line from Kammer 138 kV substation to Holloway 138 kV substation ($20.8M)
  - P2014_1-14G: Approximately 4-mile 138 kV transmission line from Tidd 138 kV substation to Windsor 138 kV substation ($12.8M)

AEP Transmission Zone – Greenfield Projects

- Proposing Entity: Northeast Transmission Development
  - P2014_1-14C: Build 138 kV switching station (Garrison Run) interconnecting the Tidd – West Liberty 138 kV Line, Tidd - Fort Henry 138 kV Line, Windsor – Lagonda 138 kV Line, and Windsor – Dutch Fork 138 kV Line ($24.1M)
  - P2014_1-14J1: Build 345/138 kV Substation (Swisher Hill) Interconnecting Kyger Creek-DOE 345 kV Line to Sporn-Mercerville 138 kV Line + 138 kV line from Gavin - new (Swisher Hill) substation ($46.6M)
  - P2014_1-14J: Build 345/138 kV Substation (Swisher Hill) Interconnecting Kyger Creek-DOE 345 kV Line to Sporn-Mercerville 138 kV Line ($33.8M)

AEP Transmission Zone – Greenfield Projects

- Proposing Entity: ITC
  - P2014_1-11A: Build a new 765/138 kV substation (Clinch River 765 kV) that taps the Virginia City-Clinch River 138 kV ckt #1, add 765/138 kV transformer at new substation, run two 765 kV single structure single ckt from new substation to Broadford-Baker 765 kV cutting into the existing 765 kV line. Upgrade the limiting equipment on the Elk Garden-Saltville line ($207.9M)
  - P2014_1-11E: Build 138 kV switchyard (Liberty) at the confluence of the following lines: Windsor-Dutch Fork 138 kV, Windsor-Lagonda 138 kV, Tidd-Fort Henry 138 kV, and West Liberty-Battle 138 kV. Reconductor Fort Henry-Sand Hill, Kammer-Big Grave Creek, and Big Grave Creek-Aston Switch 138kV lines ($45.4M)
  - P2014_1-11F: Build Kyger Creek-Sporn 345 kV line. Replace/upgrade Sporn transformer #3 ($104M)

AEP Transmission Zone – Greenfield Projects

- Proposing Entity: AEP
  - P2014_1-2G: Construct a ~22 mile of new 138 kV line between Clinch River and Keen Mountain ($38.5M)
  - P2014_1-2H: Construct a ~43 mile of new 138 kV line between Clinch River and new Beaver Creek station ($95M)
  - P2014_1-2L: Construct a ~3.2 mile of new 345 kV line between OVEC's Kyger Creek and AEP's Gavin stations, and install a 345/138kV transformer at Gavin ($17.7M)

- Proposing Entity: PSEG
  - P2014_1-15F: Construct a new station tapping the Sporn-Tristate line and construct a line from the new station to Kyger Creek ($92M)

AEP Transmission Zone – Greenfield Projects

- Proposing Entity: PPL
  - P2014_1-7E: Build one new 138 kV line, single ckt, from Clinch River-Saltville ($82.5M)
  - P2014_1-7F: Build one new double ckt 138 kV line Kammer-Windsor ($98.1M)

- Proposing Entity: Transource
  - P2014_1-3A: Construct a new 138 kV switchyard at the intersection of the AEP Tidd-Fort Henry 138 kV line and the Allegheny Power Windsor-Dutch Fork 138 kV line ($14.6 M)

Transmission Owner Upgrades

- Proposing Entity: AEP
  - P2014_1-2C: Perform remediation work to improve the rating of Kammer to West Bellaire ($0.6M)
  - P2014_1-2D: Install two 138 kV prop structures to increase the Maximum Operating Temperature of the Clinch River – Clinchfield 138 kV line ($1.1M)
  - P2014_1-2E: Install two 138 kV prop structures to increase the Maximum Operating Temperature of the Clinch River – Clinchfield 138 kV line. Additionally upgrade ACSR Entrance/Exit spans, MOAB's, and MCMs at Clinch River, Lebanon, Elk Garden, Saltville, and Fletchers Ridge ($2M)
  - P2014_1-2F: Rebuild 5.09 miles of Clinch River – Clinchfield 138 kV line. Additionally upgrade ACSR Entrance/Exit spans, MOAB's, and MCMs at Clinch River, Lebanon, Elk Garden, Saltville, and Fletchers Ridge ($8M)

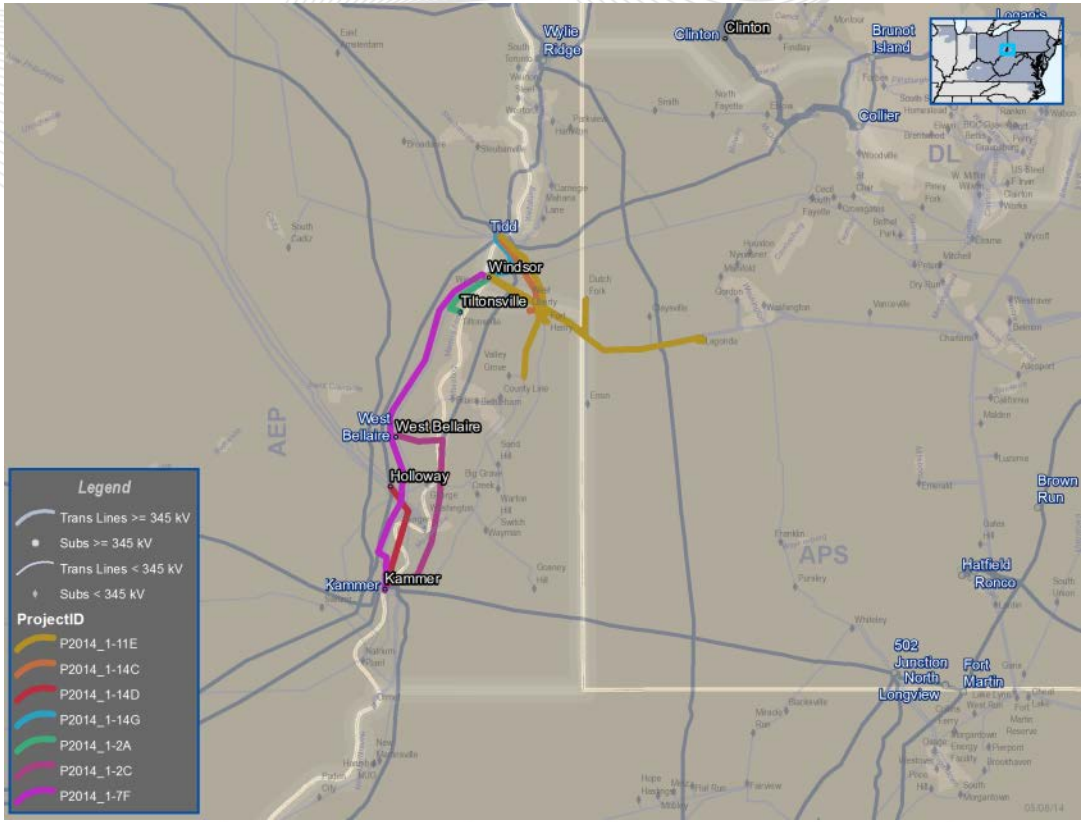
AEP Transmission Zone – TO Upgrades

- Proposing Entity: AEP
  - P2014_1-2A: Reconductor 0.5 miles of Tiltonsville-Windsor 138 kV and string the vacant side of the 4.5 mile section using 556 ACSR in a six wire configuration ($2M)
  - P2014_1-2K: Configure both Kyger Creek-Sporn 345 kV CKTS 1 and 2 in a six wired arrangement ($0.3M)
  - P2014_1-2J: Reconductor both Kyger Creek-Sporn 345 kV CKTS 1 and 2 ($21.3M)
  - P2014_1-2I: Reconductor Kyger Creek-Sporn 345 kV CKT 2 ($15.5M)

