



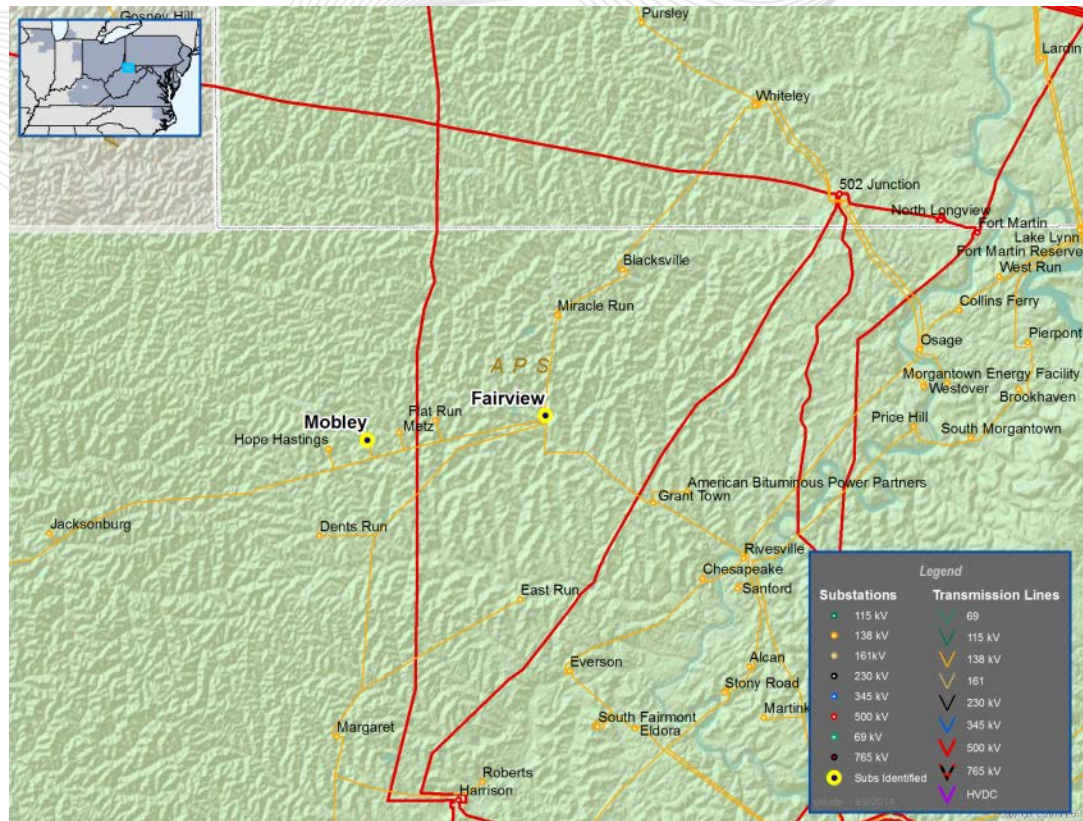
Sub Regional RTEP Committee PJM West

September 24, 2014



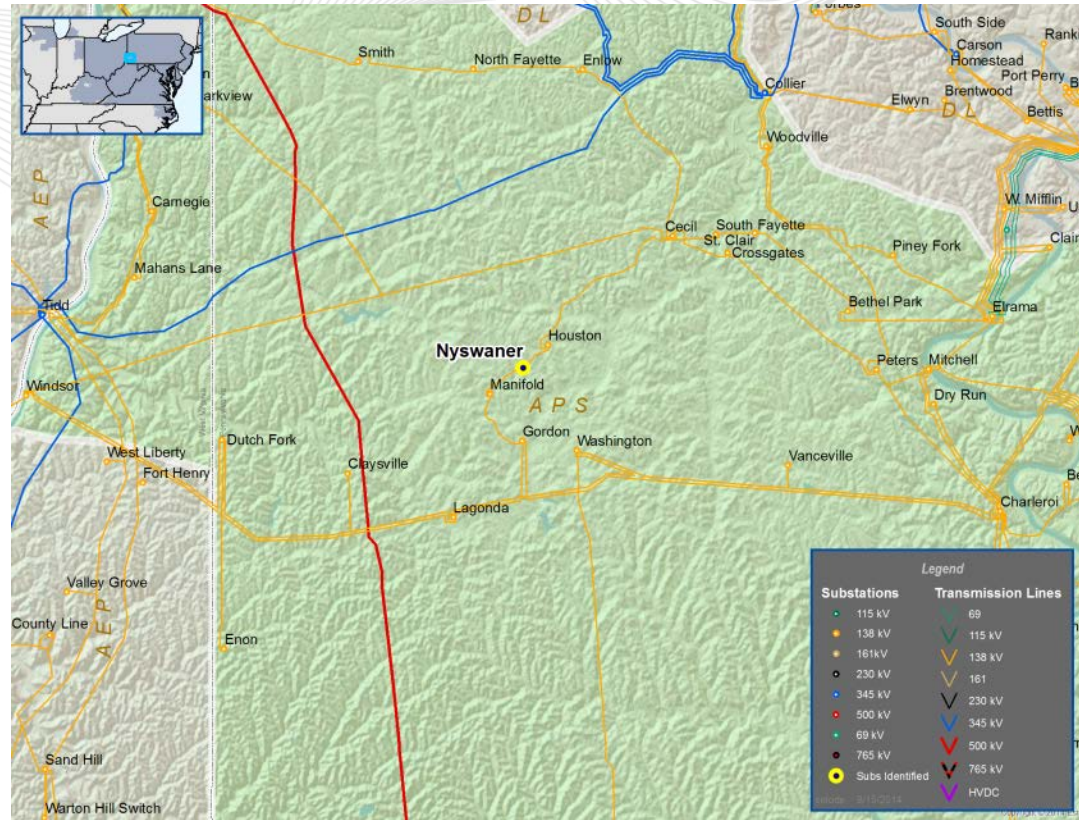
Reliability Analysis Update

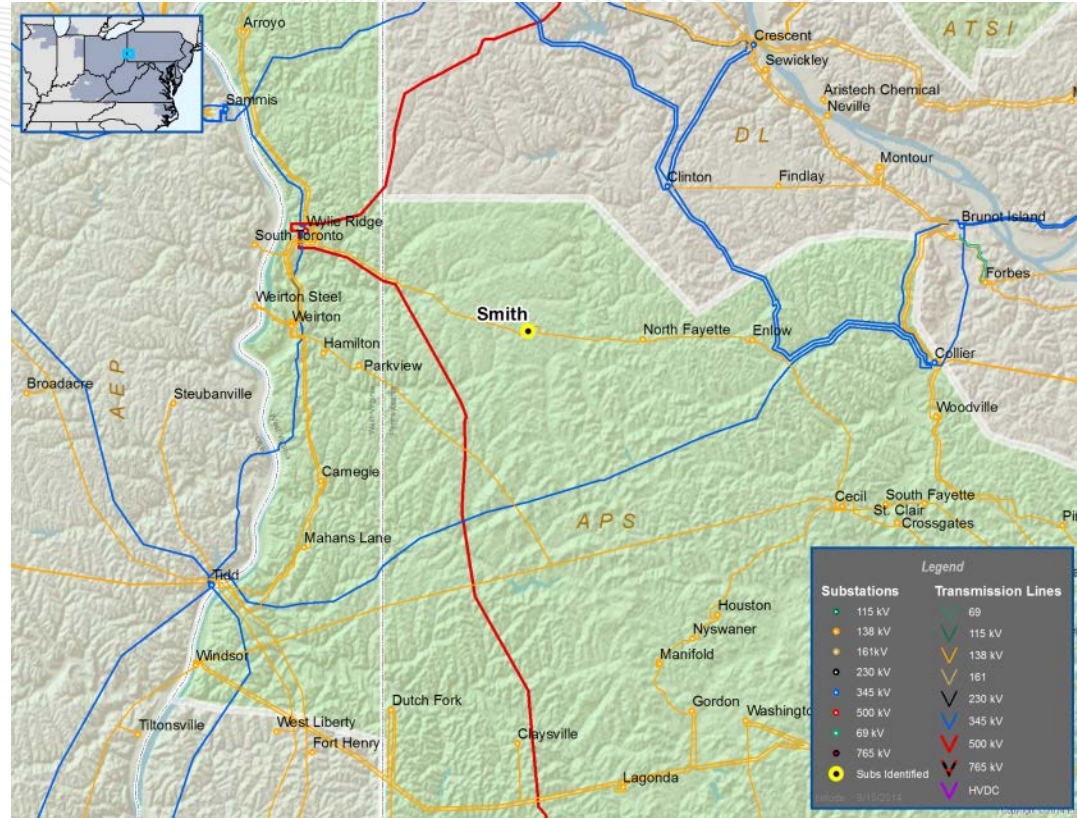
- N-1 Voltage Violation
- Driver: Block load addition in the APS zone
- Lead time: less than 24 months
- N-1 Low voltage and voltage drop violation at Mobley 138 kV and surrounding buses for multiple contingencies
- Construct a new 138 kV substation (Shuman Hill substation) connected to the Fairview-Willow Island (84) 138 kV line(B2545.1)
- Install a ring bus station with five active positions and two 52.8 Mvar capacitors with 0.941 mH reactors(B2545.2)
- Install a +90/-30 Mvar SVC protected by a 138 kV breaker(B2545.3)
- Remove the 31.7MVAR capacitor bank at Mobley 138 kV (B2545.4)
- Estimated Project Cost: \$40M
- Required IS Date: 7/1/2015



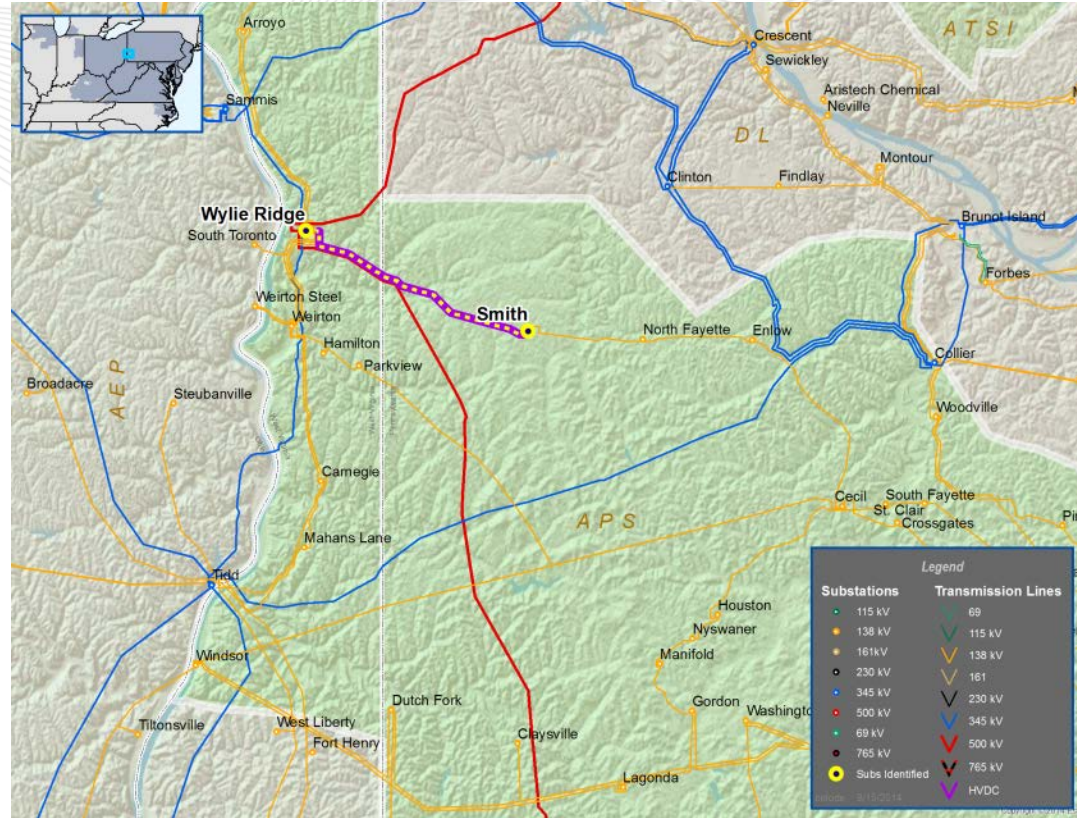
• N-1-1 Voltage Violation

- Driver: Block load addition in the APS zone
- Lead time: less than 24 months
- Low Voltage at Gordon, and Lagonda 138 kV buses for the loss of Cecil-Houston 138 kV line and the loss of Charleroi-Gordon 138 kV line
- Install a 51.8 MVAR (Rated) 138 kV Capacitor at Nyswaner 138kV substation (B2546)
- Estimated Project Cost: \$1.0M
- Required IS Date: 4/1/2015

