



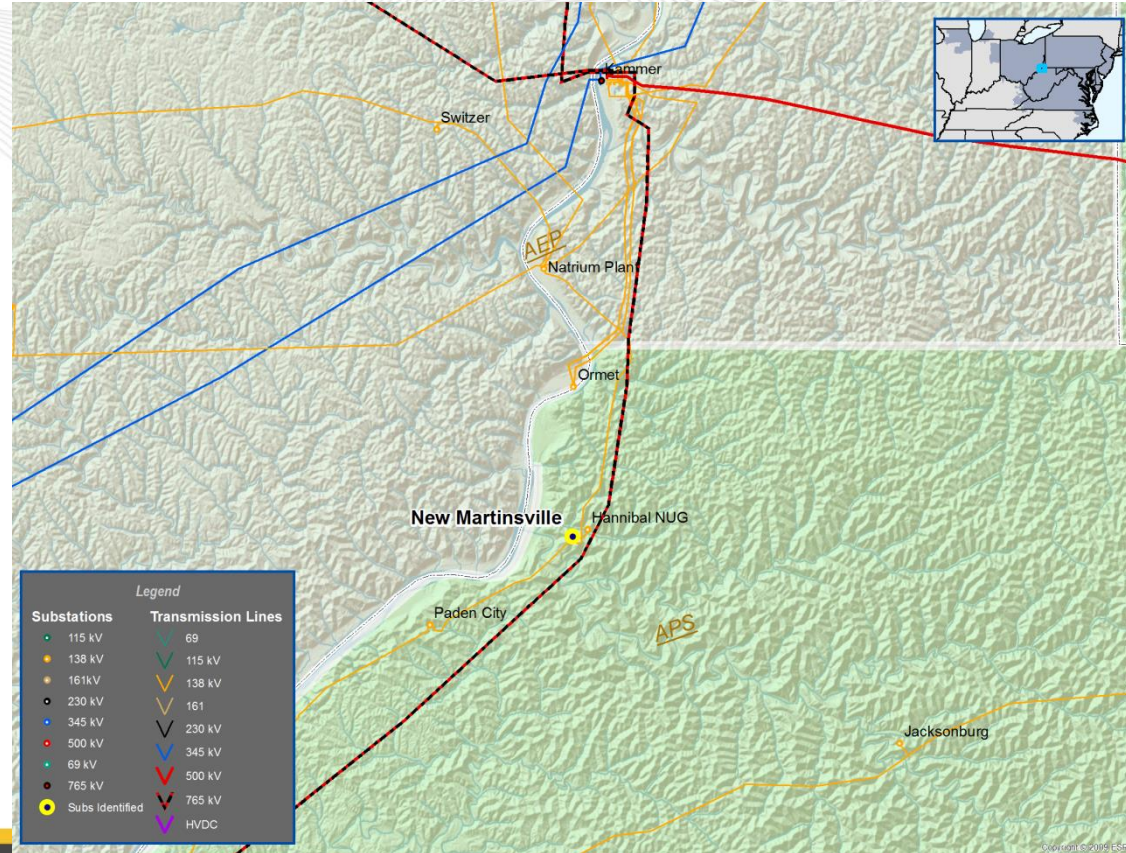
Sub Regional RTEP Committee PJM West

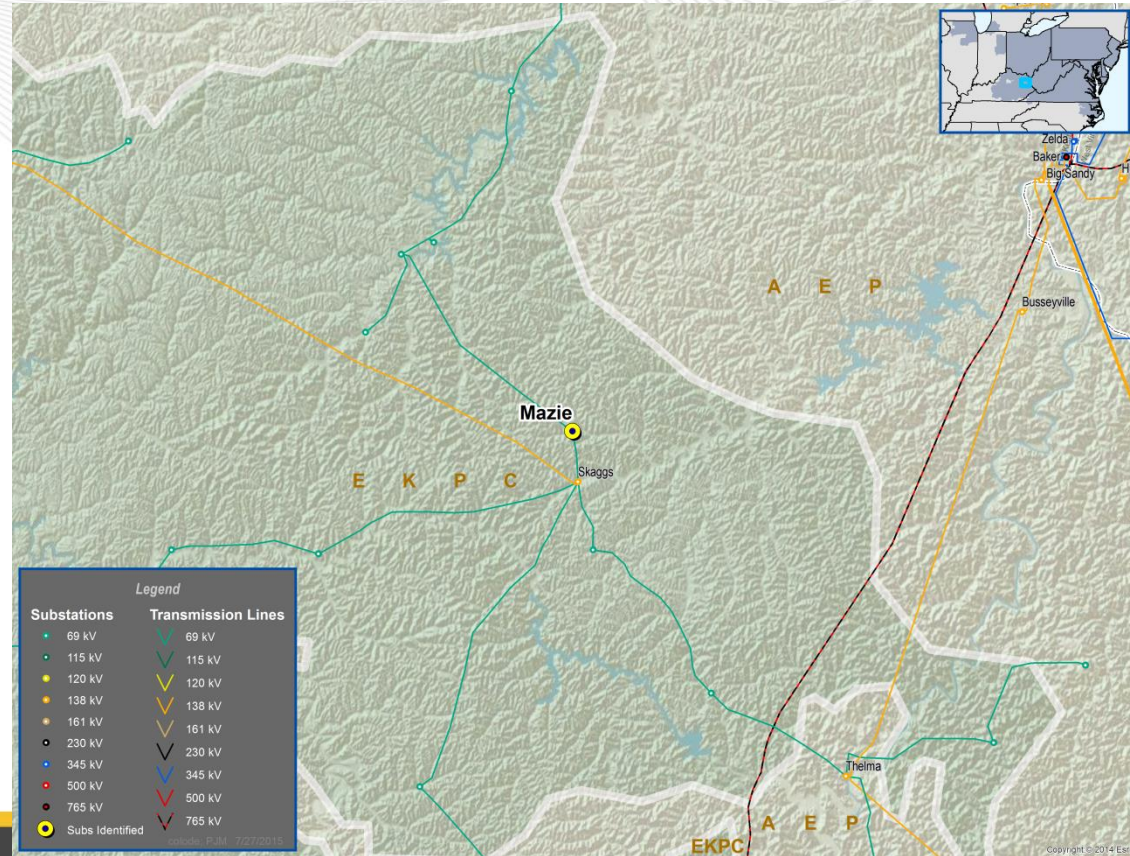
July 30, 2015



Reliability Updates

- **Project Cancellation**
- Cancel existing baseline reliability project: Add 44 MVAR Cap at New Martinsville. (B2118)
- Reason: This project is no longer needed due to a forecasted load decrease at Ormet 138kV bus in AEP
- Estimated Cost: \$1.1M
- Projected IS Date: 06/01/2015





- **TO Criteria Violation**

- Low voltage violation at the Mazie 69kV bus for the loss of the Mazie - Skaggs 69kV line section and the loss of the Cooper 1 and Cooper 2 generators

- This need is time sensitive due to the criteria violation in the immediate need time frame