AEP Transmission Zone

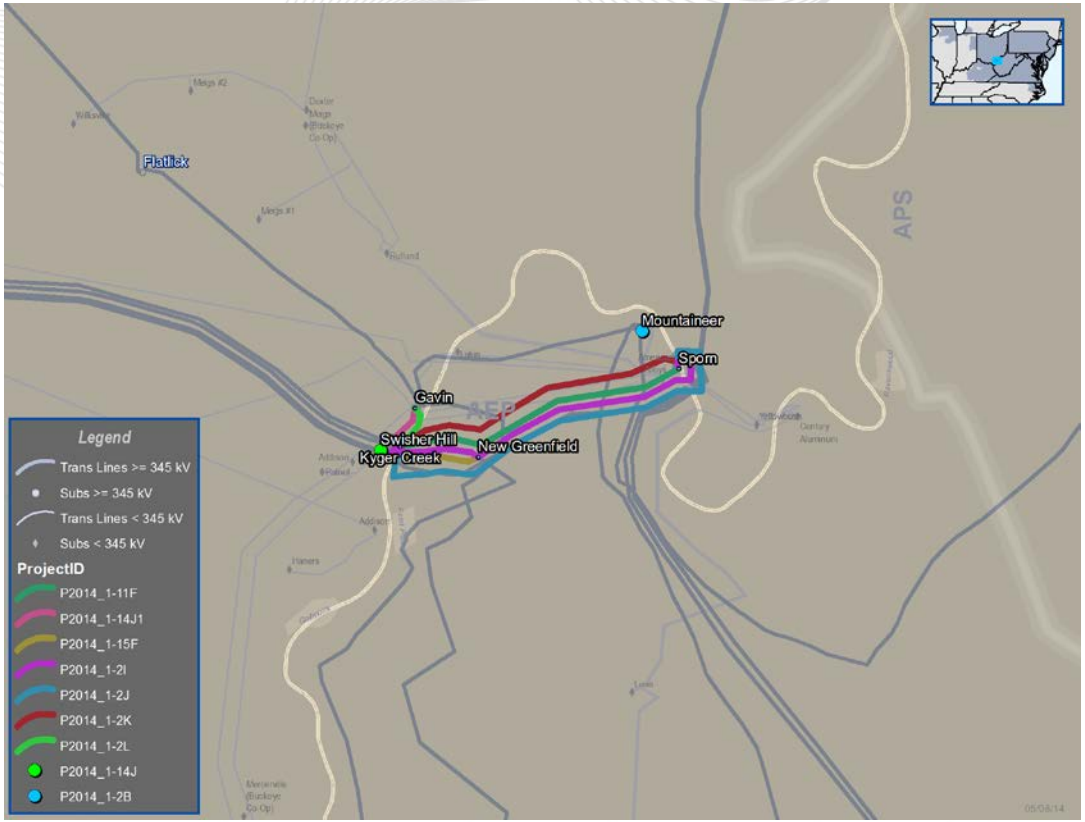
- Proposals:
  - 17 Greenfield Projects
  - 8 Transmission Owner Upgrades

- Next Steps
  - Evaluate the proposals that are unrelated to the Clinch River and Tanner Creek retirement



AEP Transmission Zone

AEP Continued



AEP Transmission Zone

AEP Continued

Transmission Owner Upgrades

- Proposing Entity: BGE
  - P2014_1-8E: Reconductor Northwest – Northwest #2 115kV 110574 substation tie circuit with 2-bundle 1272 ACSR and replace the Northwest 115kV 110574 tie circuit breaker to achieve ratings of 519/600 MVA SN/SE ($2.5M)
  - P2014_1-8D: Reconductor Northwest – Northwest #2 115kV 110574 substation tie circuit with 2167 ACSR to achieve ratings of 400/462 MVA SN/SE ($1.2M)
  - P2014_1-8C: Upgrade the Riverside 115kV substation strain bus conductors on circuits 115012 and 115011 with double bundled 1272 ACSR to achieve ratings of 491/577 MVA SN/SE on both transformer leads. Reconfigure Riverside 230kV substation by installing a 230kV breaker on line 2344 and installing circuit switchers on the high side of transformers 230-1 and 230-2 ($3.74M)
  - P2014_1-8B: Reconfigure Riverside 230kV substation by installing a 230kV breaker on line 2344 and install circuit switchers on the high side of transformers 230-1 and 230-2 ($2.6)

BGE Transmission Zone – Transmission Owner Upgrades

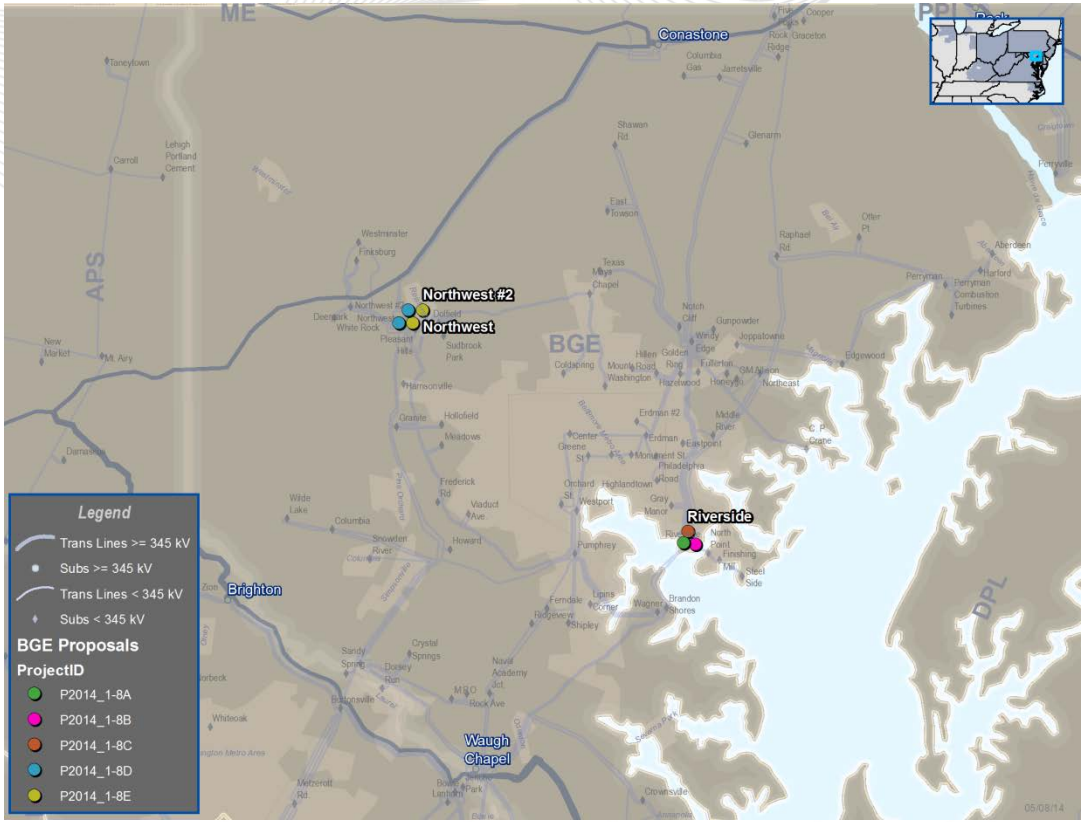
- Proposing Entity: BGE
  - P2014_1-8A: Upgrade the Riverside 115kV substation strain bus conductors on circuits 115012 and 115011 with double bundled 1272 ACSR to achieve ratings of 491/577 MVA SN/SE on both transformer leads ($1.14M)

BGE Transmission Zone

- Proposals:
  - 5 Transmission Owner Upgrades

- Consideration:
  - The proposed Transmission Owner Upgrades address the reliability criteria violations in the BGE zone.

- Next Steps
  - Evaluate the effectiveness of the 5 proposed Transmission Owner Upgrades



ComEd Transmission Zone – Greenfield Projects & Transmission Owner Upgrades

Greenfield Projects

- Proposing Entity: Transource
  - P2014_1-3K: Establish a new 765/345 kV station near the existing ComEd Dresden station. Loop the Collins-Wilton Center 765 kV line and the Dresden Red - Pontiac Midpoint Red 345 kV line into this station, and install a 765/345 kV transformer ($71M)

Transmission Owner Upgrades

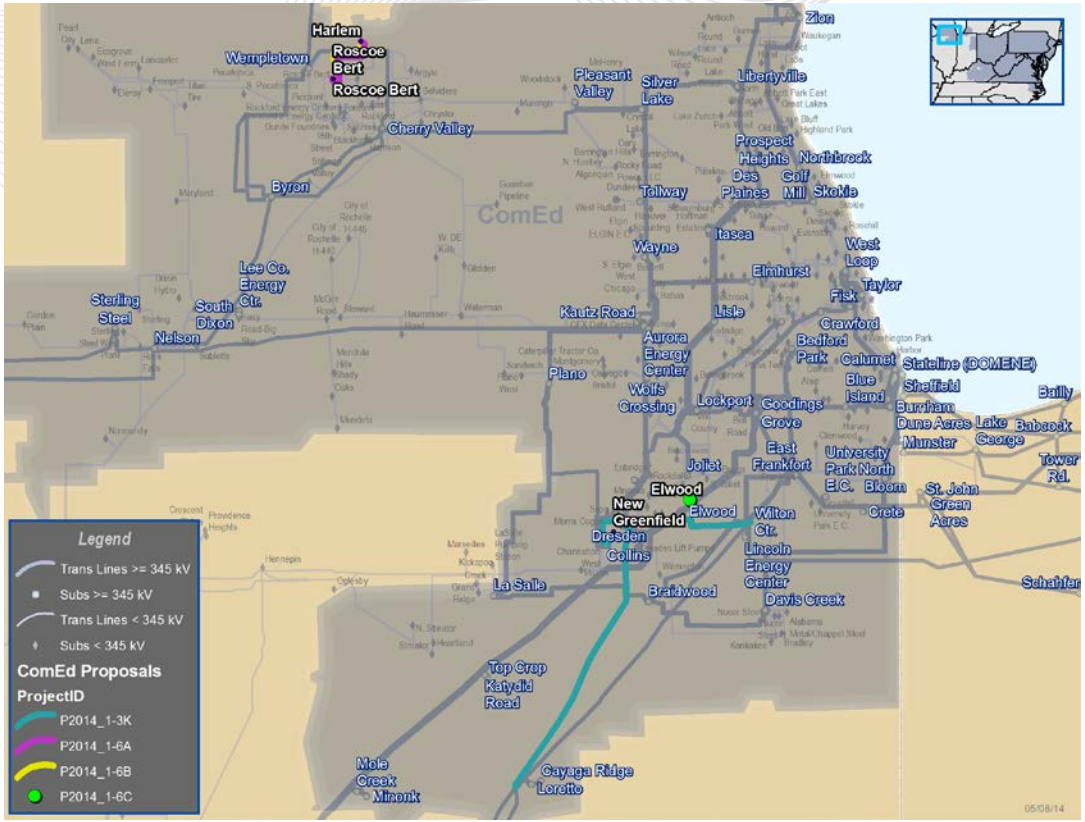
- Proposing Entity: ComEd
  - P2014_1-6C: Install new 345 kV circuit breaker 5-7 at Elwood substation ($2.6M)
  - P2014_1-6B: Remove 2.0 miles of wood poles on 138 kV line 17105, erect new steel structures, and install new 1113 kcmil ACSR conductor from Roscoe Bert to Harlem; replace existing 138kV line 17105 circuit-switcher #0564 ($4.7M)
  - P2014_1-6A: Remove 2.0 miles of wood poles on 138 kV line 17105, erect new steel structures, and install new 1113 kcmil ACSR conductor from Roscoe Bert to Harlem ($4.6M)