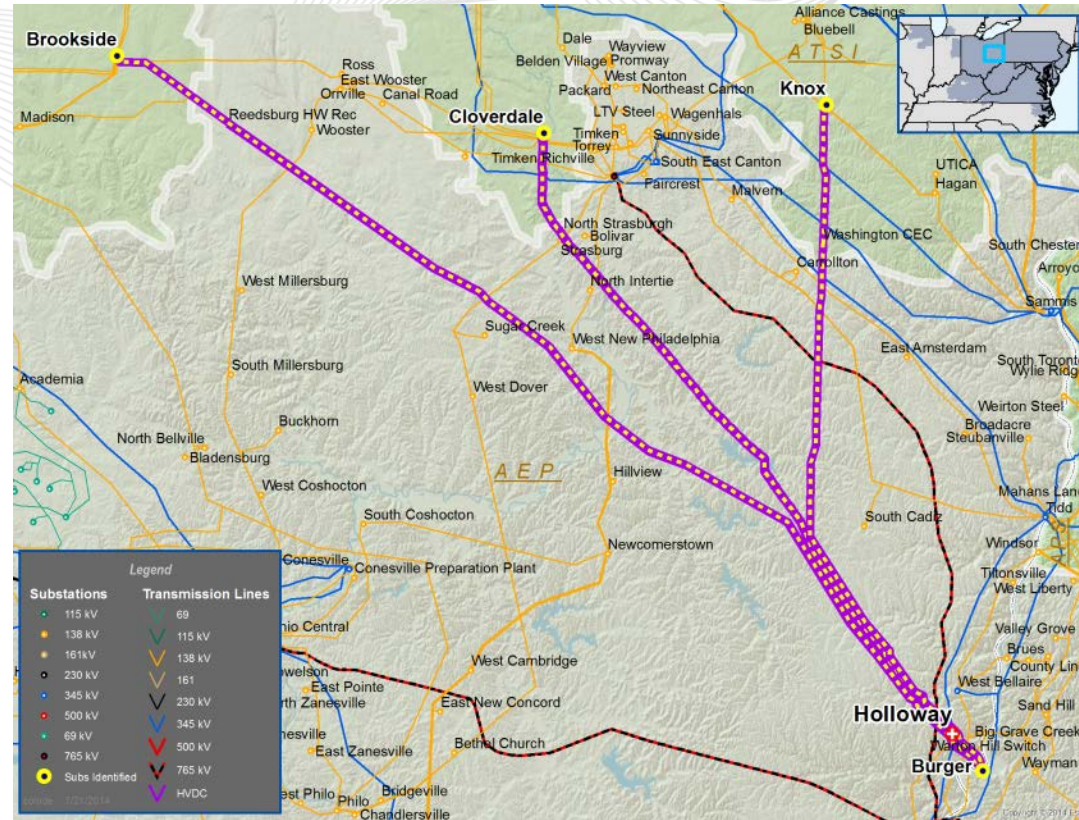




- **N-1 Voltage Violation**
- Driver: Block load addition in the APS zone
- Lead time: less than 24 months
- Low Voltage and Voltage Drop at Smith, Enlow, North Fayette, Hillman, and Imperial 138 kV buses for the loss of Smith – Wylie Ridge 138 kV line
- Construct new 138 kV 6 breaker ring bus Hillman substation (B2547.1)
- Loop Smith-Imperial 138 kV line into the new Hillman substation (B2547.2)
- Install +125/-75 MVAR SVC at Hillman substation (B2547.3)
- Install two 31.7Mvar 138kV capacitors (B2547.4)
- Estimated Project Cost: \$31.5M
- Required IS Date: 2/1/2016



- Basecase N-1 Thermal Violation
- Driver: Block load addition in the APS zone
- Lead time: less than 24 months
- The Wylie Ridge –Smith 138 kV line is overloaded in base case and for multiple single contingencies
- Eliminate Clearance De-Rate on Wylie Ridge-Smith and upgrade terminals at Smith; New Line Rating 294 MVA (Rate A) and 350 MVA (Rate B) (B2548)
- Estimated Project Cost: \$2.3M
- Required IS Date: 2/1/2016



Addition to B2019 Project Scope

B2019: Establish Burger (Holloway) 345/138 kV station

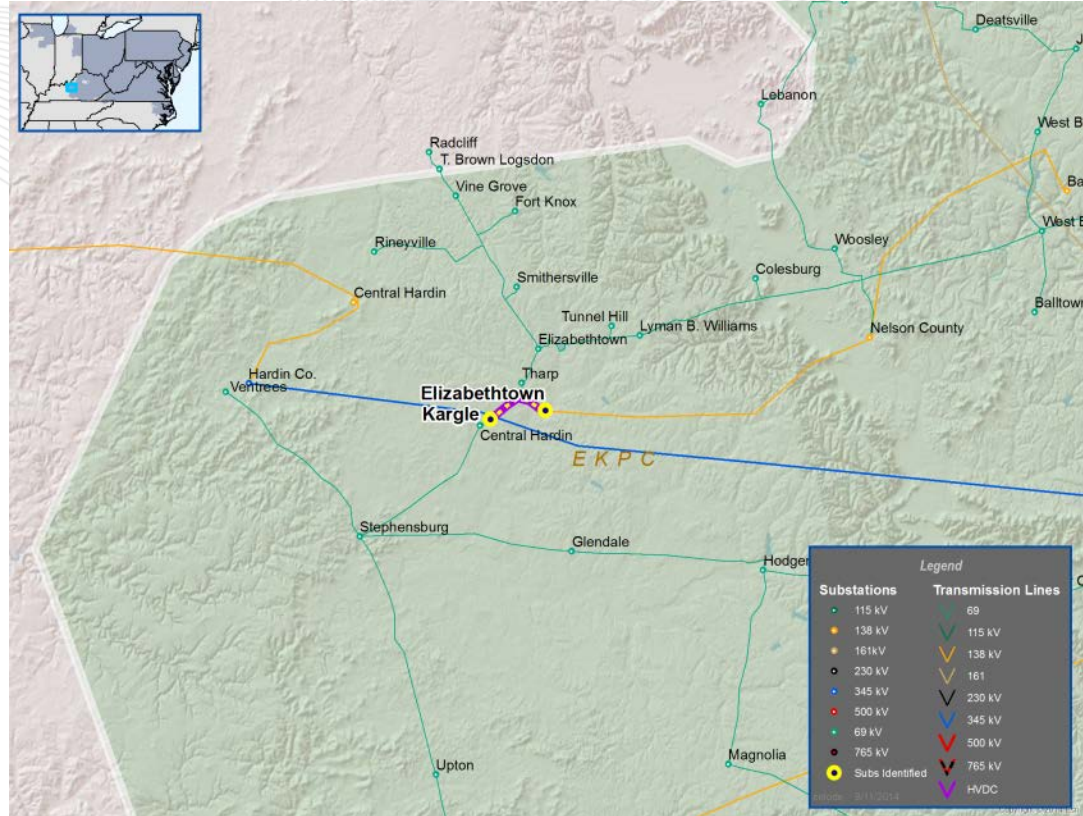
Terminate the Burger-Longview 138kV, Burger-Brookside 138kV, Burger-Cloverdale #1 138kV, and Burger-Harmon #2 138kV line into the new Holloway substation and Loop the Burger-Harmon #1 138kV and Burger-Knox 138kV lines into the new Holloway substation. (B2019.2)

Reconfigure Burger 138kV substation to accommodate two 138kV line exits and the generation facilities. (B2019.3)

Estimated Project Cost: \$1.5M

Required IS Date: 6/1/2014

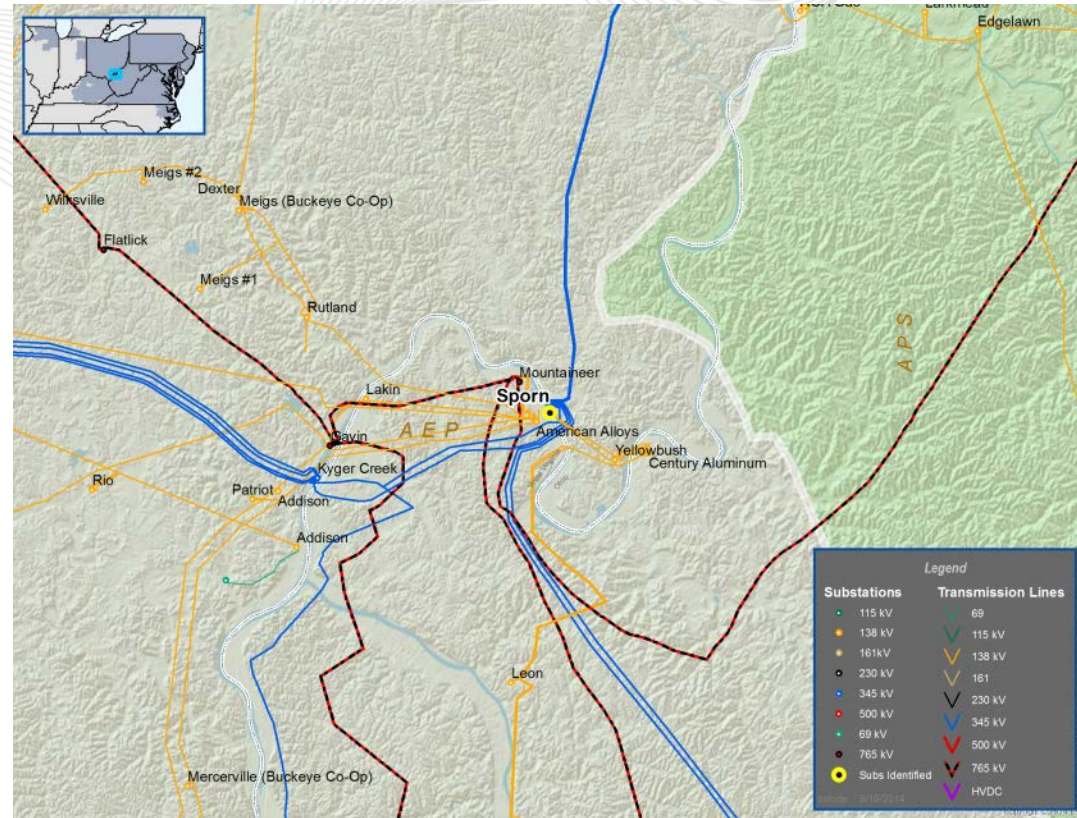
- EKPC Criteria Violation
- The Kargle-KU Elizabethtown 69 KV line section is overloaded for an outage of the Central Hardin-Hardin County 138 KV line section with LGE/KU's brown #3 out.
- Increase the MOT of the 266.8 MCM ACSR section (1.4 miles), of the Kargle-KU Elizabethtown 69 KV line section to 266°F. (B2544)
- Estimated Project Cost: \$0.0276M
- Required IS Date: 6/1/2015