- The low voltage condition violates EKPC planning criteria in the 2016/17 winter screening of the 2015 series case. This low voltage condition was noted in past studies in the 2019/2020 winter case but load forecast changes from the 2014 series to 2015 series case led to the increased need for voltage support.

- **Alternatives Considered:** Other transmission and non-transmission options that were considered but concluded would not sufficiently address the immediate reliability need.

- **Proposed Immediate Need Solution**

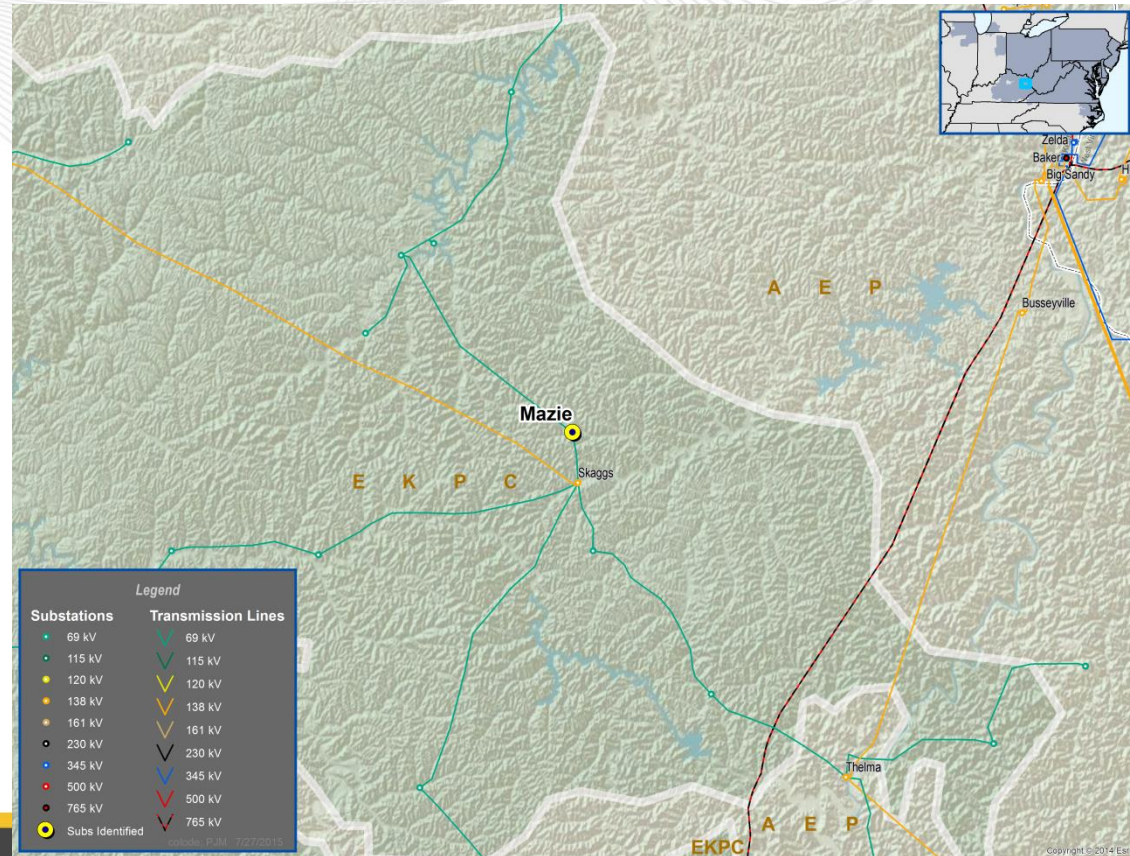
- Due to the immediate need, a proposal window is infeasible. The local Transmission Owner will be the Designated Entity.

