Transmission Expansion Advisory Committee

July 10, 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

Proposal Windows Update

2014 Schedule

- 2014 RTEP Proposal Window #1
  - Opened June 27th, 2014
  - Scheduled close on July 28th, 2014
  - Scope: Baseline N-1 thermal, Generator Deliverability and Common Mode Outage, Load Deliverability Thermal and Voltage, N-1-1 Thermal
- 2014 RTEP Proposal Window #2
  - Schedule: TBD
  - Potential Scope: N-1 Voltage, N-1-1 Voltage, Light Load Reliability criteria

2014 RTEP Preliminary Reliability Results

2014 RTEP Preliminary Reliability Results

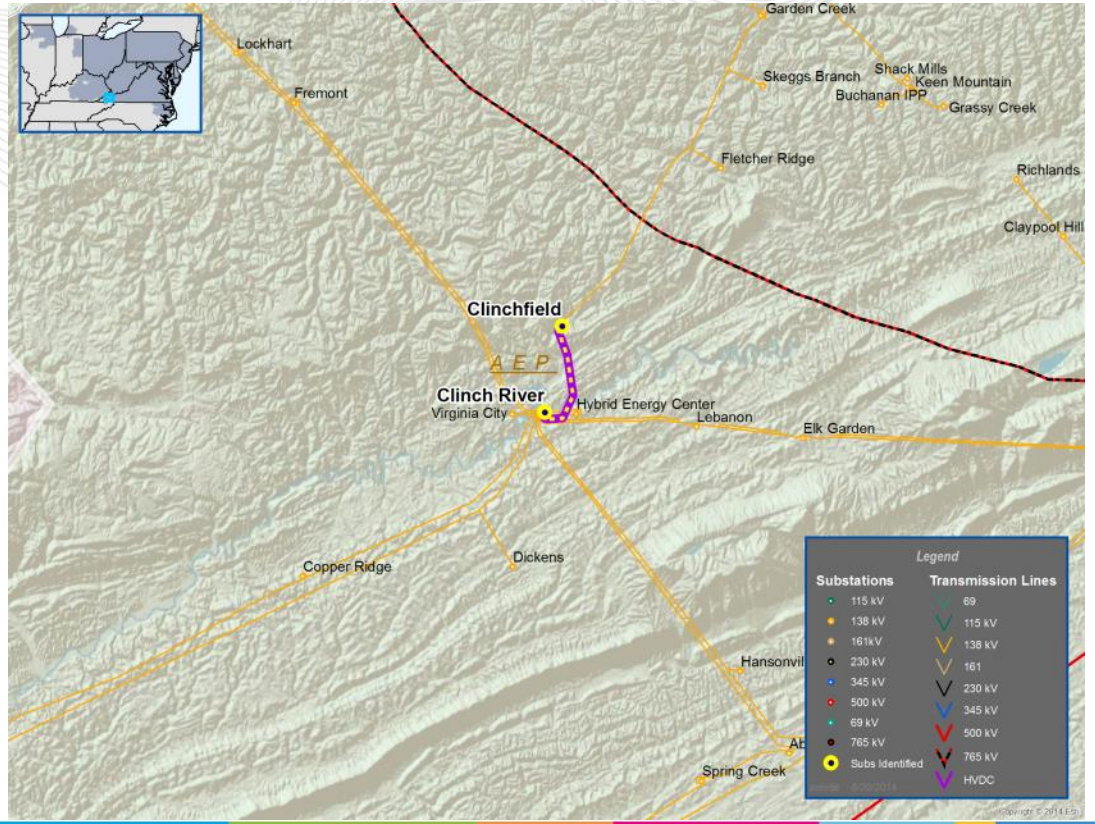
- All results in this section are posted for the 2014 RTEP Proposal Window #1 that opened on 6/27/2014 and anticipated to close on 7/28/2014

- The current project need date for these violations is 2019 or later

- These results include Baseline N-1 thermal, Generator Deliverability and Common Mode Outage, Load Deliverability Thermal and Voltage, N-1-1 Thermal

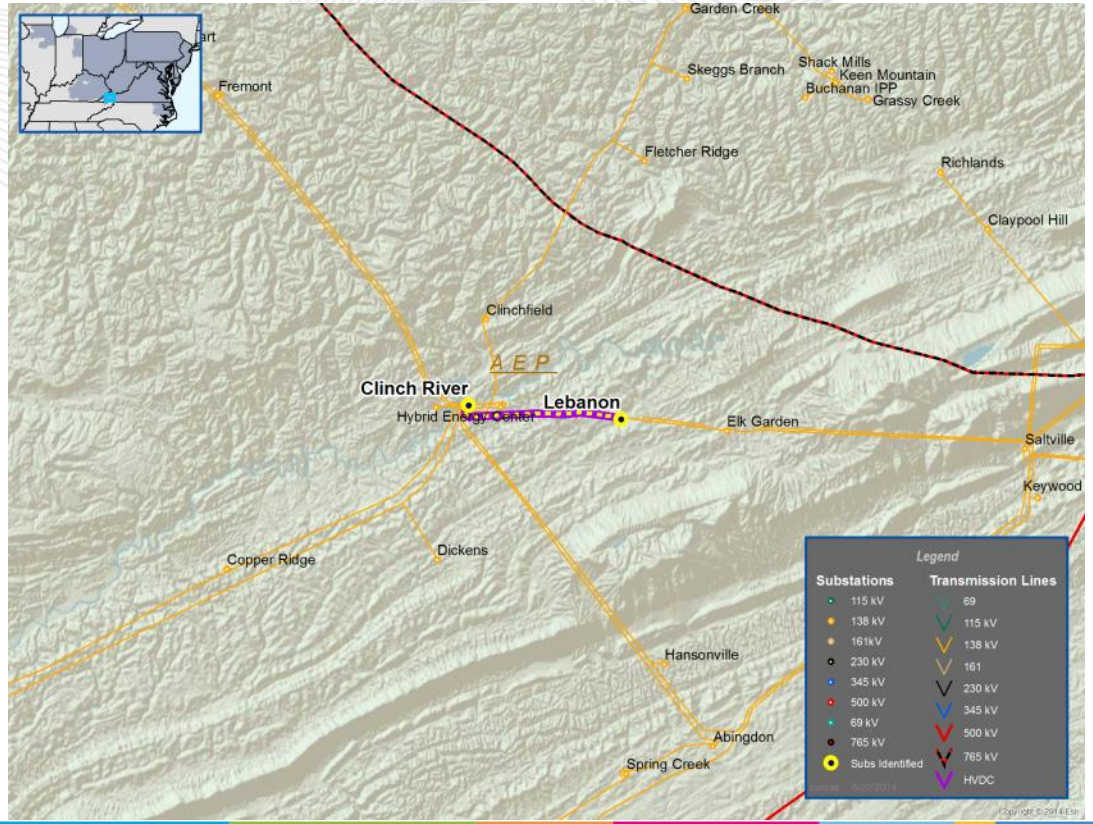
AEP Transmission Zone

- Generation Deliverability and Common Mode Outage Violation.
- The Clinch River to Clinch Field 138 kV circuit is overloaded for multiple contingencies.



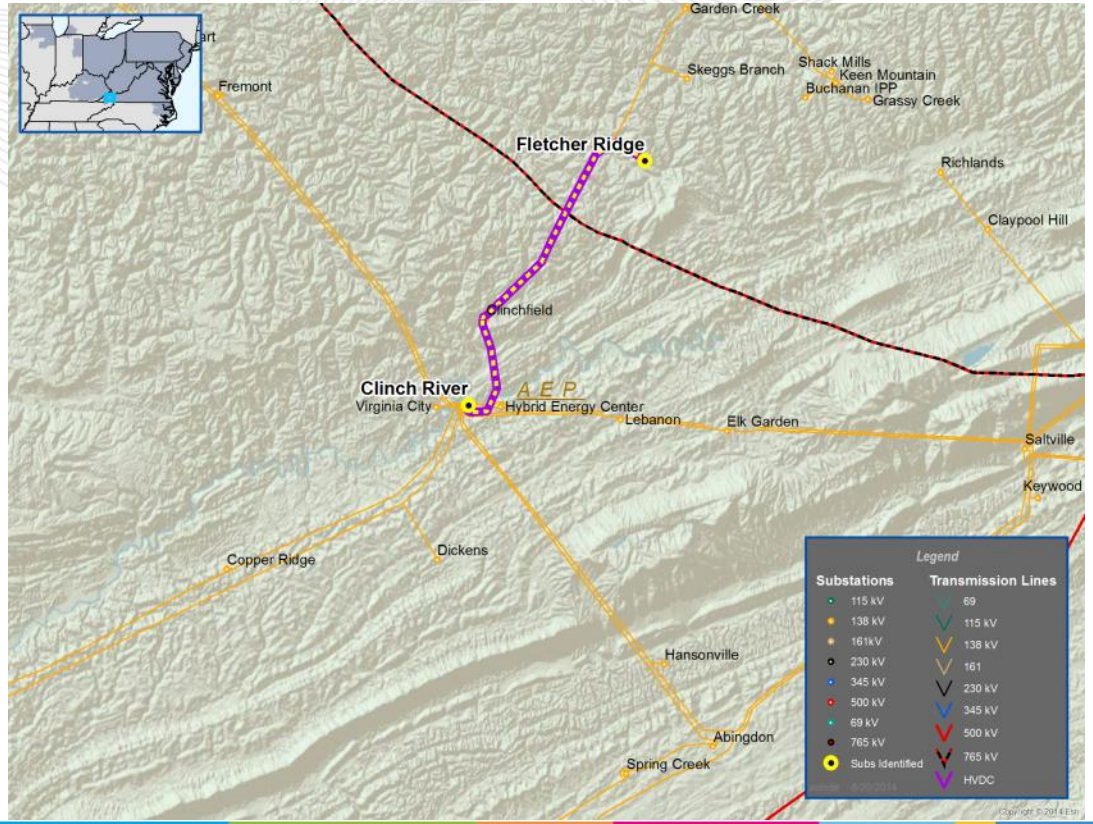
AEP Transmission Zone

- Generation Deliverability and Common Mode Outage Violation.
- The Clinch River to Lebanon 138 kV circuit is overloaded for multiple contingencies.



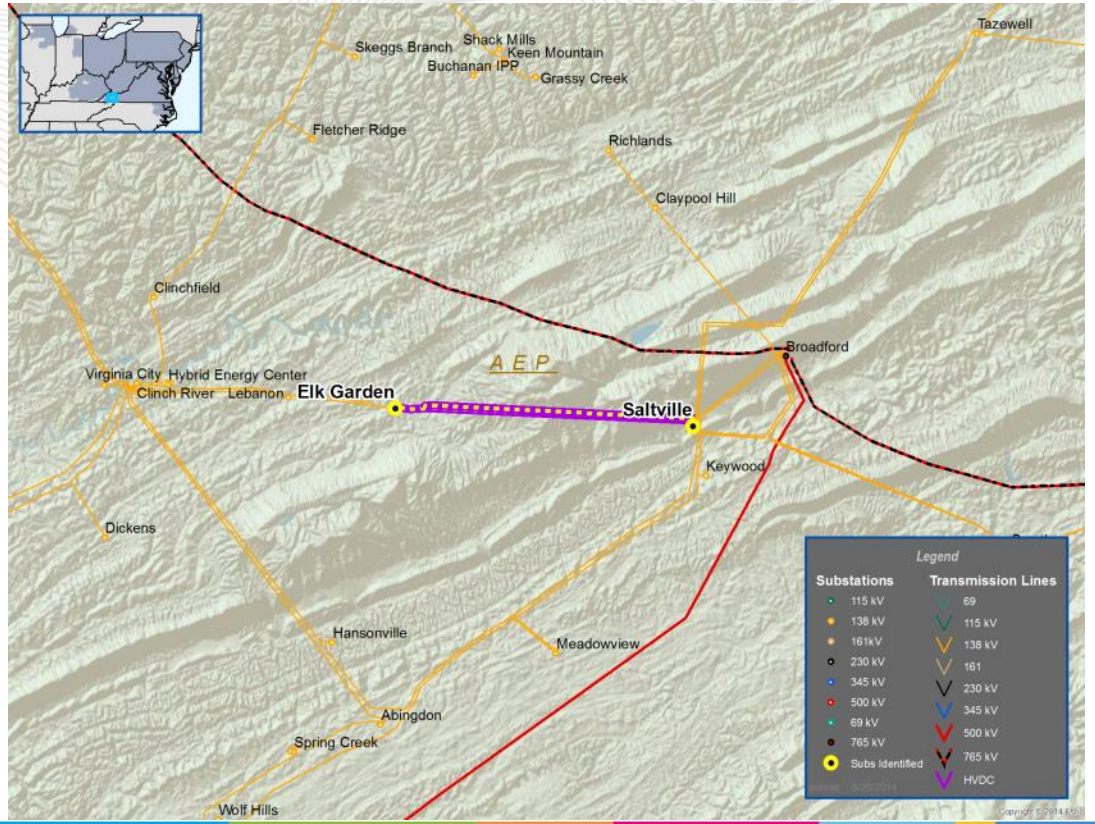
AEP Transmission Zone

- Generation Deliverability Violation.
- The Clinch Field to Fletcher Ridge 138 kV circuit is overloaded for multiple single contingencies.



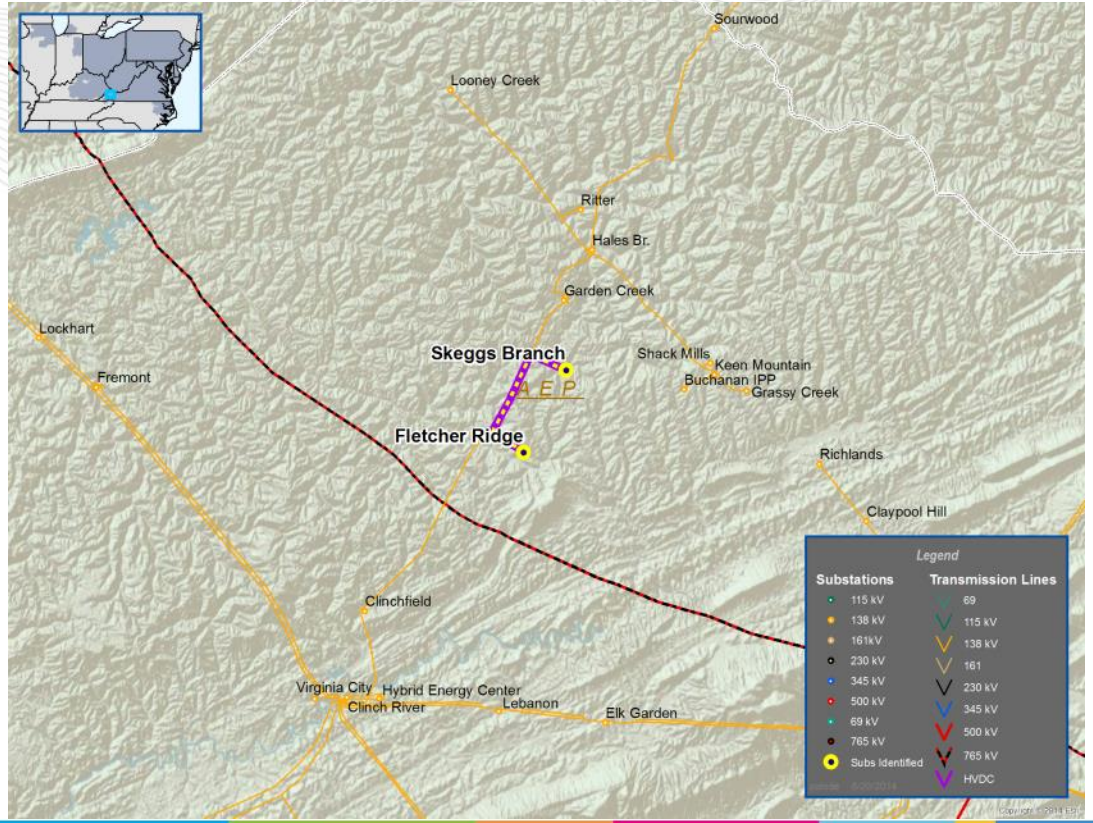
AEP Transmission Zone

- Generation Deliverability and Common Mode Outage Violation.
- The Saltville – Elk Garden 138 kV circuit is overloaded for multiple contingencies.



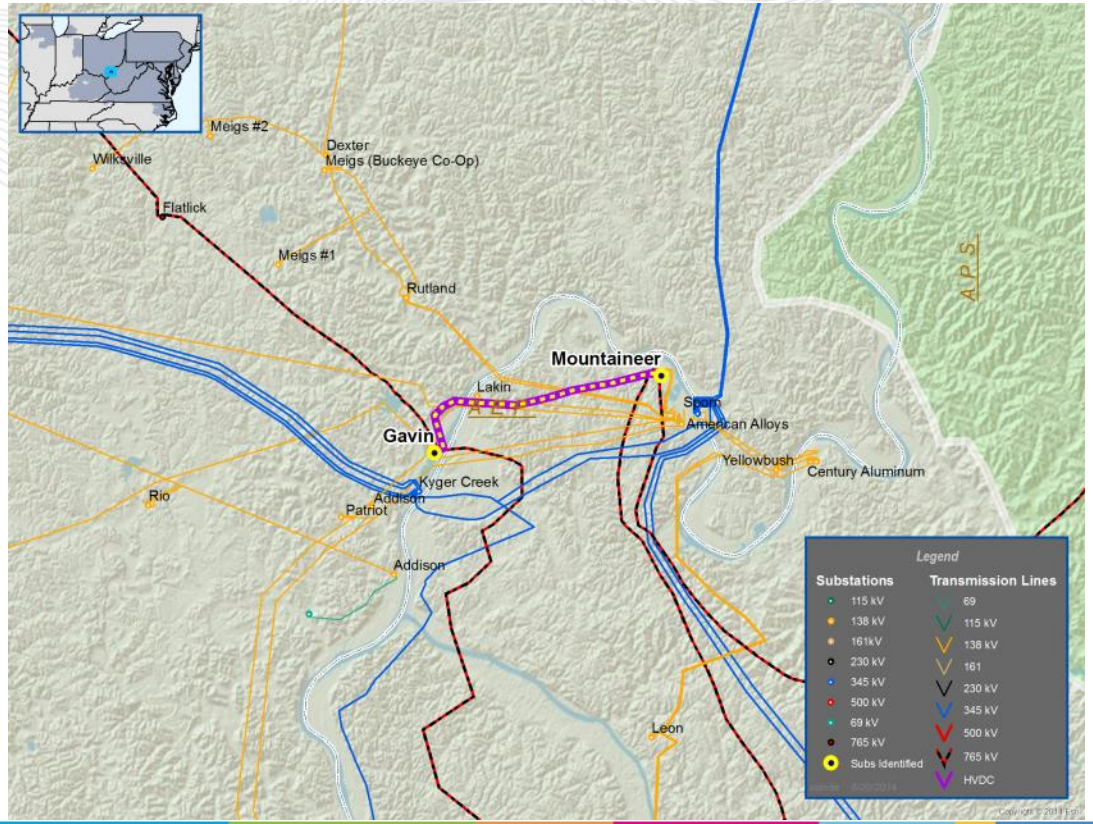
AEP Transmission Zone

- Generation Deliverability Violation.
- The Fletcher Ridge to Skeggs Branch 138 kV circuit is overloaded for multiple single contingencies.



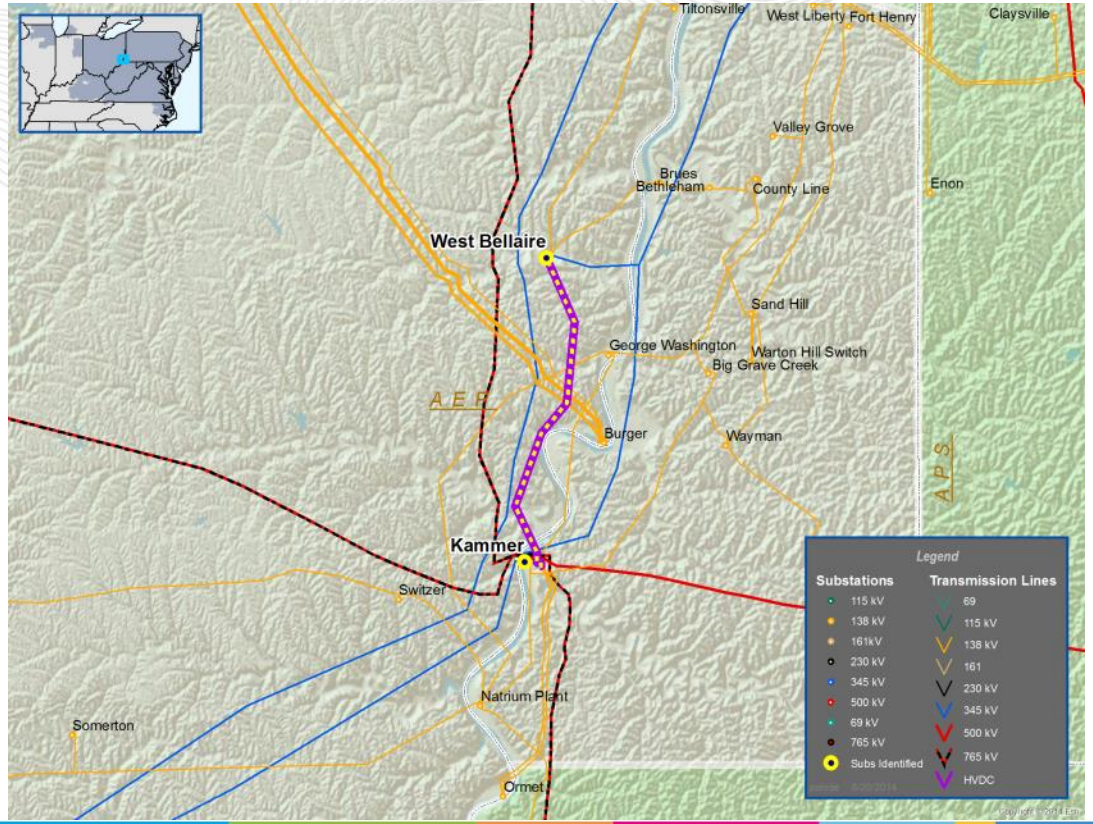
AEP Transmission Zone

- Generation Deliverability Violation.
- The Gavin to Mountaineer 765 kV is overloaded for single contingency loss of the Flatlick – Marysville 765 kV circuit.



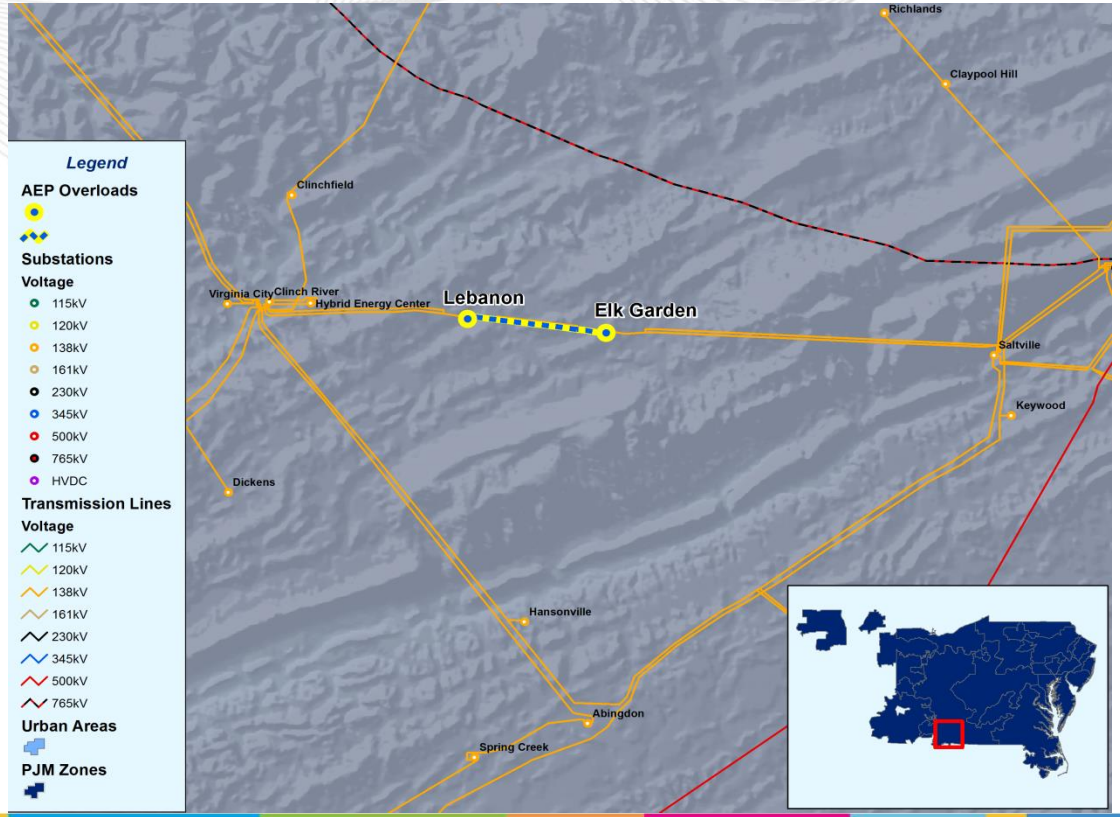
AEP Transmission Zone

- Generation Deliverability and Common Mode Outage Violation.
- The Kammer to West Bellaire 138 kV circuit is overloaded for multiple contingencies.



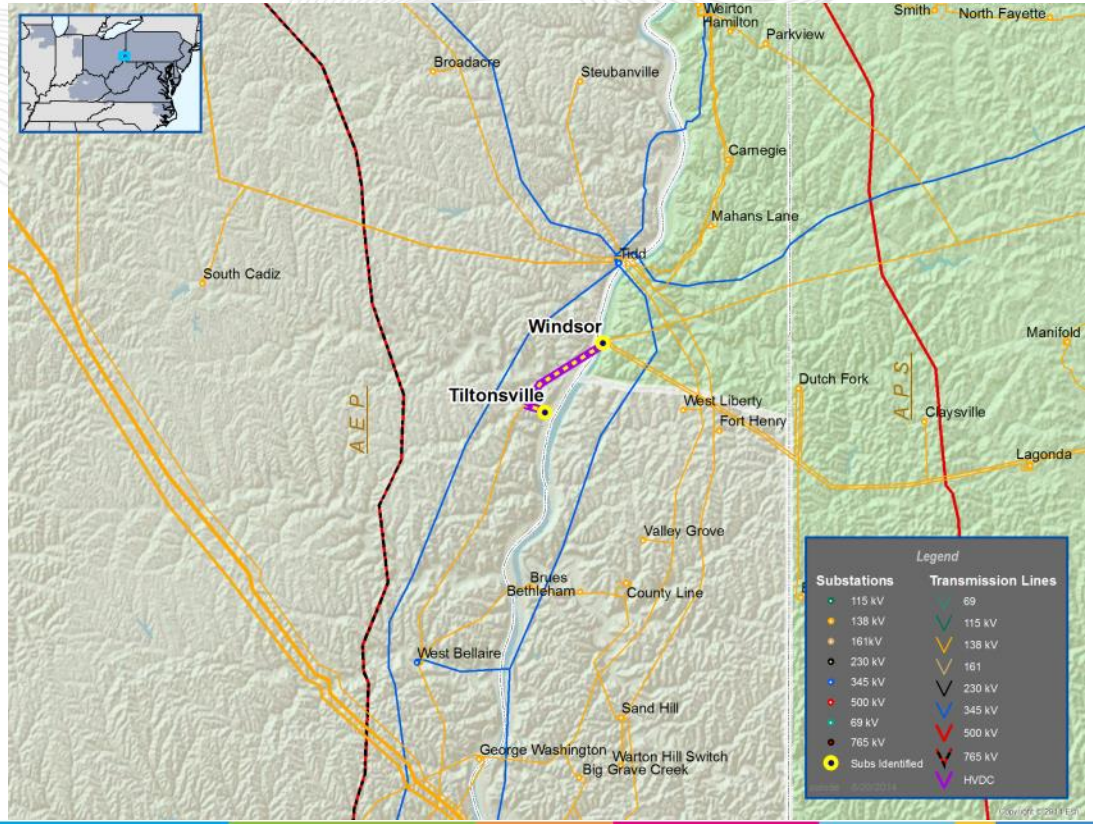
AEP Transmission Zone

- Generation Deliverability and Common Mode Outage Violation.
- The Lebanon to Elk Garden 138 kV circuit is overloaded for multiple contingencies.