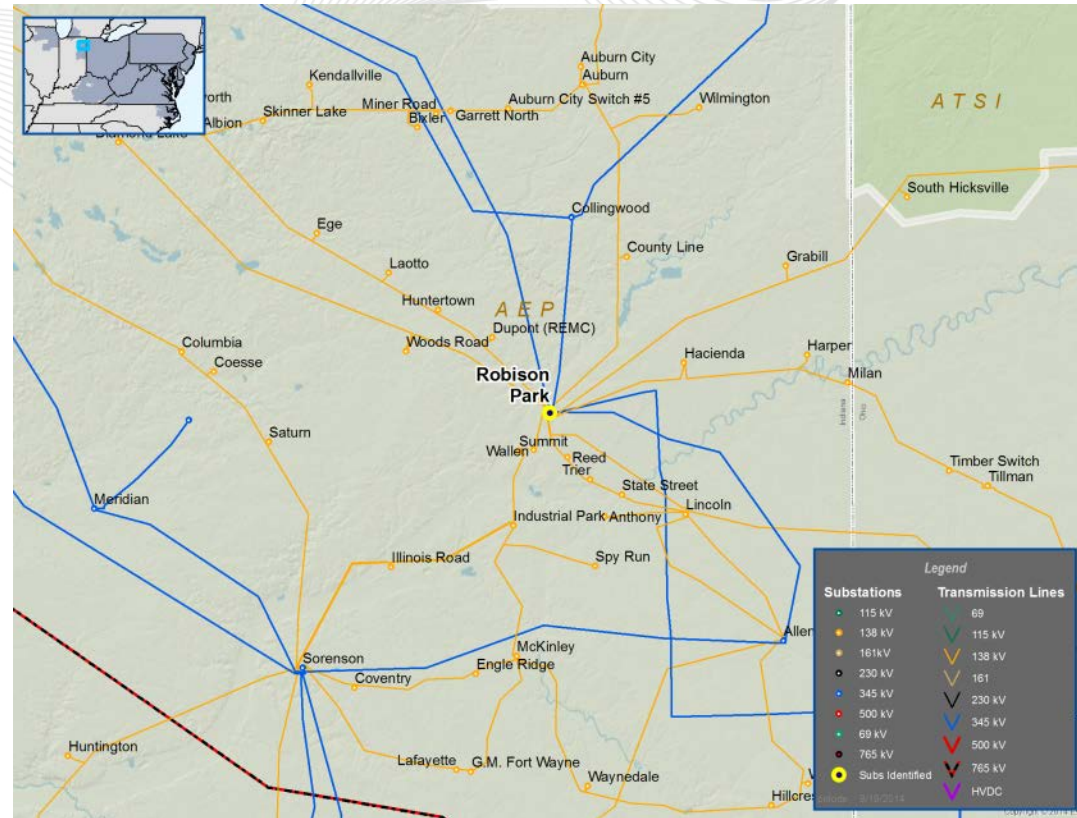


Short Circuit

- The Sporn 138kV breakers 'D', 'G1', 'O', 'O1', 'O2', 'P2', and 'U' are overstressed
- Proposed Solution: Replace the Sporn 138kV breakers 'D', 'G1', 'O', 'O1', 'O2', 'P2', and 'U' with 80kA breakers (B2530 - B2536)
- Estimated Project Cost: \$1M per breaker
- Required IS Date: 6/1/2018



- The Robinson Park 138 kV breakers 'A1', 'A2', 'B1', 'B2', 'C1', 'C2', 'D1', 'D2', 'E1', 'E2', and 'F1' are overstressed
- Proposed Solution: Replace the Robinson Park 138 kV breakers 'A1', 'A2', 'B1', 'B2', 'C1', 'C2', 'D1', 'D2', 'E1', 'E2', and 'F1' with 63 kA breakers (B2537)
- Estimated Project Cost: \$15M
- Required IS Date: 6/1/2016

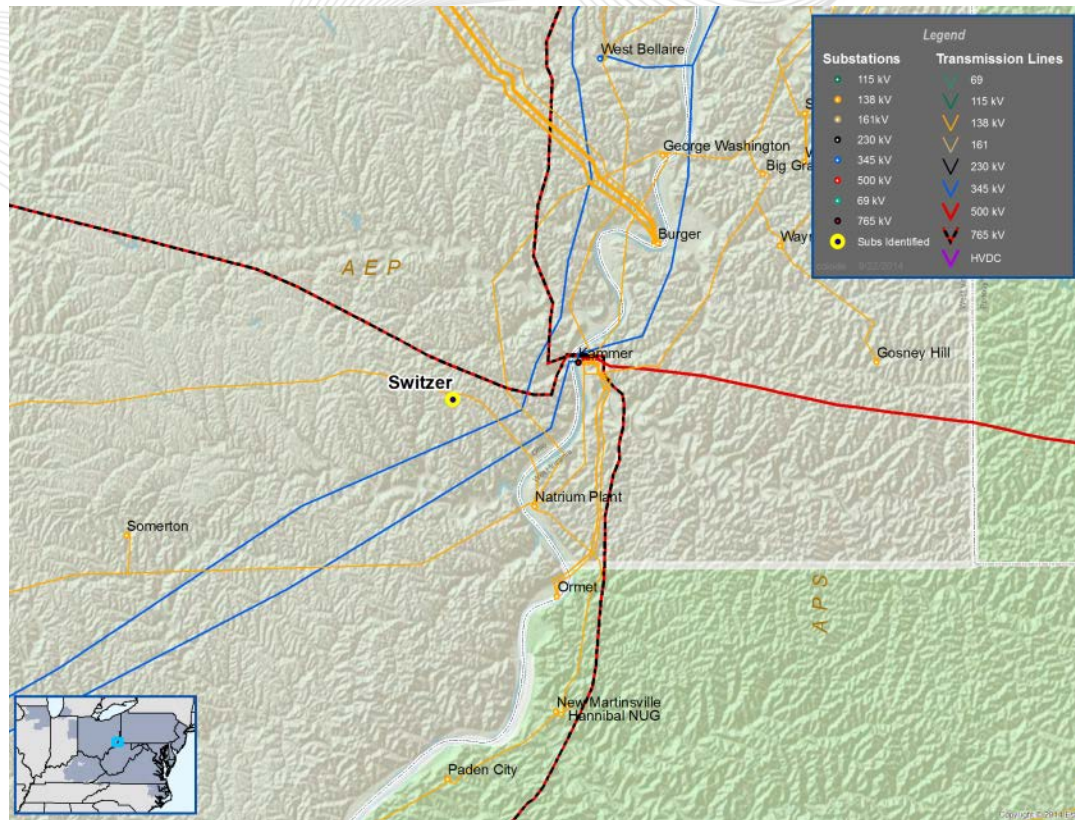




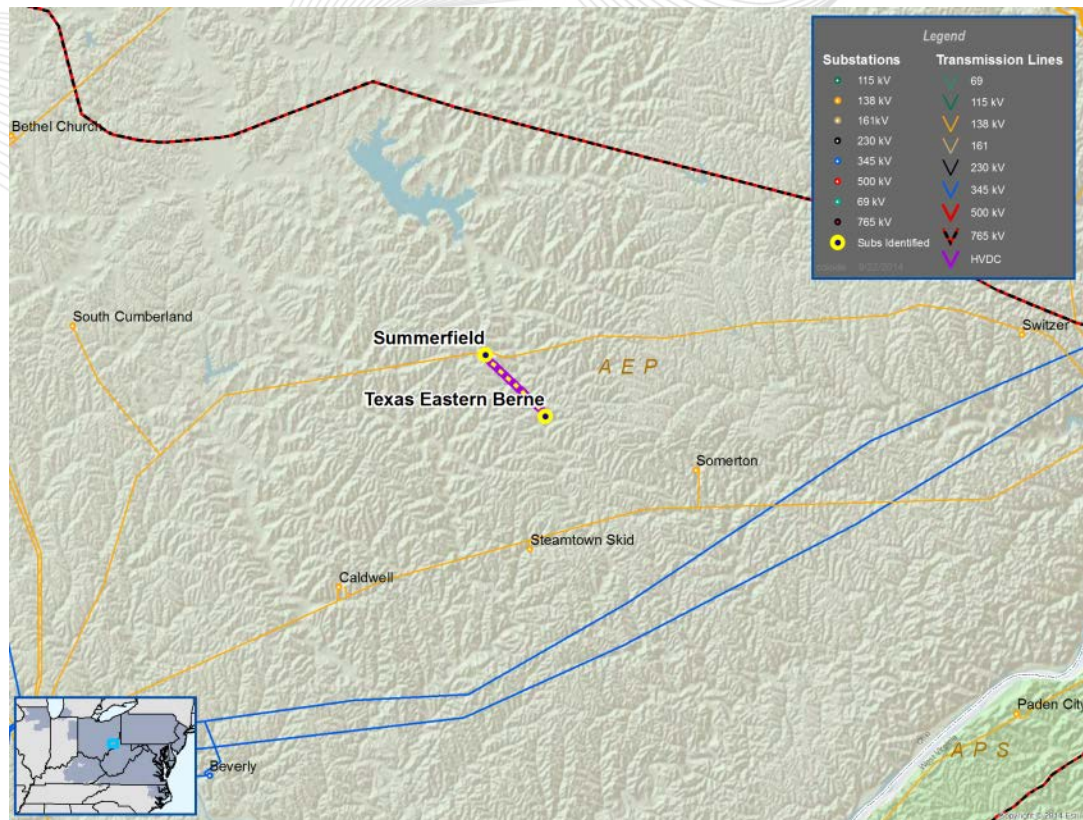
Supplemental Projects

- Supplemental Project

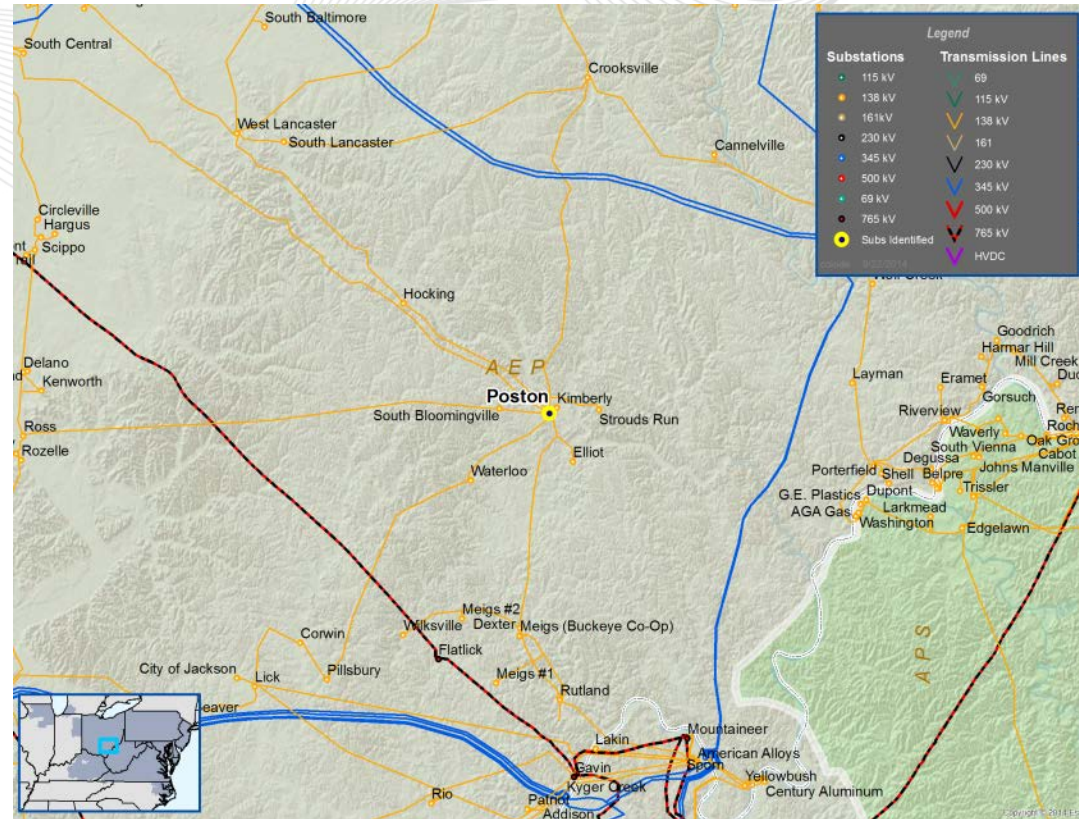
- Rebuild existing 138/69V Switzer Station with accommodations for 138kV line MOAB's, and a 138/69kV 50MVA transformer with high side circuit switcher and 69kV breakers towards Cameron Sw and Powhattan. (S0765)
- Estimated Project Cost: \$5.23M
- Projected IS Date: 6/8/2015



- Supplemental Project
- Build 138kV Blue Racer Station tapping the existing Summerfield – Berne 138kV radial line. The Blue Racer Station is configured on a box bay arrangement with line breakers and future exits to make provisions for looped facilities. (S0766)
- Estimated Project Cost: \$5.35M
- Projected IS Date: 11/1/2015