ComEd Transmission Zone

- Proposals:
  - 1 Greenfield Project
  - 3 Transmission Owner Upgrades

- Consideration:
  - The proposed Transmission Owner Upgrades address the reliability criteria violations in the ComEd zone.

- Next Steps
  - Evaluate the effectiveness of the 3 proposed Transmission Owner Upgrades



DEOK Transmission Zone – Greenfield Projects & Transmission Owner Upgrades

Greenfield Projects

- Proposing Entity: Duke Energy
  - P2014_1-1B: New 138 kV line from Miami Fort to Wiley ($20M)
- Proposing Entity: Transource
  - P2014_1-3H: Construct a new 138 kV path between Duke Ohio & Kentucky's Willey Station to a new 345/138 kV station to be established on the AEP Tanner's Creek to Desoto 345 kV in Indiana ($34.1M)
- Proposing Entity: Northeast Transmission Development
  - P2014_1-14F: Build 345/138 kV Substation (Paddys Run) Interconnecting Miami Fort-West Milton 345 kV Line to Willey 138 kV ($32M)

Transmission Owner Upgrades

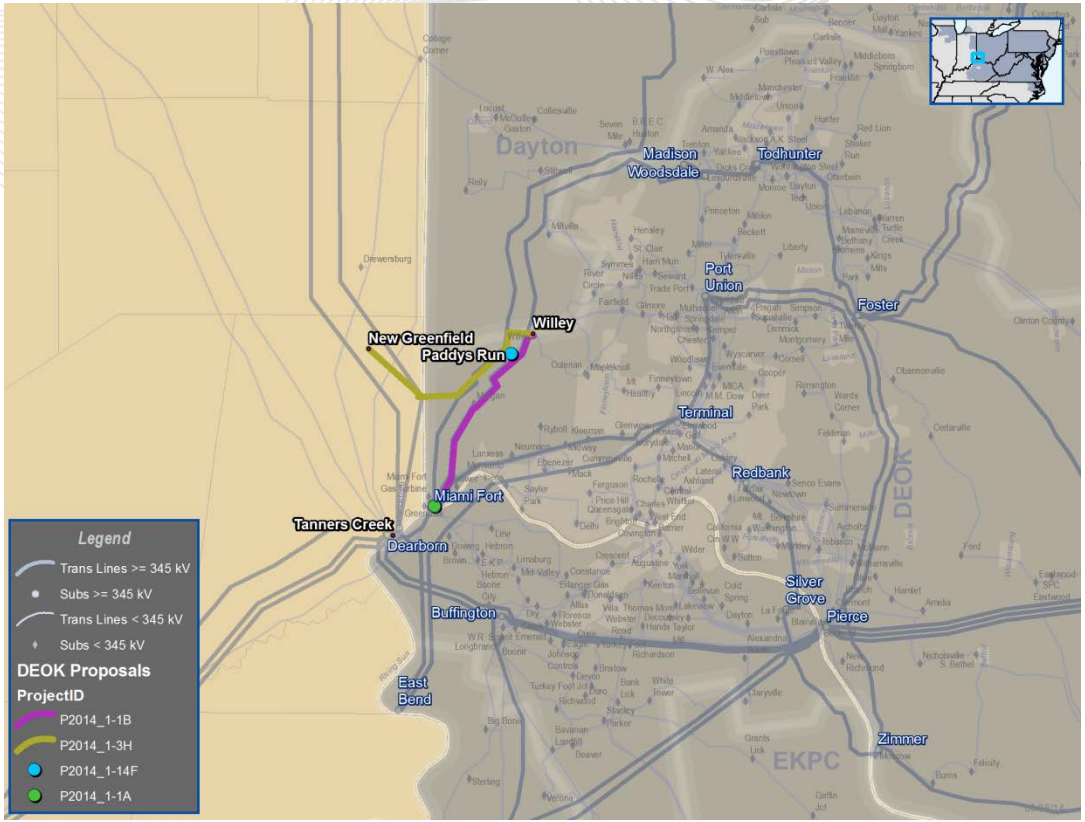
- Proposing Entity: Duke Energy
  - P2014_1-1A: Add two breakers at Miami Fort 138 kV ($2M)

DEOK Transmission Zone

- Proposals:
  - 3 Greenfield Projects
  - 1 Transmission Owner Upgrade

- Consideration:
  - The proposed Transmission Owner Upgrade addresses the reliability criteria violations in the DEOK zone.

- Next Steps
  - Evaluate the effectiveness of the 1 proposed Transmission Owner Upgrade



DLCO(DUQ) Transmission Zone – Greenfield Projects & Transmission Owner Upgrades

Greenfield Projects

- Proposing Entity: Transource
  - P2014_1-3J: Tie Beaver Valley - Clinton and Beaver Valley - Crescent 345 kV lines into a new 345 kV switching station configured in a breaker and a half. Build a new 345 kV line from this new station to Clinton Station ($30.8M)
- Proposing Entity: Northeast Transmission Development
  - P2014_1-14A: Build 500/138 kV Substation (Crows Run) Interconnecting Wylie Ridge-Cranberry 500 kV Line to Crescent-Valley 138 kV Line and Wolfe Run-Legionville 138 kV Line ($50.1M)

Transmission Owner Upgrades

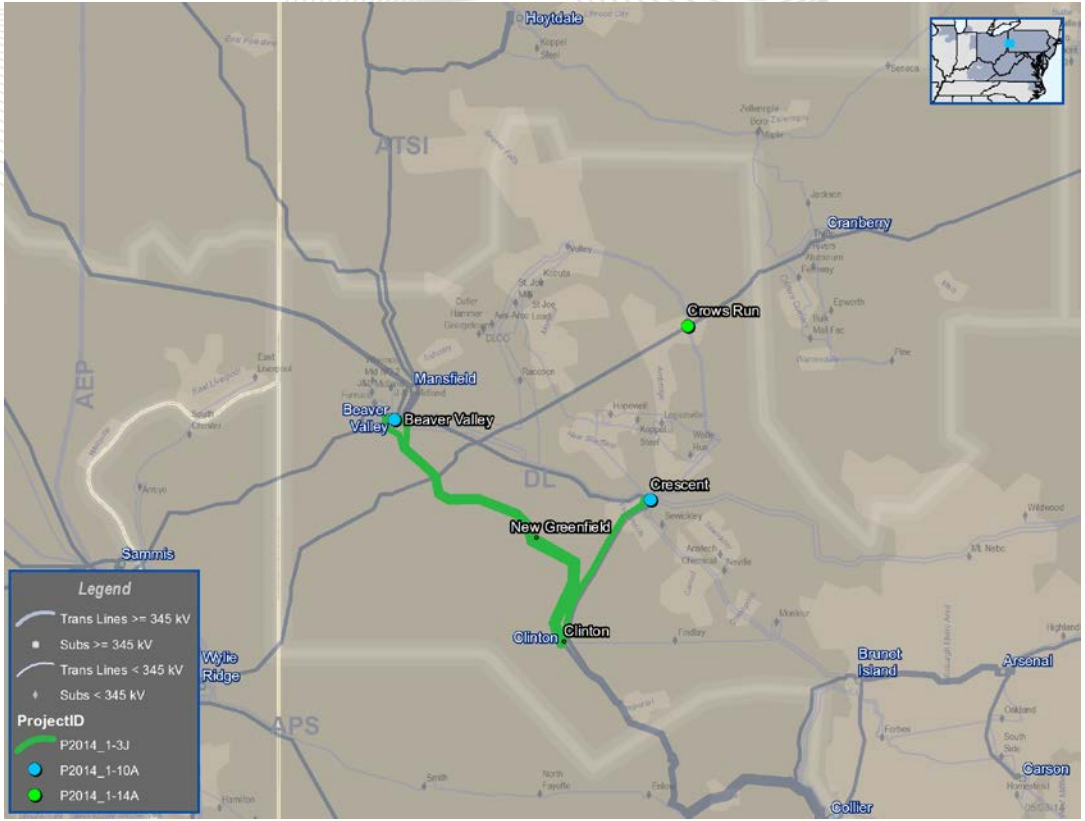
- Proposing Entity: Duquesne
  - P2014_1-10A: Operate with the Crescent No. 3 345/138kV autotransformer in-service by replacing eight (8) overdutied 138kV breakers at Crescent and three (3) 138kV breakers at Beaver Valley and install a No. 1 section 345kV breaker for the 331 circuit at Crescent ($7.285M)

DLCO Transmission Zone

- Proposals:
  - 2 Greenfield Projects
  - 1 Transmission Owner Upgrade

- Consideration:
  - The proposed Transmission Owner Upgrade is intended to addresses the reliability criteria violations in the DLCO zone.