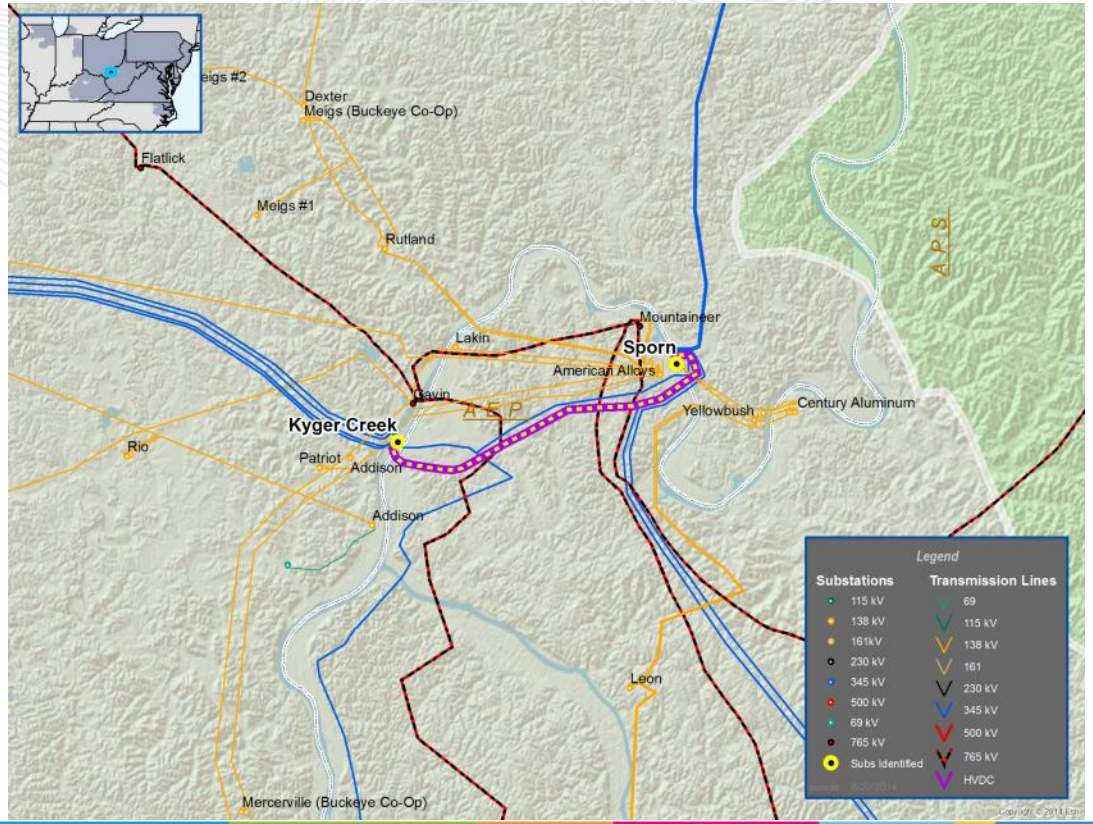
AEP Transmission Zone

- Baseline, Generation Deliverability and Common Mode Outage Violation.
- The Tiltonsville to Windsor 138 kV circuit is overloaded for multiple contingencies.



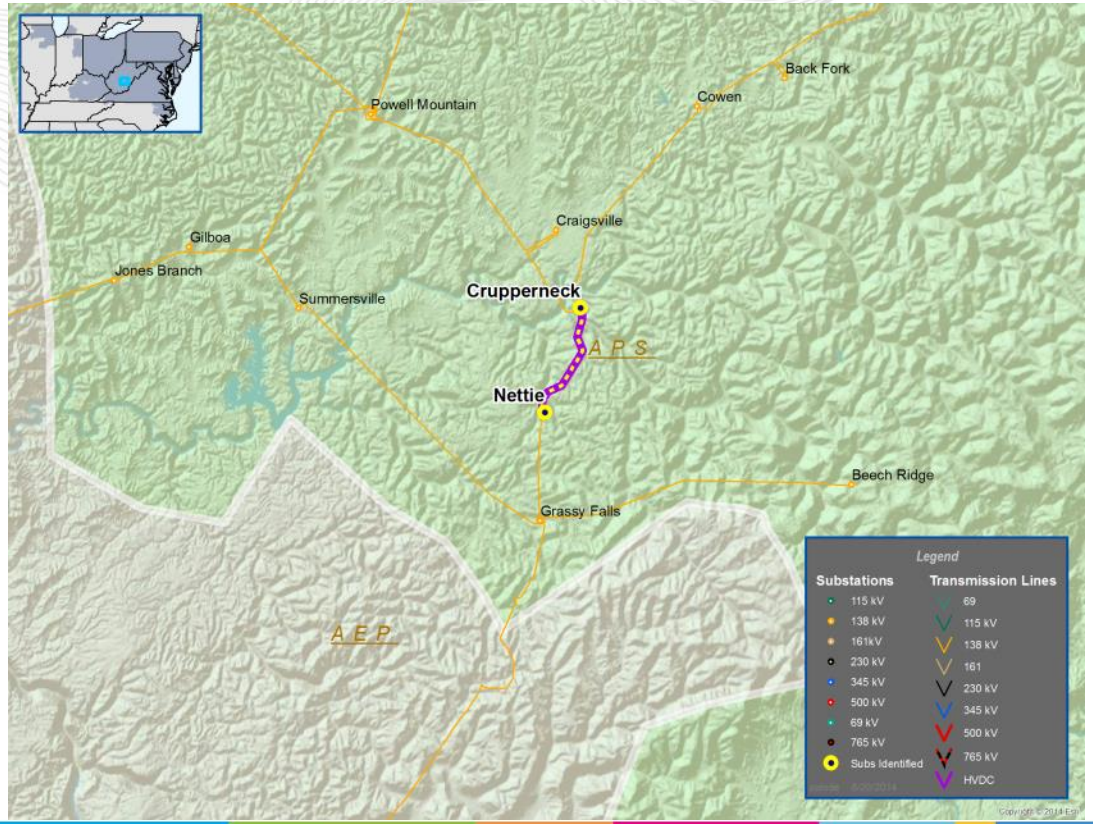
AEP Transmission Zone

- Generation Deliverability Violation.
- The Kyger Creek to Sporn 345 kV circuit #2 is overloaded for multiple single contingencies.



APS Transmission Zone

- Common Mode Outage Violation.
- The Nettie – Crupperneck 138 kV circuit is overloaded for line fault stuck breaker contingency loss of the Gilboa – Powell Mt. – Summersville 138 kV circuit and Gilboa 138/23 kV transformer.



ATSI Transmission Zone

- Common Mode Outage Violation.
- The Avon 345/138 kV transformer #92 is overloaded for line fault stuck breaker contingency loss of Avon – Juniper 345 kV circuit and Avon 345/138 kV transformer #91.

ATSI Transmission Zone

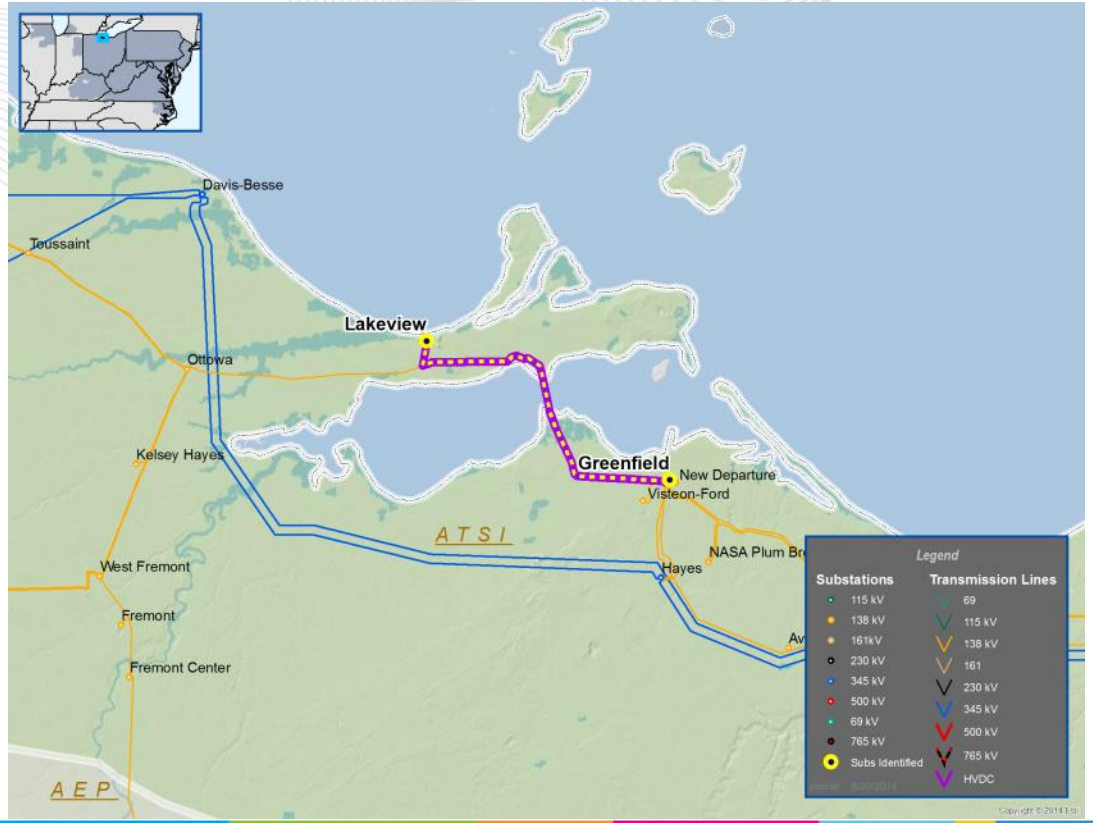
- Common Mode Outage Violation.
- The Beaver – Lake Ave. 345 kV circuit #2 is overloaded for line fault stuck breaker contingency loss of Beaver – Carlisle and Beaver – Lake Ave. #1 345 kV circuits.
- Update: 6/24/2014 – the correct rating is applied this is no longer an issue

ATSI Transmission Zone

- Baseline and Common Mode Outage Violation.
- The Black River to Lorain 138 kV circuit is overloaded for multiple category C contingencies.

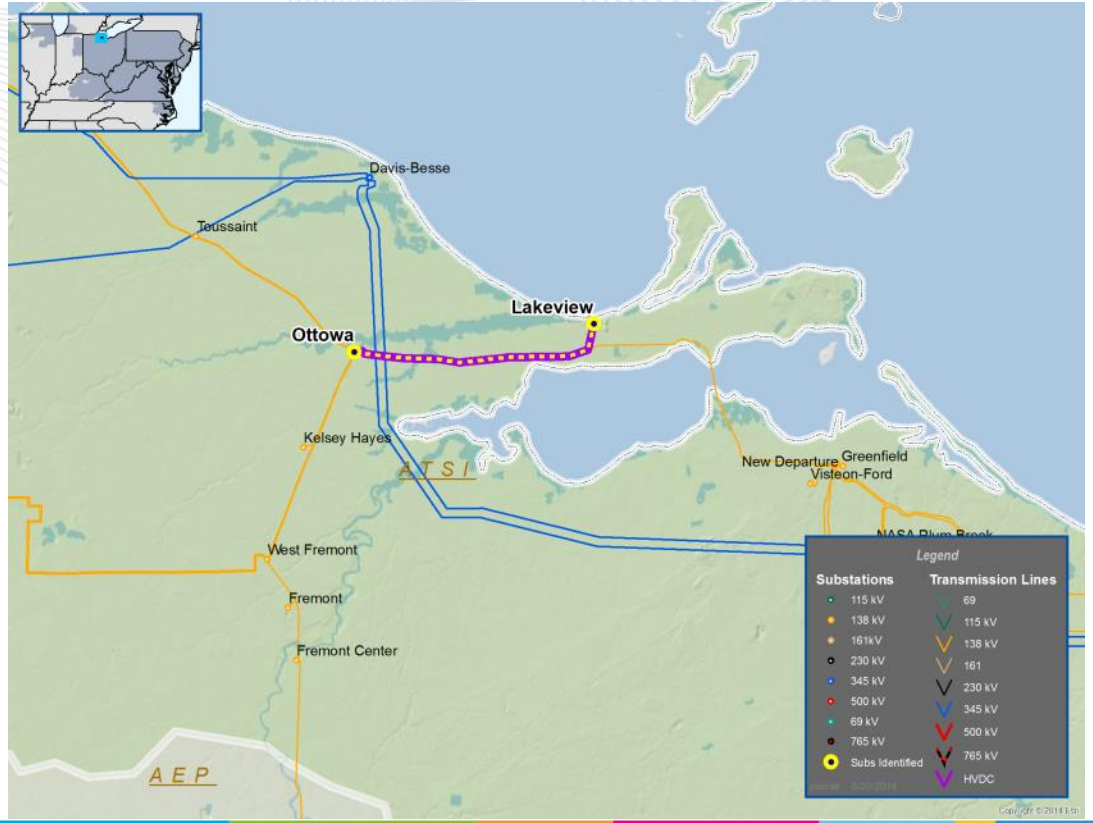
ATSI Transmission Zone

- Common Mode Outage Violation.
- The Lakeview – Greenfield 138 kV circuit is overloaded for tower contingency loss of the Dave Besse – Hayes and Dave Besse – Beaver 345 kV circuits.



ATSI Transmission Zone

- Common Mode Outage Violation.
- The Ottowa - Lakeview 138 kV circuit is overloaded for tower contingency loss of the Dave Besse – Hayes and Dave Besse – Beaver 345 kV circuits.

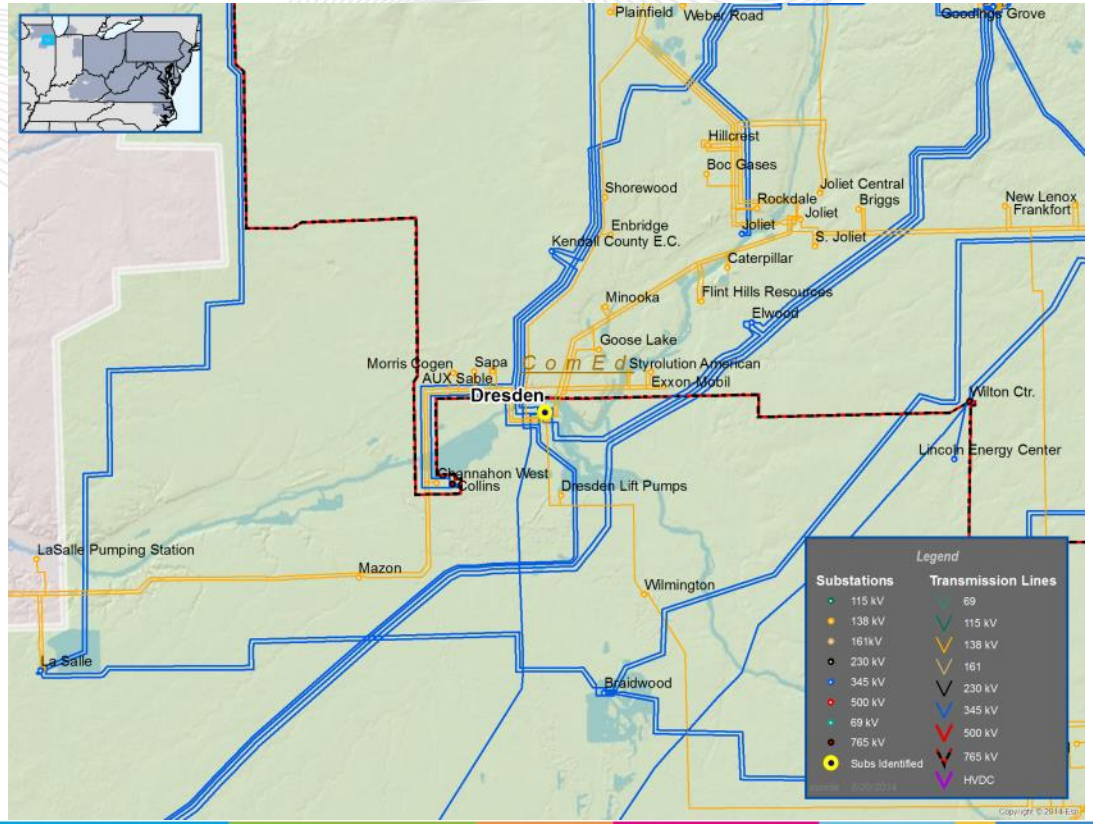


ATSI Transmission Zone

- Common Mode Outage Violation.
- The Richland to Naomi 138 kV circuit is overloaded for bus contingency loss of the Richland 138 kV bus section.

ComEd Transmission Zone

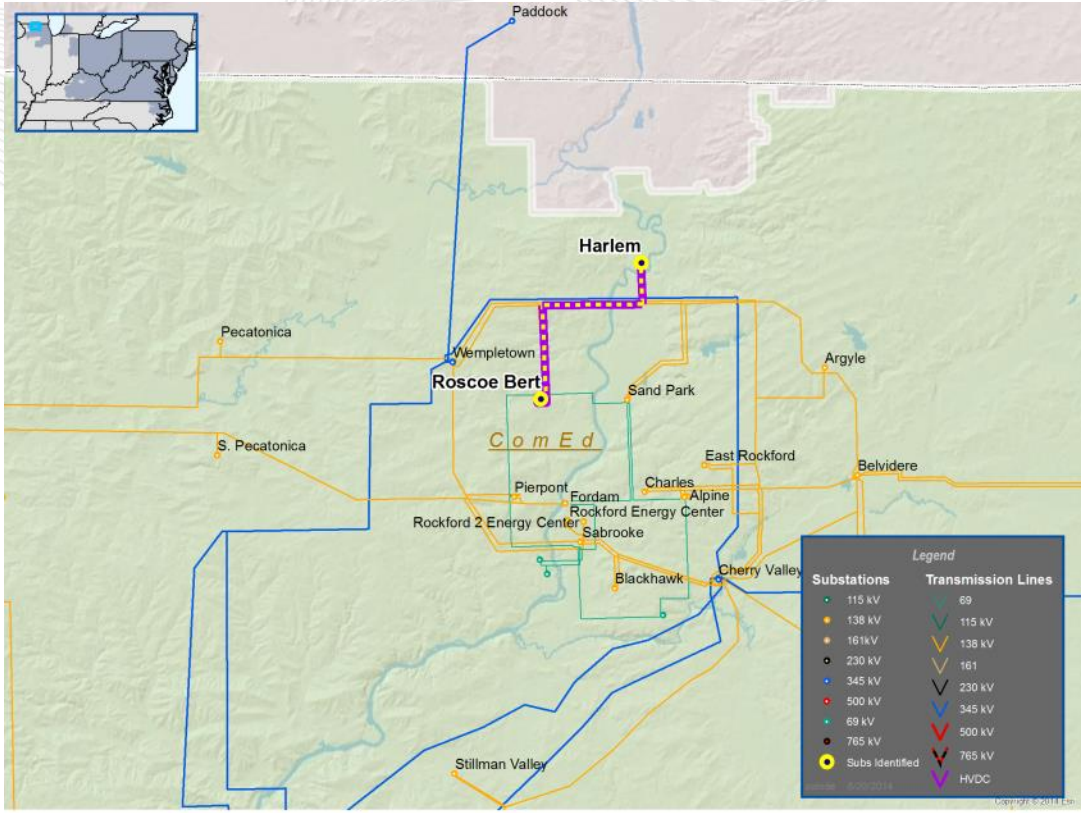
- Common Mode Outage Violation.
- The Dresden 345/138 kV transformer 83 is overloaded for line fault stuck breaker contingency loss of Dresden – Elwood 345 kV circuit and Elwood bus tie.



ComEd Transmission Zone

- Baseline, Generation Deliverability and N-1-1 Violation.

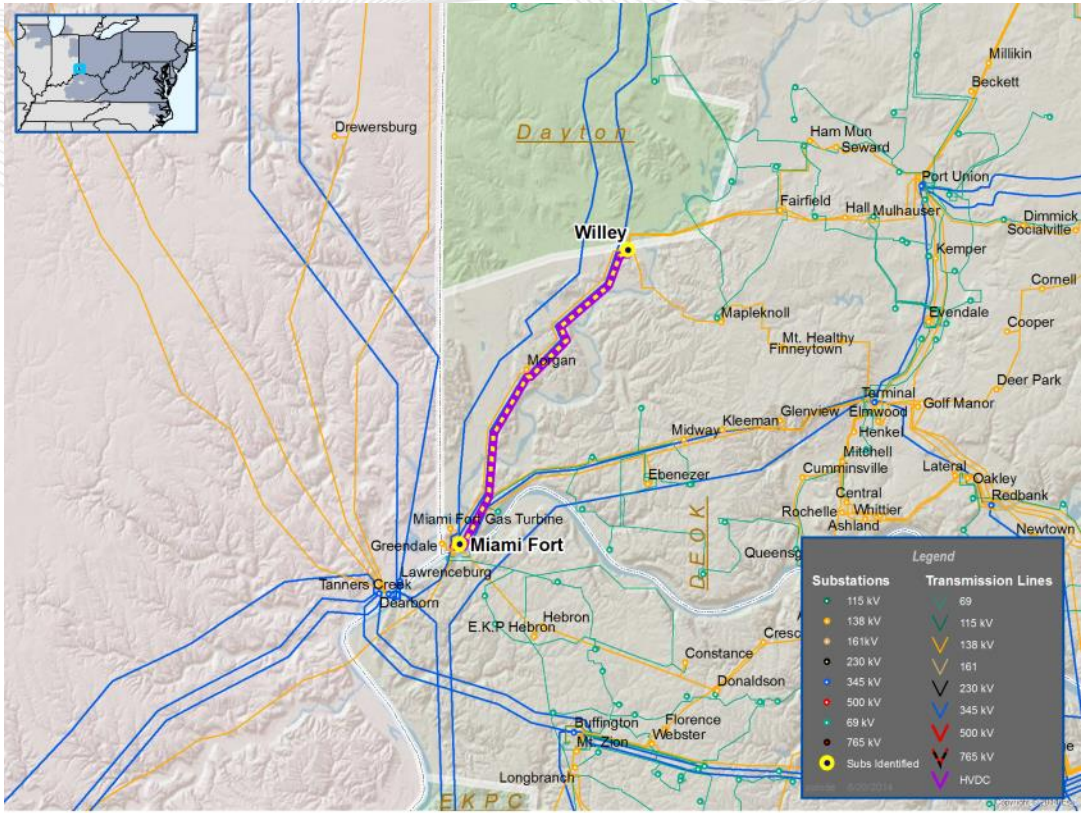
- The Harlem to Roscoe Bert 138kV Blue line is overloaded for single contingency loss of the Cherry Valley – Belvidere 138 kV circuit and for multiple contingency pairs.



DEOK Transmission Zone

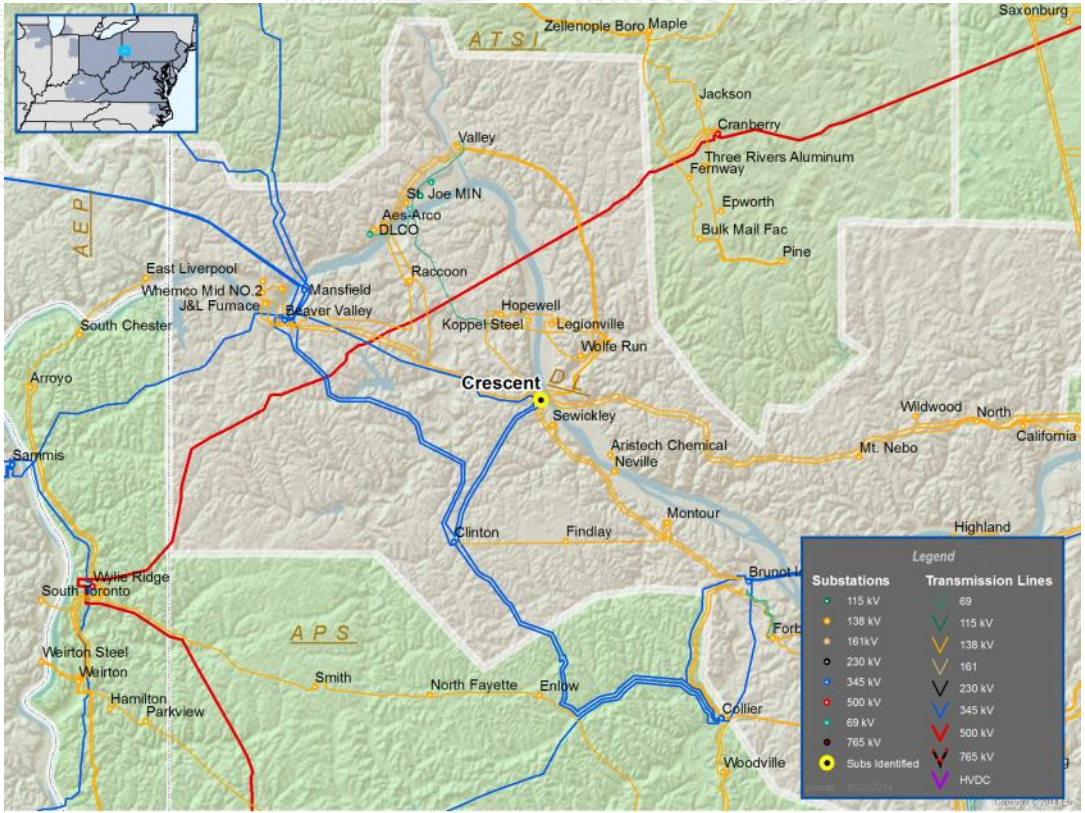
- Baseline and Common Mode Outage Violation.

- The Miami Fort to Willey 138 kV circuit is overloaded for line fault stuck breaker contingency loss of the Miami Fort – Clifty Creek, Miami Fort – Hebron Tap, Miami Fort – Midway, Miami Fort – Morgan 138 kV circuits and one of the Miami Fort 345/138 kV transformer.



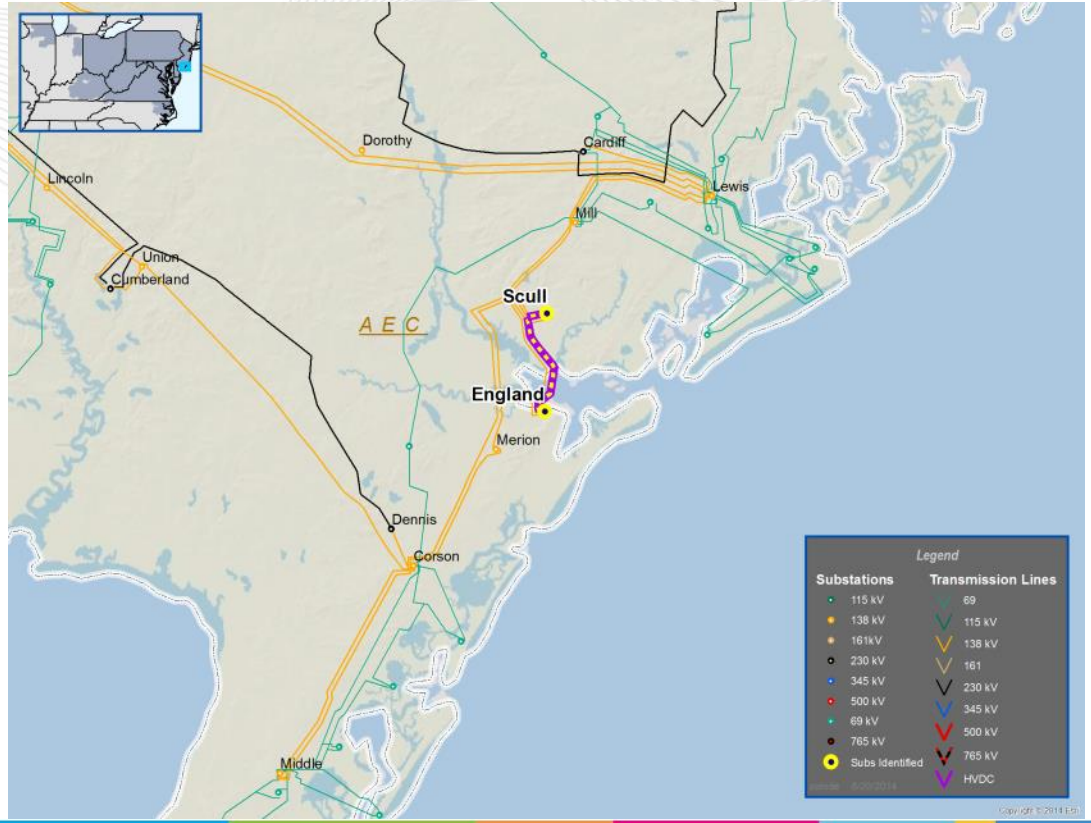
DLCO Transmission Zone

- Baseline and Common Mode Outage Violation.
- The Crescent 345/138 kV transformers #1 and #2 are overloaded for multiple category C contingencies.