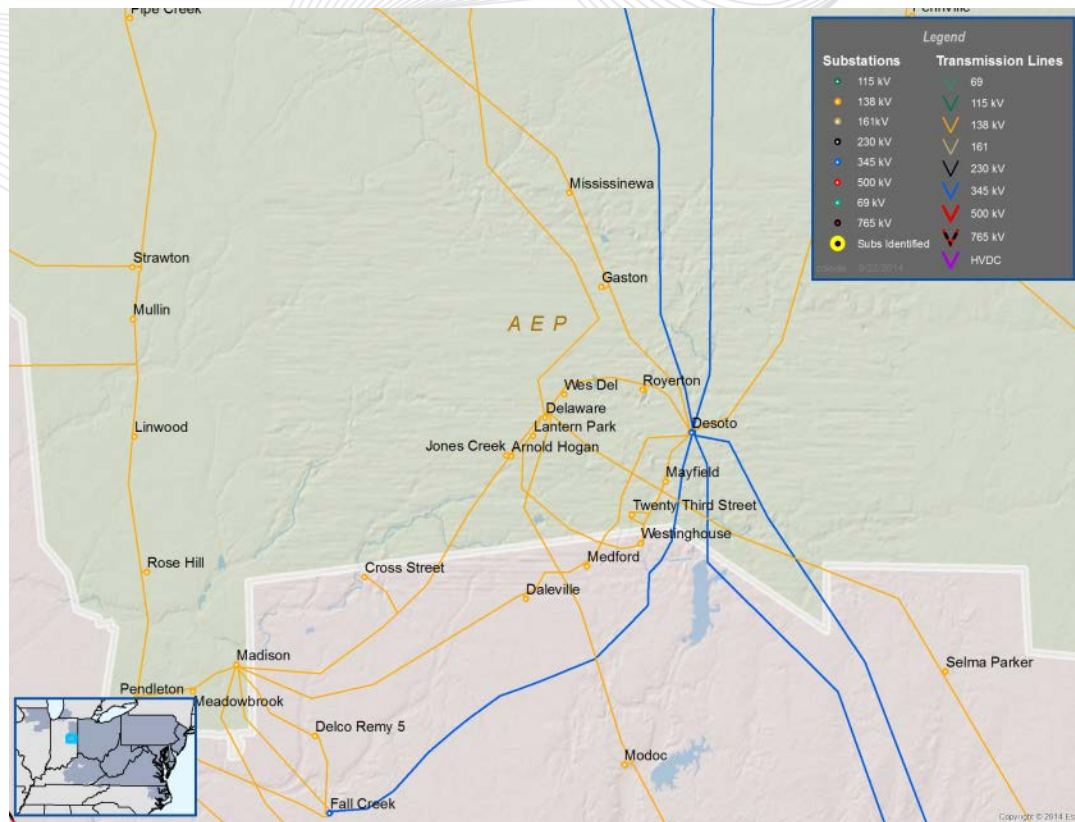
- Supplemental Project
- Provide a new 138 kV source at Elk Station and retire Poston – Coalton Tap section of the Poston – Floodwood, Floodwood – Berlin and 18% of the Berlin – Ross 69 kV line 40 miles of 90 year old 69 kV line. (S0767.1)
- Rebuild and relocate the Poston – Lick 138 kV line out of the Vinton Furnace Experimental Forest (part of Zaleski State Forest). (S0767.2)
- Estimated Project Cost: \$70M
- Projected IS Date: 7/1/2017



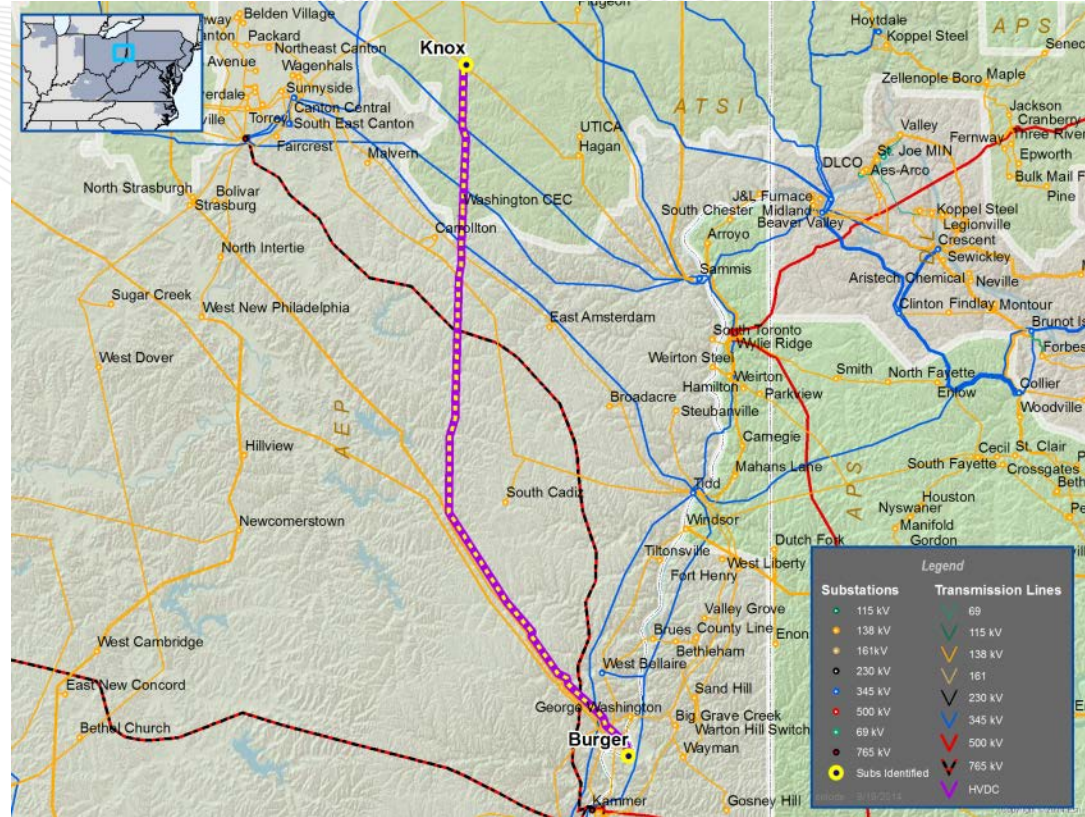


AEP Transmission Zone

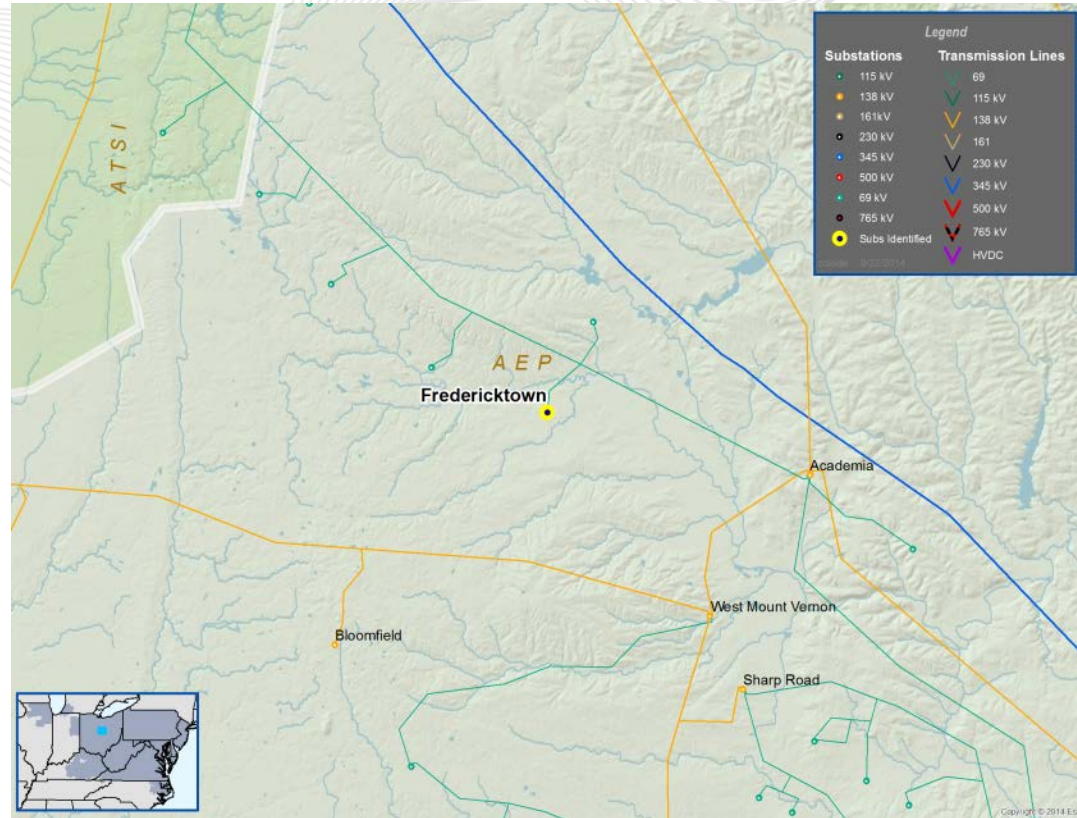
- Supplemental Project
- Load addition to the Lincoln Street 34.5KV switch Station. (S0768)
- Estimated Project Cost: \$0.5M
- Projected IS Date: 4/1/2015



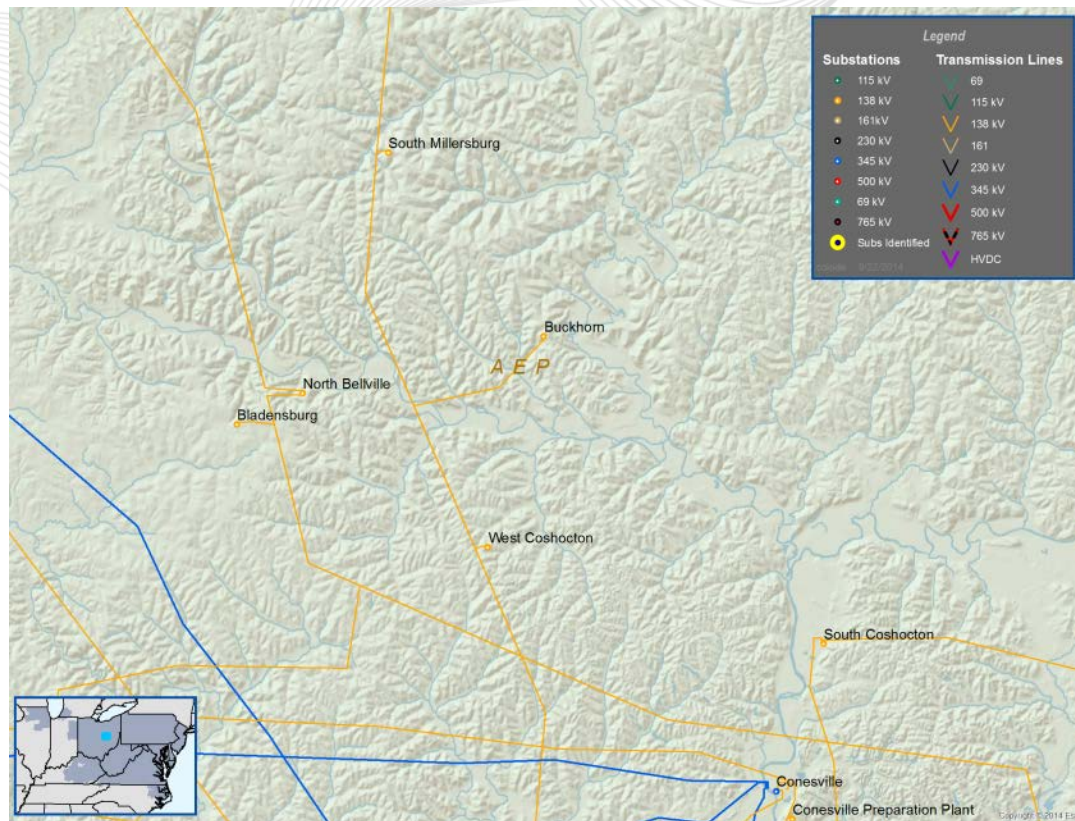
- Supplemental Project
- Tap First Energy's Burger-Knox 138kV line and install three one way switches, build 1.4 miles of 138kV line to customer facility and meter customer at 138kV. Install a 138kV mobile capacitor bank. (S0769)
- Estimated Project Cost: \$2.5M
- Projected IS Date: 10/26/2014