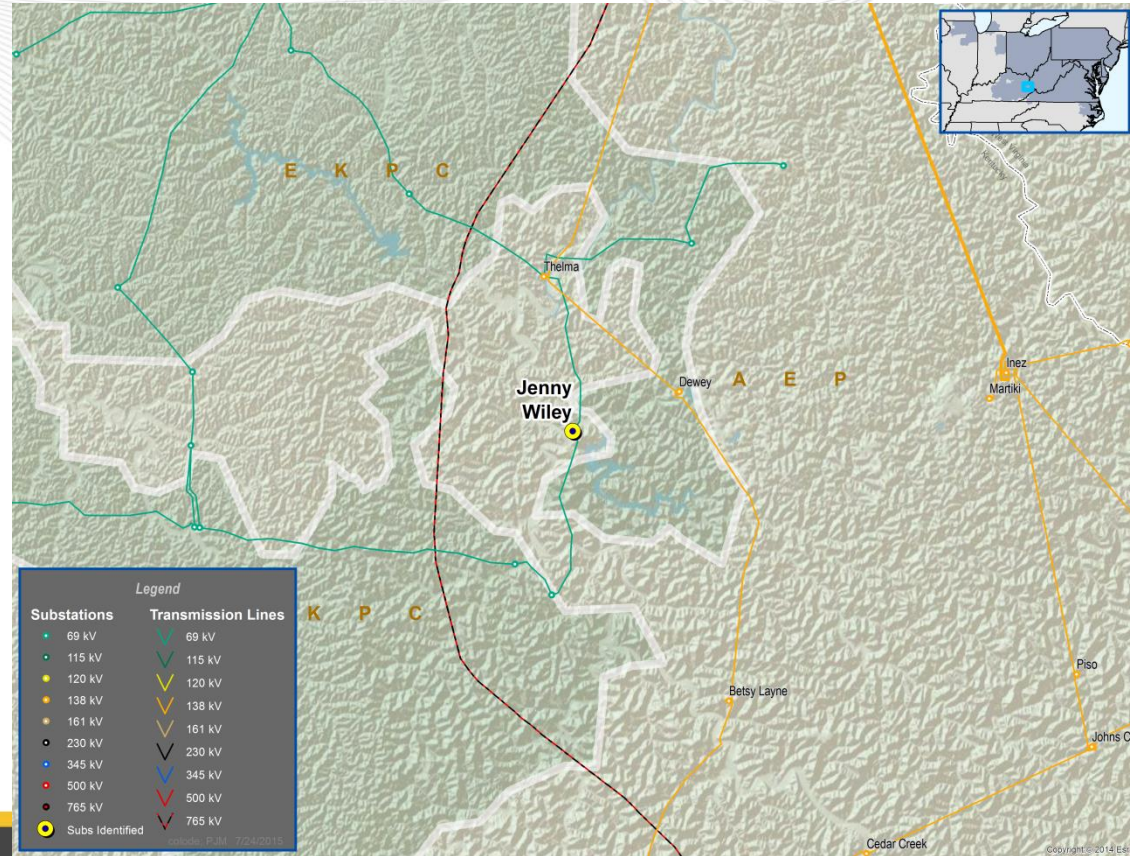
- Increase the size of the existing Leon 69KV capacitor bank from 13.2 MVAR to 18.36 MVAR (B2655)