- Next Steps
  - Evaluate the effectiveness of the 1 proposed Transmission Owner Upgrade



JCPL Transmission Zone – TO Upgrades

Transmission Owner Upgrades

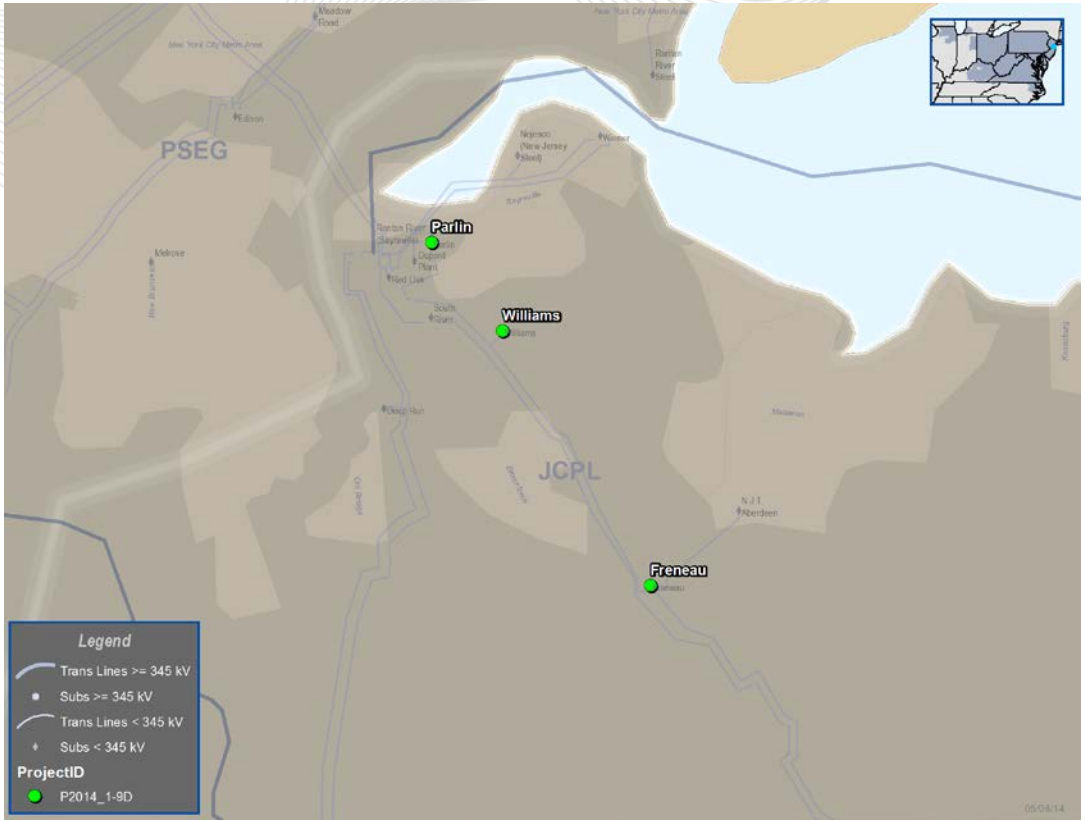
- Proposing Entity: First Energy
  - P2014_1-9D: Upgrade limiting terminal facilities at Freneau, Parlin, and Williams substations ($0.6M)

JCPL Transmission Zone

- Proposals:
  - 1 Transmission Owner Upgrade

- Consideration:
  - The proposed Transmission Owner Upgrade is intended to addresses the reliability criteria violations in the JCPL zone.

- Next Steps
  - Evaluate the effectiveness of the 1 proposed Transmission Owner Upgrade



METED Transmission Zone – TO Upgrades

Transmission Owner Upgrades

- Proposing Entity: First Energy
  - P2014_1-9C: Upgrade the limiting terminal facilities at both Jackson and North Hanover ($0.1M)

METED Transmission Zone

- Proposals:
  - 1 Transmission Owner Upgrade

- Consideration:
  - The proposed Transmission Owner Upgrade is intended to addresses the reliability criteria violations in the METED zone.

- Next Steps
  - Evaluate the effectiveness of the 1 proposed Transmission Owner Upgrade

Greenfield Projects

- Proposing Entity: Northeast Transmission Development
  - P2014_1-14B: Approx. 4 mile 230 kV transmission line from Delco 230 kV substation to Eddystone 230 kV substation ($22.7M)
- Proposing Entity: ITC
  - P2014_1-11D: Build a 230 kV switchyard (Colora tap) at the confluence of the following lines: Conowingo-Nottingham 230 kV, Conowingo-Colora 230 kV, and Colora-Clary 230 kV ($27.1M)
- Proposing Entity: Transource
  - P2014_1-3L: Construct new 230 kV line between Mickleton station in New Jersey and Eddystone station in Pennsylvania ($49M)

Transmission Owner Upgrades

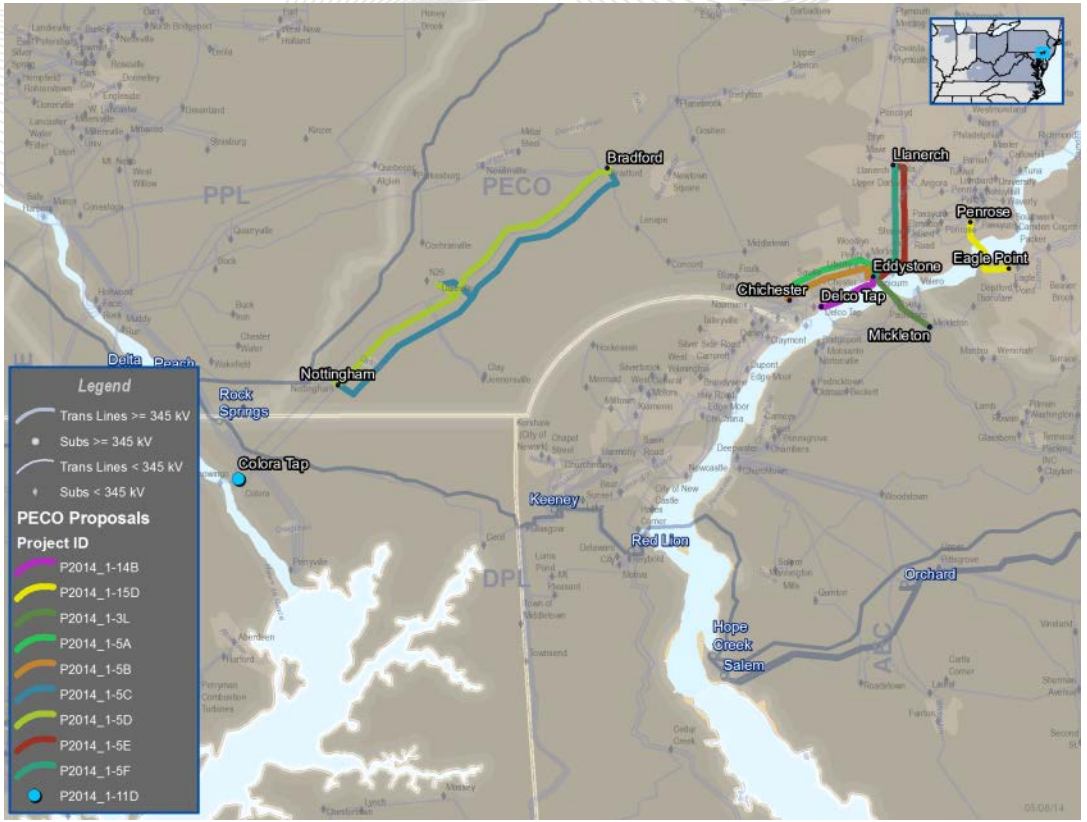
- Proposing Entity: PECO
  - P2014_1-5F: Rebuild 130-45 Eddystone-Llanerch 138 kV line ($38.4M)
  - P2014_1-5E: Replace terminal equipment inside Llanerch substation on 130-45 Eddystone-Llanerch 138 kV line ($0.1M)
  - P2014_1-5D: Re-conductor the 220-05 Nottingham-Daleville-Bradford 230 kV line ($26.5M)
  - P2014_1-5C: Replace terminal equipment inside Nottingham substation on 220-05 Nottingham-Daleville-Bradford 230 kV line ($0.1M)
  - P2014_1-5B: Replace terminal equipment inside Chichester and Eddystone substations on 220-36 Chichester-Eddystone 230 kV line ($2.2M)
  - P2014_1-5A: Replace terminal equipment inside Chichester substation on 220-36 Chichester-Eddystone 230 kV line ($0.4M)