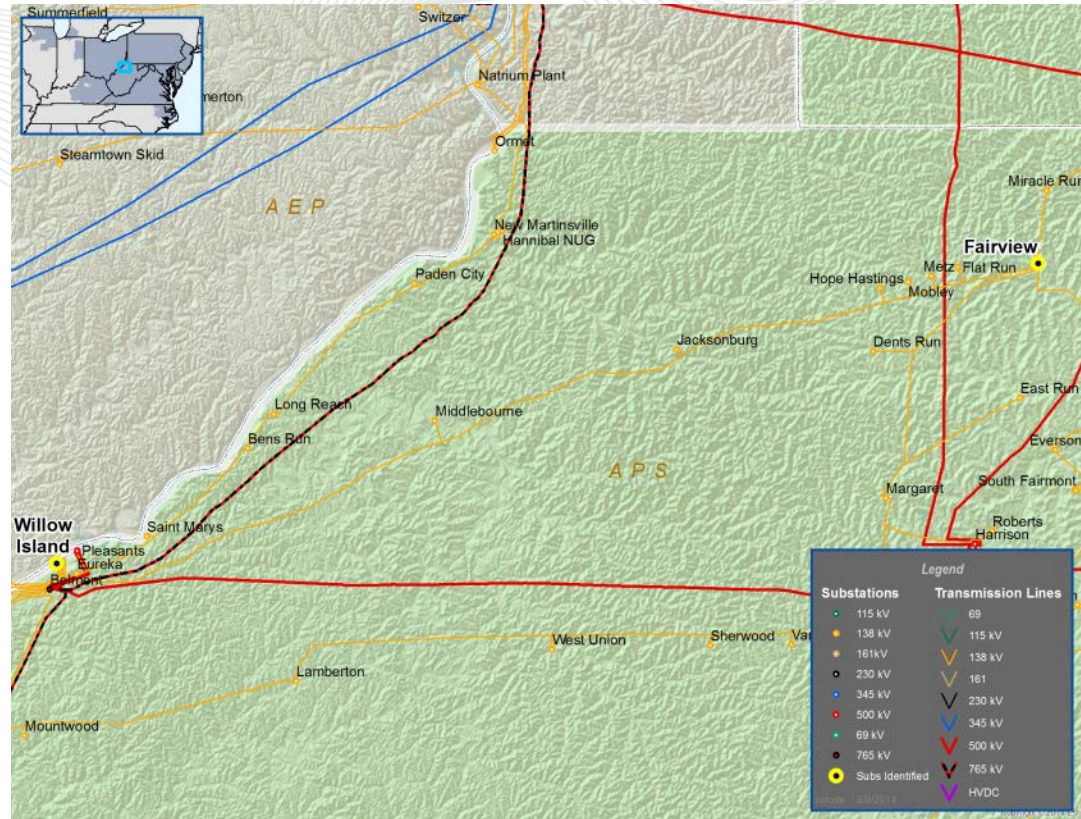
- Supplemental Project
- Replace 69 kV GOAB Switch and MOAB Switch “W” at East Fredericktown Sw with 69 kV circuit breakers.(S0770)
- Estimated Project Cost: \$7M
- Projected IS Date: 4/1/2016



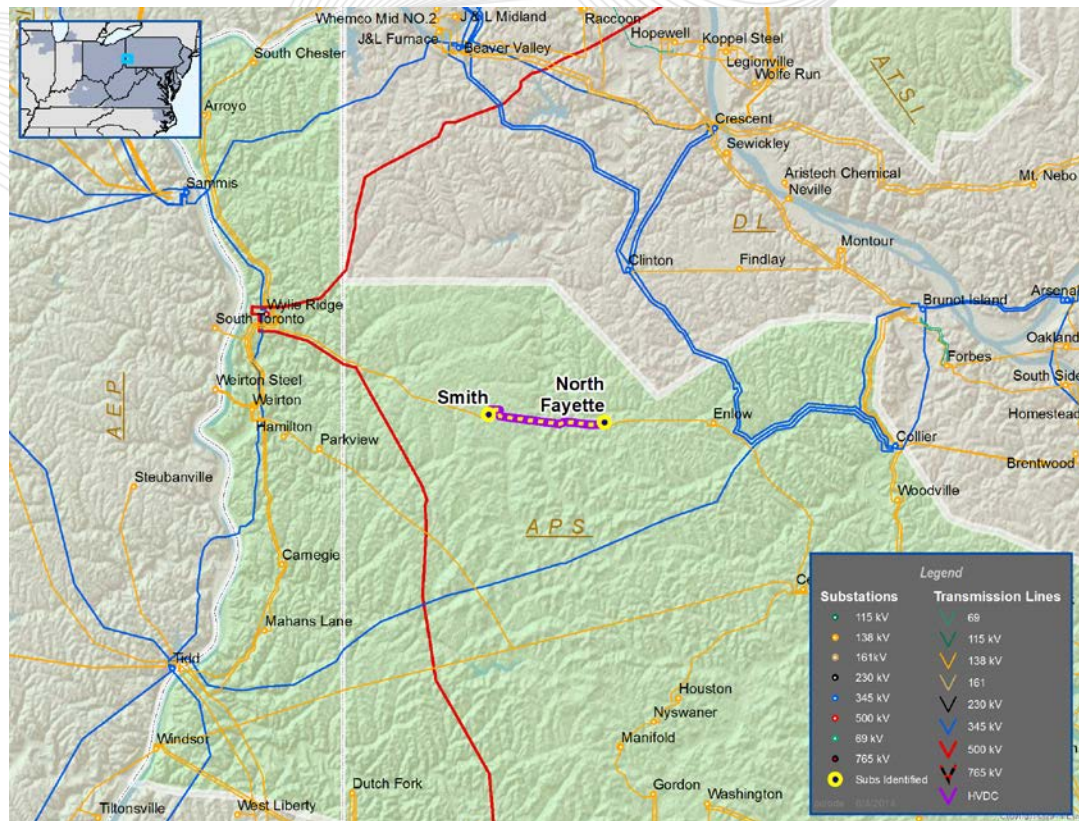
- Supplemental Project
- Replace the switch at South Warsaw Sw 34 kV with a 3-way POP and MOAB Switch towards the Moscow Sw. (S0771)
- Estimated Project Cost: \$0.49M
- Projected IS Date: 6/1/2015



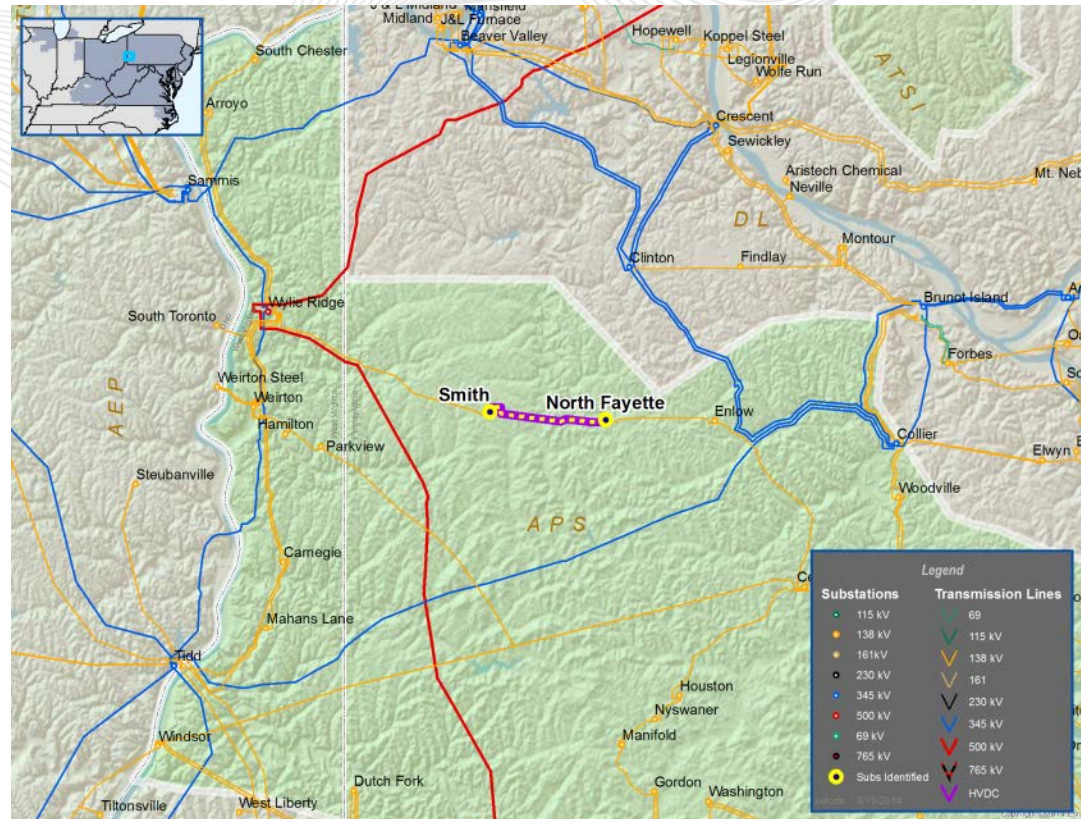
- Supplemental Project
- Loop the Fairview-Willow Island (84) 138 kV line into the new Shuman Hill 138 kV Station and install two 138 kV breakers (S0784)
- Estimated Project Cost: \$5.1M
- Projected IS Date: 7/1/2015



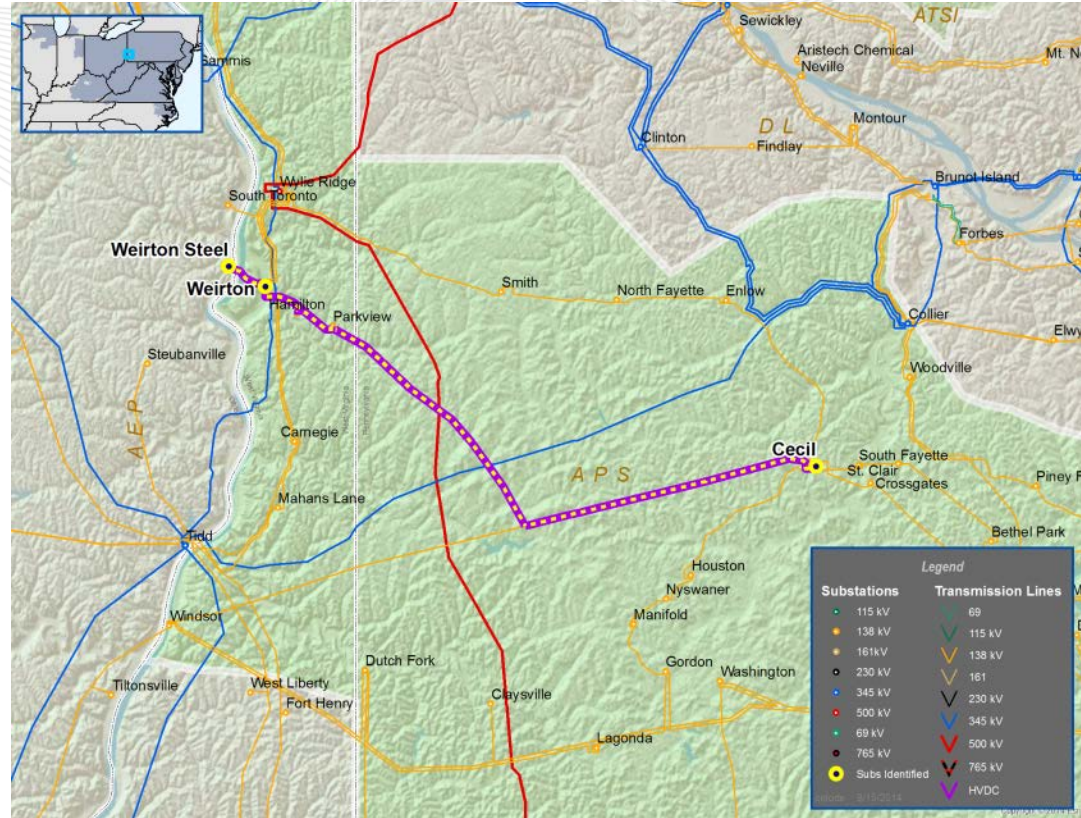
- Supplemental Project
- Load connection to Tap into the Smith – North Fayette 138kV line; Construct approximately 1.3 miles of 138kV line to customer dead-end and install 3 SCADA controlled 138kV switches and two 138kV meters; Install a 138kV breaker on the North Fayette terminal at Smith 138KV substation (S0736)
- Estimated Project Cost: \$3.8M
- Projected IS Date: 8/1/2015