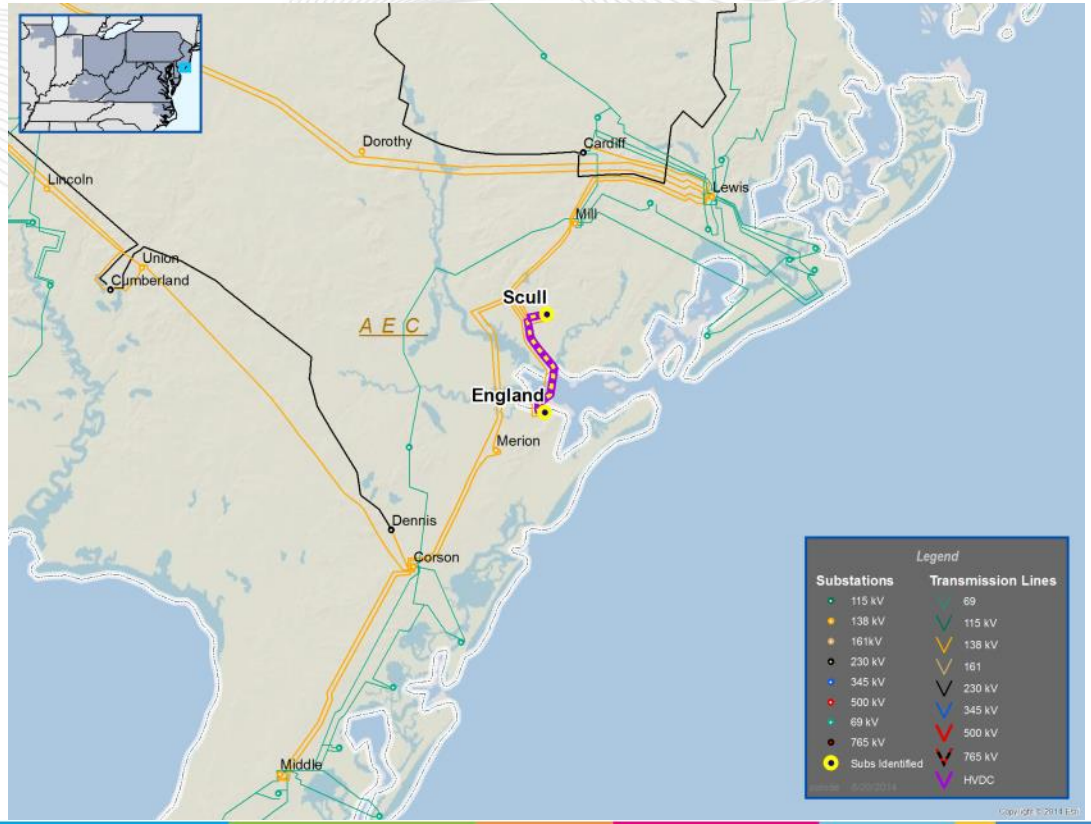
AE Transmission Zone

- Generation Deliverability and Common Mode Outage Violation.
- The BL England to Scull 138 kV circuit #1 is overloaded for multiple contingencies.



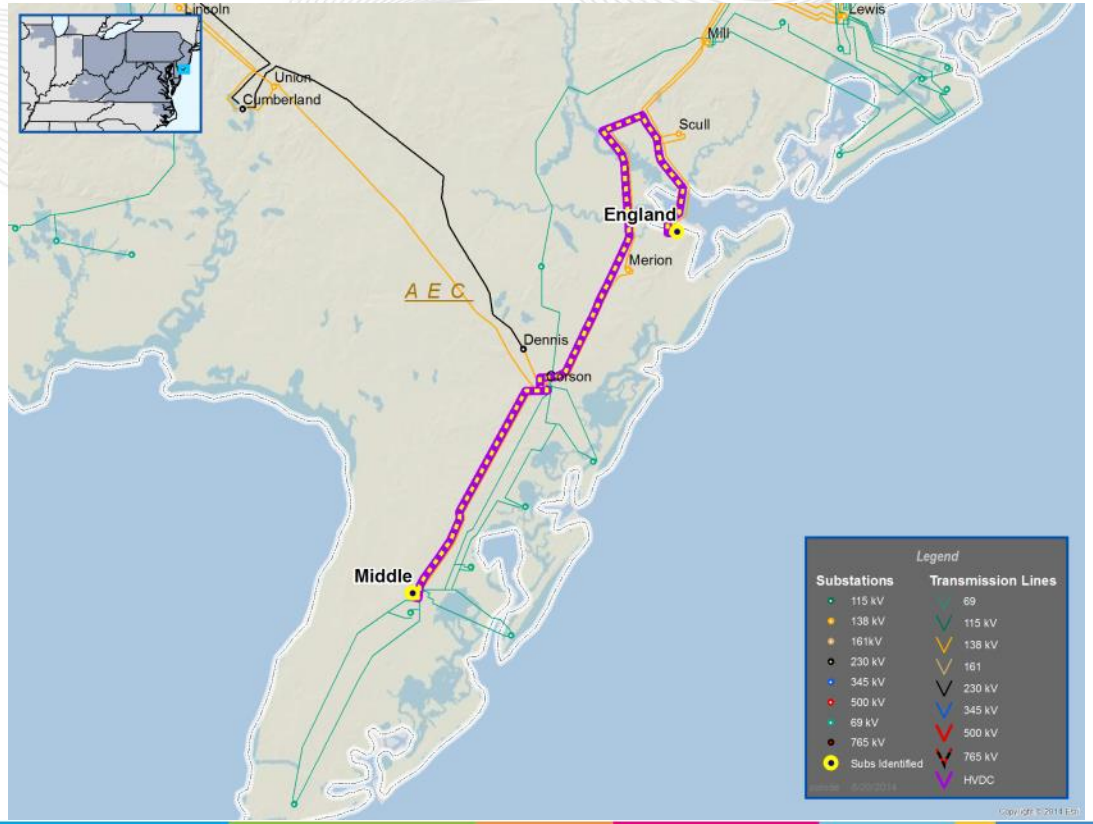
AE Transmission Zone

- Generation Deliverability and Common Mode Outage Violation.
- The BL England to Scull 138 kV circuit #2 is overloaded for multiple contingencies.



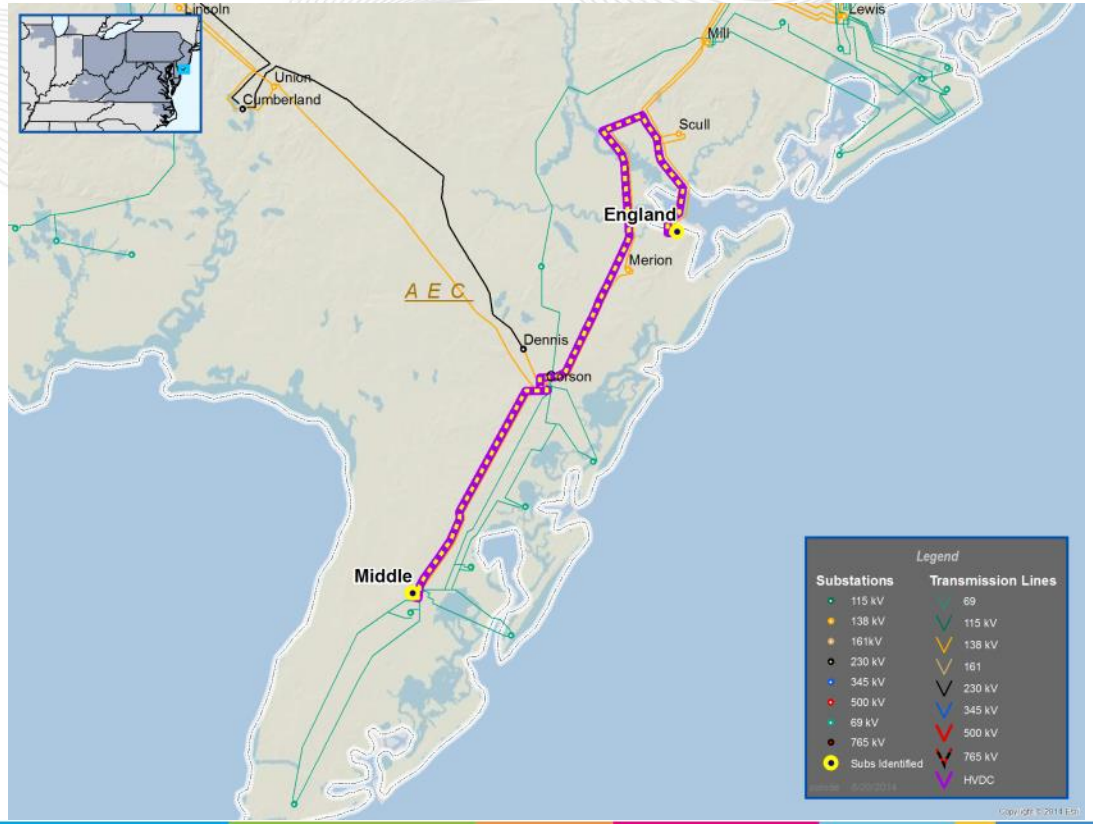
AE Transmission Zone

- Common Mode Outage Violation.
- The BL England to Middle Tap 138 kV circuit is overloaded for tower contingency loss of the BL England – Scull – Mill 138 kV circuits #1 & #2.



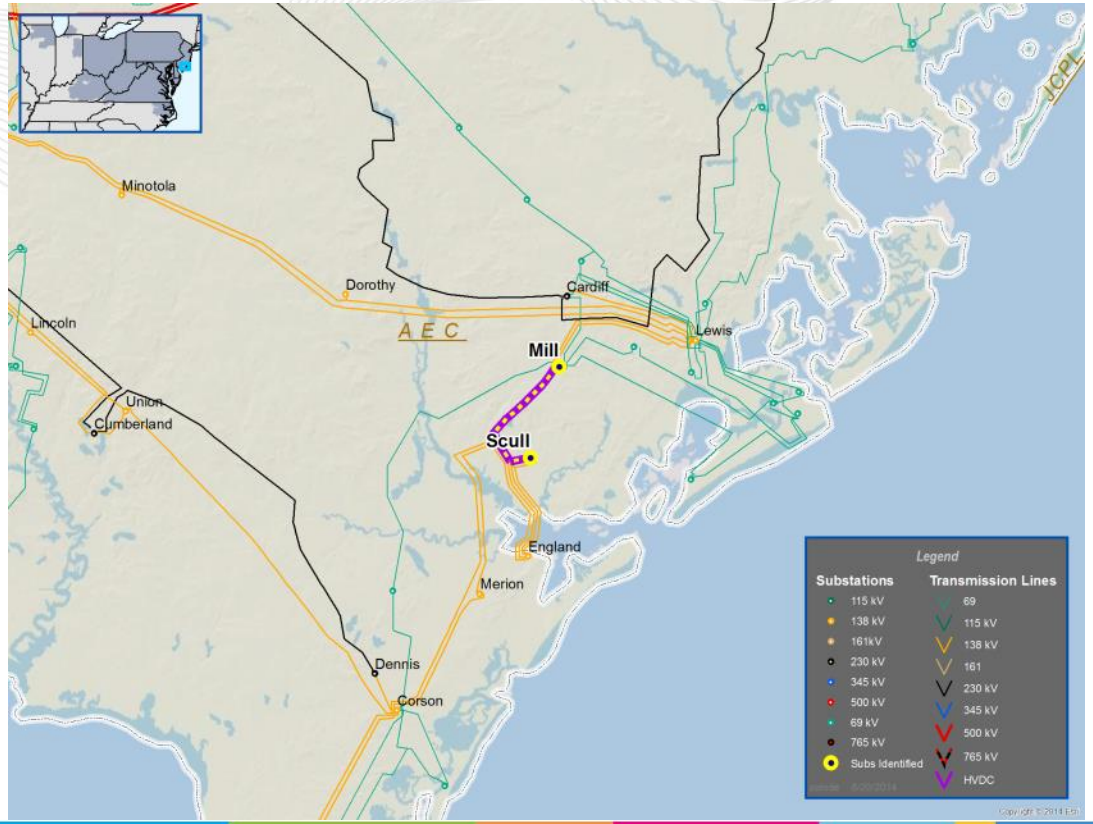
AE Transmission Zone

- Generation Deliverability and Common Mode Outage Violation.
- The Scull to Mill 138 kV circuit #1 is overloaded for multiple contingencies.



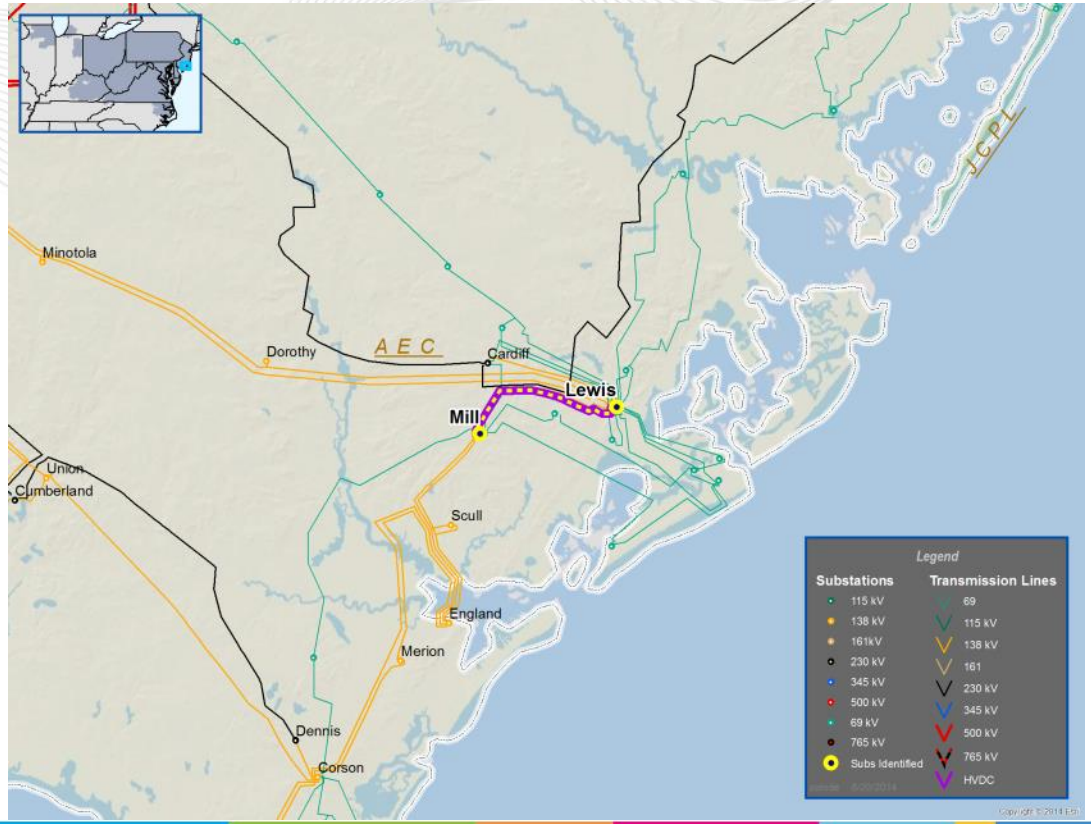
AE Transmission Zone

- Generation Deliverability and Common Mode Outage Violation.
- The Scull to Mill 138 kV circuit #2 is overloaded for multiple contingencies.



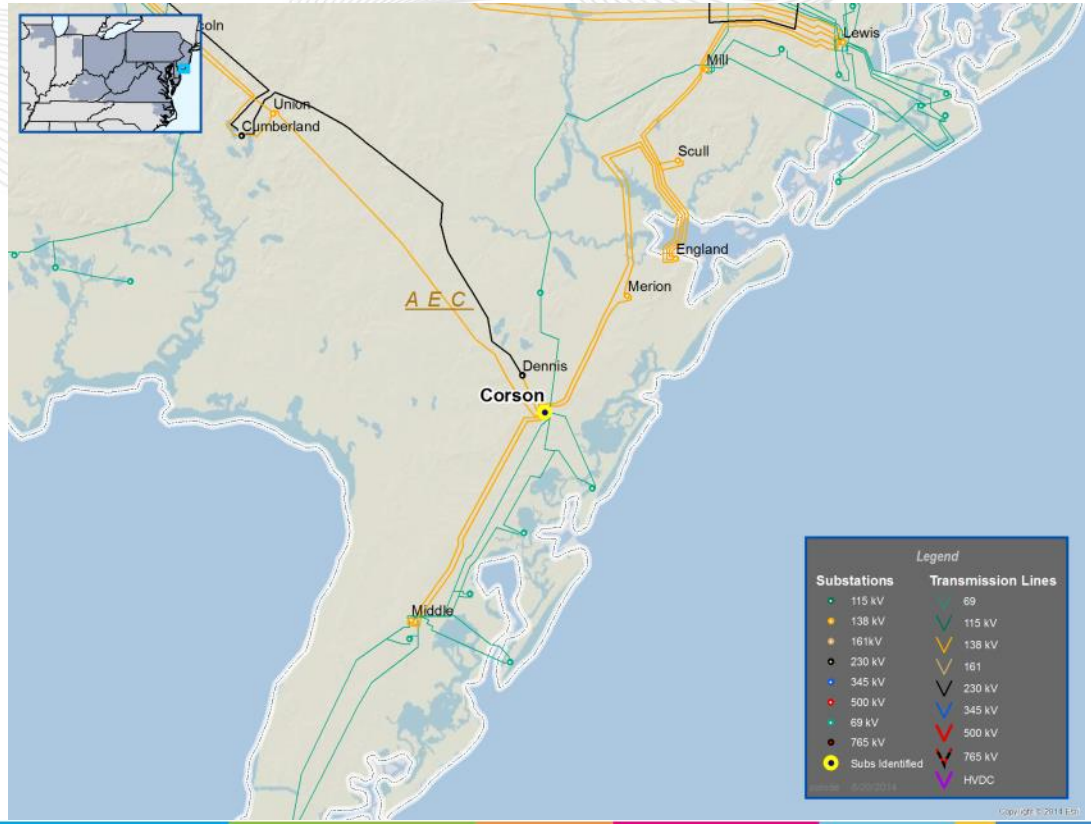
AE Transmission Zone

- Generation Deliverability and Common Mode Outage Violation.
- The Mill - Lewis 138 kV circuit #1 is overloaded for multiple contingencies.



AE Transmission Zone

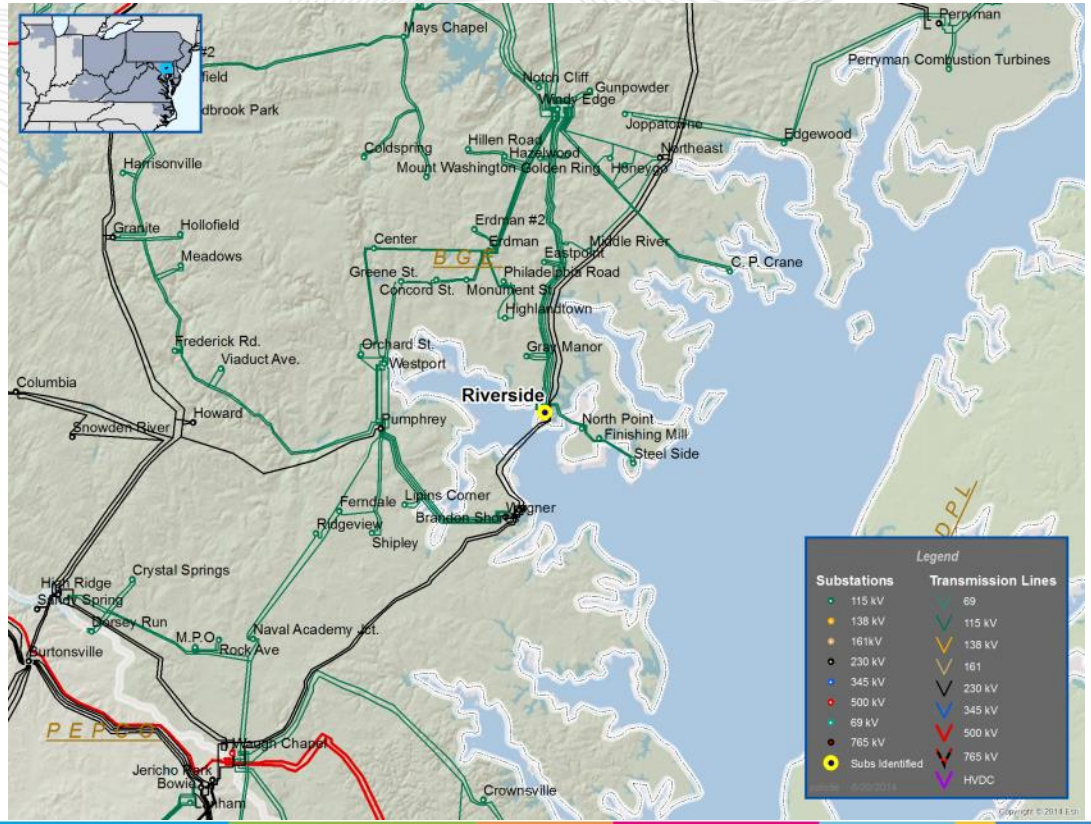
- Common Mode Outage Violation.
- The Corson 138/69 kV transformer #1 is overloaded for line stuck breaker contingency loss of the BL England – Middle Tap – Corson and Corson – Dennis 138 kV circuits, plus Corson 138/69 kV transformer #2.



BGE Transmission Zone

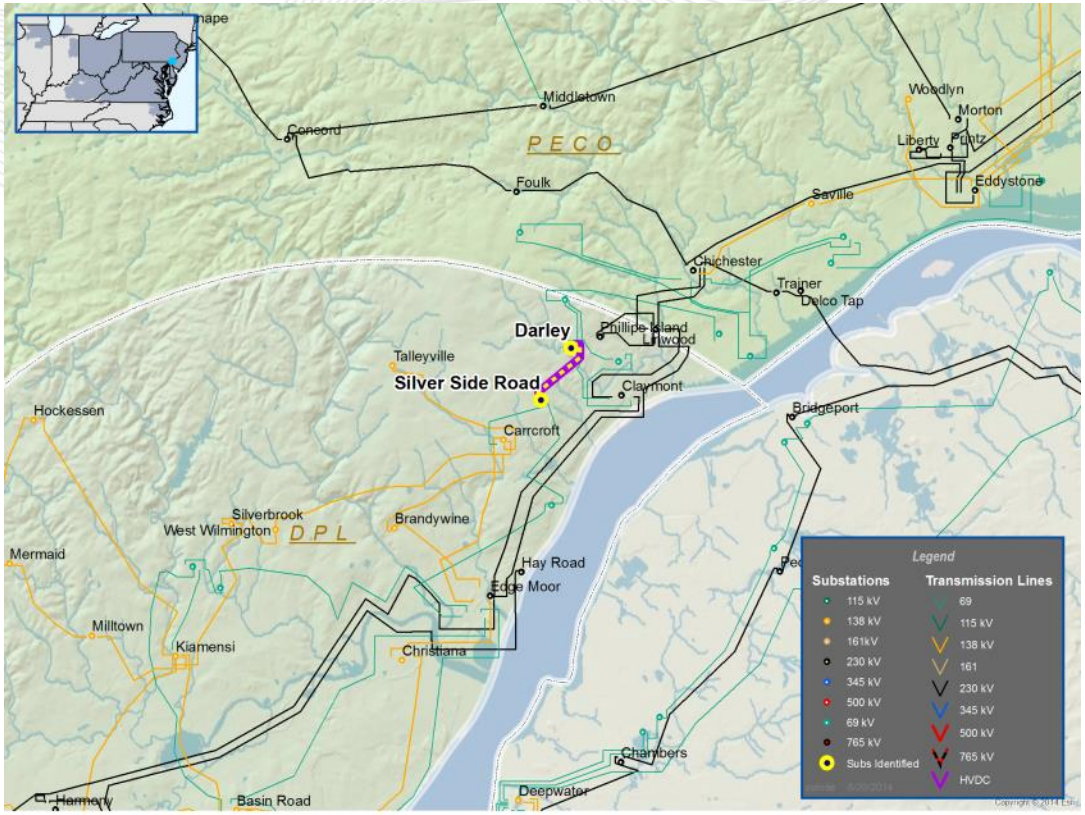
- Baseline and Common Mode Outage Violation.

- The Riverside 115 kV bus section is overloaded for line fault stuck breaker contingency loss of the Brandon Shores to Riverside 230 kV circuit ‘2344’, Riverside 230/115 kV transformer #1 and Brandon Shores 230/115 kV transformer #2.



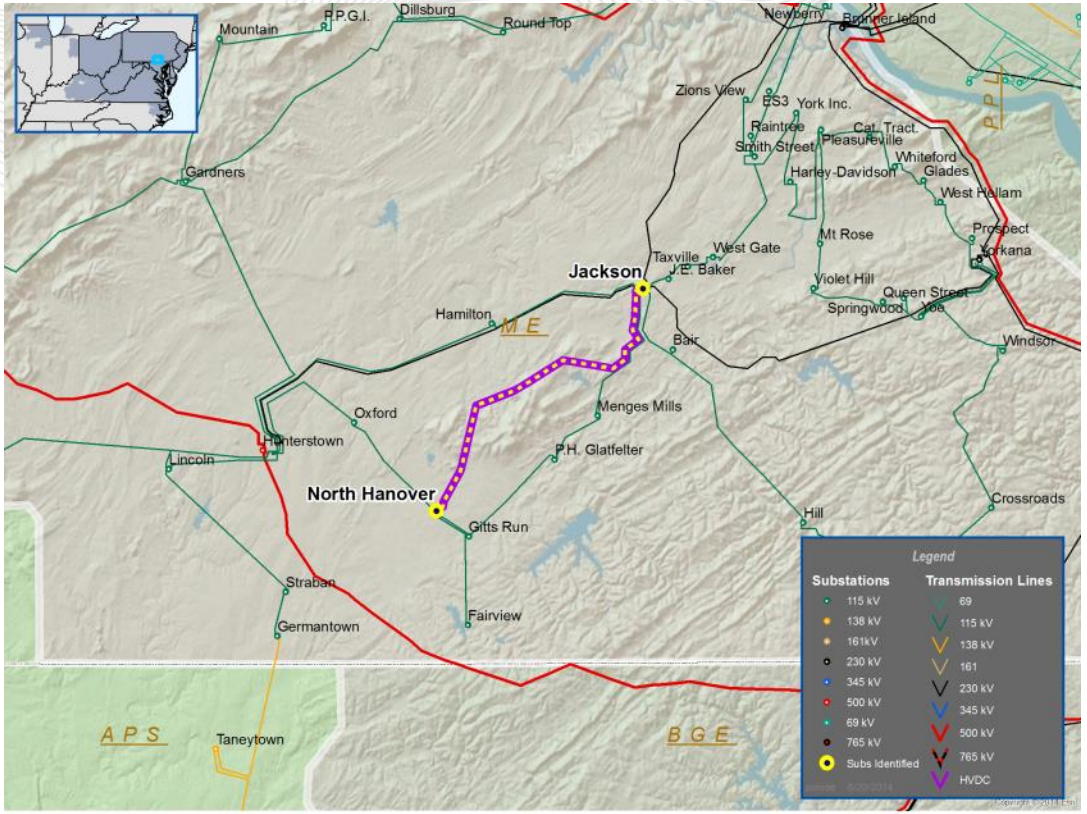
DPL Transmission Zone

- Common Mode Outage Violation.
- The Silver Side Road to Darley 69 kV circuit is overloaded for tower contingency loss of the Edgemore – Clay and Edgemore – Linwood 230 kV circuits .



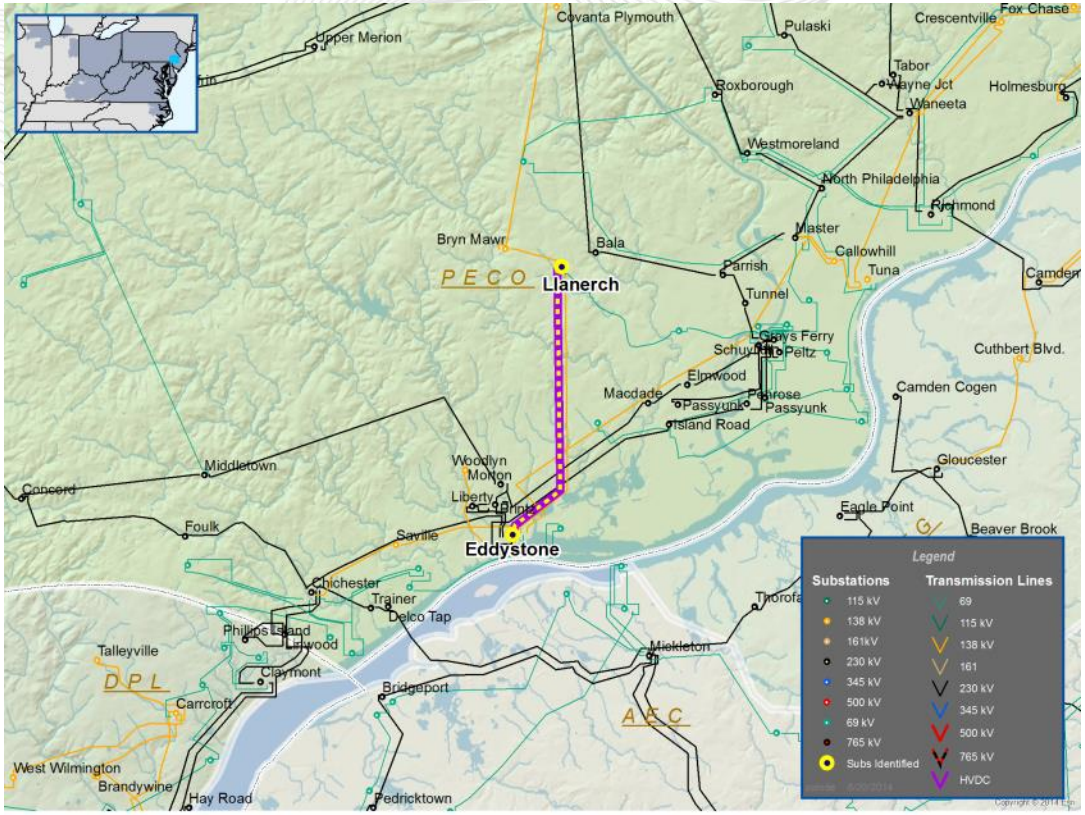
MetEd Transmission Zone

- N-1-1 Violation.
- The Jackson to North Hanover 115 kV circuit is overloaded for multiple N-1-1 contingencies.