PECO Transmission Zone

- Proposals:
  - 3 Greenfield Projects
  - 6 Transmission Owner Upgrades

- Consideration:
  - Several Greenfield Projects are competitively priced relative to Transmission Owner Upgrades
  - Proposed projects also target overloads in the neighboring PSE&G zone

- Next Steps
  - Evaluate both the proposed Transmission Owner Upgrade and greenfield proposals to determine a recommended solution for the PECO zone

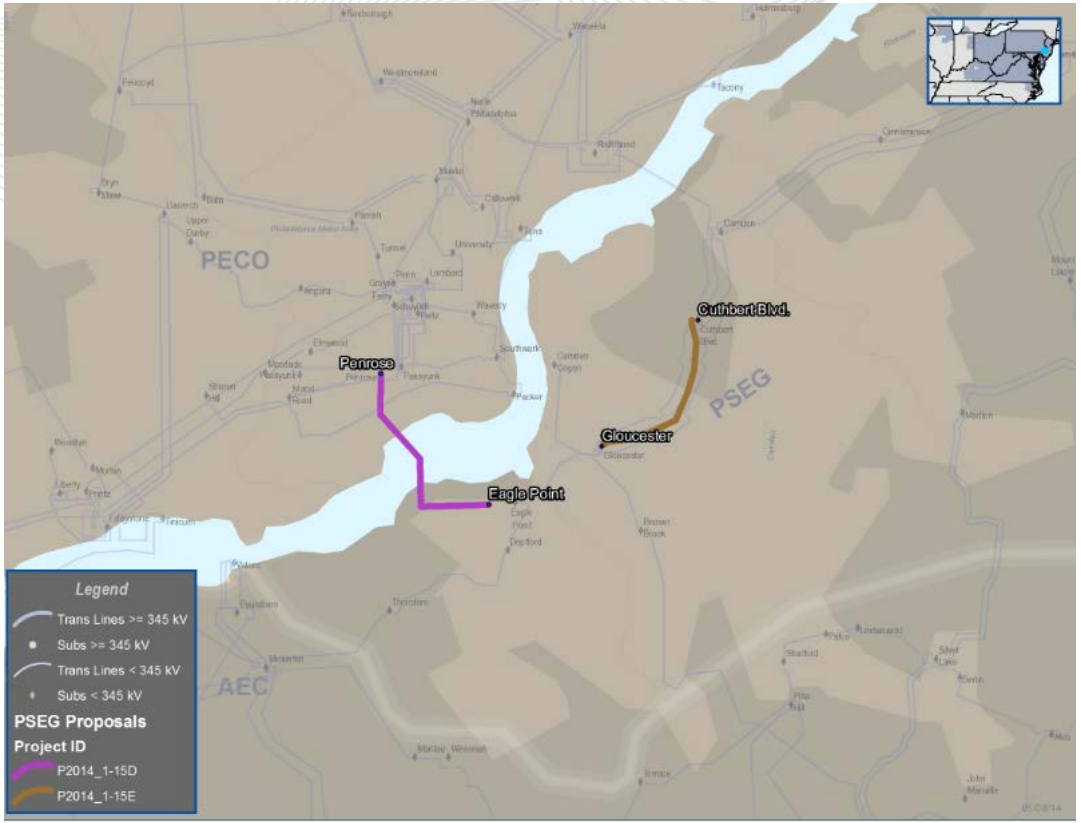


Greenfield Projects

- Proposing Entity: PSEG
  - P2014_1-15E: Build a new 230 kV underground circuit from Gloucester-Cuthbert ($92M)
  - P2014_1-15D: Build a new 230 kV underground circuit from new station at Eagle Point to Penrose ($101M)

PSEG Transmission Zone

- Proposals:
  - 2 Greenfield Projects
- Consideration:
  - Several Greenfield Projects are competitively priced relative to Transmission Owner Upgrades
  - Proposed projects also target overloads in the neighboring PECO zone
- Next Steps
  - Evaluate both proposed greenfield proposals to determine a recommended solution for the PSE&G zone



Greenfield Projects

- Proposing Entity: Dominion High Voltage MidAtlantic
  - P2014_1-4C: A new 500/230kV transformation station at the intersection of the 500kV Sunbury-Susquehanna line and 230kV Montour-Columbia-Frackville line, and Line upgrades to the Montour-Columbia-Frackville line ($31.8M)
- Proposing Entity: NextEra Energy Transmission LLC
  - P2014_1-13B: Build a new single circuit overhead 230 kV line from Montour-Sunbury ($55.36M)
  - P2014_1-13A: Build a new single circuit overhead 230 kV line from North Meshoppen-Lackawanna ($68.81M)
- Proposing Entity: Transource
  - P2014_1-3I: Establish a new 500 kV path between the existing Montour 230 kV station and the Sunbury - Susquehanna 500kV line ($146.4M)

PPL Transmission Zone – Greenfield Projects

- Proposing Entity: Northeast Transmission Development
  - P2014_1-14E1: Approximately 18-mile 230 kV transmission line from Montour 230 kV substation to a new 500/230 kV substation (“Furman”) on the Sunbury – Susquehanna 500 and 230 KV Lines ($80.9M)
  - P2014_1-14E: Approximately 18-mile 230 kV transmission line from Montour 230 kV substation to a new 230 kV switching station ("Furman") on the Sunbury - Susquehanna 230 kV Line ($49.8M)
- Proposing Entity: PPL
  - P2014_1-7O: Build a new 230 kV line Montour-Harwood ($164.2M)
  - P2014_1-7N: Build a new 500-230 kV Substation near Catawissa with 2-750 MVA transformers and increase capacity on the existing 230 kV line from Montour to Catawissa Sub ($112.5M)

PPL Transmission Zone – Greenfield Projects

- Proposing Entity: PPL
  - P2014_1-7M: Build a new 500-230 kV Substation near Catawissa with 1-750 MVA transformer and increase capacity on the existing 230 kV line from Montour to Catawissa Sub ($102.9M)
  - P2014_1-7L: Build new 230 kV line from Montour-Susquhanna T-10 ($87.1M)
  - P2014_1-7K: Build new 230 kV line from Montour-Sunbury ($114.1M)
  - P2014_1-7P: Build a new double circuit 500 kV line and corresponding 500 kV substations. The line begins at PPL EU's Lackawanna 500 kV substation and terminates at PPL EU's Sunbury 500 kV substation. Between start and end points, the line connects to FE's existing North Meshoppen 230 kV and PLL EU's Montour 230 kV substation ($1,367M)