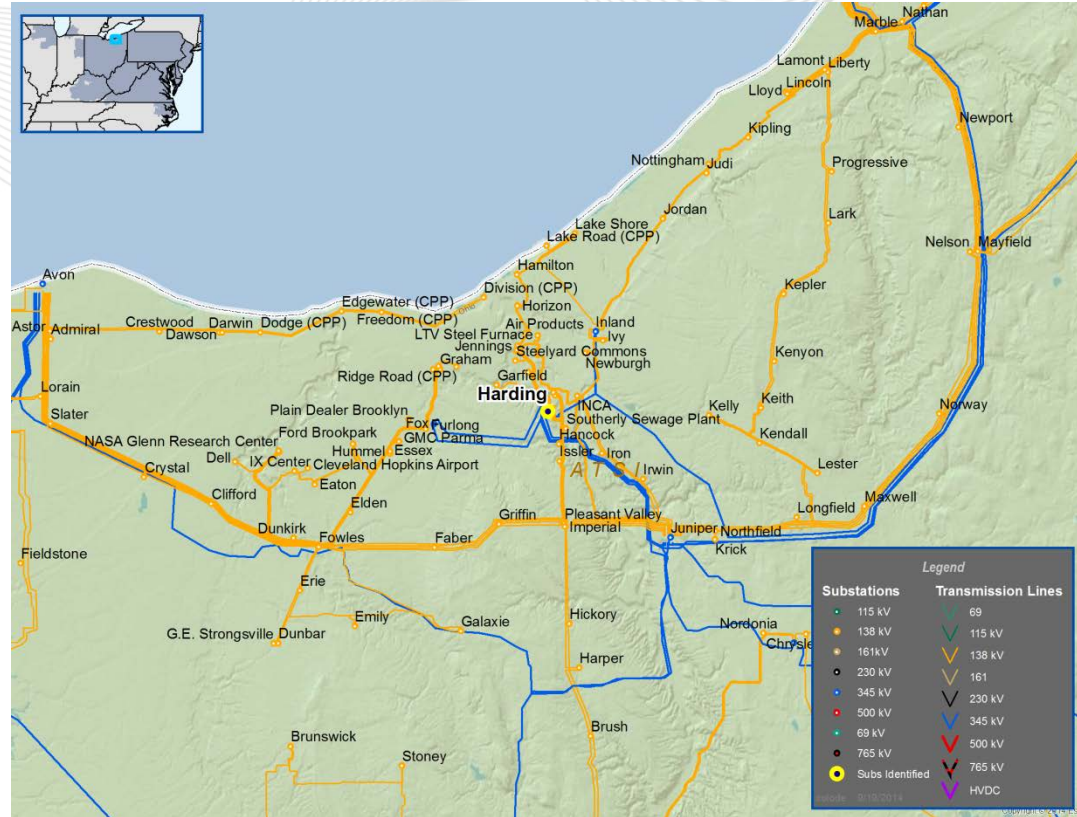
- Supplemental Project
- New load at Hillman: Tap the Smith-Imperial 138 kV line and provide 138 kV meter (S0785)
- Estimated Project Cost: N/A
- Projected IS Date: 2/1/2016



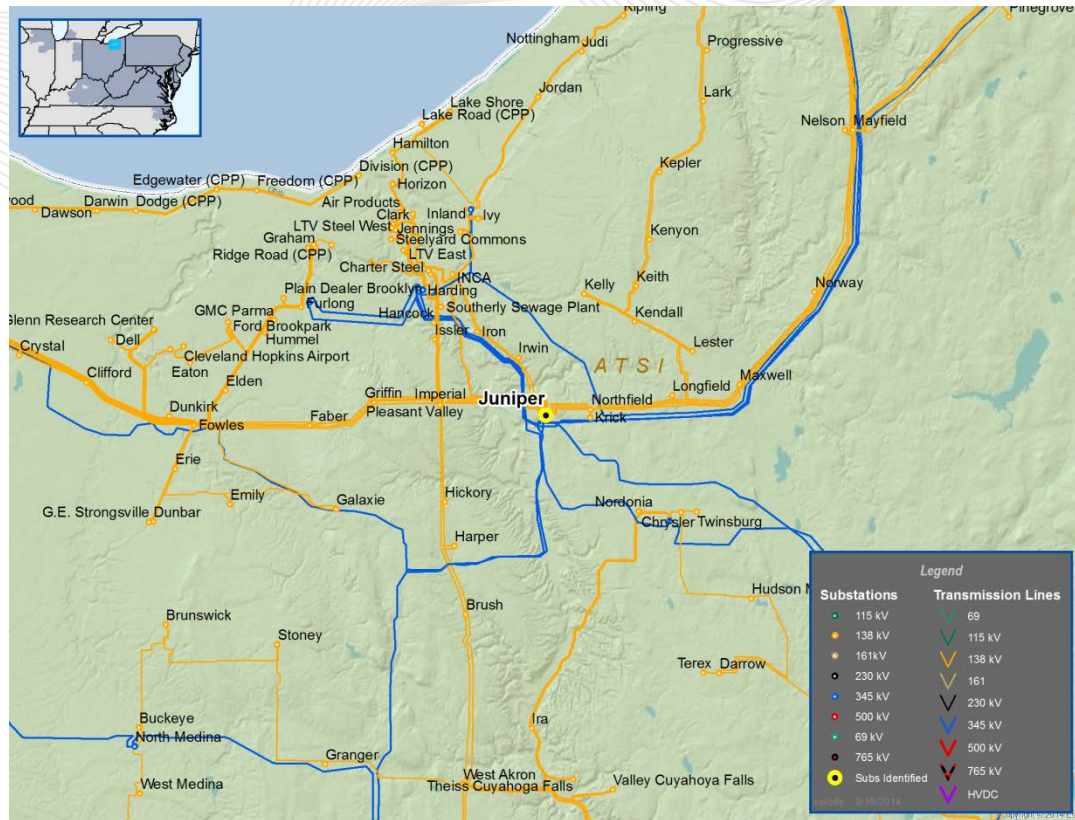
- Supplemental Project
- New load at Gula: Tap the Cecil-Windsor-Weirton 138 kV line and provide 138 kV meter (S0786)
- Estimated Project Cost: N/A
- Projected IS Date: 12/1/2017



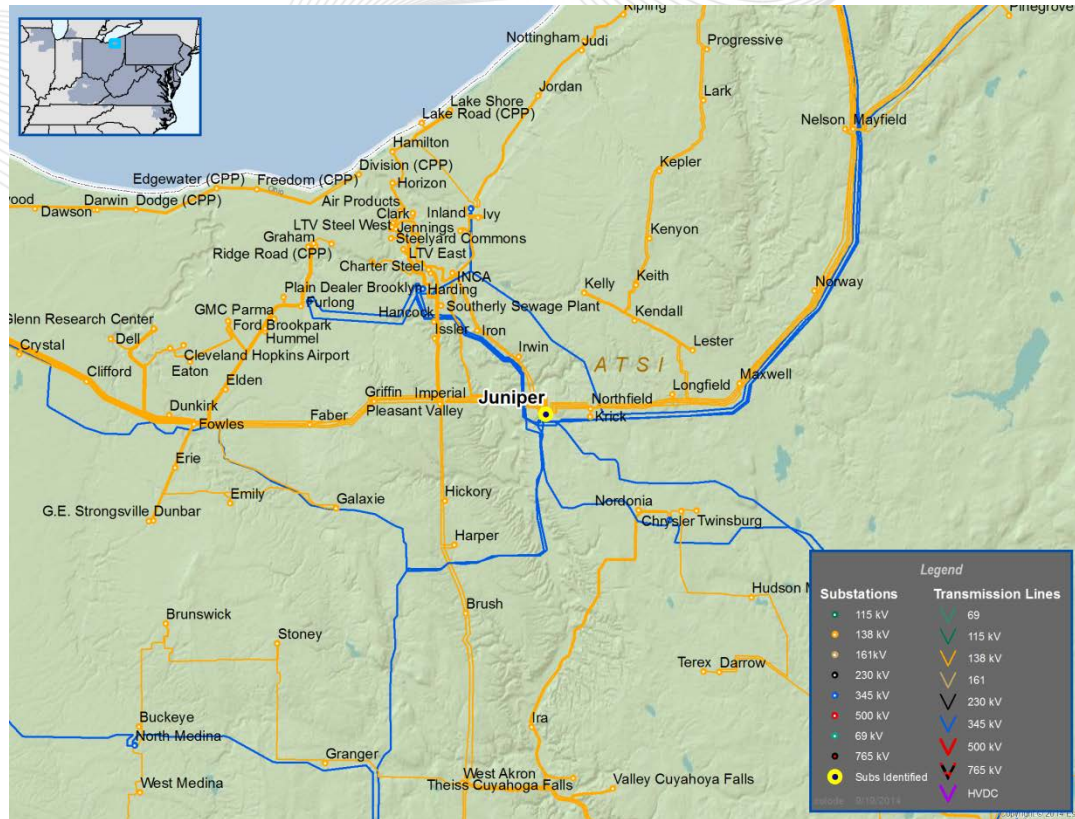
- **Supplemental Project**
- Harding 345/138kV Transformer #2 Addition. (S0776)
- Estimated Project Cost: \$2.9M
- Projected IS Date: 12/31/2014



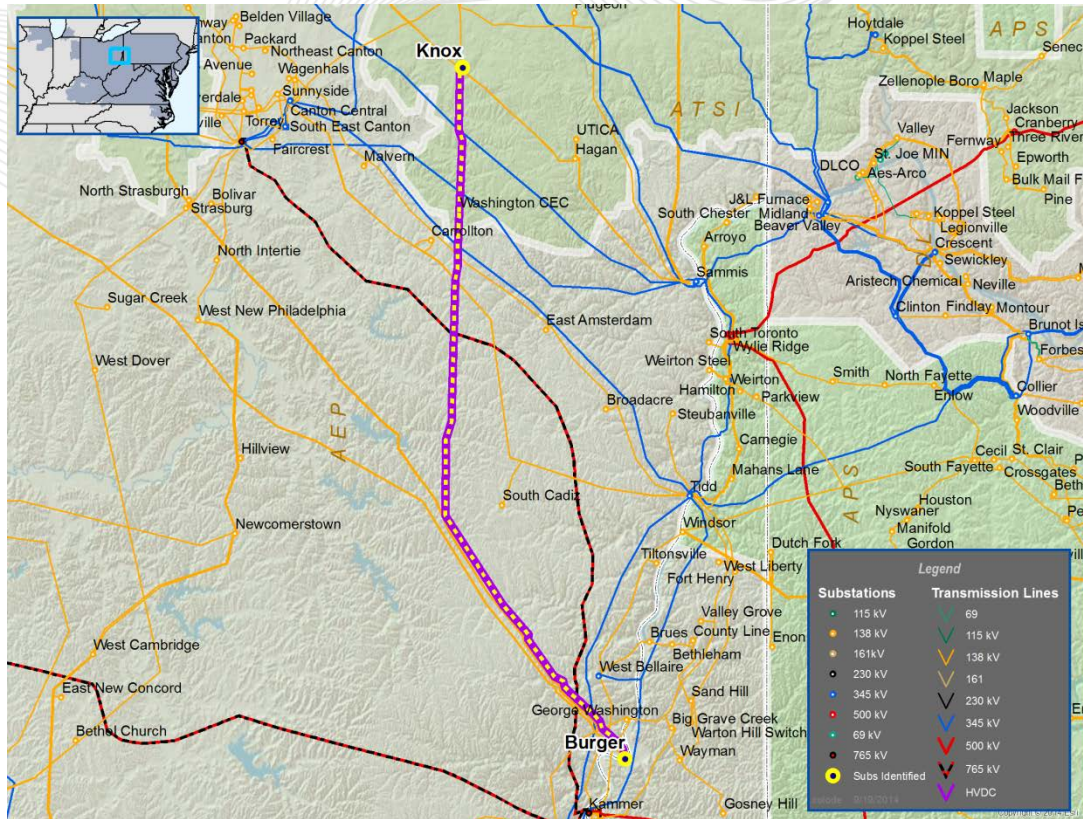
- **Supplemental Project**
- Juniper 345/138kV Transformer #3 Addition. (S0777)
- Estimated Project Cost: \$3.1M
- Projected IS Date: 12/31/2014