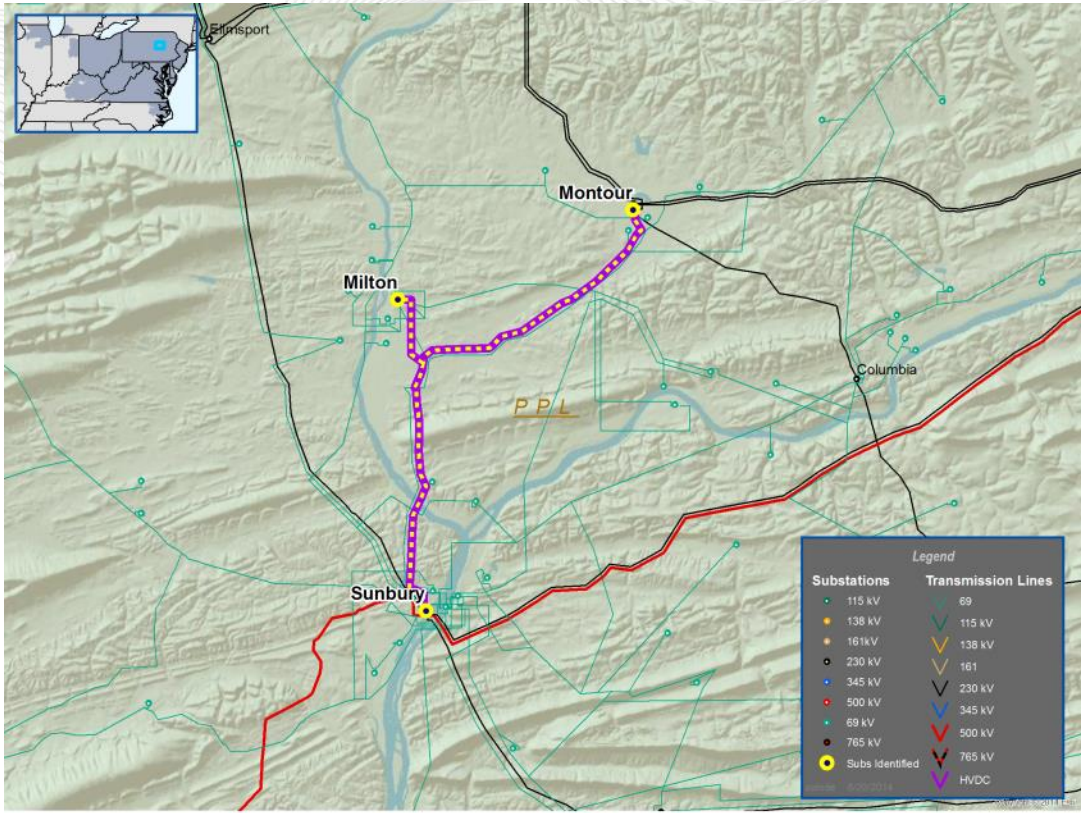
PECO Transmission Zone

- N-1-1 Violation.
- The Eddystone to Llanerch 138 kV circuit ‘130-45’ is overloaded for N-1-1 contingency loss of Plymouth – Brynmawr 230 kV and Eddystone to Llanerch 138 kV ‘130-42’ circuits.



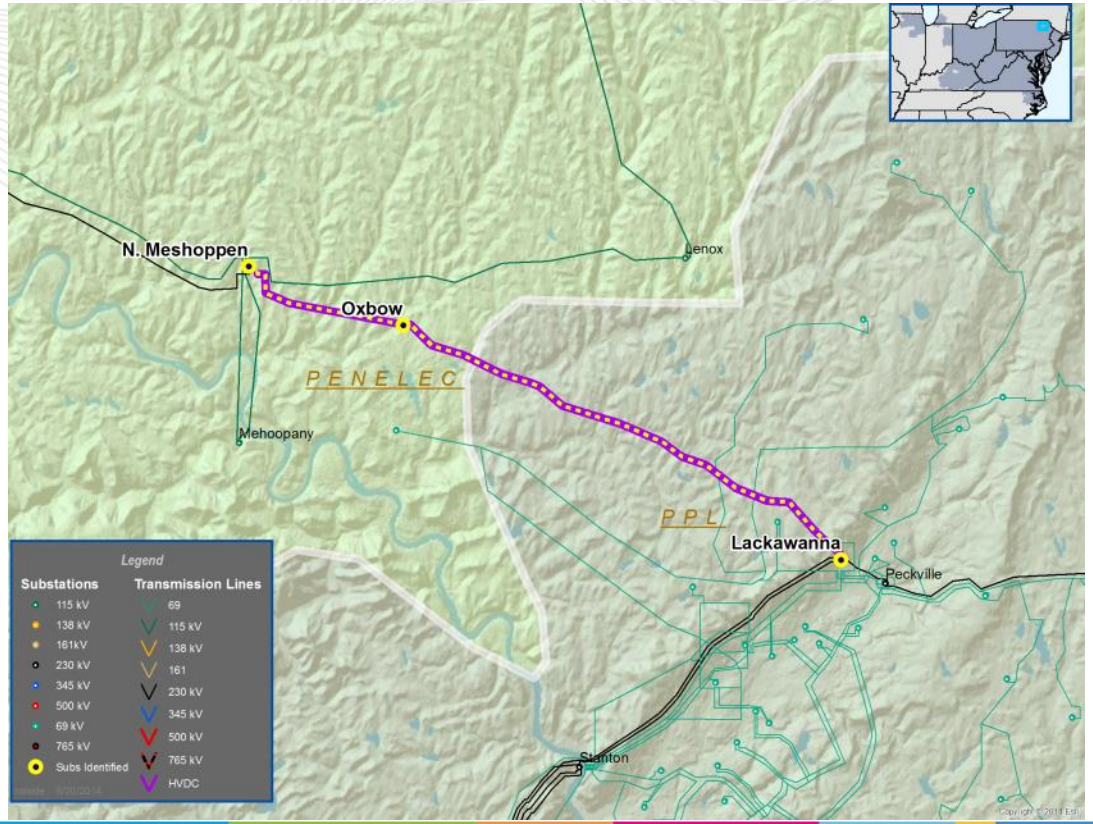
PPL Transmission Zone

- Common Mode Outage Violation.
- The Montour – Milton – Sunbury 230 kV circuit is overloaded for tower contingency loss of Montour – Susquehanna 230 kV circuits.



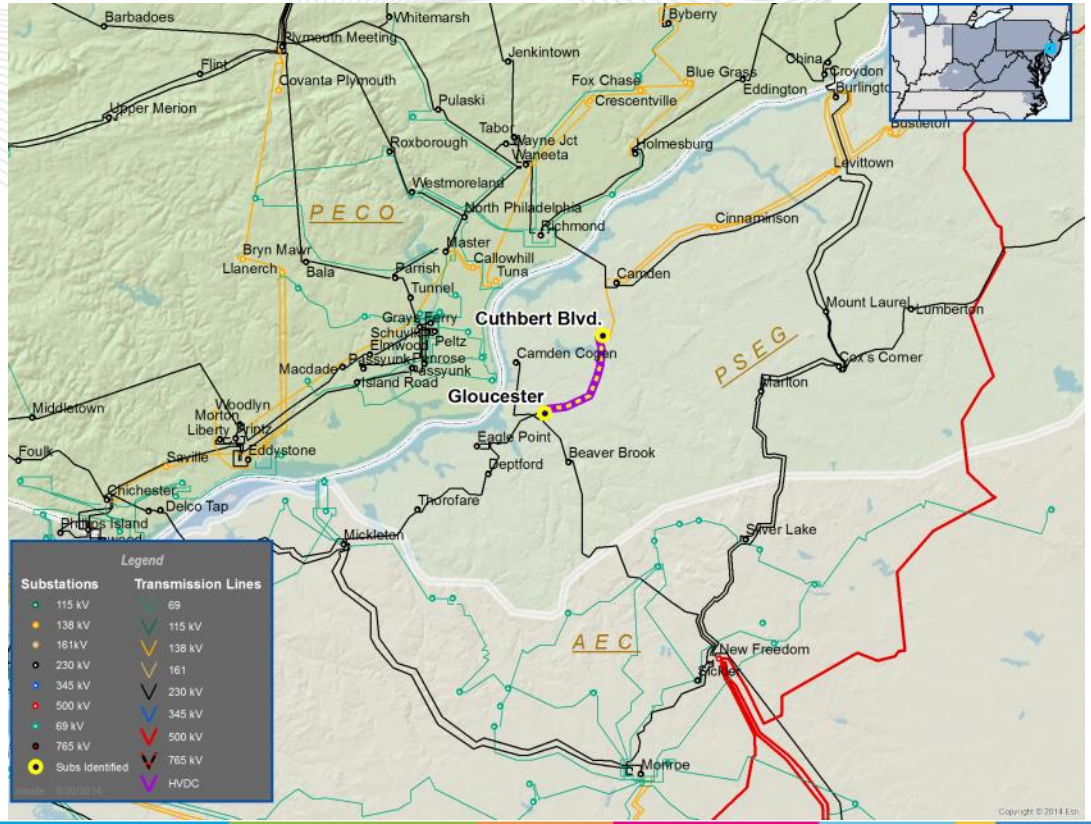
PPL/PenElecTransmission Zone

- Common Mode Outage Violation.
- The North Meshoppen – Oxbow - Lackawanna 230 kV circuit is overloaded for line fault stuck breaker contingency loss of Susquehanna generator # 1 and Susquehanna – Mountain 230 kV circuit.



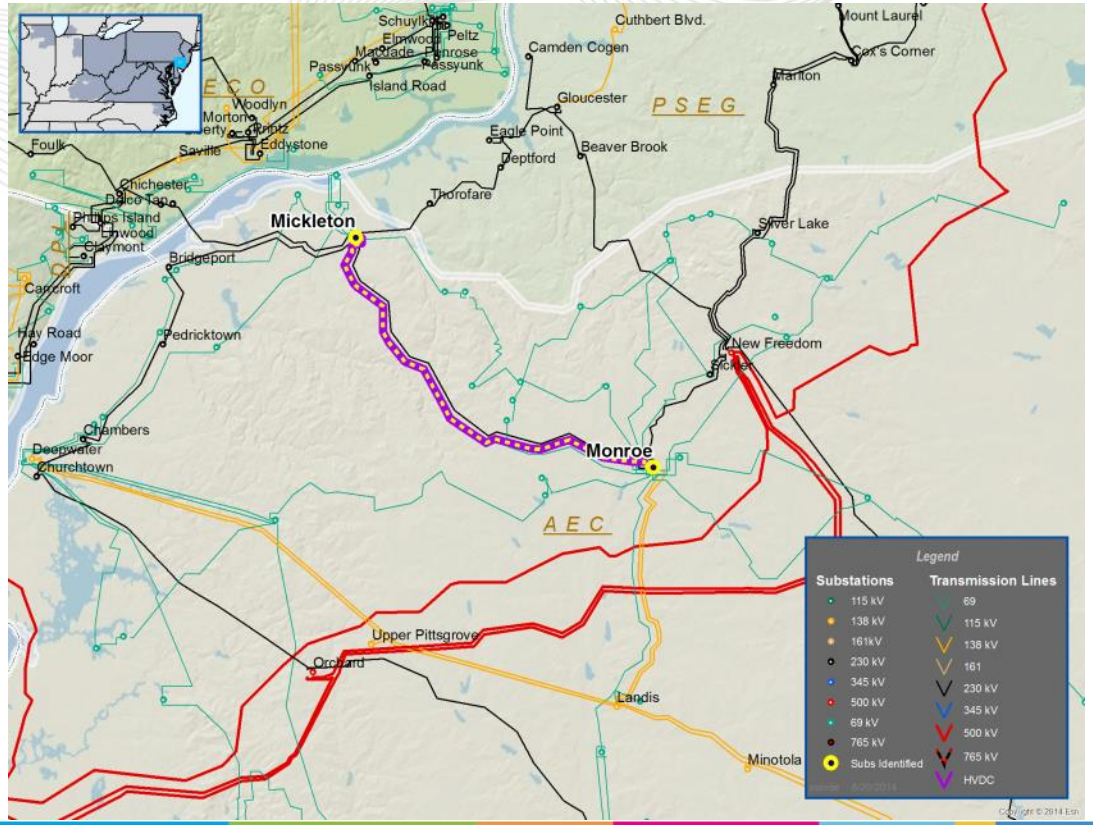
PSEG Transmission Zone

- Common Mode Outage Violation.
- The Gloucester – Cuthbert 230 kV circuit # 2 is overloaded for line fault stuck breaker contingency loss of the Gloucester – Cuthbert 230 kV circuit # 1 and one of the Gloucester 230/69 kV transformers.



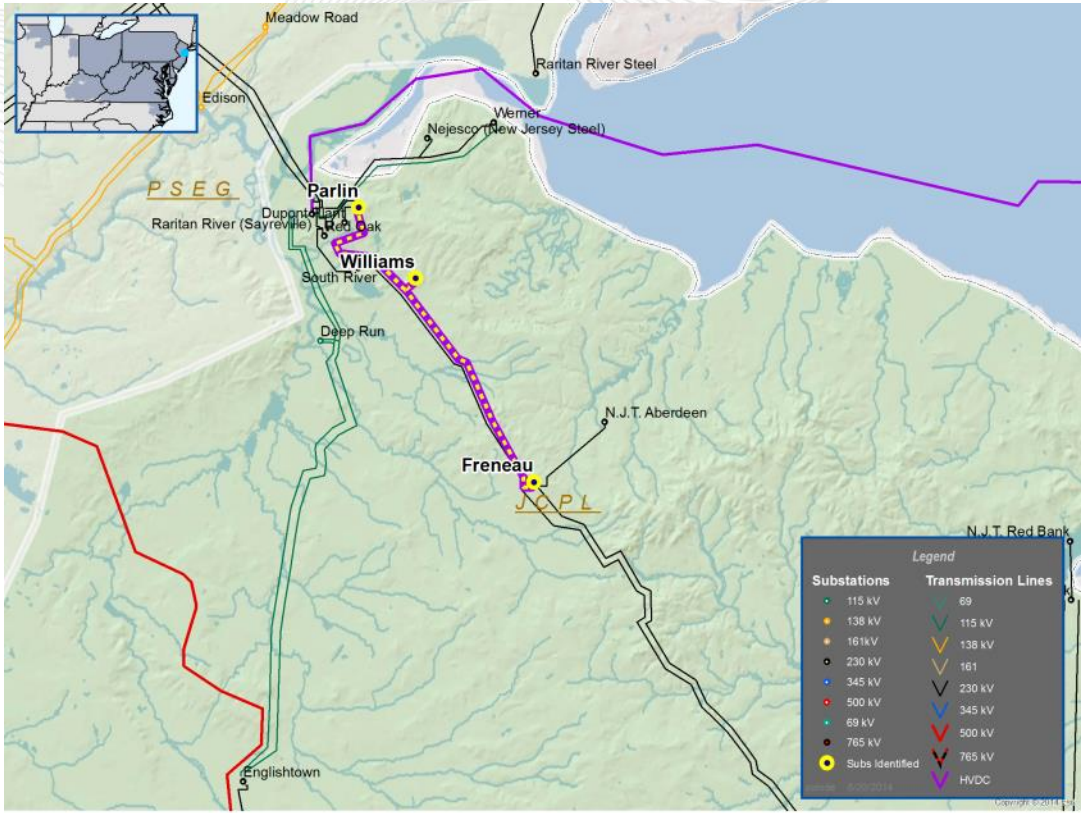
AE Transmission Zone

- Common Mode Outage Violation.
- The Mickleton – Monroe 230 kV circuit #1 & #2 are overloaded for tower contingency loss of the Gloucester – Eagle Point and Gloucester – Deptford 230 kV circuits.



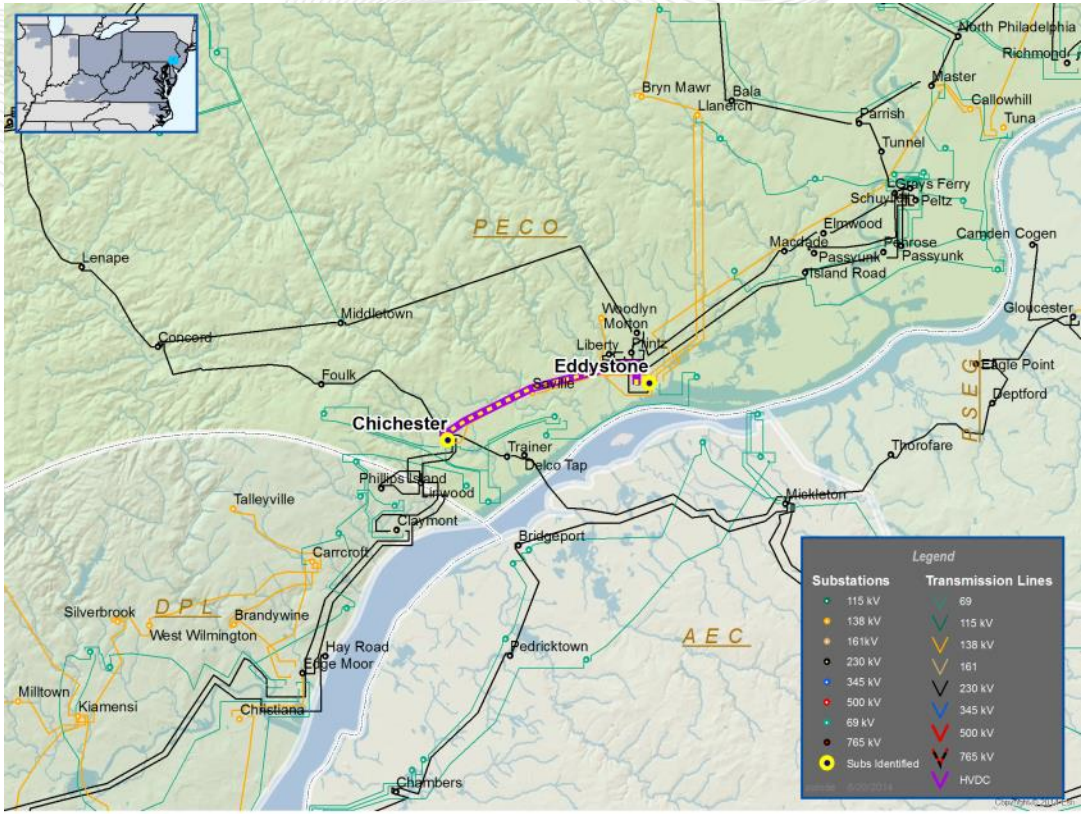
JCPL Transmission Zone

- Common Mode Outage Violation.
- The Parlin – Williams – Freneau 230 kV circuit is overloaded for multiple tower and breaker contingencies.



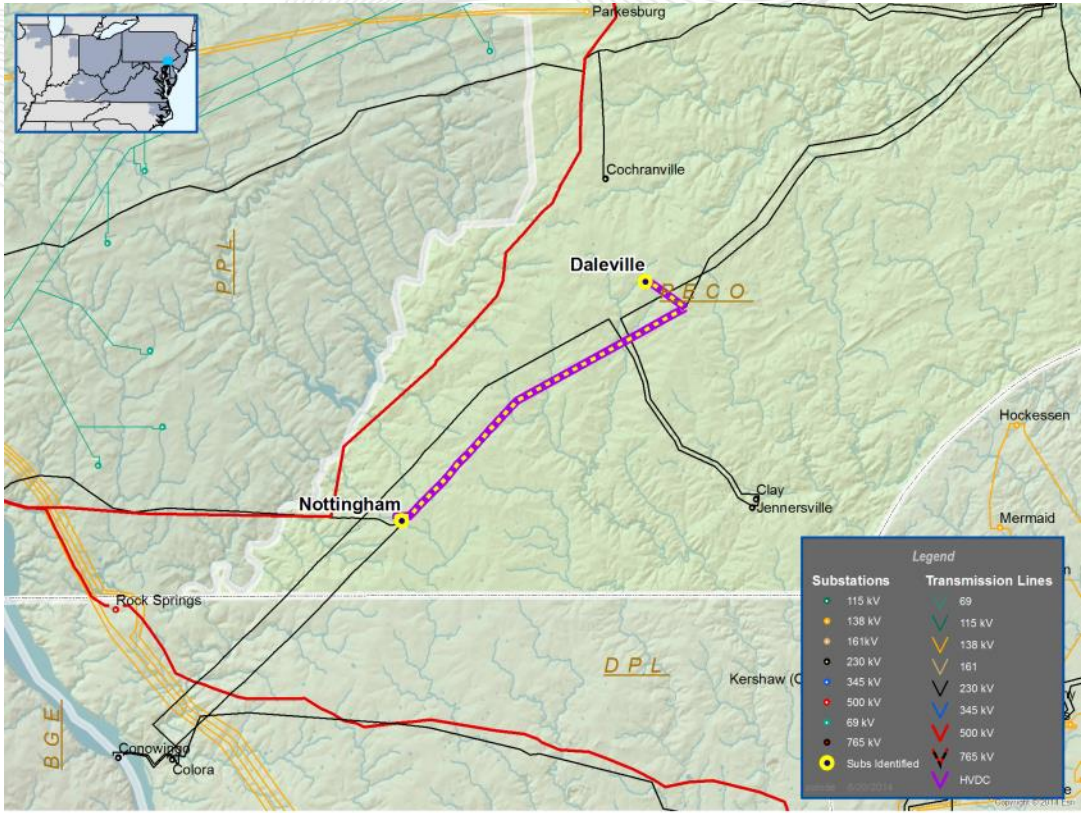
PECO Transmission Zone

- Generation Deliverability Violation.
- The Chichester – Eddystone 230 kV circuit is overloaded for multiple single contingencies.



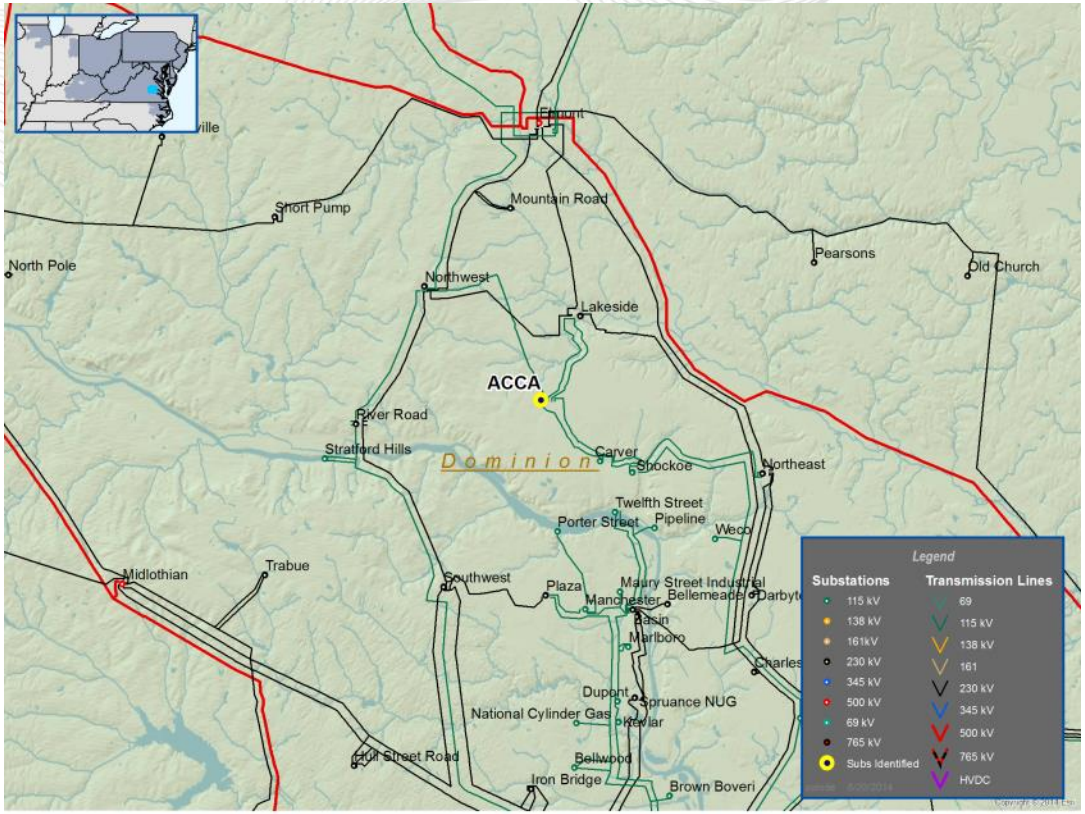
PECO Transmission Zone

- Generation Deliverability Violation.
- The Nottingham – Daleville 230 kV circuit is overloaded for single contingency loss of Colora – Conowingo 230 kV circuit.



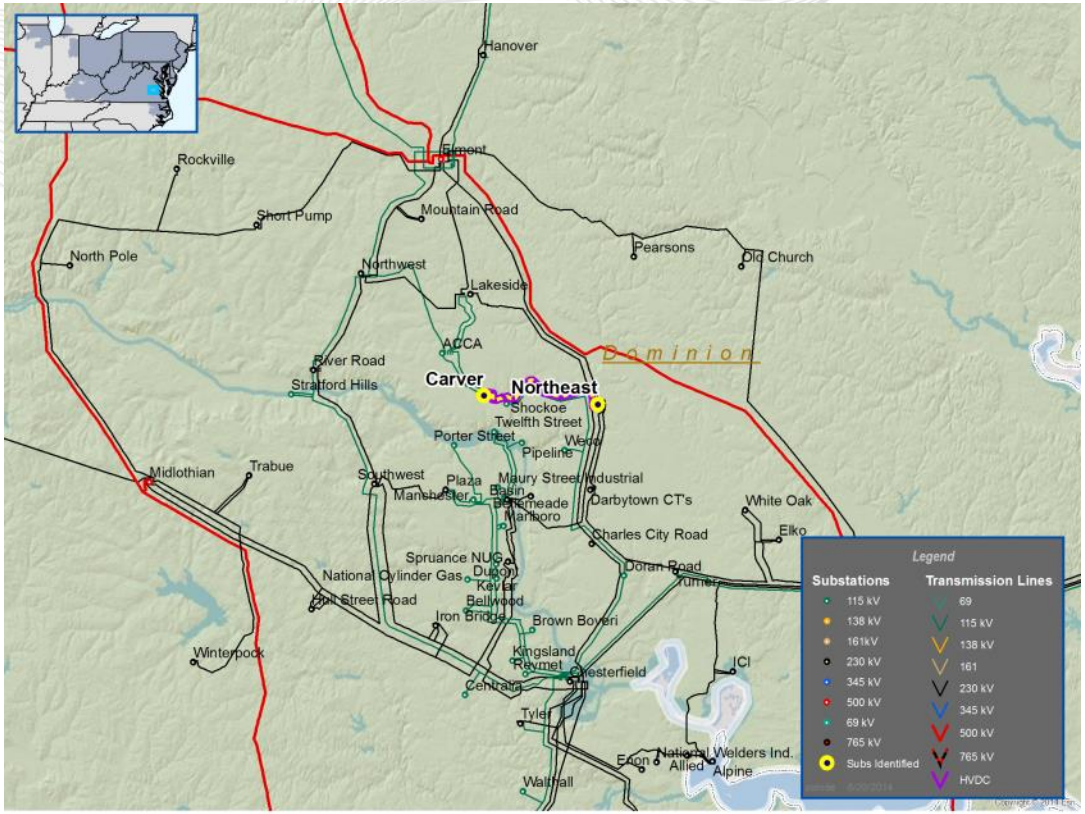
Dominion Transmission Zone

- Baseline and Generation Deliverability Violation.
- The ACCA to Shockoe 115 kV circuit is overloaded for single contingency loss of Northeast – Shockoe 115 kV circuit.



Dominion Transmission Zone

- Baseline and Generation Deliverability Violation.
- The Northeast to Carver 115 kV circuit is overloaded for single contingency loss of Northeast – Shockoe 115 kV circuit.