Transmission Owner Upgrades

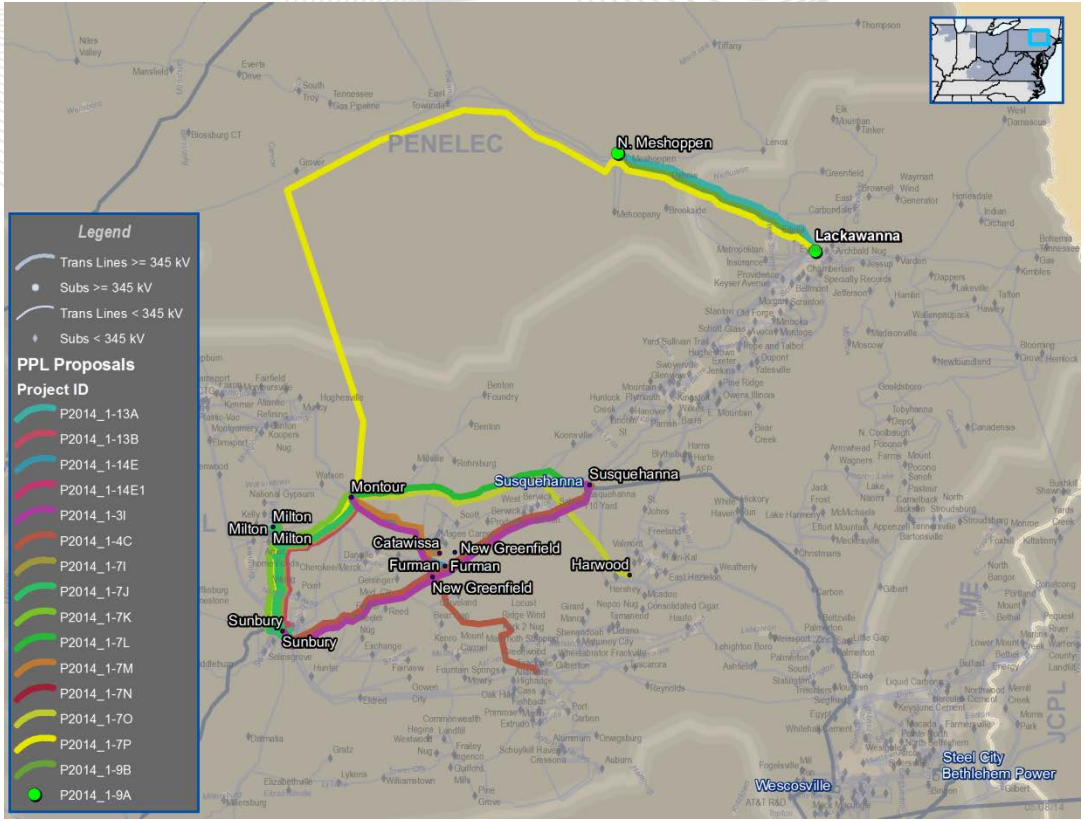
- Proposing Entity: PPL
  - P2014_1-7J: Add second 230 kV circuit to existing Montour - Sunbury 230 kV circuit from Montour to Milton Substation. Energize existing 69 kV circuit from Milton to Sunbury at 230 kV ($29.2M)
  - P2014_1-7I: Rebuild Existing Montour-Milton-Sunbury 230 kV ckt to higher capacity ($139.2M)
- Proposing Entity: First Energy
  - P2014_1-9B: Rebuild Lackawanna - North Meshoppen Line and upgrade terminals ($73.4M)
  - P2014_1-9A: Reconductor Lackawanna - North Meshoppen Line and upgrade terminals ($26.5M)

PPL Transmission Zone

- Proposals:
  - 12 Greenfield Projects
  - 4 Transmission Owner Upgrade

- Consideration:
  - Several Greenfield Projects are competitively priced relative to Transmission Owner Upgrades

- Next Steps
  - Evaluate both the proposed Transmission Owner Upgrade and greenfield proposals to determine a recommended solution for the PPL zone



Transmission Owner Upgrades

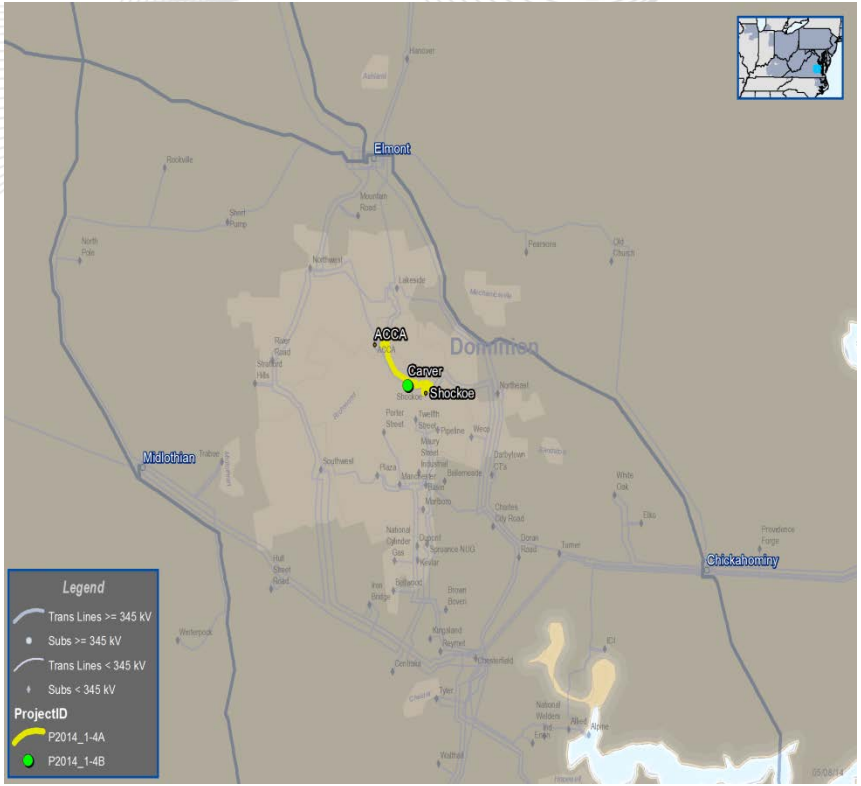
- Proposing Entity: Dominion Virginia Power
  - P2014_1-4B: Replace Wave Trap at Carver Substation with a 2000a Wave Trap ($0.04M)
  - P2014_1-4A: Reconductor 1.41 miles of existing line between Acca and Hermitage and upgrade associated terminal equipment ($1.82M)

Dominion Virginia Power Transmission Zone

- Proposals:
  - 2 Transmission Owner Upgrade

- Consideration:
  - The proposed Transmission Owner Upgrades address the reliability criteria violations in the Dominion Virginia Power zone.

- Next Steps
  - Evaluate the effectiveness of the 2 proposed Transmission Owner Upgrades



Transmission Owner Upgrades

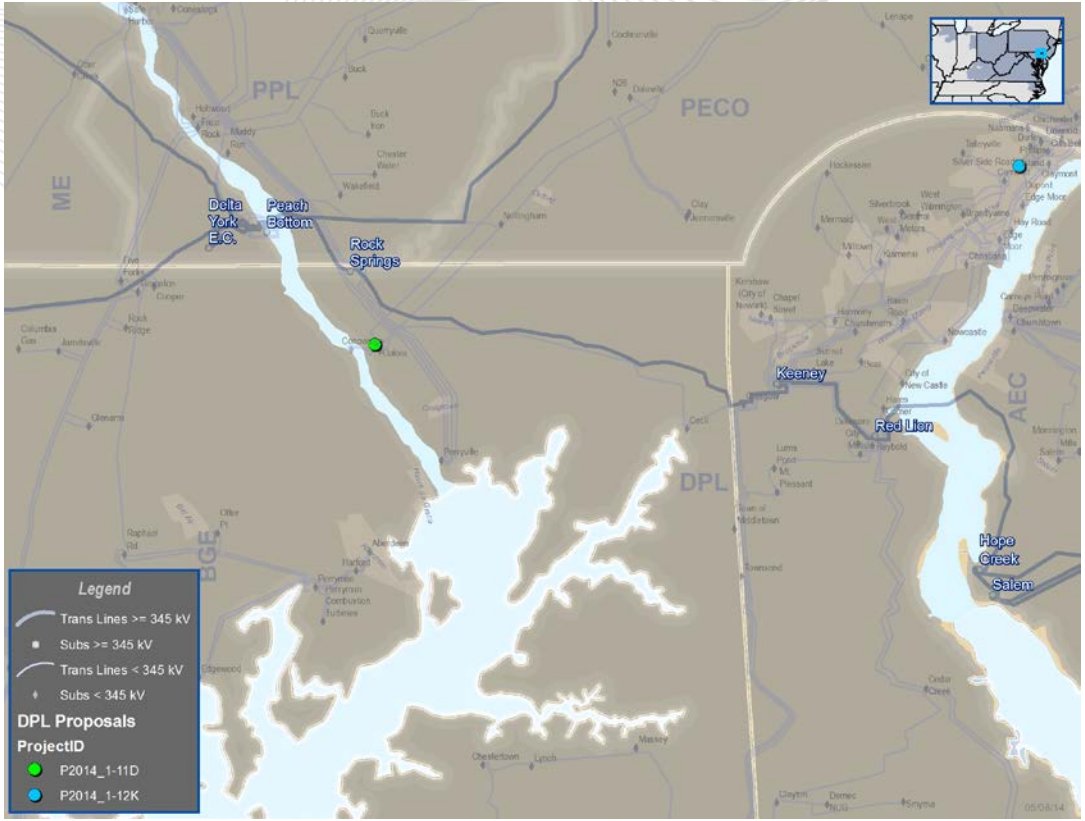
- Proposing Entity: PHI
  - P2014_1-12K: Replace terminal equipment at Silverside 69 kV substation ($0.04M)

DP&L Transmission Zone

- Proposals:
  - 1 Transmission Owner Upgrade

- Consideration:
  - The proposed Transmission Owner Upgrade addresses the reliability criteria violations in the DP&L zone.