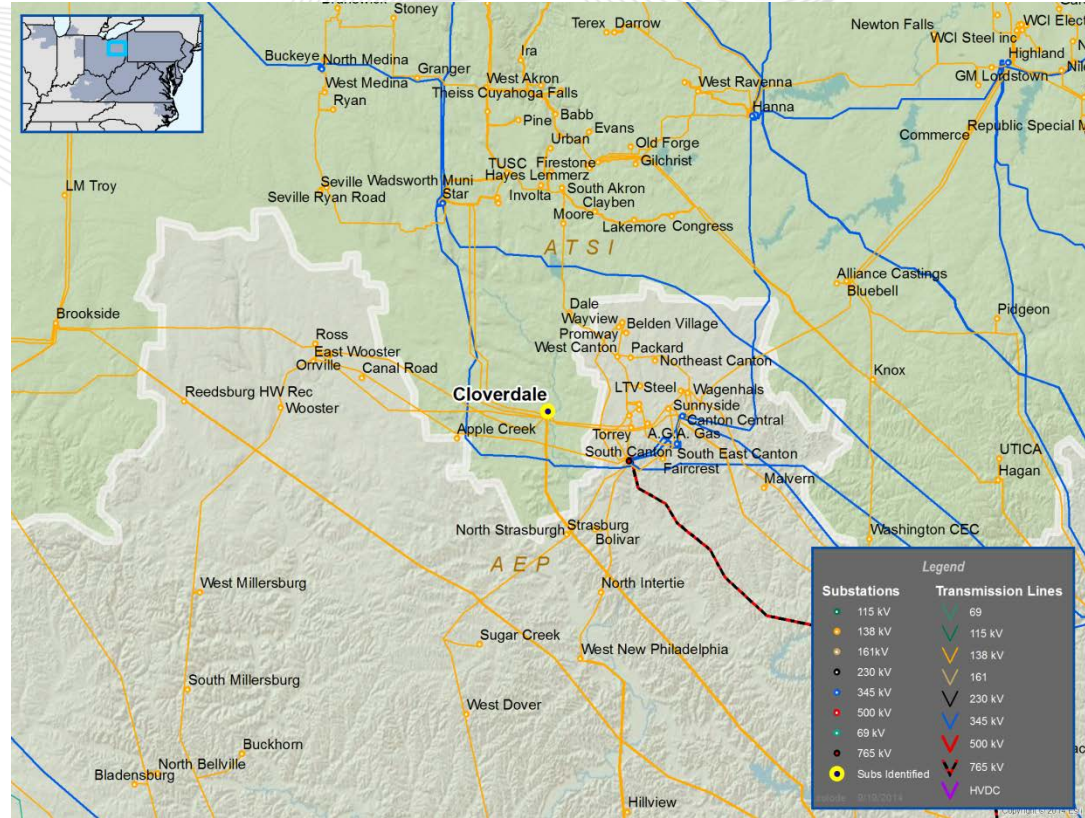
- **Supplemental Project**
- Juniper 345/138kV Transformer #2 Addition. (S0778)
- Estimated Project Cost: \$2.8M
- Projected IS Date: 12/31/2014



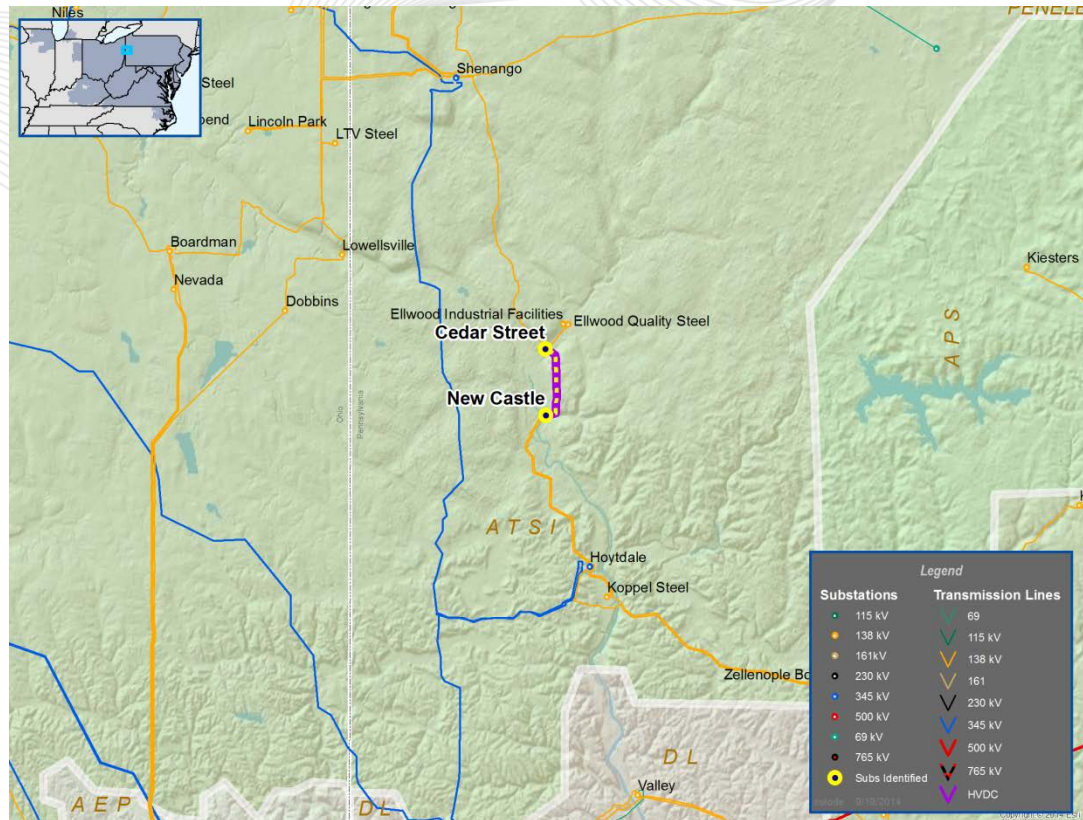
- **Supplemental Project**
- Customer Tap into the Burger-Knox 138kV Line. (S0779)
- Estimated Project Cost: \$1.1M
- Projected IS Date: 10/31/2014



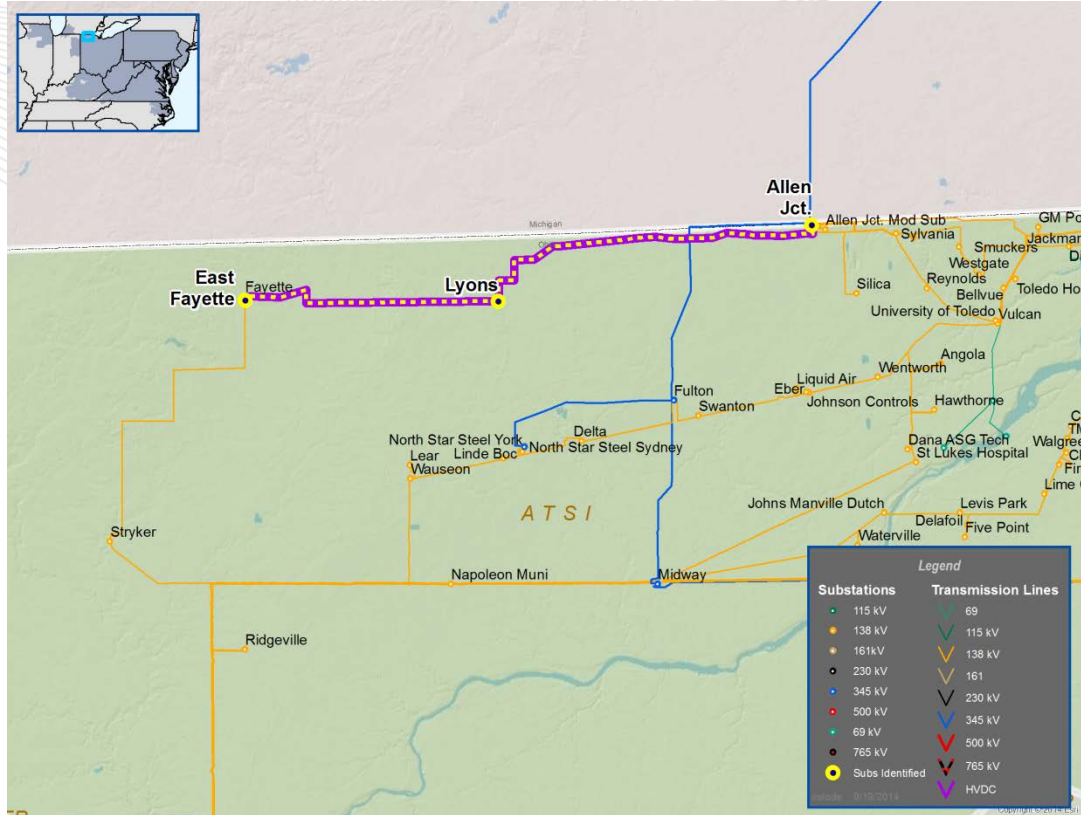
- **Supplemental Project**
- Reconnector the Tiger-Cloverdale 69kV Line. (S0780)
- Estimated Project Cost: \$5.5M
- Projected IS Date: 12/31/2014



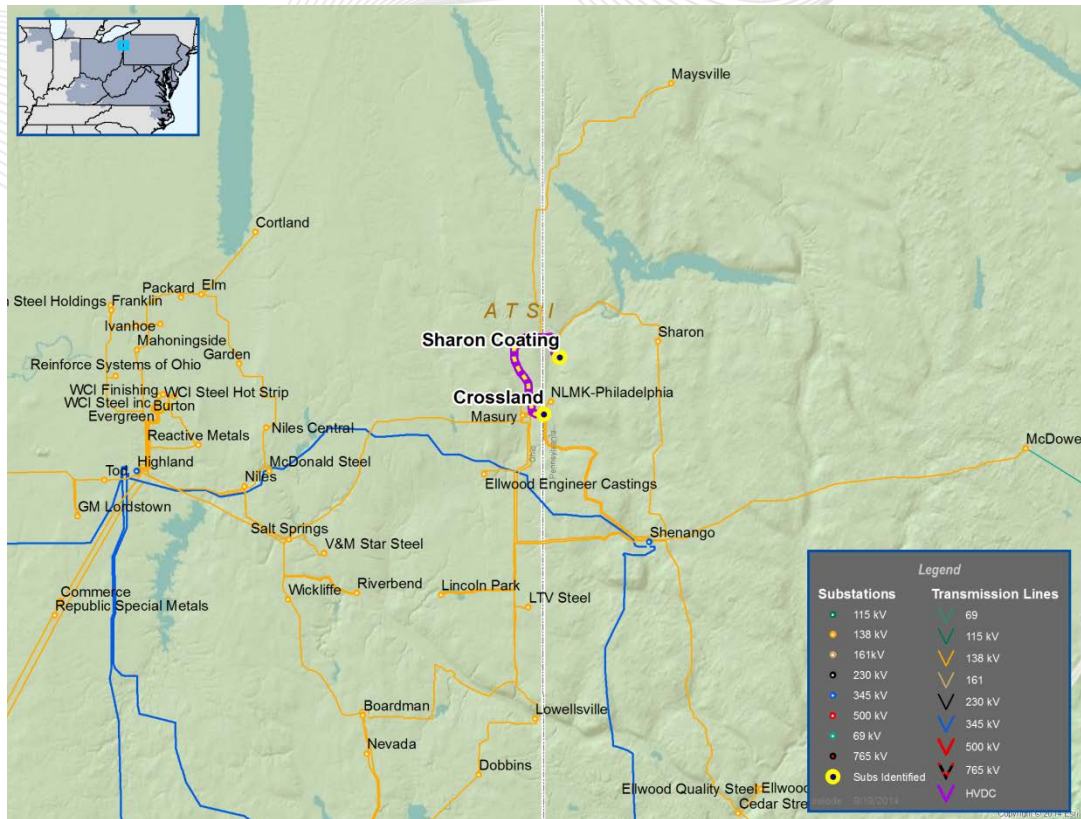
- **Supplemental Project**
- Rebuild the New Castle-Cedar Street 138kV Line. (S0781)
- Estimated Project Cost: \$2.5M
- Projected IS Date: 12/31/2014