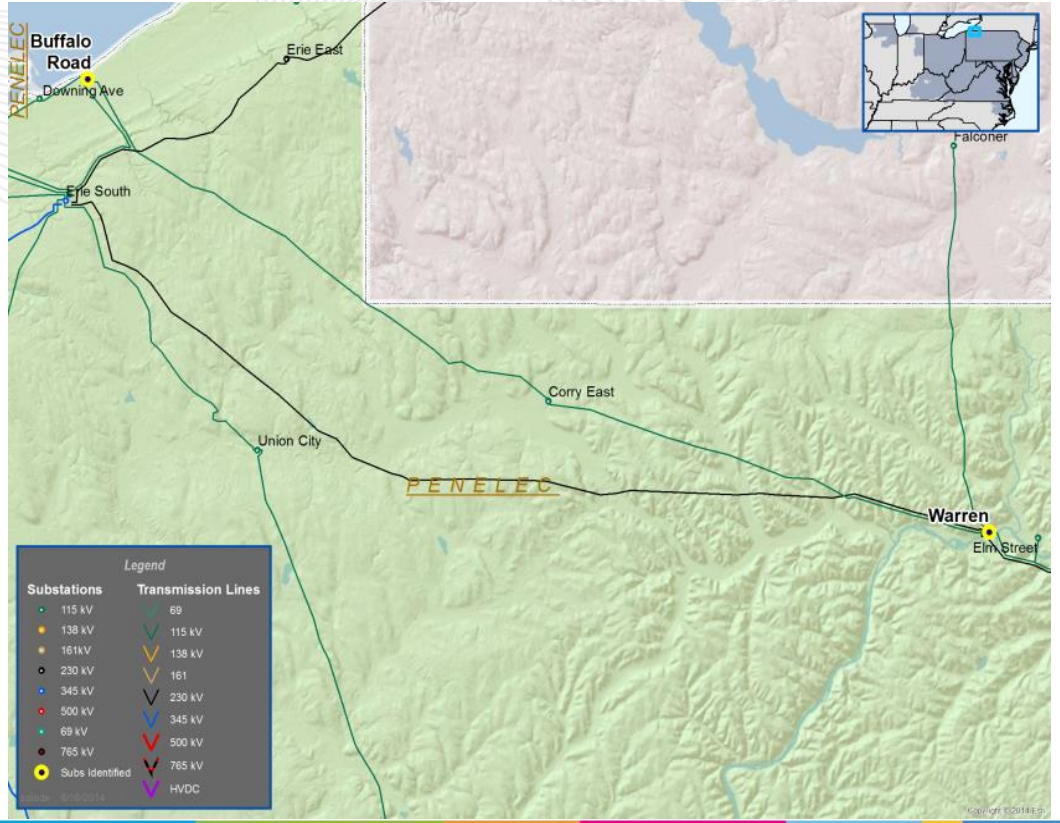
Reliability Analysis Update

PenElec Transmission Zone

- FE Planning Criteria Violation and Operational Performance:
- Voltage violation in the North Western Pennsylvania (Warren/Buffalo Road) vicinity for multiple contingencies.
- Proposed Solution:
  - Construct Warren 230 kV ring bus and install a second Warren 230/115 kV transformer (B2494).
- Estimated Project Cost:

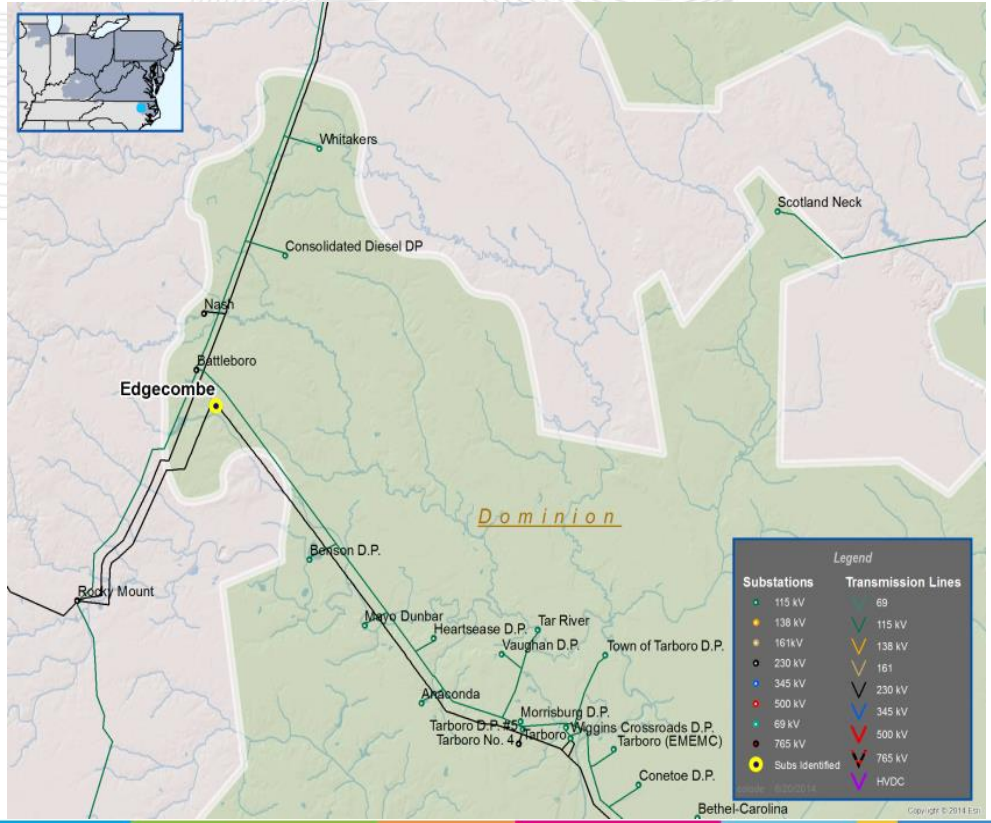
  $ 15 M
- Required IS Date:

  6/1/2016



Dominion Transmission Zone

- B1794 Cost and Scope Change:
- Previous Scope:
  - Split 230 kV Line #2056 (Hornertown - Rocky Mount) and double tap the line to Battleboro Substation. Expand station, install a 230 kV 3 breaker ring bus and install a 230/115 kV transformer.
- New Scope:
  - Build a new substation near the Edgecombe NUG to be called Morning Star Substation with a 230-115kV Tx, 4-230kV breakers in a breaker and half scheme, 3-115kV breakers in a ring. Re-configure Lines 80 (Battleboro – Anaconda), 229 (Edgecombe – Tarboro) and 2058 to terminate into Morning Star Substation.
- Estimated Project Cost:
  Previous → $ 8 M
  New → $ 14.5 M
- Expected IS Date:
  5/30/2016



AEP Transmission Zone

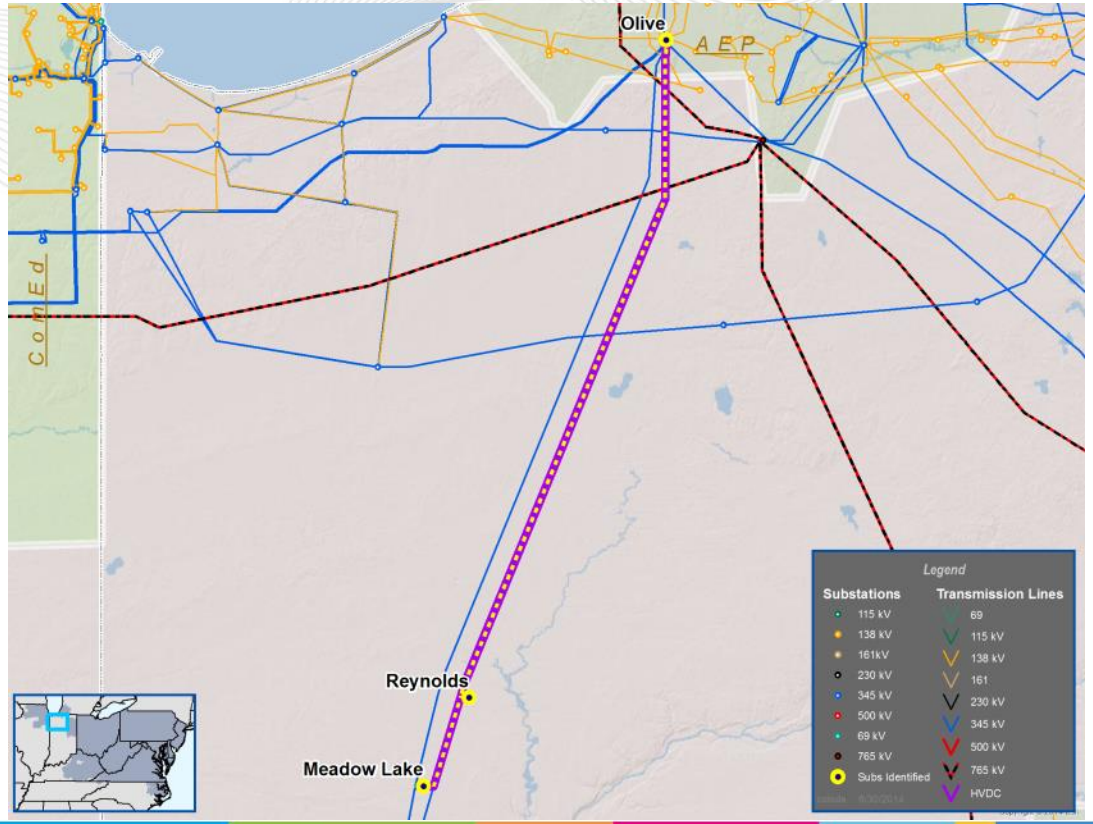
- Project cancellation

- Cancel B2287: Loop in the Meadow Lake - Olive 345 kV circuit into Reynolds 765/345 kV station

- This project is no longer needed due to project B2449 to Rebuild the 7-mile 345 kV line section between Meadow Lake and Reynolds 345 kV stations

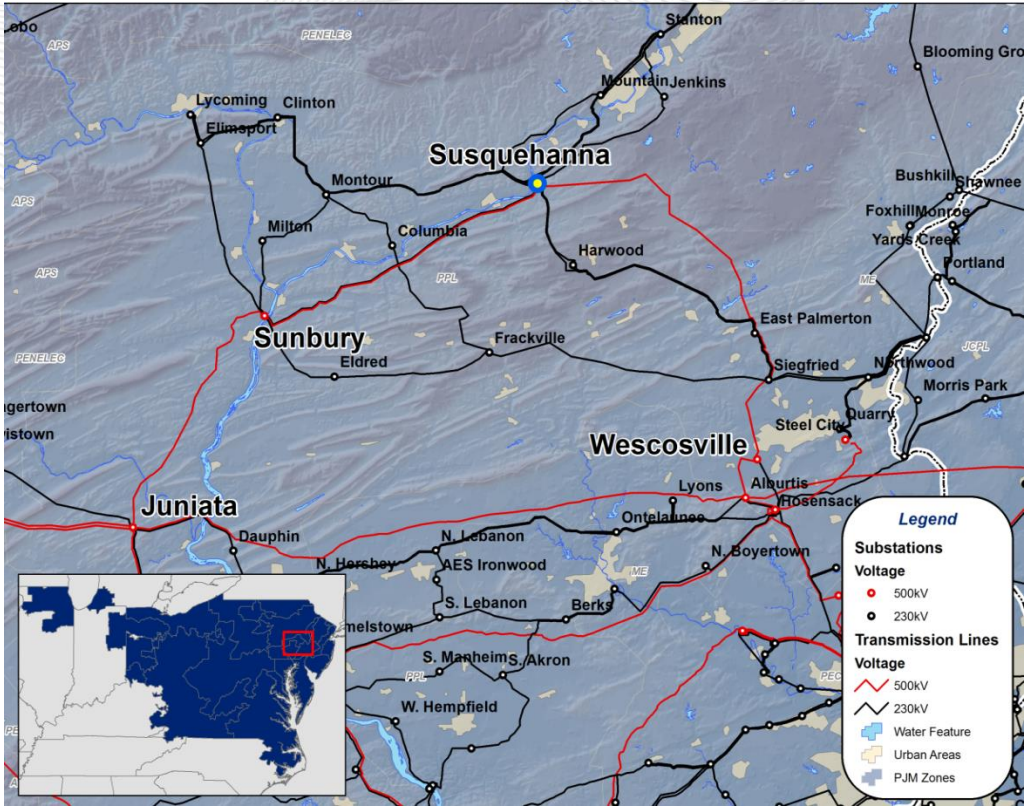
- Estimated Cost: $1M

- Projected IS Date: 6/1/2018



PPL Transmission Zone

- **Cancelation of B1808.2 and B1808.4 upgrades**
- B1808.2 (replace AVR and rectifier bank on Susquehanna unit 1) and B1808.4 (replace AVR and rectifier bank on Susquehanna unit 2) were identified as part of the overall plan to mitigate a previous stability criteria violation at the Susquehanna generation plant.
- However, the stability issue is already mitigated by B1808.1 (install PSS at Susquehanna unit 1) and B1808.3 (install PSS at Susquehanna unit 2).
- As a result, B1808.2 and B1808.4 are not required and will be canceled.



15 Year Analysis Result

15 Year Analysis Result for 2014 RTEP

2014 RTEP 15 Year Analysis - Single Contingency Result							
Fr Bus	**Fr Name**	**To Bus**	**To Name**	**CKT**	**KVs**	**Areas**	**100% Year**
232004	MILF_230	232001	COOLSPGS	1	230/230	DPL	2029
314074	6POSSUM	314057	6LAKERD	1	230/230	Dominion	2027
314228	6MESSER	314225	6CHARCTY	1	230/230	Dominion	2020
314072	6PL VIEW	314004	6ASHBURN	1	230/230	Dominion	2024
314074	6POSSUM	314096	6WOODB A	1	230/230	Dominion	2025
314287	6CHSTF B	314228	6MESSER	1	230/230	Dominion	2020
248005	06KYGER	242528	05SPORN	2	345/345	OVEC/AEP	2019
208114	SUSQ G1	208113	SUSQ	1	230/230	PPL	2027
223983	CHALK230	292453	T133TAP1	1	230/230	PEPCO	2022
223983	CHALK230	292453	T133TAP1	2	230/230	PEPCO	2022
213519	CONOWG01	231006	COLOR_PE	1	230/230	PECO/DPL	2025
231004	RL_230	232002	CEDAR CK	1	230/230	DPL	2026
213520	CONOWG03	213844	NOTTNGHM	1	230/230	PECO	2026
243217	05DEQUIN	243878	05MEADOW	1	345/345	AEP	2024
243217	05DEQUIN	243878	05MEADOW	2	345/345	AEP	2024

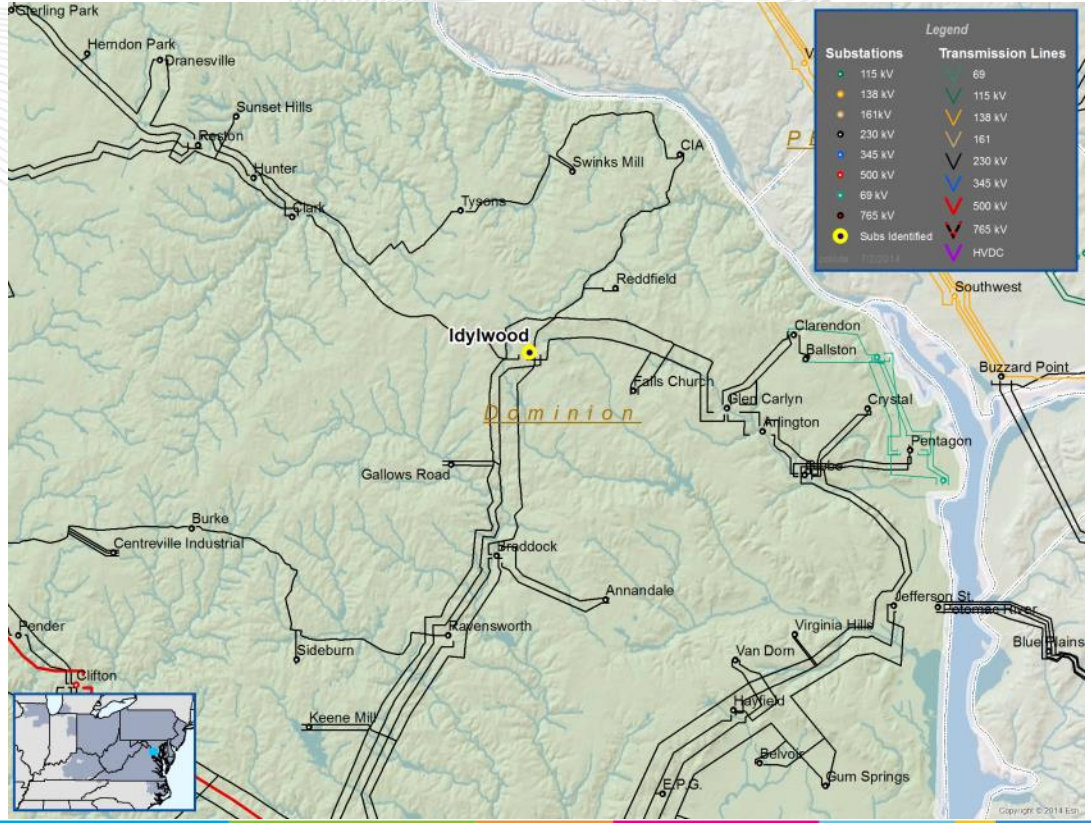
15 Year Analysis Result for 2014 RTEP

2014 RTEP 15 Year Analysis - Tower Contingency Result							
Fr Bus	**Fr Name**	**To Bus**	**To Name**	**CKT**	**KVs**	**Areas**	**100% Year**
208034	MILT	208109	SUNB	1	230/230	PPL	2019
228401	MCKLTON	228402	MONROE	1	230/230	AE	2019
208040	MONT	208034	MILT	1	230/230	PPL	2019
206298	28WILLIAMS	206292	28FRENEAU	1	230/230	JCPL	2027
206322	28PARLIN	206298	28WILLIAMS	1	230/230	JCPL	2027
206314	28RED OAKA	206305	28RAR RVR	1	230/230	JCPL	2024
228401	MCKLTON	228402	MONROE	2	230/230	AE	2019
207968	ELIM	208109	SUNB	1	230/230	PPL	2026

Short Circuit Upgrades

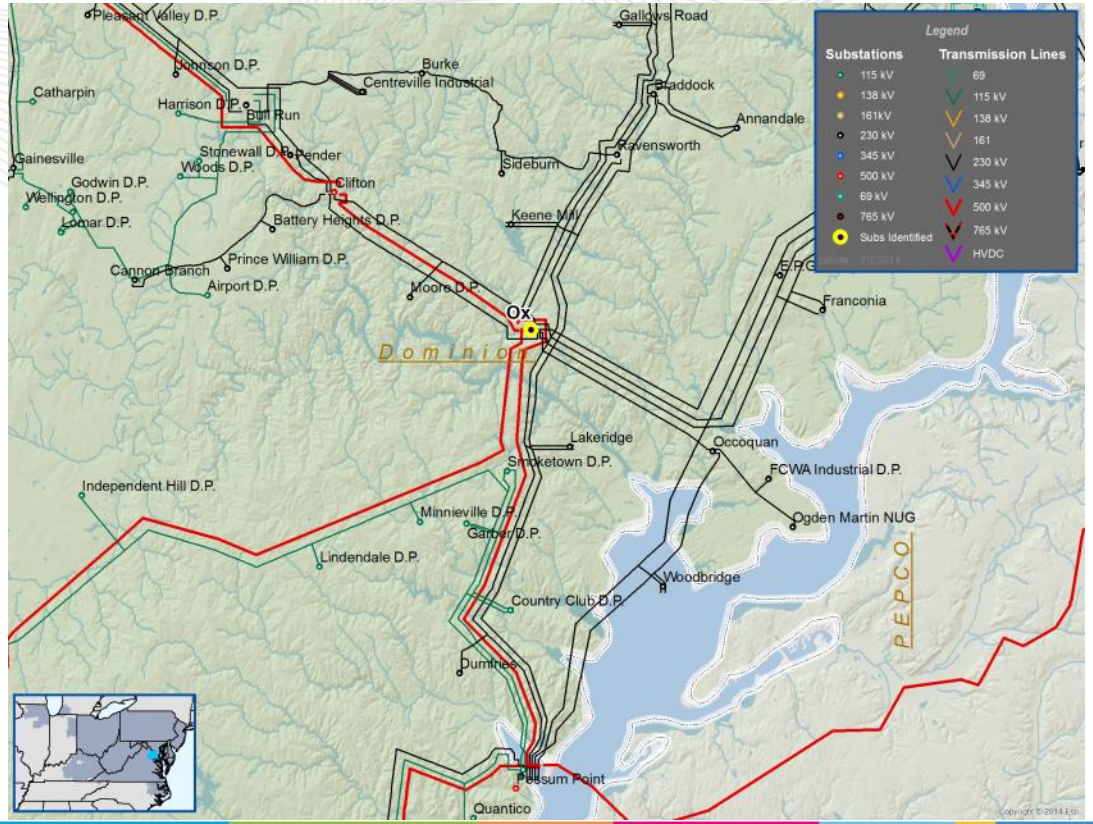
Dominion Transmission Zone

- The Idylwood 230kV breaker '203512' is overstressed
- Significant Driver: Construct new underground 230 kV line from Glebe to Station C (b2443)
- Proposed Solution: Replace the Idylwood 230kV breaker '203512' with a 50 kA breaker (b2443.1)
- Estimated Project Cost: $255 K
- Required IS Date: 6/1/2018



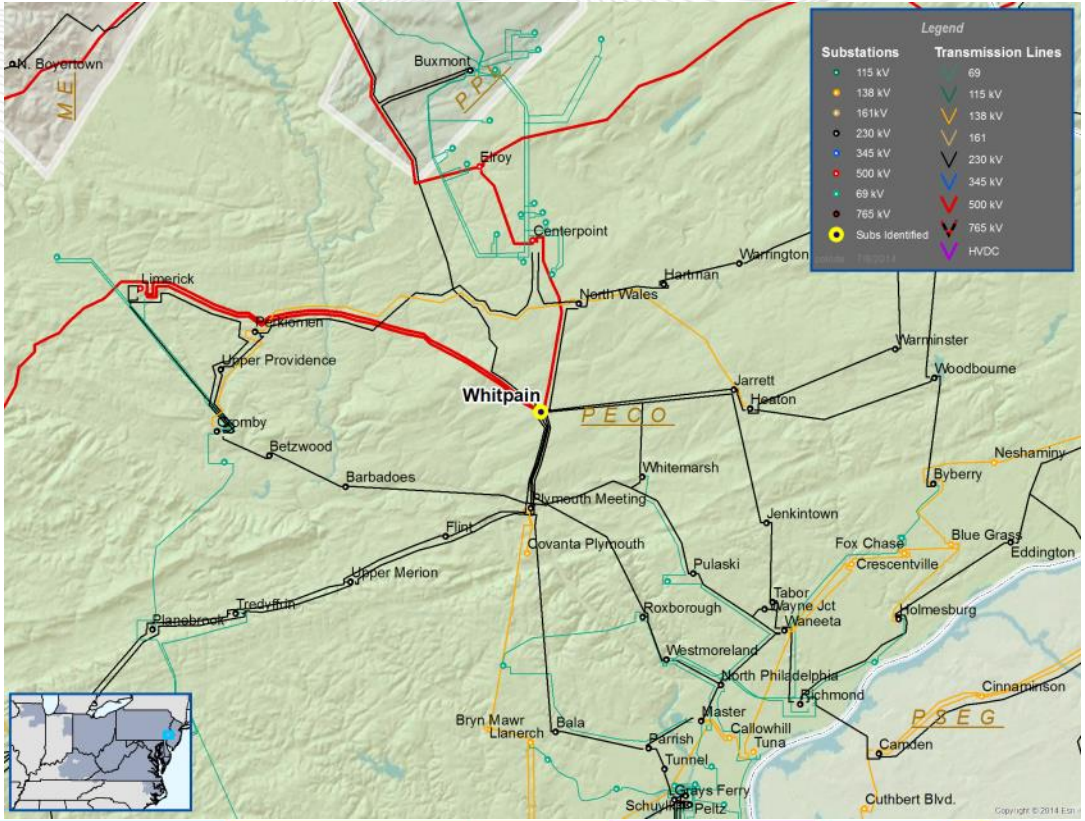
Dominion Transmission Zone

- The Ox 230kV breaker ‘206342’ is overstressed
- Significant Driver: Construct new underground 230 kV line from Glebe to Station C (b2443)
- Proposed Solution: Replace the Ox 230kV breaker ‘206342’ with a 63 kA breaker (b2443.2)
- Estimated Project Cost: $270 K
- Required IS Date: 6/1/2018



PECO Transmission Area

- The Whitpain 230 kV breakers ‘155,’ ‘525,’ and ‘175’ are overstressed
- Proposed Solution: Replace Whitpain 230 kV breakers ‘155,’ ‘525,’ and ‘175’ (b2527 – b2529)
- Estimated Project Cost: $600 K per breaker
- Required IS Date: 6/1/2016



Winter Peak Study Update

- Base Dispatch
  - Dispatch based on historical average Capacity Factors (5 years of data) by fuel type were applied.
  - Nuclear and coal generation are dispatched to 100% capacity
  - Gas unit scaling
    - Gas units scaled uniformly to maintain the target PJM interchange (net of yearly LTF transmission service)
    - Gas units in PJM West and MAAC scaled uniformly to maintain the target MAAC interchange (historical Winter Peak values)

2014 RTEP Winter Study Update

- Test Methodology
  - Similar to Generator Deliverability, Common Mode Outage and Light Load Reliability Criteria, generation is ramped from their base values
    - Wind is ramped up to 80% for single contingencies, 100% for multiple contingencies
    - The ramping limit for the remaining generators of all fuel types is 100%
- Contingencies Considered
  - NERC Category A (no contingency), Category B (single), Category C (tower, bus, line fault with stuck breaker)
- Monitored Facilities
  - All PJM BES and lower voltage market monitored facilities
- Results are preliminary pending TO review

2014 RTEP Winter Study Update – Initial Deliverability Results

- MAAC (Potential Overloads)

Fr Bus	Name	To Bus	Name	CKT	KVs	Areas
200013	PEACHBTM	200004	CNASTONE	1	500/500	PJM 500/PJM 500
200676	26E.SAYRE	130836	N.WAV115	1	115/115	PENELEC/NY
200674	26TOWANDA	200676	26E.SAYRE	1	115/115	PENELEC/PENELEC
207964	ELDR TR1	208111	SUNBTR23	1	230/230	PPL/PPL
207965	ELDR TR2	207964	ELDR TR1	1	230/230	PPL/PPL
208040	MONT	208034	MILT	1	230/230	PPL/PPL
212340	PANDA	212397	SAEG	1	230/230	PPL/PPL
903270	W3-022 TAP	207975	FRAC TR3	1	230/230	PPL/PPL
903270	W3-022 TAP	207965	ELDR TR2	1	230/230	PPL/PPL
213463	BYB19	213429	BLGRASS1	1	138/138	PECO/PECO
213489	CHICHST1	213588	EDDYSTN4	1	230/230	PECO/PECO
213922	RICHMOND	214012	WANEETA3	1	230/230	PECO/PECO
214206	RICHMRE29	213922	RICHMOND	1	230/230	PECO/PECO
214010	WANEETA2	213817	N PHILA	1	230/230	PECO/PECO
219125	CAMDEN	214206	RICHMRE29	1	230/230	PSE&G/PECO

2014 RTEP Winter Study Update – Initial Deliverability Results

- MAAC (Potential Overloads continued)

Fr Bus	Name	To Bus	Name	CKT	KVs	Areas
217303	BERGEN_B	217156	BERGEN_3	1	138/138	PSE&G/PSE&G
221361	GOULD ST	221372	WP PH.S1	1	34.5/34.5	BG&E/BG&E
223949	BML 138	224079	BETH T7	1	138/138	PEPCO/PEPCO
910860	X3-087 TAP	223994	BURCH230	1	230/230	PEPCO/PEPCO
227903	MILL #1	227902	LEWIS #1	1	138/138	AE/AE
227905	SCULL#1	227903	MILL #1	1	138/138	AE/AE
227906	SCULL#2	227904	MILL #2	1	138/138	AE/AE
232247	DUP-SFRD	232249	LAUREL	1	69/69	DP&L/DP&L
232227	EASTN_69	232232	TRAPPETP	1	69/69	DP&L/DP&L
232244	GREENWD	232245	BRIDGEVL	1	69/69	DP&L/DP&L
232215	KENT	232813	VAUGHN	1	69/69	DP&L/DP&L
232276	KINGS_69	232129	KINGS CK	1	69/138	DP&L/DP&L
231803	MOTIVA	231214	REYBD_69	1	138/69	DP&L/DP&L
232233	PRESTON	232234	TODD	1	69/69	DP&L/DP&L
231214	REYBD_69	231128	REYBOLD	1	69/138	DP&L/DP&L

2014 RTEP Winter Study Update – Initial Deliverability Results

- MAAC (Potential Overloads continued)

Fr Bus	Name	To Bus	Name	CKT	KVs	Areas
231215	SILVERSD	231205	DARLEY	1	69/69	DP&L/DP&L
232000	STEELE	232004	MILF_230	1	230/230	DP&L/DP&L
232821	TANYARD	232233	PRESTON	1	69/69	DP&L/DP&L
232815	WELLS	232217	HARRNGTN	1	69/69	DP&L/DP&L
232842	WESTOVER	232276	KINGS_69	1	69/69	DP&L/DP&L
232267	WORCR_69	232832	OCEANPIN	1	69/69	DP&L/DP&L
907322	X1-096 TAP	232842	WESTOVER	1	69/69	DP&L/DP&L
909190	X2-066 TAP	232118	NSEAFORD	1	138/138	DP&L/DP&L
909190	X2-066 TAP	232114	SHARNGTN	1	138/138	DP&L/DP&L

2014 RTEP Winter Study Update – Initial Deliverability Results

- PJM West (Potential overloads)