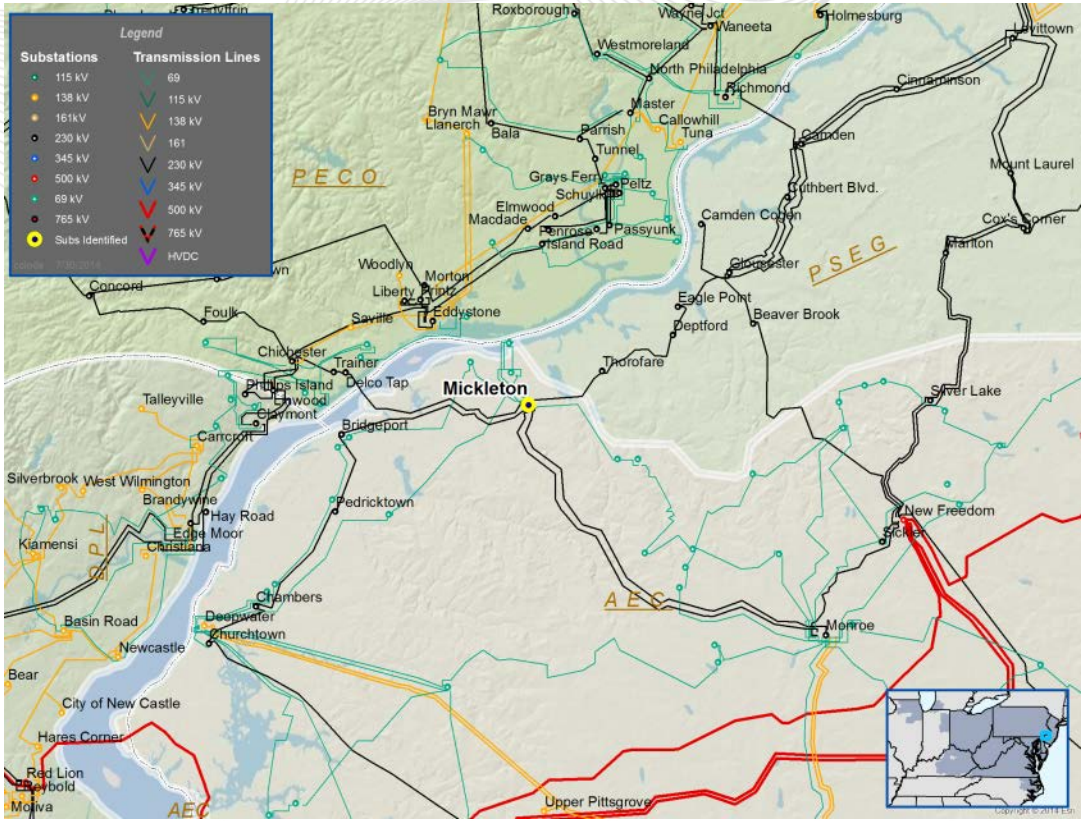
- Next Steps
  - Evaluate the effectiveness of the 1 proposed Transmission Owner Upgrade



Short Circuit Upgrades

AEC Transmission Area

- The Mickleton 230kV breaker ‘MK’ is overstressed
- Proposed Solution: Replace the Mickleton 230kV breaker ‘MK’ with a 63 kA breaker (b2538)
- Estimated Project Cost: $400 K
- Required IS Date: 6/1/2016



Supplemental Projects

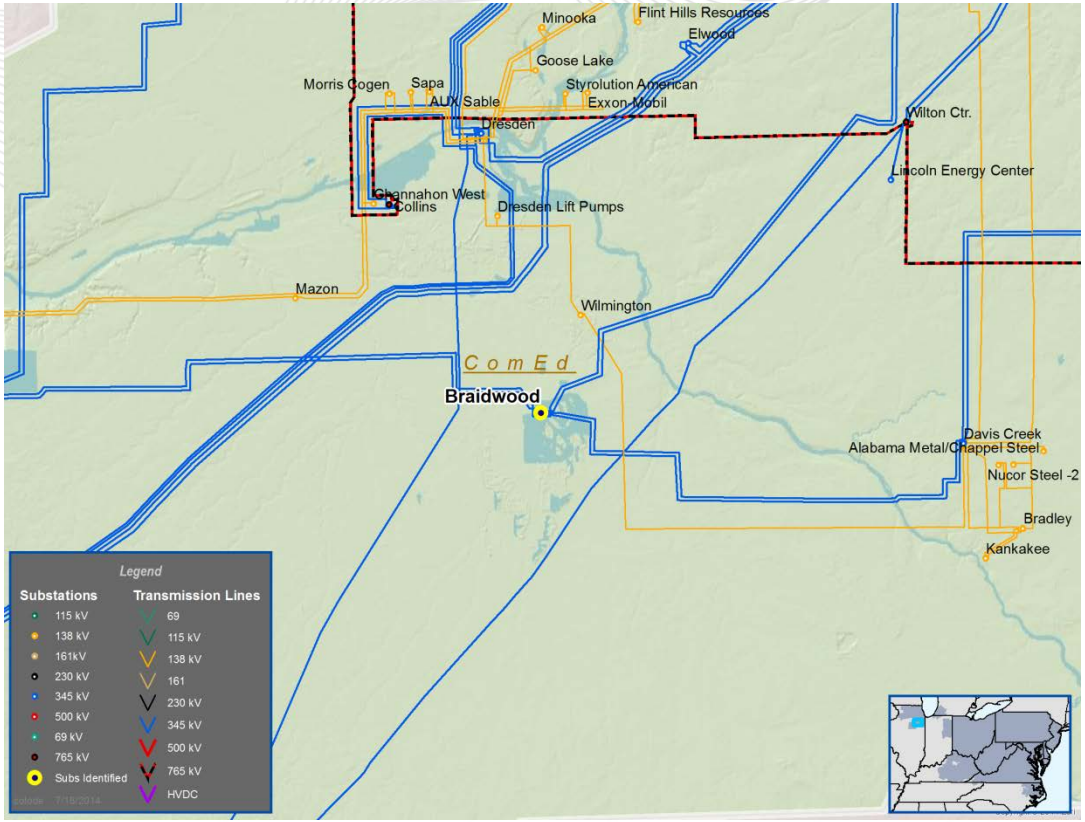
ComEd Transmission Zone

- Supplemental Project

- Replace Braidwood 345kV Bus tie 14-15 breaker (S0756.1)
- Replace Braidwood 345kV Bus tie 3-4 breaker(S0756.2)

- Estimated Project Cost: $4.5M

- Projected IS Date: 6/1/2017
- Projected IS Date: 6/1/2018



Winter Peak Study Update

2019 Winter Generator Deliverability Study

- Updated Results
  - Re-ran the study including changes in TO's feedback for the initial results

2019 Winter Generator Deliverability Results Updates

Fr Bus	Name	To Bus	Name	CKT	KVs	Areas
239728	02BLKRVR	238915	02LRN Q2	1	138/138	ATSI
239070	02RICHLD	239071	02RICHLN	ZB	138/138	ATSI
239070	02RICHLD	238521	02NAOMI	1	138/138	ATSI
239071	02RICHLN	239269	02RICHLJ	ZB	138/138	ATSI
242576	05CAPITO	242783	05RUTLED	1	138/138	AEP
242593	05CHEM 2	242576	05CAPITO	1	138/138	AEP
242605	05CLNCHR	242700	05LEBANO	1	138/138	AEP
243503	05ELIOTZ	243506	05ELLIOT	1	138/138	AEP
243664	05HAZARD	243693	05HAZRD2	1	161/138	AEP
243311	05HOGAN	243275	05DELAWR	1	138/138	AEP
242685	05J.FERX	242745	05PEAKCK	1	138/138	AEP
246929	05MADDOX	242935	05E LIMA	1	345/345	AEP
243878	05MEADOW	255205	17REYNOLDS	1	345/345	AEP/NIPSCO
242745	05PEAKCK	242841	05W GLOW	1	138/138	AEP
242933	05RPMONE	243211	05ALLEN	1	345/345	AEP

The blue text ones are overlapped with summer study

2019 Winter Generator Deliverability Results Updates

Fr Bus	Name	To Bus	Name	CKT	KVs	Areas
246950	05TIMBSS	243017	05HAVILN	1	138/138	AEP
247319	05WOLFCK	243533	05LAYMAN	1	138/138	AEP
242853	05WURNO	242609	05CLYTR2	1	138/138	AEP
248005	06KYGER	242528	05SPORN	2	345/345	OVEC/AEP
250057	08M.FORT	250131	08WILEY2	1	138/138	DEOK
249568	08M.FTHS	250057	08M.FORT	9	345/138	DEOK
249568	08M.FTHS	250057	08M.FORT	10	345/138	DEOK
272365	ESS H440 ;RT	272363	ESS H440 ; R	1	138/138	ComEd
200013	PEACHBTM	200004	CNASTONE	1	500/500	PECO/BGE
200676	26E.SAYRE	130836	N.WAV115	1	115/115	PN/NYISO
200674	26TOWANDA	200676	26E.SAYRE	1	115/115	PN
207964	ELDR TR1	208111	SUNBTR23	1	230/230	PPL
207965	ELDR TR2	207964	ELDR TR1	1	230/230	PPL
208040	MONT	208034	MILT	1	230/230	PPL
903270	W3-022 TAP	207975	FRAC TR3	1	230/230	PPL