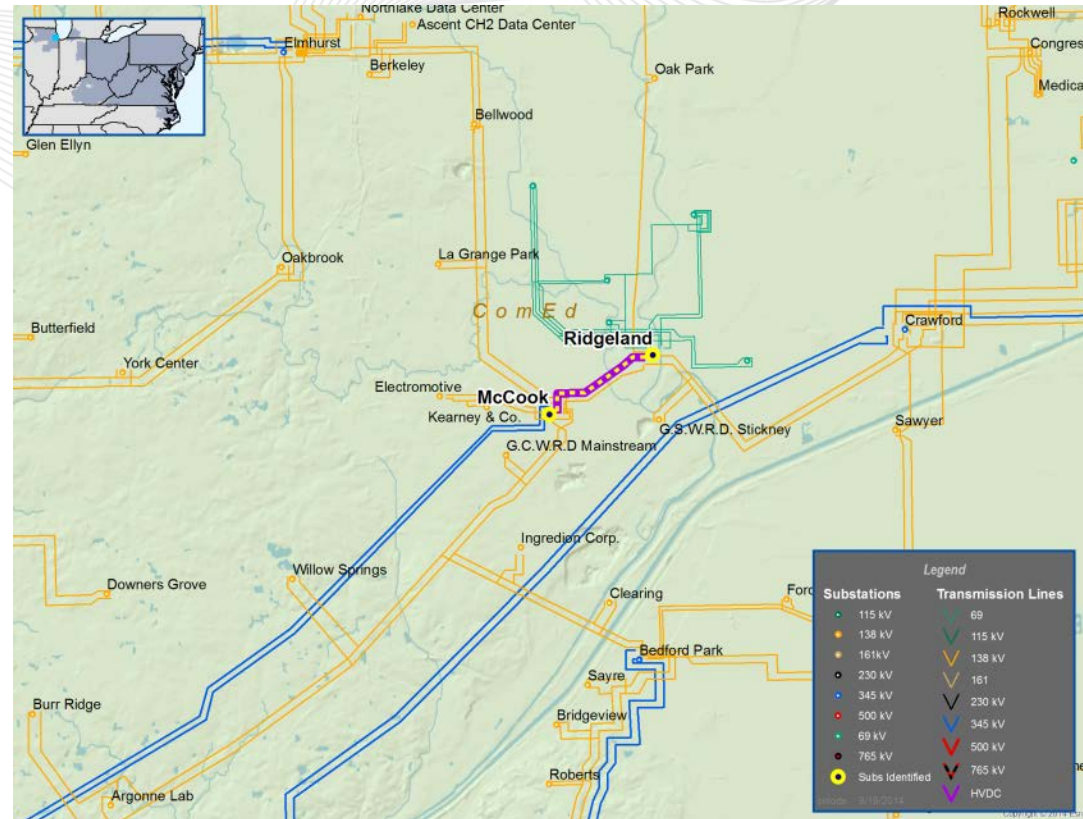
- **Supplemental Project**
- Rebuild the Allen Junction-East Fayette (AJ to Lyons) 138kV Line. (S0782)
- Estimated Project Cost: \$16.7M
- Projected IS Date: 12/31/2014



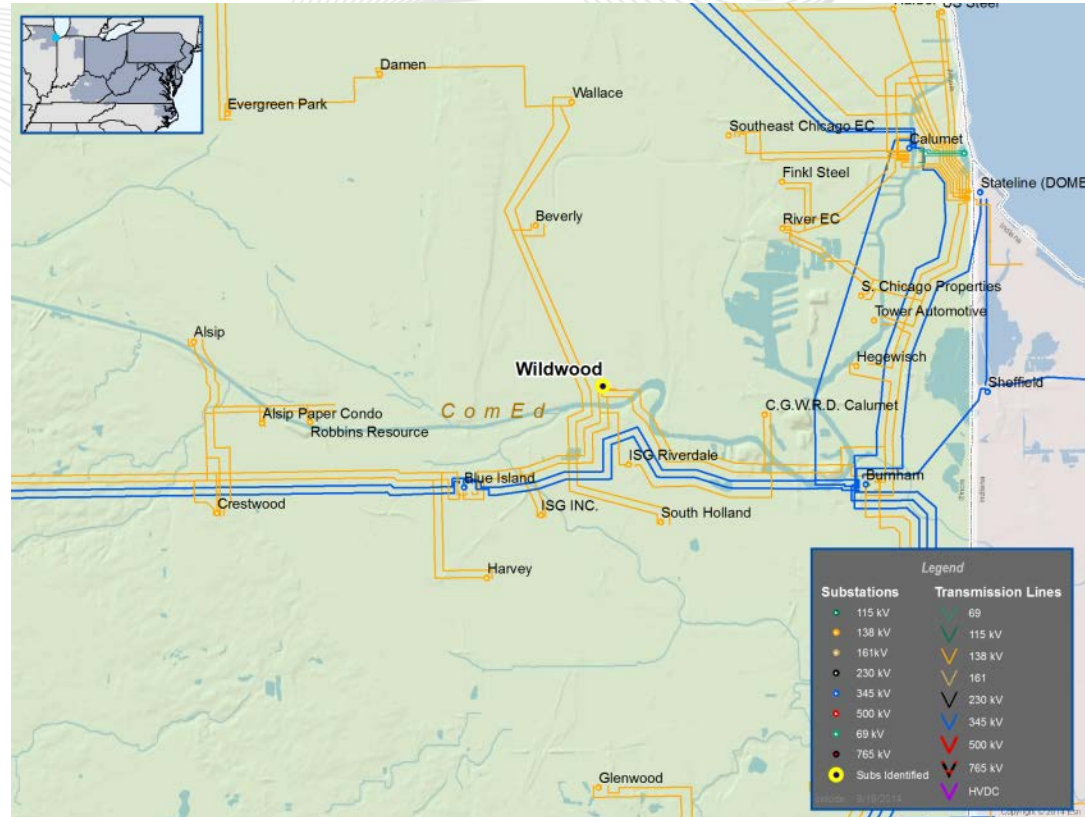
- **Supplemental Project**
- Customer (Ellwood Crankshaft and Machine) Tap into the Crossland-Sharon Z-112 138kV line. (S0783)
- Estimated Project Cost: \$0.4M
- Projected IS Date: 3/31/2015



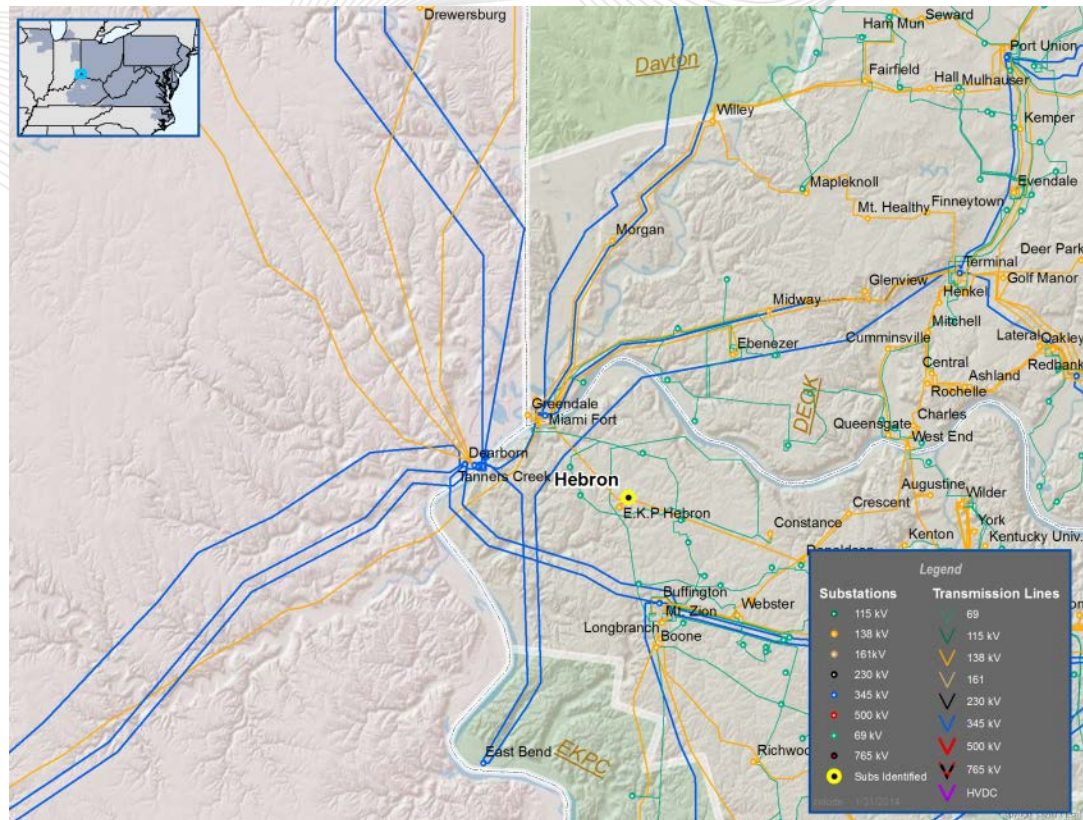
- Supplemental Project
- Reconnector the McCook - Ridgeland 138 kV Line (5107). (S0774)
- Estimated Project Cost: \$4.4M
- Projected IS Date: 12/31/2014



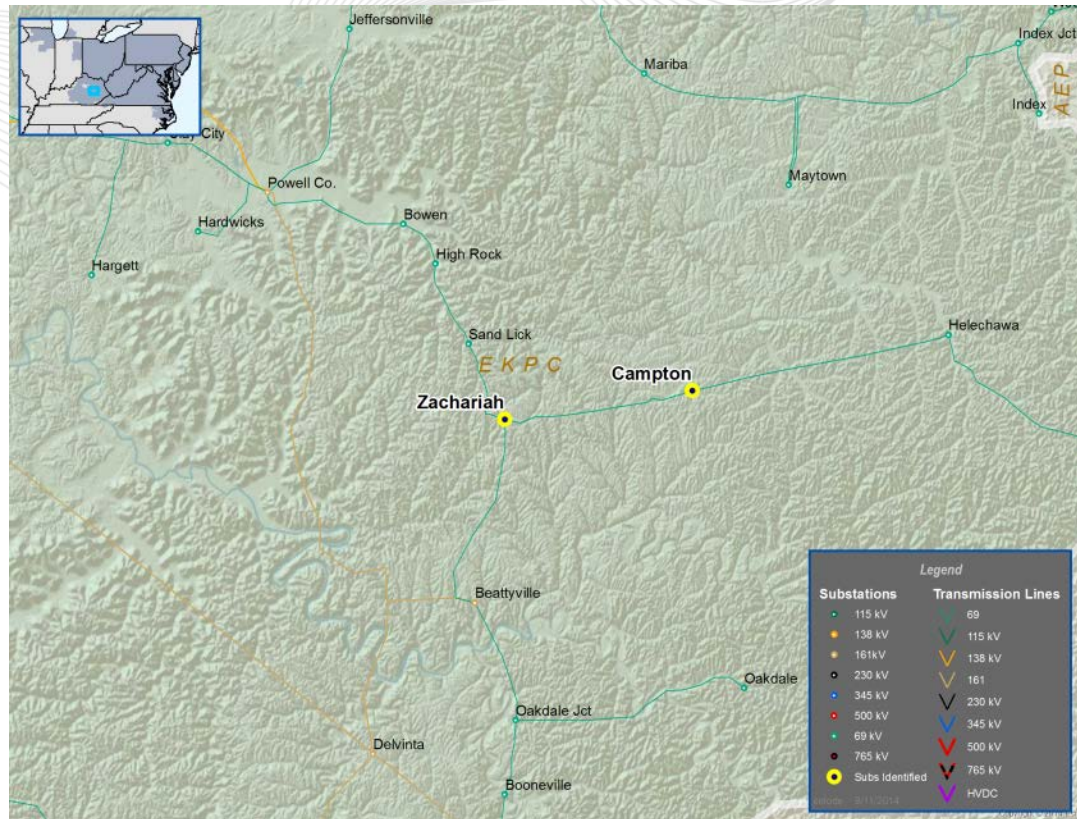
- Supplemental Project
- Replace the wave trap on the Tss 43 Wildwood – ESS Z-524 138kV line (17714) at TSS 43 Wildwood due to material condition. (S0775)
- Estimated Project Cost: \$0.06M
- Projected IS Date: 12/31/2014



- Supplemental Project
- Establish a 69 kV interconnection with Duke Energy at Hebron by installing two 69 kV circuit breakers at EKPC's Hebron. (S0772)
- Estimated Project Cost: \$0.43M
- Projected IS Date: 12/1/2015



- Supplemental Project
- Relocate the Zachariah 9.6 MVAR, 69 KV capacitor bank to Campton. (S0773)
- Estimated Project Cost: 0.343M
- Projected IS Date: 12/1/2014



Questions?

Email: RTEP@pjm.com

- **Revision History**

- Version 1: Original version posted to the PJM TEAC on 9/23/2014