Fr Bus	Name	To Bus	Name	CKT	KVs	Areas
239728	02BLKRVR	238915	02LRN Q2	1	138/138	ATSI/ATSI
239070	02RICHLD	239071	02RICHLN	ZB	138/138	ATSI/ATSI
239070	02RICHLD	238521	02NAOMI	1	138/138	ATSI/ATSI
239071	02RICHLN	239269	02RICHLJ	ZB	138/138	ATSI/ATSI
242576	05CAPITO	242783	05RUTLED	1	138/138	AEP/AEP
242593	05CHEM 2	242576	05CAPITO	1	138/138	AEP/AEP
242605	05CLNCHR	242700	05LEBANO	1	138/138	AEP/AEP
243503	05ELIOTZ	243506	05ELLIOT	1	138/138	AEP/AEP
243664	05HAZARD	243693	05HAZRD2	1	161/138	AEP/AEP
242685	05J.FERX	242745	05PEAKCK	1	138/138	AEP/AEP
246929	05MADDOX	242935	05E LIMA	1	345/345	AEP/AEP
243878	05MEADOW	255205	17REYNOLDS	1	345/345	AEP/NIPS
242745	05PEAKCK	242841	05W GLOW	1	138/138	AEP/AEP
242933	05RPMONE	243211	05ALLEN	1	345/345	AEP/AEP
246950	05TIMBSS	243017	05HAVILN	1	138/138	AEP/AEP

2014 RTEP Winter Study Update – Initial Deliverability Results

- PJM West (Potential overloads continued)

Fr Bus	Name	To Bus	Name	CKT	KVs	Areas
247319	05WOLFCK	243533	05LAYMAN	1	138/138	AEP/AEP
242853	05WURNO	242609	05CLYTR2	1	138/138	AEP/AEP
248005	06KYGER	242528	05SPORN	2	345/345	OVEC/AEP
248005	06KYGER	242528	05SPORN	1	345/345	OVEC/AEP
250057	08M.FORT	250131	08WILEY2	1	138/138	DEOK/DEOK
249568	08M.FTHS	250057	08M.FORT	9	345/138	DEOK/DEOK
249568	08M.FTHS	250057	08M.FORT	10	345/138	DEOK/DEOK
274750	CRETE EC ;BP	255112	17STJOHN	1	345/345	COMED/NIPS
272365	ESS H440 ;RT	272363	ESS H440 ; R	1	138/138	COMED/COMED
271655	HENNEPIN ; T	348918	4HENNEPIN S	1	138/138	COMED/AMIL
271838	KEWANEE ;13	348923	4KEWANEE N	1	138/138	COMED/AMIL
272002	MCGIRR RD;	271333	DIXON ; R	1	138/138	COMED/COMED
293510	O09 OP1 138	272367	ROCK FALL; R	1	138/138	COMED/COMED
293710	O29	272097	NELSON ;RT	1	138/138	COMED/COMED
272504	STATELINE;3B	272506	STATELINE;2S	1	138/138	COMED/COMED
296277	R30_345	270853	PONTIAC ; R	1	345/345	COMED/COMED
272506	STATELINE;2S	272726	WASHINGTO; B	1	138/138	COMED/COMED
272730	WATERMAN ;3B	271558	GLIDDEN ; B	1	138/138	COMED/COMED

2014 RTEP Winter Study Update – Initial Deliverability Results

- South (potential overloads)

Fr Bus	Name	To Bus	Name	CKT	KVs	Areas
314170	6COHMIL	314072	6PL VIEW	1	230/230	Dominion

2014 RTEP Winter Study – PROMOD Simulation

- The current study assumptions were based in part on historical interchange and capacity factor data. The purpose of the PROMOD simulation was to determine if a sensitivity study is required to adjust these values from the historical values

- PROMOD Assumptions:
  - Firm interchange levels modeled with PJM neighbors (TVA, LGEE, Carolinas, NY, OVEC and MISO) based on Transmission Planning Assumptions
  - Economic interchange facilitated through hurdle rates
  - Generation model meets reserve requirements in 2019 using only Existing + ISA generation (no FSA's dispatched for economics)

- Promod results:
  - Average Capacity Factor for generation : Comparable to Historical data
  - Average interchange for MAAC during winter peak hours: importing 1062MW (Vs. Historical importing 1278MW)

- Conclusion:
  - Based on the comparison of the PROMOD result to the historical data, no capacity factor or interchange sensitivity is recommended at this time

2014 RTEP Winter Study – Load Deliverability Analysis

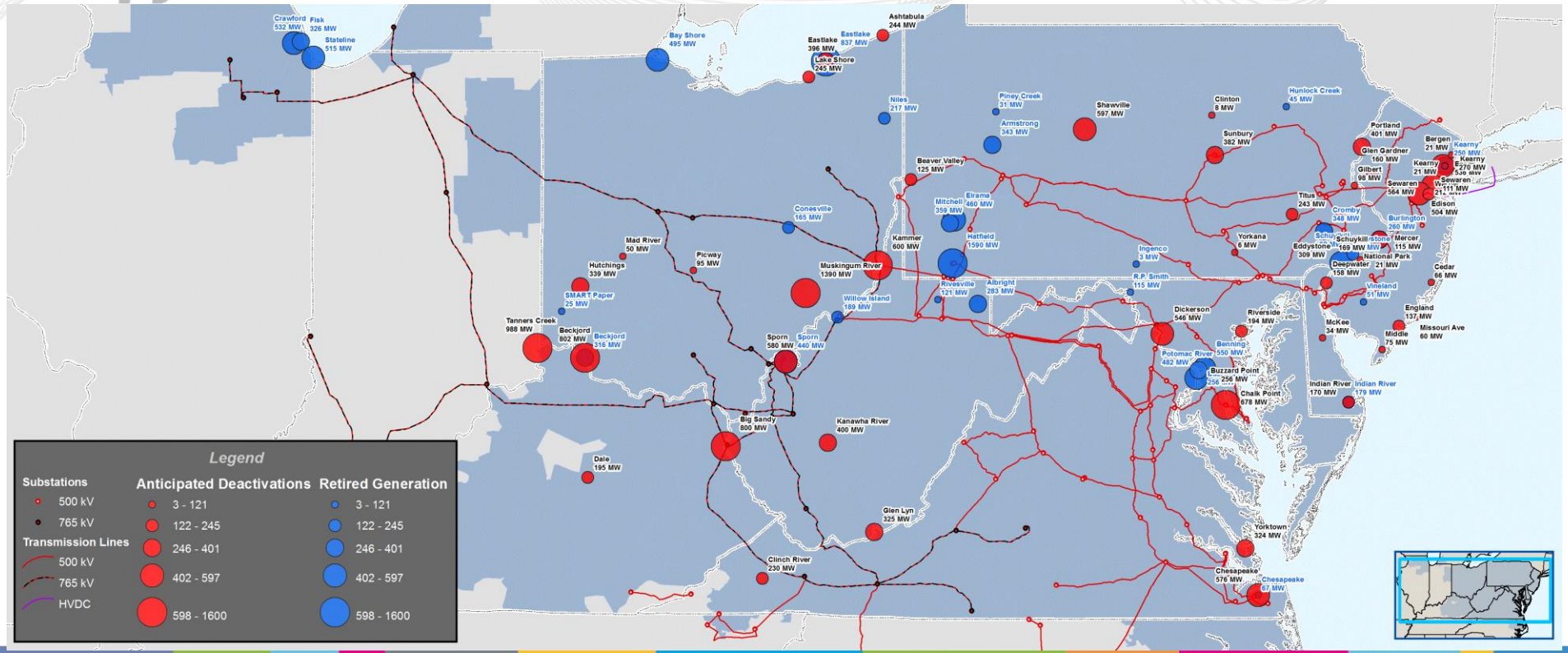
- CETO Calculations
  - Work underway to calculate winter CETO values for PJM LDAs
  - Winter CETO values will be calculated for each of three scenarios of natural gas related generation outages
- CETL Evaluation
  - PJM will select LDAs to perform Load Deliverability analysis and calculate winter CETL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

2014 RTEP Winter Study – Next Steps

- Work with the TOs to validate the winter generator deliverability results
- Finalize winter CETO development
- Calculate winter CETL values

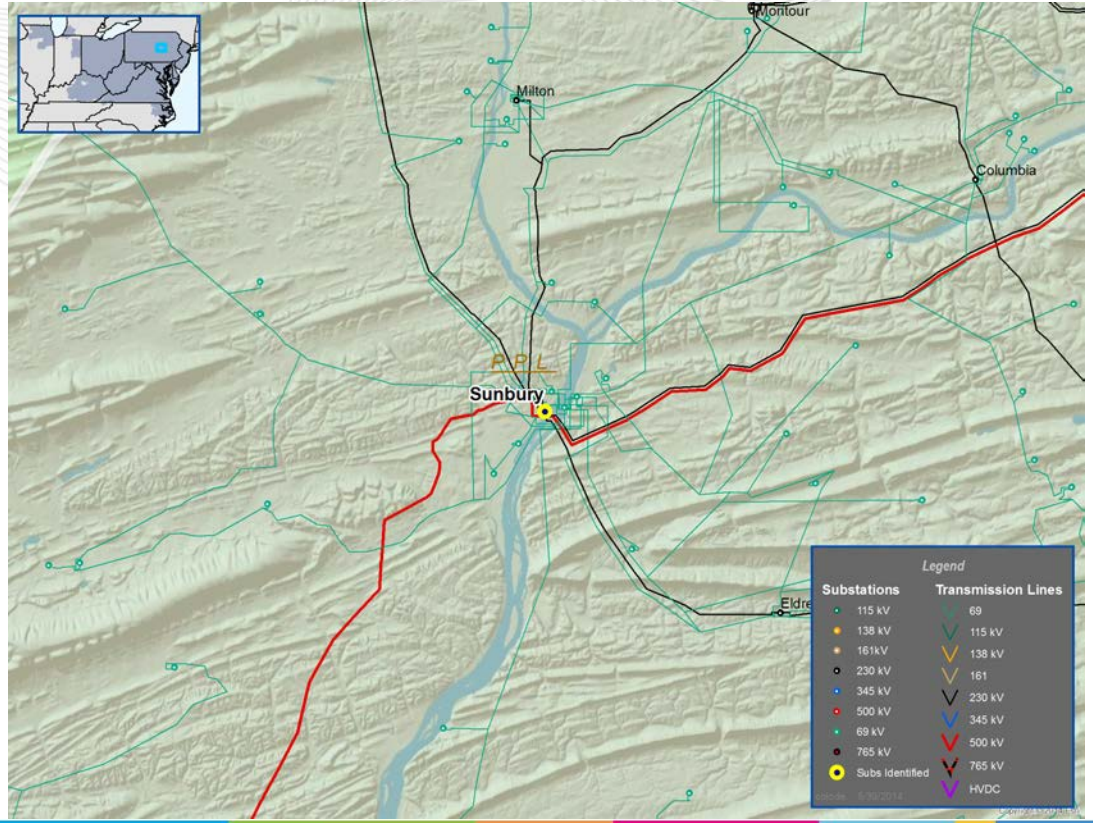
Generation Deactivation Notification Update

Generation Retirements



Deactivation Update: Deactivation Notifications

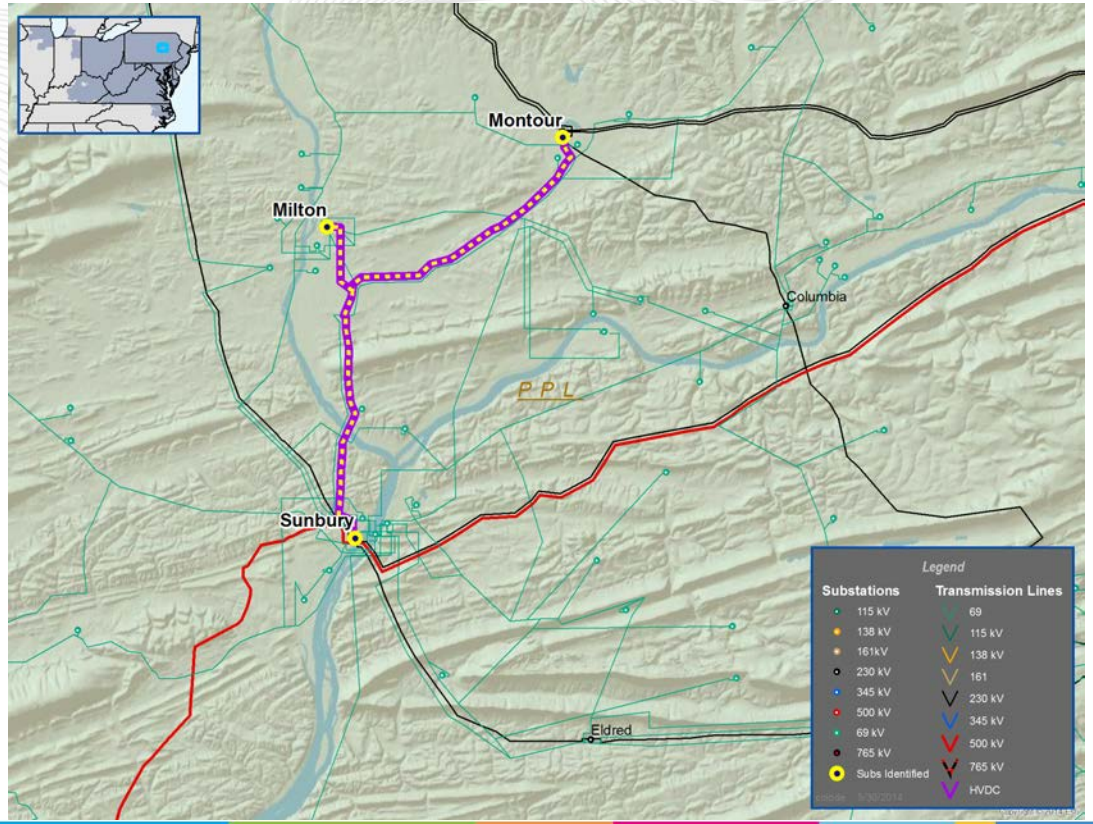
- Sunbury units
  - Unit 1 – 80 MW
  - Unit 2 – 80 MW
  - Unit 3 – 94 MW
  - Unit 4 – 128 MW
  - PPL Transmission Zone
  - Deactivation date: 07/18/2014



PPL Transmission Zone

N-1 Common Mode Voltage Violation

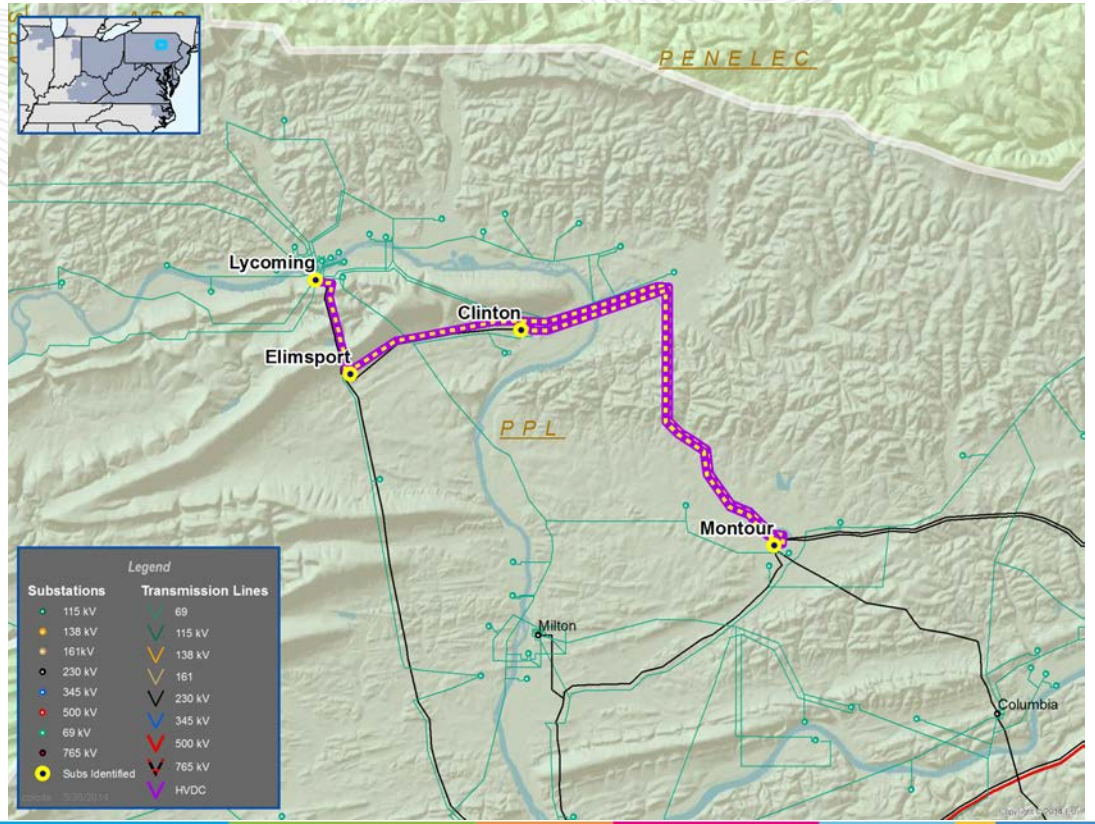
- Several voltage magnitude violations on PPL 69 kV buses for the stuck breaker contingency loss of Sunbury 500/230 kV transformer#24 and Sunbury – Milton – Montour 230 kV line (‘PL101001’).



PPL Transmission Zone

N-1 Common Mode Voltage Violation

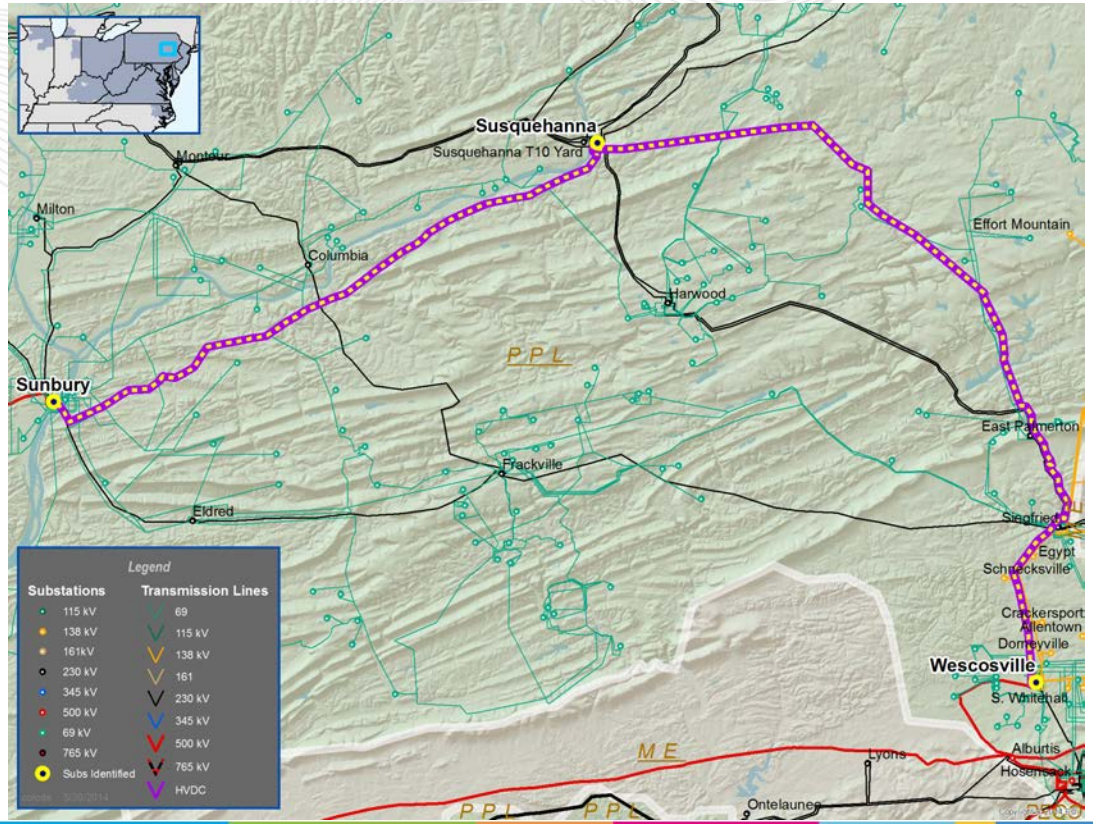
- Several voltage drop violations on PPL 69 kV buses for the tower contingency loss of Montour – Elimsport – Lycoming 230 kV line and Montour – Clinton 230 kV line ('PL100487').



PPL Transmission Zone

N-1-1 Thermal Violation

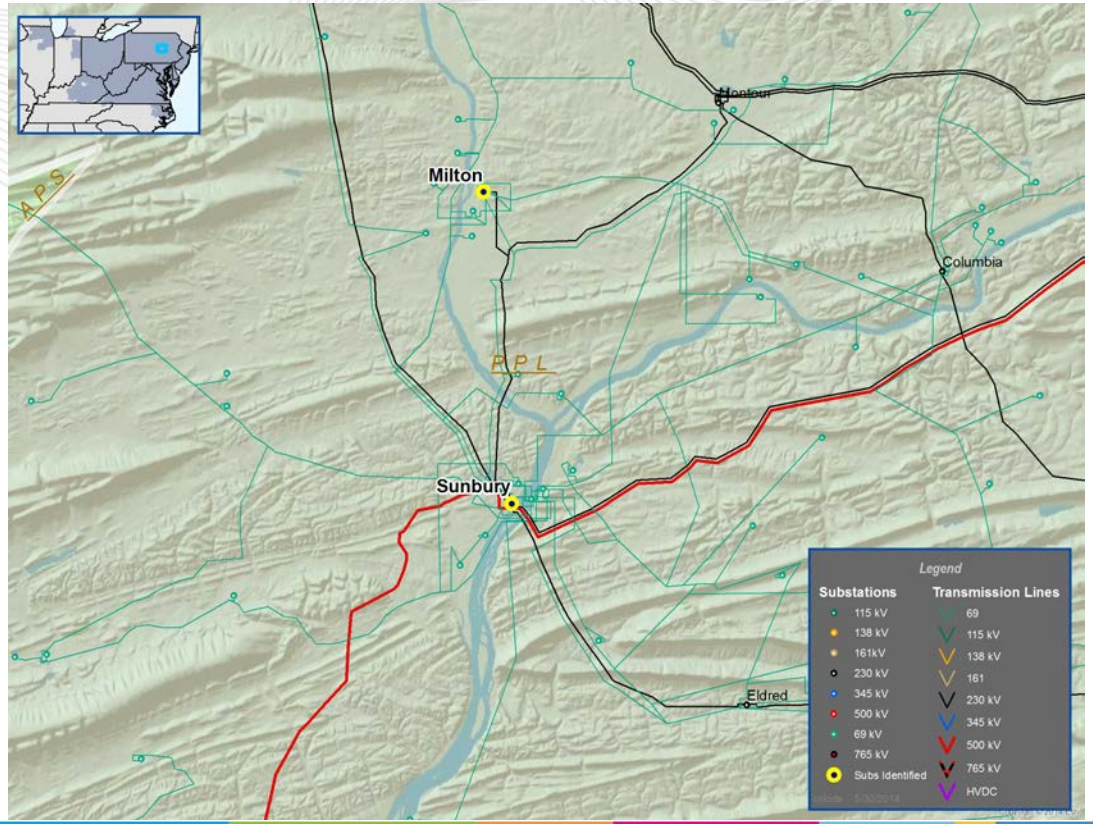
- The Susquehanna 500/230 kV transformer#21 is loaded to 100.34% of its emergency rating (1165 MVA) for the N-1-1 loss of Sunbury - Susquehanna 500 kV line (‘PJM50’) followed by Susquehanna-Wescosville 500 kV line ('200022(SUSQHANA)-200023(WESCOVLE)_1').



PPL Transmission Zone

N-1-1 Voltage Magnitude Violation

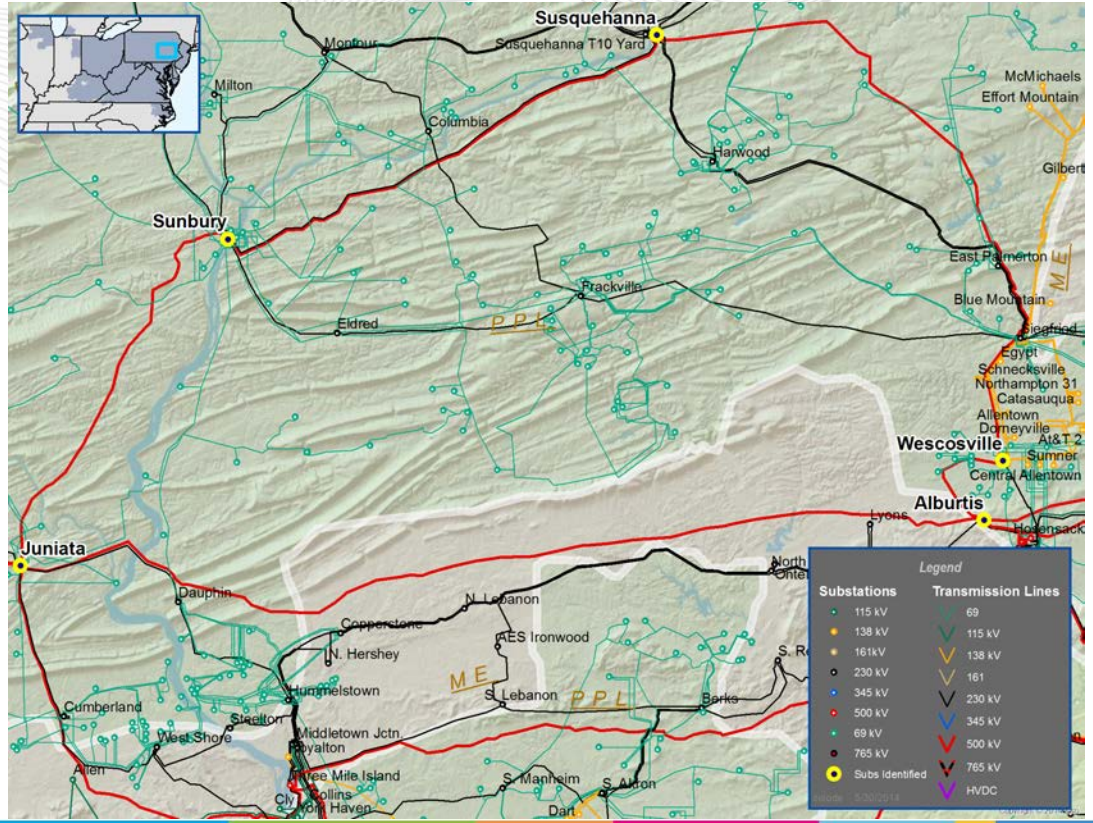
- The voltage magnitude on Sunbury 138 kV bus is below 0.92 pu (0.8184 pu) for the N-1-1 contingency loss of Milton 230/69 kV transformer T1 ('PL100453') followed by loss of Sunbury 230/69 kV transformer T22 ('PL100448').



PPL Transmission Zone

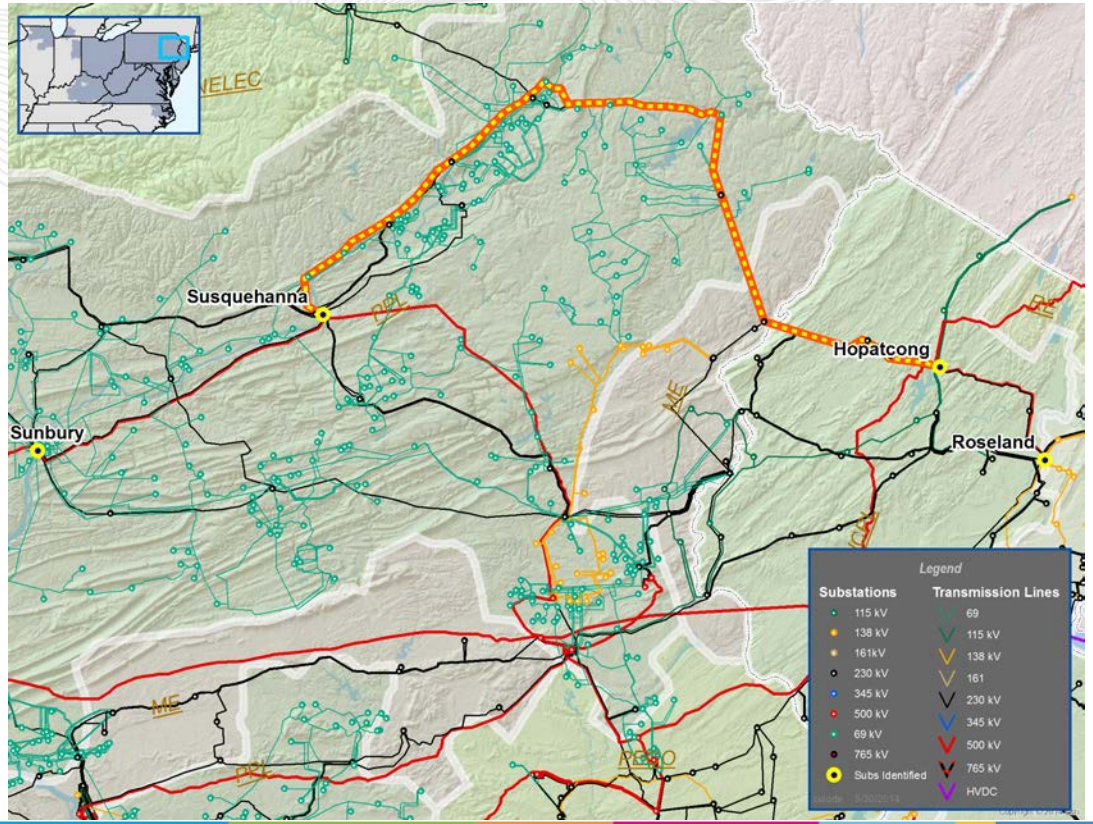
N-1-1 Voltage Drop Violation

- Several voltage drop violations on PPL 138 kV buses for the N-1-1 loss of Juniata-Sunbury-Susquehanna 500 kV line (‘PJM69’) followed by Susquehanna-Wescosville-Alburtis 500 kV line (‘PJM66’).