The blue text ones are overlapped with summer study

2019 Winter Generator Deliverability Results Updates

Fr Bus	Name	To Bus	Name	CKT	KVs	Areas
903270	W3-022 TAP	207965	ELDR TR2	1	230/230	PPL
219125	CAMDEN	214206	RICHMRE29	1	230/230	PSEG/PECO
213489	CHICHST1	213588	EDDYSTN4	1	230/230	PECO
213922	RICHMOND	214012	WANEETA3	1	230/230	PECO
214206	RICHMRE29	213922	RICHMOND	1	230/230	PECO
214010	WANEETA2	213817	N PHILA	1	230/230	PECO
217014	FAIRLAWN_3	216901	ATHENIA_3	1	138/138	PSEG
219110	GLOUCSTR_2	219755	CUTHBERT_4	2	230/230	PSEG
221361	GOULD ST	221372	WP PH.S1	1	34.5/34.5	BGE
223949	BML 138	224079	BETH T7	1	138/138	PEPCO
910860	X3-087 TAP	223994	BURCH230	1	230/230	PEPCO
227903	MILL #1	227902	LEWIS #1	1	138/138	AE
227905	SCULL#1	227903	MILL #1	1	138/138	AE
227906	SCULL#2	227904	MILL #2	1	138/138	AE
232247	DUP-SFRD	232249	LAUREL	1	69/69	DPL

The blue text ones are overlapped with summer study

2019 Winter Generator Deliverability Results Updates

Fr Bus	Name	To Bus	Name	CKT	KVs	Areas
232227	EASTN_69	232232	TRAPPETP	1	69/69	DPL
232244	GREENWD	232245	BRIDGEVL	1	69/69	DPL
232215	KENT	232813	VAUGHN	1	69/69	DPL
232276	KINGS_69	232129	KINGS CK	1	69/138	DPL
231803	MOTIVA	231214	REYBD_69	1	138/69	DPL
232233	PRESTON	232234	TODD	1	69/69	DPL
231214	REYBD_69	231128	REYBOLD	1	69/138	DPL
231215	SILVERSD	231205	DARLEY	1	69/69	DPL
232000	STEELE	232004	MILF_230	1	230/230	DPL
232821	TANYARD	232233	PRESTON	1	69/69	DPL
232815	WELLS	232217	HARRNGTN	1	69/69	DPL
232842	WESTOVER	232276	KINGS_69	1	69/69	DPL
232267	WORCR_69	232832	OCEANPIN	1	69/69	DPL
907322	X1-096 TAP	232842	WESTOVER	1	69/69	DPL
909190	X2-066 TAP	232114	SHARNGTN	1	138/138	DPL

The blue text ones are overlapped with summer study

2019 Winter Generator Deliverability Study

- Next Steps
  - Compare these potential overloads to the anticipated 2018 light load results.
  - Continue to work with the TOs to identify limiting equipment
  - Identify potential areas for reinforcement

2014 RTEP Winter Study – Load Deliverability Analysis

- Consider three different at-risk gas unit outage scenarios
  - Scenario A – Chronically curtailed gas units (units that have had a minimum 12 hours per year of gas curtailments for the winters 2007-2012; future gas interconnection projects with completed ISA that will reside on gas LDC similar to existing chronically curtailed units.
  - Scenario B – Includes all Scenario A outages plus CTs that have had at least one curtailment in the last 7 years and gas interconnection projects with a completed ISA that are deemed as high risk due to proven record of gas curtailments on the respective gas pipeline or LDC.
  - Scenario C – Includes all Scenario B outages plus all gas interconnection projects with a completed ISA.

2014 RTEP Winter Study – Load Deliverability Analysis

- Next Steps
  - CETO Calculations
    - Work underway to calculate winter CETO values for PJM LDAs
    - Winter CETO values will be calculated for each of three scenarios of natural gas related generation outages
  - CETL Evaluation
    - PJM will select LDAs to perform Load Deliverability analysis and calculate winter CETL values
  - Develop and analyze gas pipeline contingency events

Artificial Island Next Steps

Artificial Island Cost Allocation Update

- 5/8/2014 TEAC Reliability Analysis Update preliminary cost allocations:
- The 5/8/2014 preliminary cost allocation had an error in the market efficiency calculation
- Market efficiency flows for an example AI to Red Lion circuit were included in the preliminary cost allocation calculation as being predominantly from Red Lion to AI when they are actually from AI to Red Lion

Artificial Island Cost Allocation Update

- Impact to preliminary cost allocation
- Example from the AI to Red Lion 500 kV
  - The Load Ratio Share Allocation Portion is not impacted
  - The “DFAX” allocation portion will be updated with the market efficiency weighting factor to reflect the AI to Red Lion 500 kV flow
    - Allocations will increase to TO zones west of AI
- Example from the AI to Cedar Creek 230 kV
  - Not impacted
  - Allocation 100% to DPL
- The updated calculations are in-progress

Stakeholder Comments to the PJM Board

- LS Power Fixed Cost Cap Offer
- Environmental Impacts and Permitting Challenges
  - Comments primarily focused on the evaluation of potential issues in permitting the route for the new Red Lion to Hope Creek line
- Dominion 1A Project Proposal
  - Comments suggested that the project is superior to the recommended solution
- Process Comments
  - Concerns with clearly communicating technical requirements
  - Concerns with project proposal modification
  - Concerns with the application of criteria in the project evaluation
  - Concerns with the cost estimate process and use in project evaluation
  - Request for PJM to supply decision metrics that would be used for project evaluation with the RFP documentation

Artificial Island Supplemental Steps

- Items Raised in July 23rd Letter to TEAC
  - Review of Issues Raised by Stakeholders
    - Identifying issues that require additional analysis
  - Supplemental Proposals (Cost Cap Consideration)
    - PJM drafting a letter to “finalist” bidders
  - NRC Engagement on Technical Issues
  - Process Enhancements and Lessons Learned
    - Ensure fairness and transparency in discussions with qualifying entities

Artificial Island Supplemental Steps

- Environmental impacts and permitting
  - Engage independent firm to review proposals with focus on environmental impacts and permitting challenges faced by the two line routes under consideration

- Further Review of Dominion 1A project proposal analysis

2014 RTEP Next Steps

- Complete Artificial Island Recommendation
- Recommend RTEP Proposal Window #1 solutions
- Conduct RTEP Proposal Window #2
- Recommend solutions to the PJM Board in November & December 2014

Artificial Island Preliminary Cost Allocation

- Preliminary Cost Allocation for Red Lion-Hope Creek 500 kV proposals:

Transmission Zone	Load Ratio Share Allocation	DFAX Allocation
AEC	1.73%	0.01%
AEP	14.41%	0.00%
APS	5.47%	0.00%
ATSI	8.29%	0.00%
BGE	4.31%	32.94%
ComEd	14.04%	0.00%
ConEd	0.57%	0.00%
Dayton	2.15%	0.00%
DEOK	3.25%	0.00%
DL	1.86%	0.00%
Dominion	11.83%	0.00%
DPL	2.53%	63.82%
ECP**	0.20%	1.41%
HTP***	0.01%	1.81%
JCPL	4.02%	0.01%
ME	1.90%	0.00%
NEPTUNE*	0.42%	0.00%
PECO	5.43%	0.00%
PENELEC	1.95%	0.00%
PEPCO	4.12%	0.00%
PPL	4.66%	0.00%
PSEG	6.57%	0.00%
RE	0.28%	0.00%

*Neptune Regional Transmission System, LLC
**East Coast Power, LLC
***Hudson Transmission Partners, LLC

Artificial Island Preliminary Cost Allocation

- Preliminary Cost Allocation for Hope Creek – Silver Run 230 kV proposals:

Transmission Zone	Load Ratio Share Allocation	DFAX Allocation
AEC	1.73%	0.00%
AEP	14.41%	0.00%
APS	5.47%	0.00%
ATSI	8.29%	0.00%
BGE	4.31%	0.00%
ComEd	14.04%	0.00%
ConEd	0.57%	0.00%
Dayton	2.15%	0.00%
DEOK	3.25%	0.00%
DL	1.86%	0.00%
Dominion	11.83%	0.00%
DPL	2.53%	100.00%
ECP**	0.20%	0.00%
HTP***	0.01%	0.00%
JCPL	4.02%	0.00%
ME	1.90%	0.00%
NEPTUNE*	0.42%	0.00%
PECO	5.43%	0.00%
PENELEC	1.95%	0.00%
PEPCO	4.12%	0.00%
PPL	4.66%	0.00%
PSEG	6.57%	0.00%
RE	0.28%	0.00%

*Neptune Regional Transmission System, LLC
**East Coast Power, LLC
***Hudson Transmission Partners, LLC

Questions?

Email: RTEP@pjm.com

- Revision History
- Version 1: Posted 8/5/2014
- Version 2: Posted 8/6/2104
  - Revisions include: Slide 87 Project 2014_1-4C proposing entity name updated to read “Dominion High Voltage MidAtlantic
- Version 3: Posted 8/11/2014
  - Revisions include: Slide 48 updates to show correct Greenfield/Upgrade count as 60/46
- Version 4: Posted 8/18/2014
  - Revisions include: Preliminary Cost Allocation slides (Slides #’s 116 and 117) added to Artificial Island section of presentation
- Version 5: Posted 9/3/2014
  - Revisions include: Slide 88 updates to show correct descriptions for P2014_1-14E1 and P2014_1-14E