PPL Transmission Zone

- Upgrade to mitigate the violations in PPL area due to Sunbury deactivation:
- Existing baseline upgrade Susquehanna – Roseland with in-service date 06/01/2015
- PPL b0487 and b0487.1
- PSEG b0489 and b0489.9



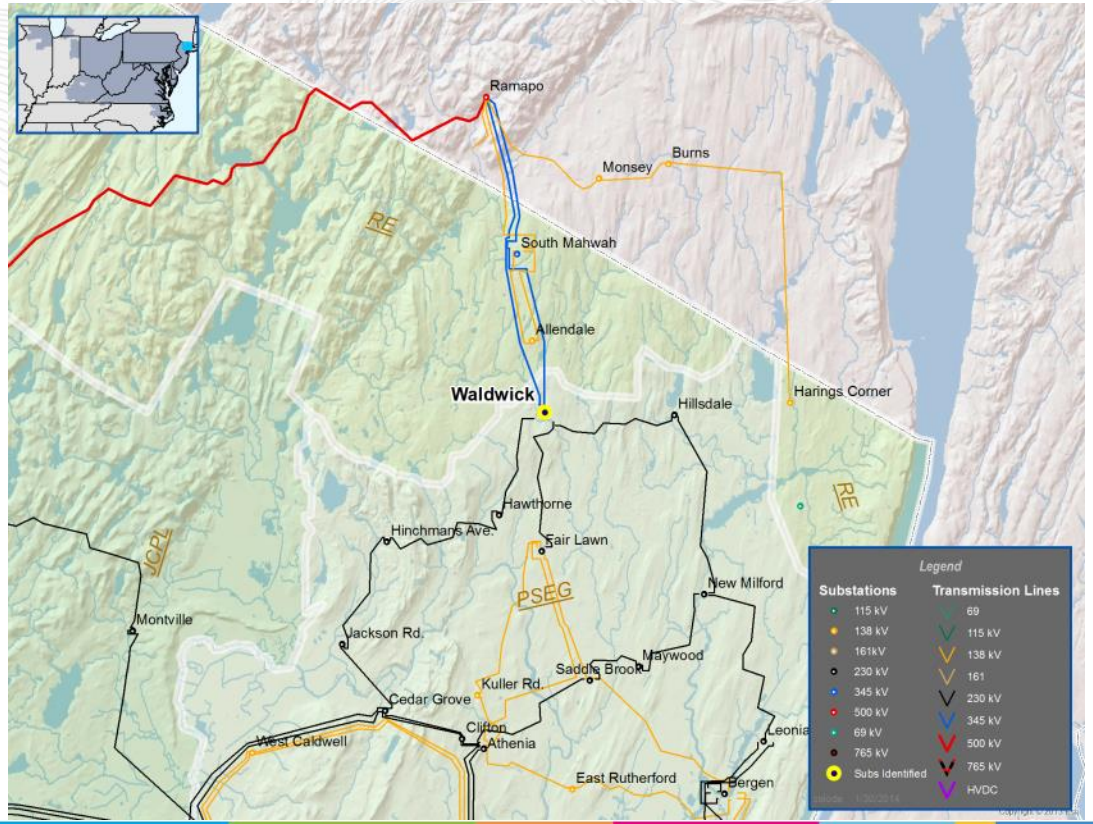
Supplemental Projects

PSE&G Transmission Zone

- Supplemental Project:
- To improve reliability due to aging infrastructure.
- Proposed Solution:
  - Replace Waldwick 230 kV PAR #2 (S0698).
- Estimated Project Cost:

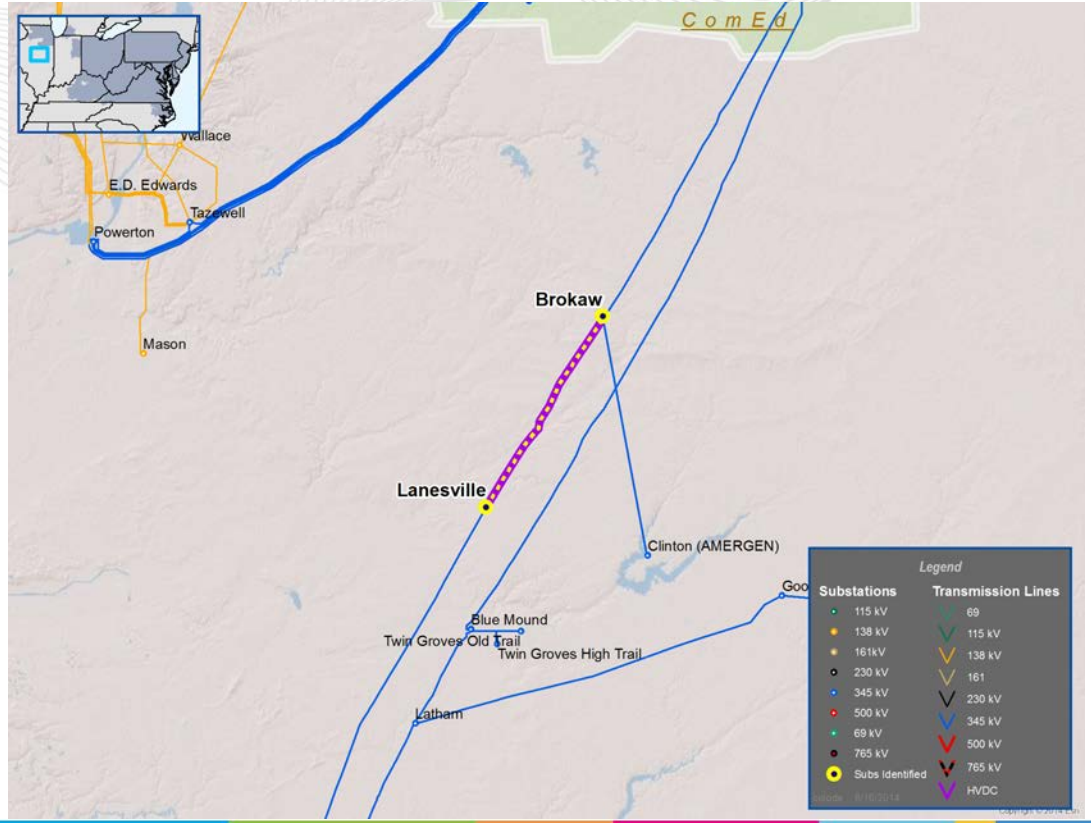
  $ 12 M
- Projected IS Date:

  12/31/2016



ComEd Transmission Zone

- **Supplemental Project**
- Reconductor 10 miles of 345 kV line 2107 between Lanesville and Brokaw (S0731)
- Estimated Project Cost: $17M
- Projected IS Date: 12/31/2014



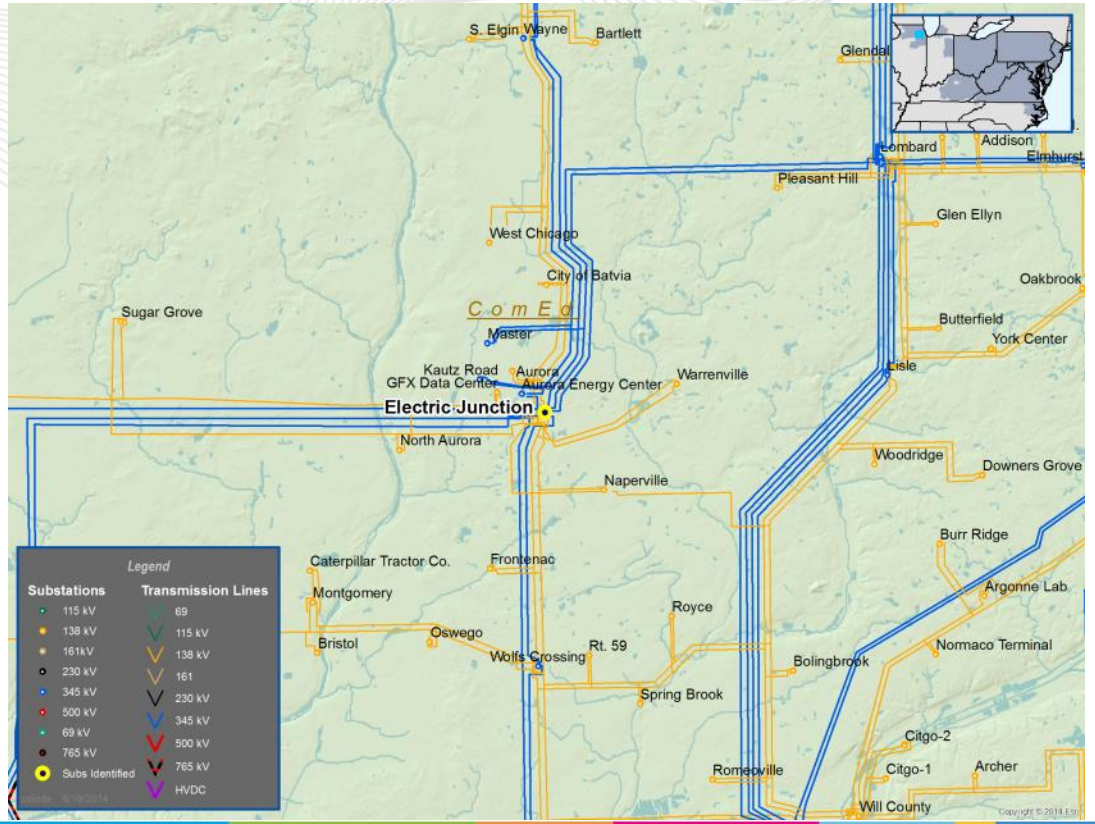
ComEd Transmission Zone

- **Supplemental Project**

- Replace Electric Junction 345 kV circuit breaker on line 11120 (Electric Junction – Lombard 345kV line), replace 345 kV circuit switcher on Electric Junction 345/138KV transformer 83 with a circuit breaker. (S0712)

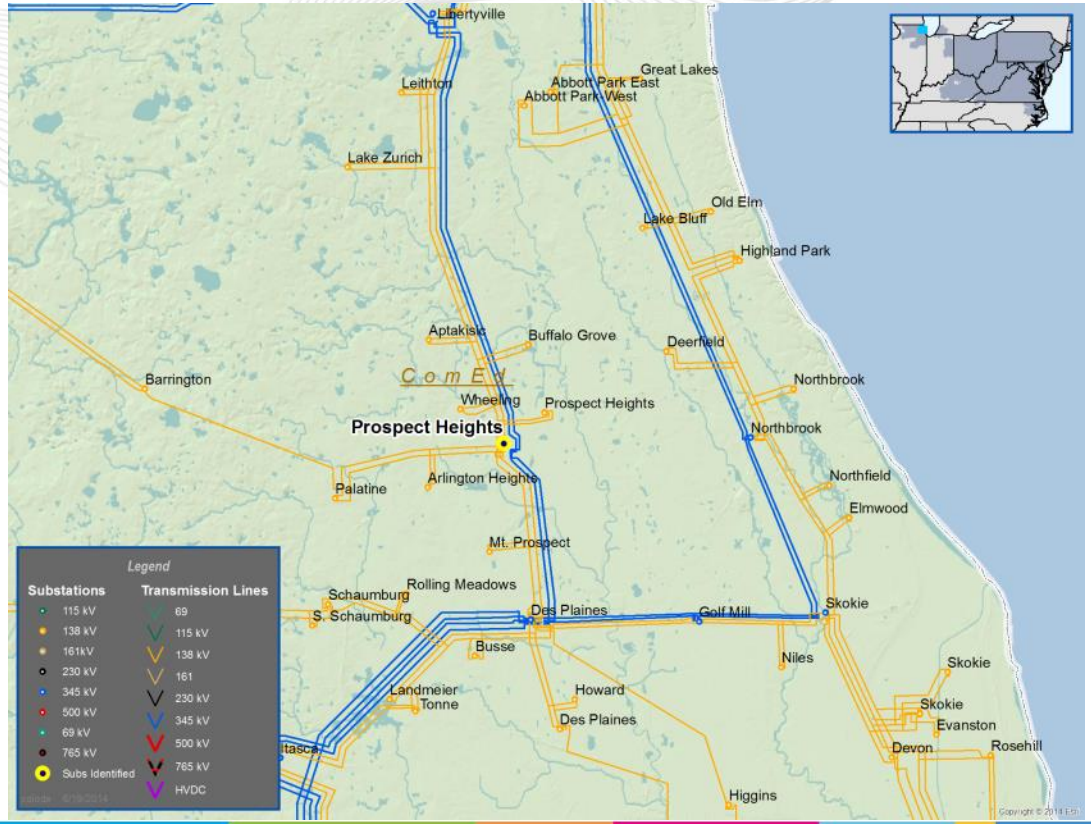
- Estimated Project Cost: $3.6M

- Projected IS Date: 12/31/2014



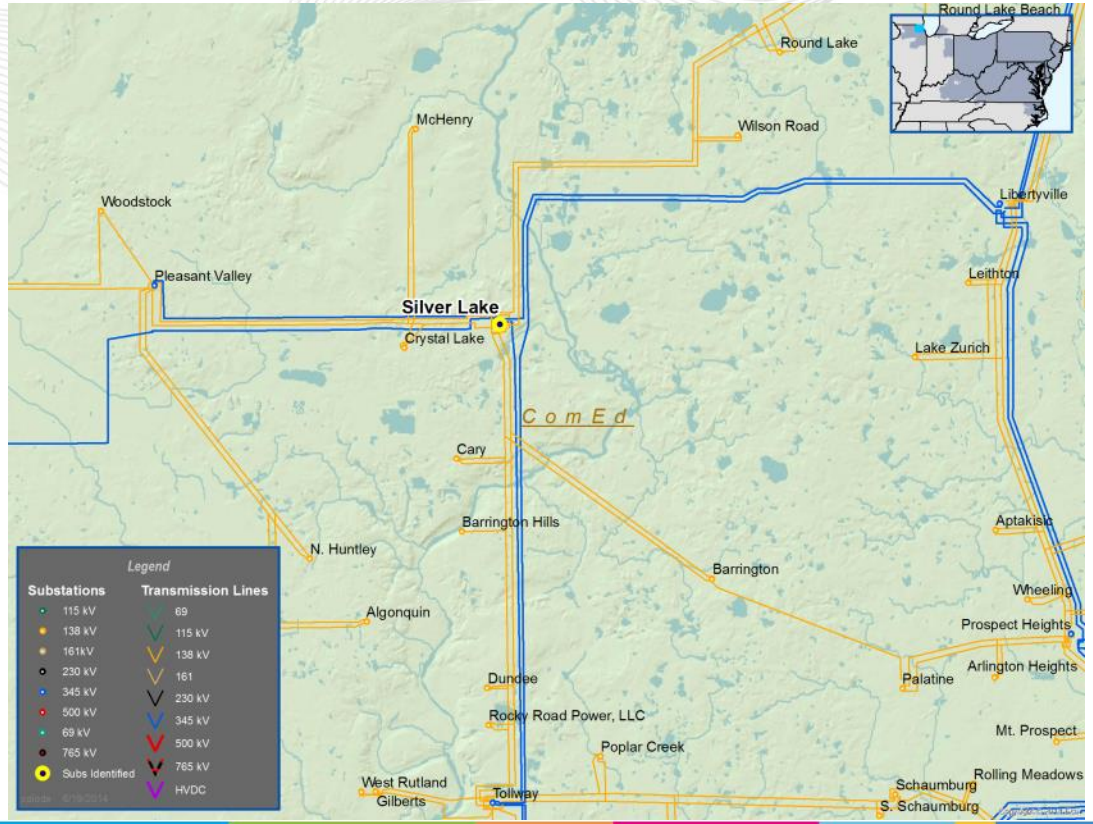
ComEd Transmission Zone

- **Supplemental Project**
- Replace the 345 kV MOD on Prospect Heights 345/138kV TR 84 with a circuit breaker. (S0713)
- Estimated Project Cost: $1.8M
- Projected IS Date: 12/31/2014



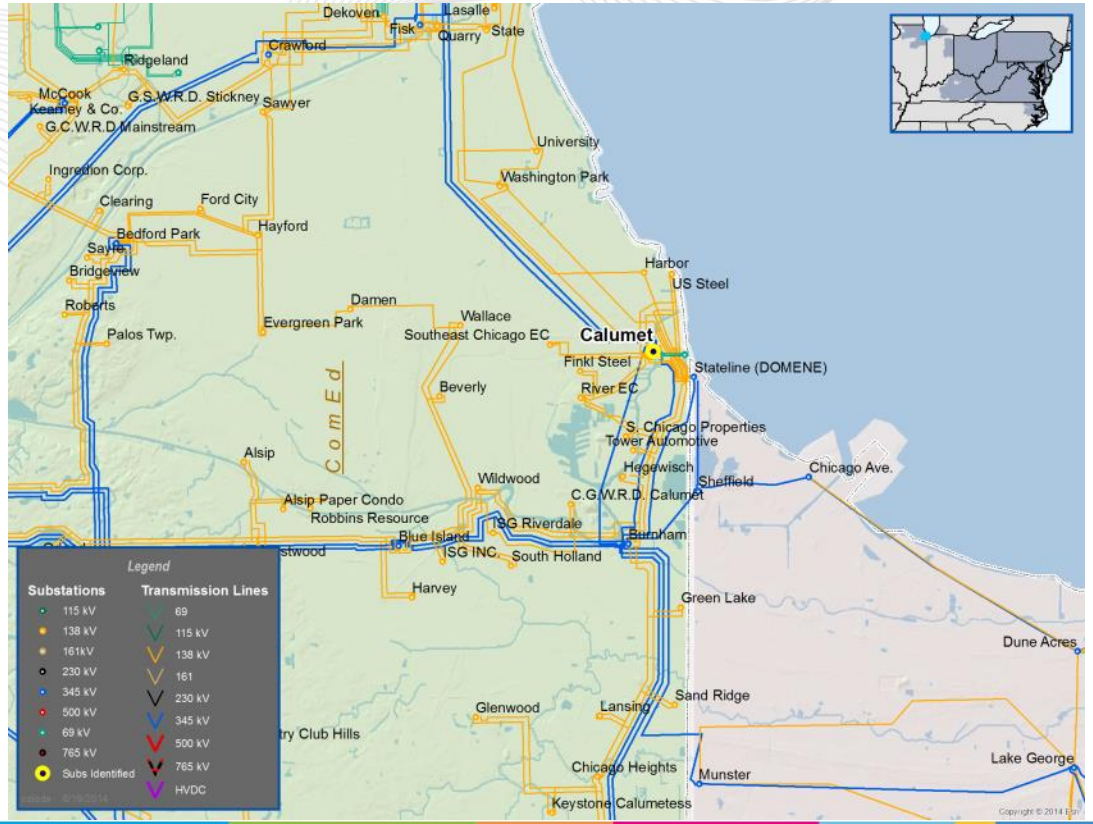
ComEd Transmission Zone

- **Supplemental Project**
- Replace Silver Lake 345 kV bus tie 5-6, 12/31/14. (S0714)
- Estimated Project Cost: $1.8M
- Projected IS Date: 12/31/2014



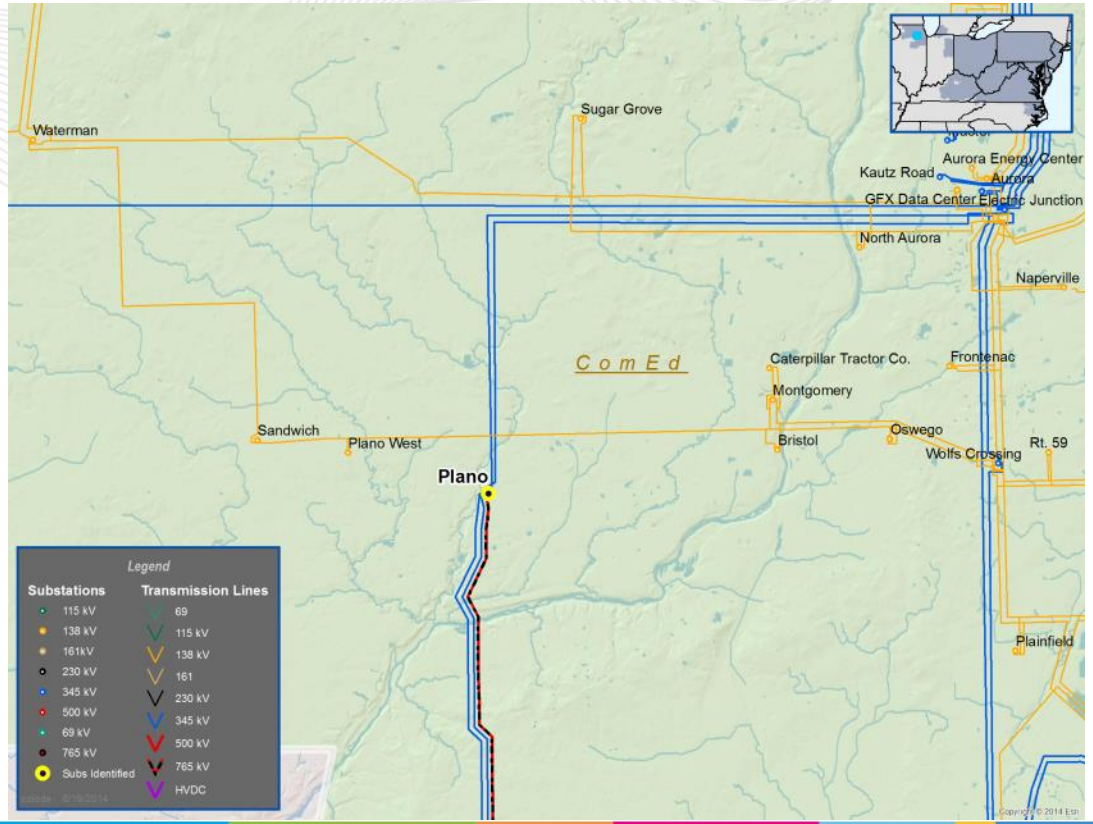
ComEd Transmission Zone

- **Supplemental Project**
- Replace Calumet 345 kV inductor 1 circuit breaker. (S0715)
- Estimated Project Cost: $1.8M
- Projected IS Date: 12/31/2014



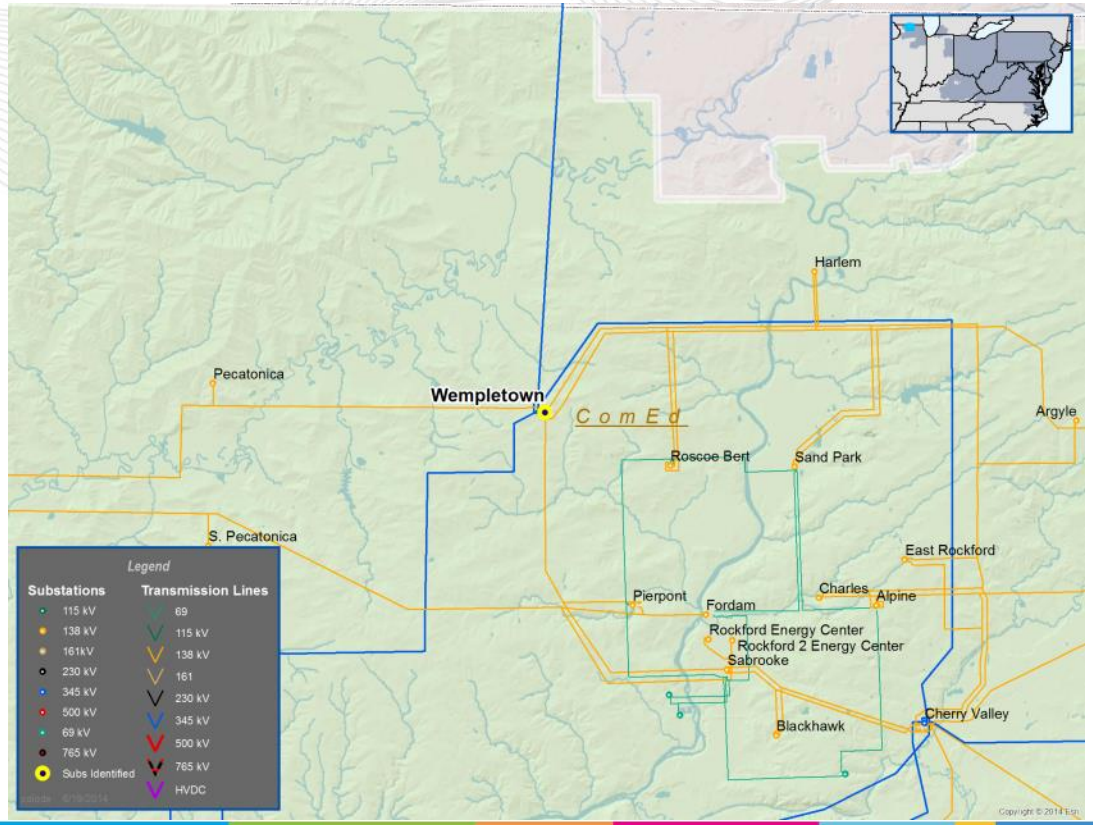
ComEd Transmission Zone

- **Supplemental Project**
- Replace Plano 345 kV bus tie 9-12 and 765/345KV transformer 93A. (S0716)
- Estimated Project Cost: $6.5M
- Projected IS Date: 12/31/2014



ComEd Transmission Zone

- **Supplemental Project**
- Replace Wempletown 345/138KV transformer 84. (S0717)
- Estimated Project Cost: $4.5M
- Projected IS Date: 12/31/2014



ComEd Transmission Zone

- **Supplemental Project**
- Replace Burnham 345 kV circuit breakers 2-4 and 4-5. (S0718)
- Estimated Project Cost: $3.6M
- Projected IS Date: 12/31/2014

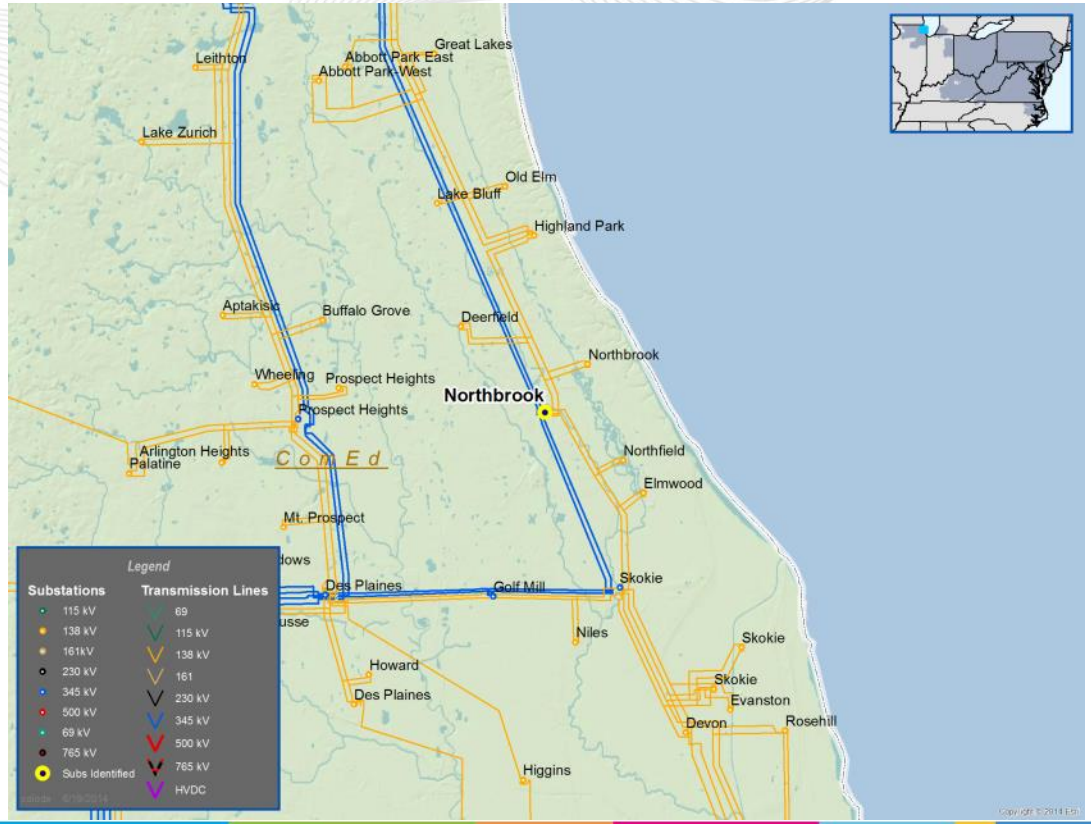
ComEd Transmission Zone

- **Supplemental Project**

- Replace Northbrook 345/138KV transformer 81 and its 138 kV circuit breaker, replace its 345 kV MOD with a circuit breaker. (S0720)

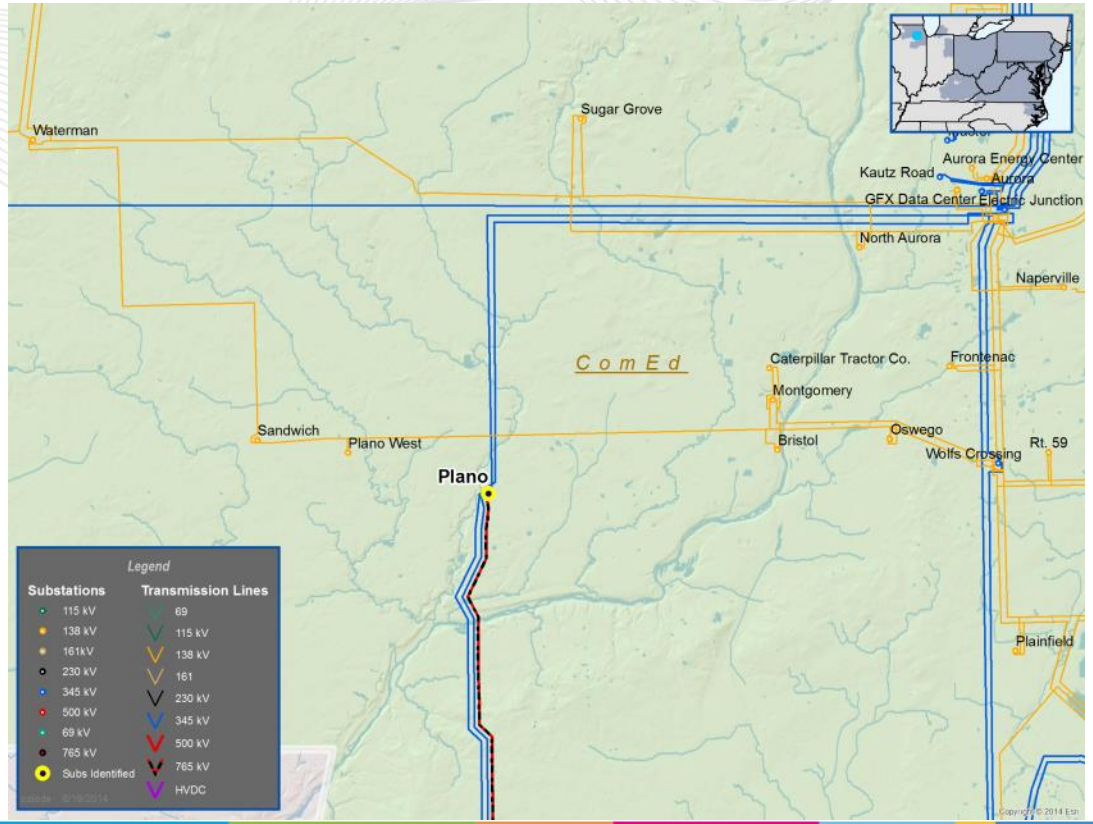
- Estimated Project Cost: $8M

- Projected IS Date: 6/1/2015



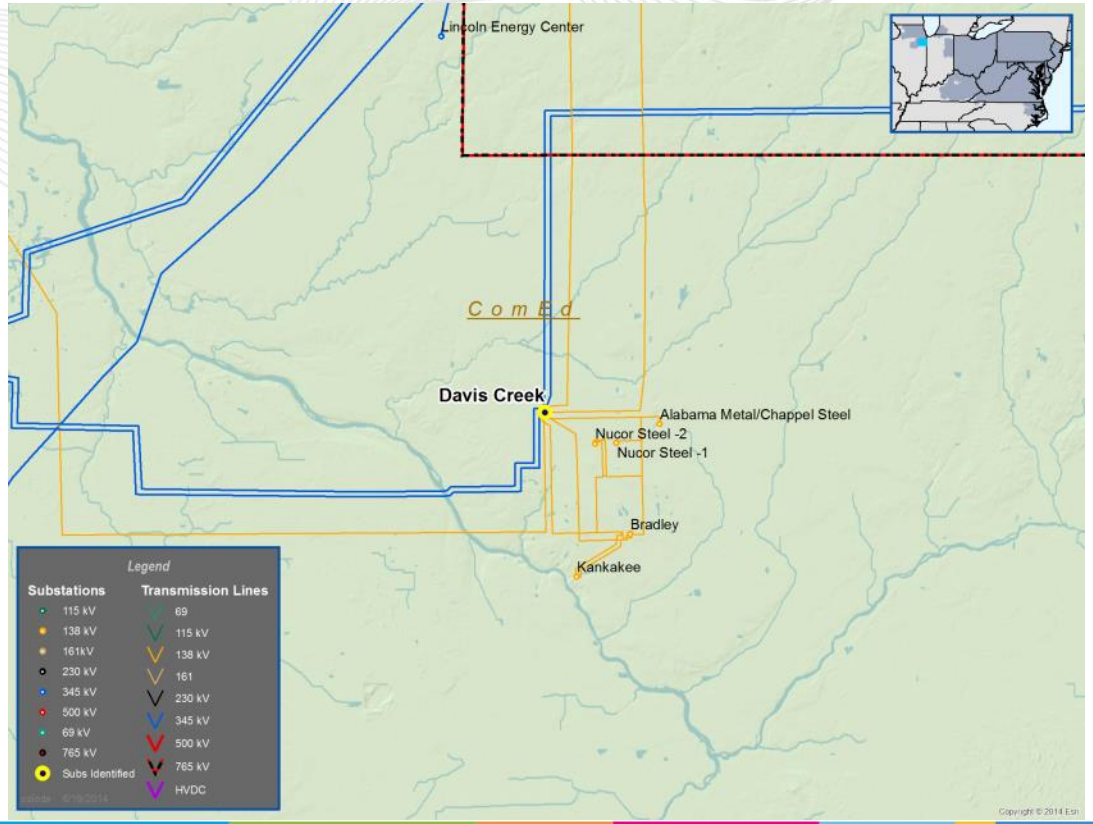
ComEd Transmission Zone

- **Supplemental Project**
- Replace Plano TR 94(A,B,&C) and 345 kV bus tie 2-5 (S0721)
- Estimated Project Cost: $15M
- Projected IS Date: 6/1/2015



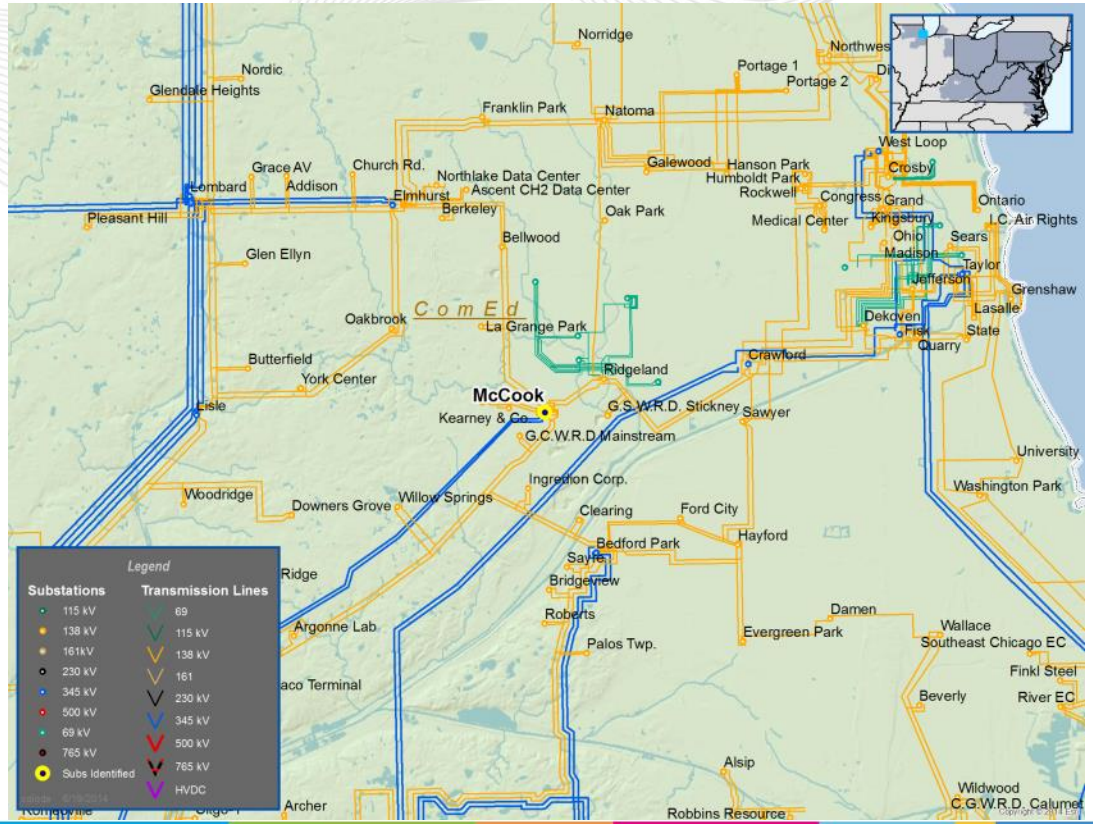
ComEd Transmission Zone

- **Supplemental Project**
- Replace Davis Creek 345 kV bus tie 3-4 (S0722)
- Estimated Project Cost: $1.8M
- Projected IS Date: 6/1/2015



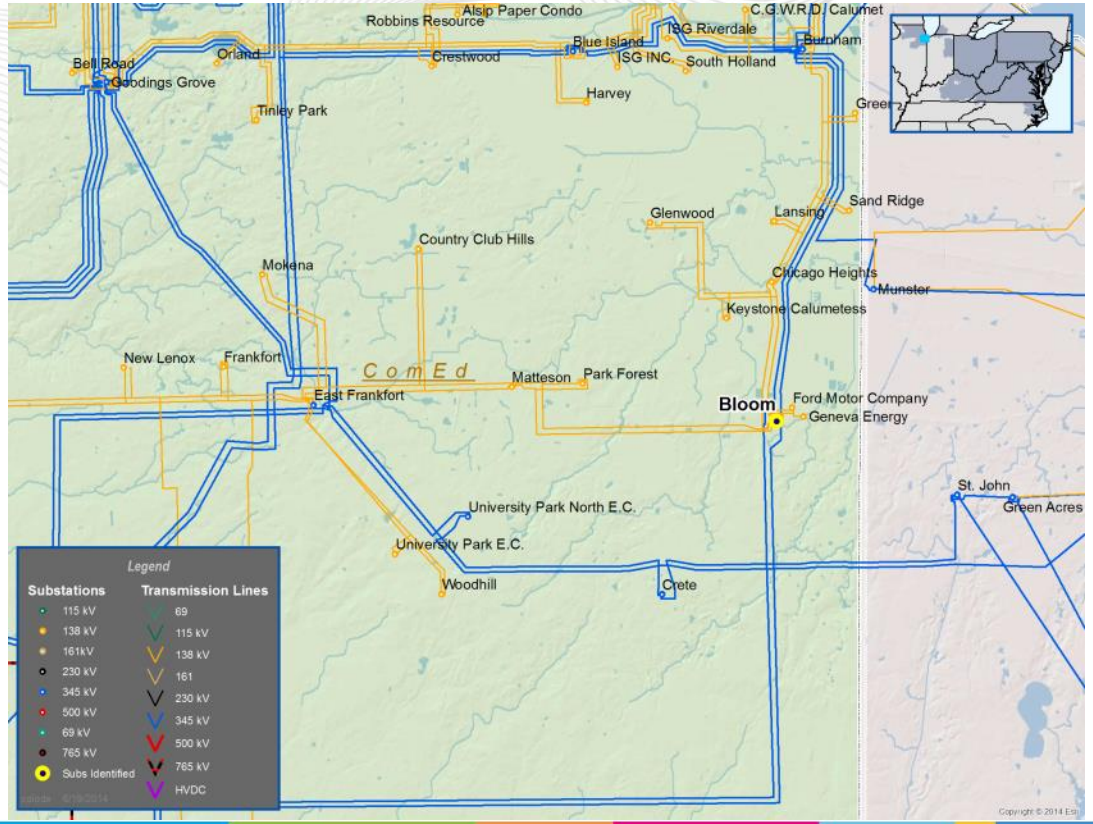
ComEd Transmission Zone

- **Supplemental Project**
- Replace McCook 345/138KV TR 82, replace high-side MOD with 345 kV circuit breaker (S0723)
- Estimated Project Cost: $4.5M
- Projected IS Date: 6/1/2015



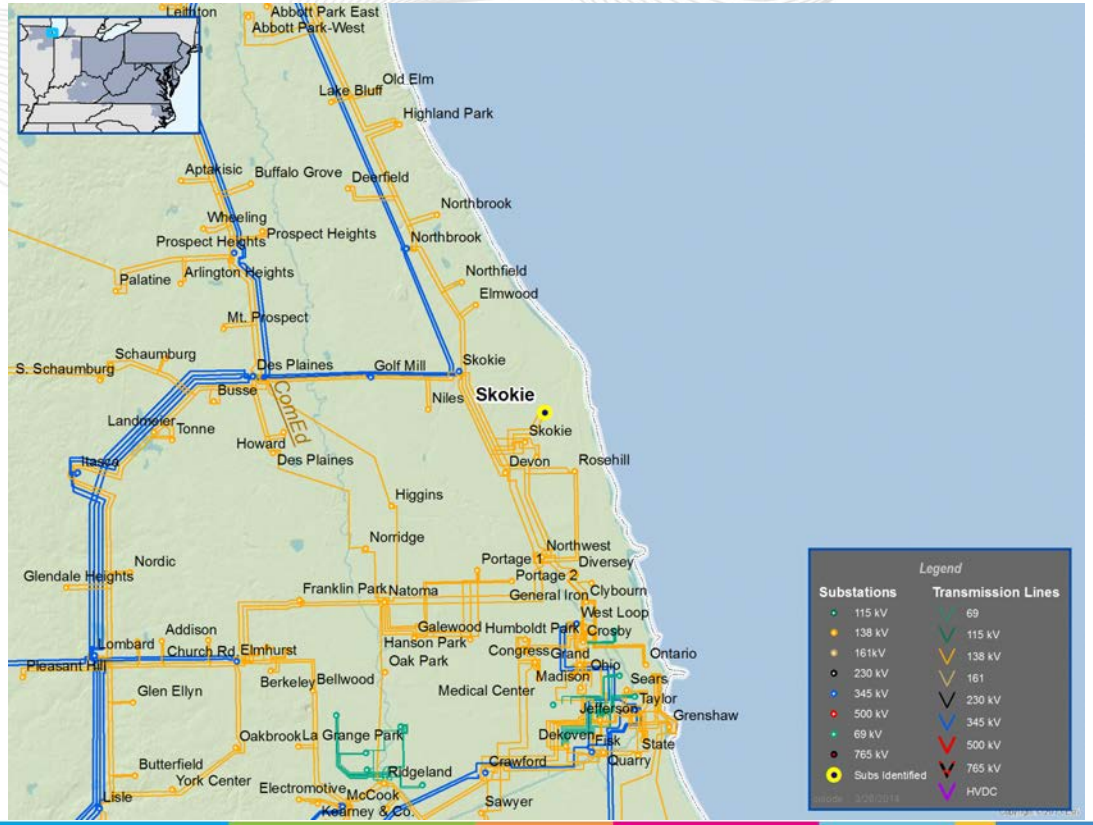
ComEd Transmission Zone

- **Supplemental Project**
- Replace Bloom 345/138KV TR 84, replace high-side MOD with 345 kV circuit breaker (S0724)
- Estimated Project Cost: $4.5M
- Projected IS Date: 6/1/2015



ComEd Transmission Zone

- **Supplemental Project**
- Replace Skokie 345/138kV TR 84, replace high-side MOD with 345 kV circuit breaker (S0725)
- Estimated Project Cost: $4.5M
- Projected IS Date: 6/1/2015

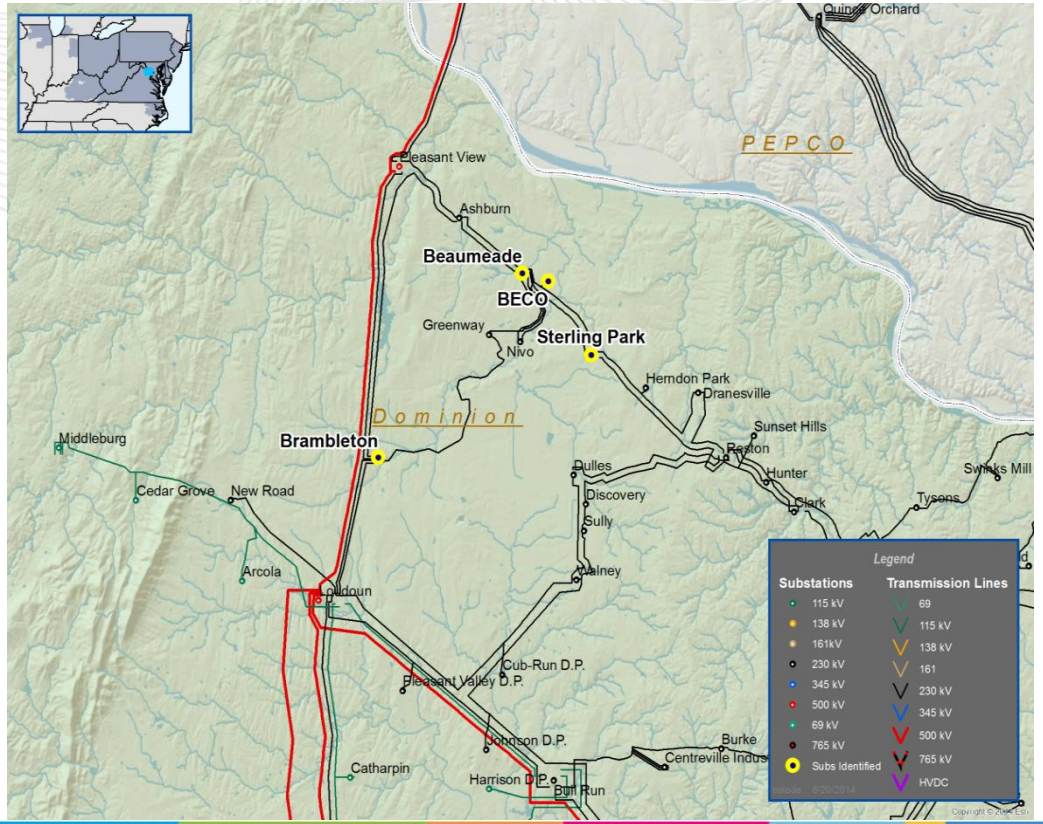


Dominion Transmission Zone

- Supplemental:
- Dominion Distribution (DVP) has submitted a Delivery Point (DP) Request for a proposed Pacific Substation (site acquired near Moran Rd and Pacific Blvd) for 60 MW load growing to over 100 MW by 2020.
- Proposed Solution:
  - Loop (in-and-out) an overhead, double-circuit, 230kV transmission line extension approximately 2 miles (along new right-of-way) from either Line #2137 (Brambleton-BECO) or Line #2081 (Beaumeade-Sterling Park) (S0744.1).
  - Install four 230kV breakers in a six-breaker ring arrangement to accommodate the connection of DVP 230-34.5kV transformers (S0744.2).
- Estimated Project Cost:

  $ 15 M
- Projected IS Date:

  5/31/2016

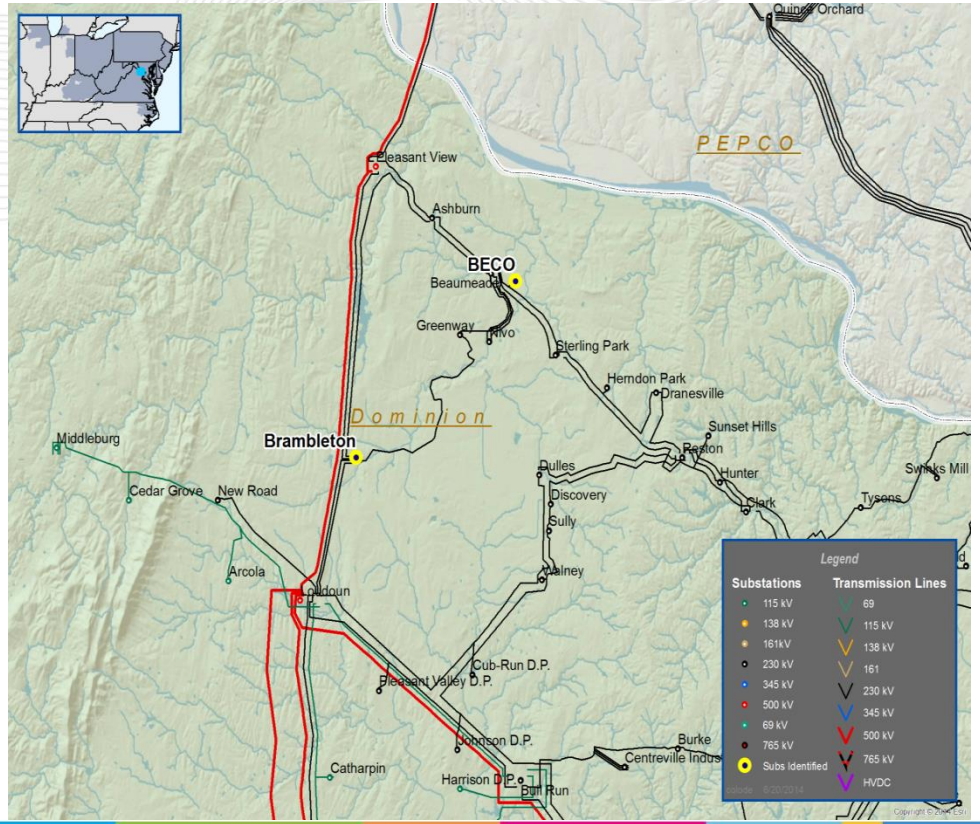


Dominion Transmission Zone

- Supplemental:
- Northern Virginia Electric Cooperative (NOVEC) has submitted a Delivery Point Request for a proposed Runway Substation for 8 MW load growing to over 15 MW by 2020 .
- Proposed Solution:
  - Tap Line #2137 (Brambleton-BECO) between structures 2095/57 and 2095/59. Install appropriate 230 kV transmission structures to accommodate tapping to DVP's backbone structure, including 2 – 230 kV air-break switches with vacuum bottle attachments (S0745).
- Estimated Project Cost:

  $ 0.75 M
- Projected IS Date:

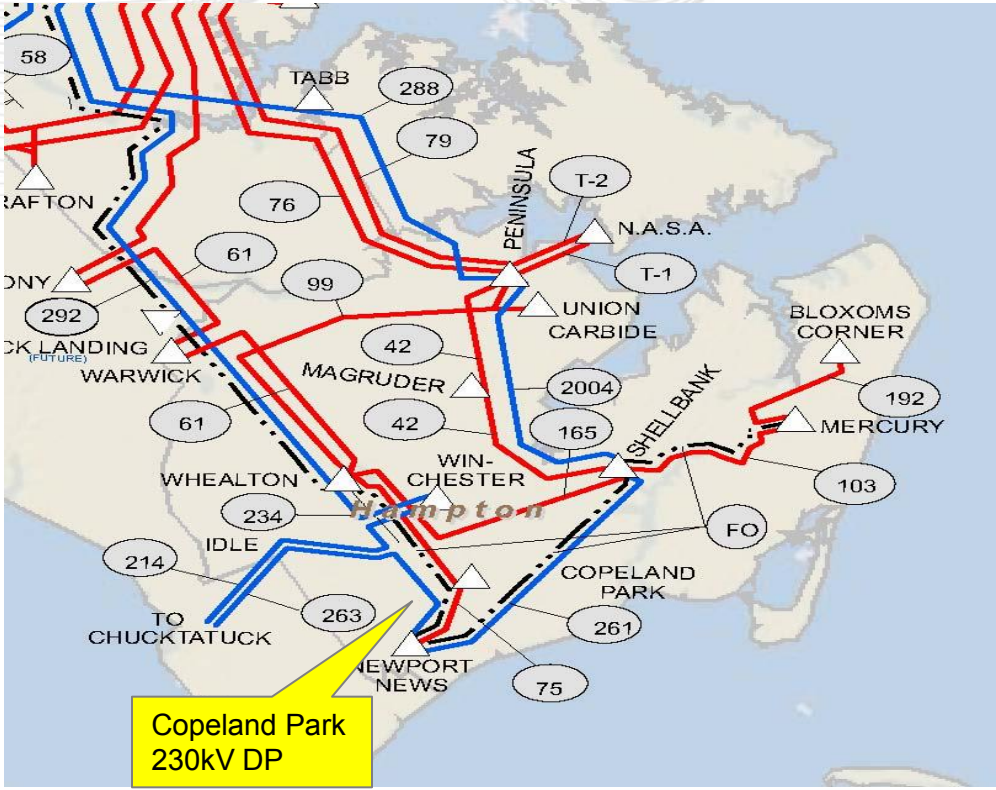
  5/30/2015



Dominion Transmission Zone

- Supplemental:
- Replace existing 115kV Delivery Point with 230kV Delivery Point for greater capacity.
- Transfer 8 MW from Newport News to the new 230kV delivery point. DP also needed to support Newport News transformer contingency.
- Projected load is 24.5MW in 2015 growing to 30 MW by 2025.

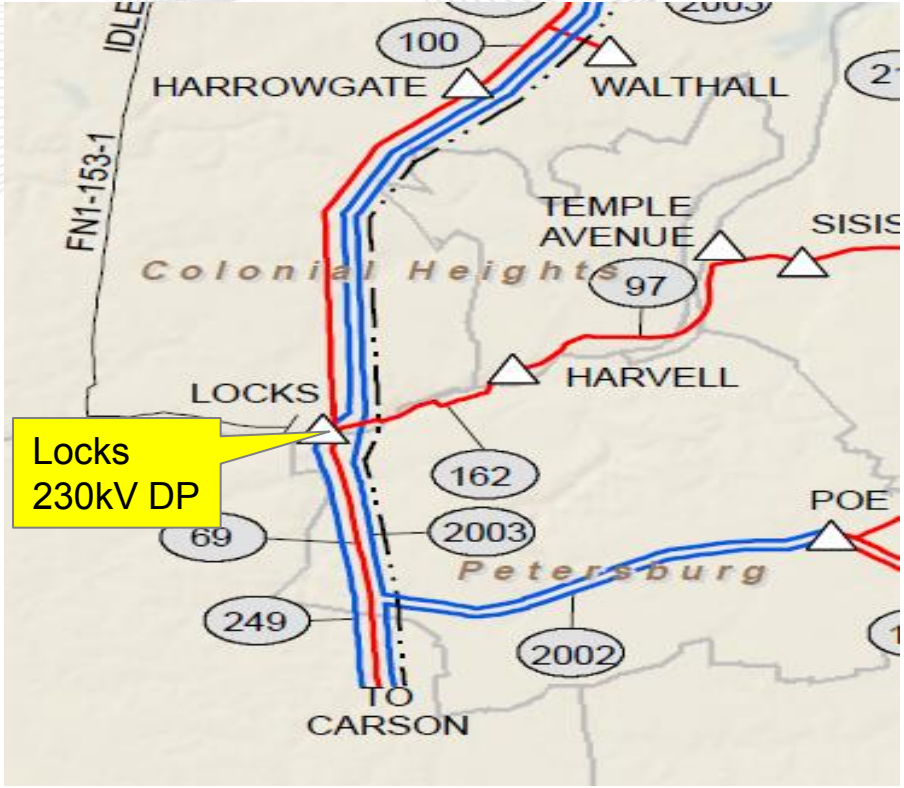
- Proposed Solution:
  - Copeland Park 230kV Delivery - Install 230kV Backbone, associated equipment and transformer high side circuit switcher (S0752).
- Estimated Project Cost:
  $ 0.8 M
- Projected IS Date:
  5/31/2015



Dominion Transmission Zone

- Supplemental:
- Transferring 31 MW (winter) from Locks 115 kV to the new 230kV DP needed for transformer contingency (exceeds mobile transformer rating).
- Projected load is 38 MW by 2025.

- Proposed Solution:
  - Relocate section of Lacks 230 kV bus and install high side switch and circuit switcher (S0754).
- Estimated Project Cost:
  $ 0.5 M
- Projected IS Date:
  11/30/2014



Questions?

Email: RTEP@pjm.com

Revision History

- 7/9/2014 - Original version distributed to PJM TEAC.
- 7/14/2014 – Updated slide #33 and added slides #42-#48 to align with the list of facilities posted for the 2014 RTEP Proposal Window #1.
- 7/22/2014 – Updated contingency description in slides #24, #25 to align with the contingency definition for the 2014 RTEP Proposal Window #1.