- **Estimated Cost:** \$0.035M

- **Projected IS Date:** 12/1/2016

- **TO Criteria Violation**
- Low voltage violation at the Mazie 69kV bus for the loss of the Mazie - Skaggs 69kV line section and the loss of the Cooper 1 and Cooper 2 generators
- This need is time sensitive due to the criteria violation in the immediate need time frame
- The low voltage condition violates EKPC planning criteria in the 2016/17 winter screening of the 2015 series case. This low voltage condition was noted in past studies in the 2019/2020 winter case. Due to load forecast changes from the 2014 series to 2015 series case and the planned Leon capacitor bank size increase in 12/1/2016 has shifted the ISD to 12/1/2018.
- **Alternatives Considered:** Increasing the output of the capacitor banks in the area was considered, however the output cannot be increased without violating EKPC capacitor bank criteria.
- **Proposed Immediate Need Solution**
- Due to the immediate need, a proposal window is infeasible. The local Transmission Owner will be the Designated Entity.
- Re-conductor the Leon-Airport Road 69 kV line section (5.72 miles) using 556.5 MCM ACTW conductor (B2656)
- **Estimated Cost:** \$1.65M
- **Projected IS Date:** 12/1/2018





TO Criteria Violation

Low voltage violation at Jenny Wiley 69kV bus for the loss of the Thelma 69kV tie with AEP and the loss of the Cooper 2 generator

This need is time sensitive due to the criteria violation in the immediate need time frame

The low voltage condition violates EKPC planning criteria in the 2016/17 winter screening of the 2015 series case. Load forecast changes from the 2014 series to 2015 series case in the AEP Zone led to the increased need for voltage support.

Alternatives Considered: Capacitor bank output in the area becomes unavailable due to the lack of a dedicated breaker on the Thelma Tie.

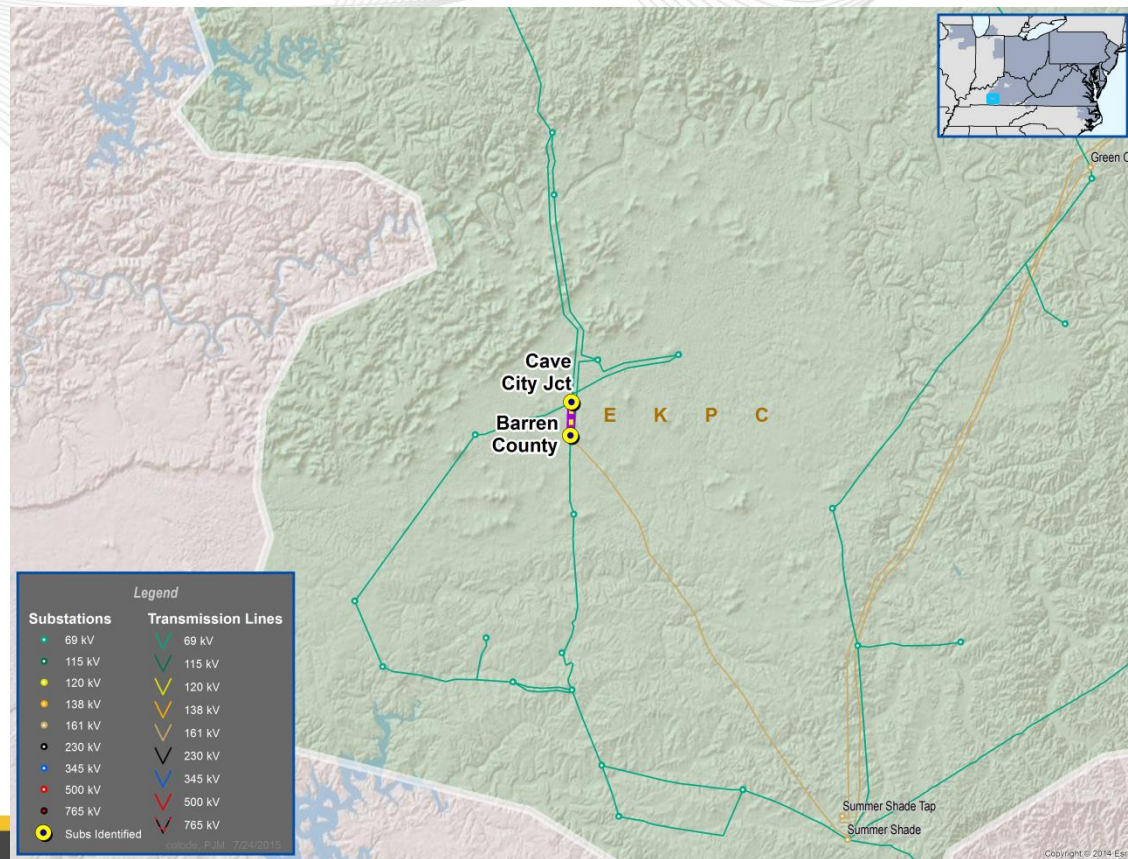
Proposed Immediate Need Solution

Due to the immediate need, a proposal window is infeasible. The local Transmission Owner will be the Designated Entity.

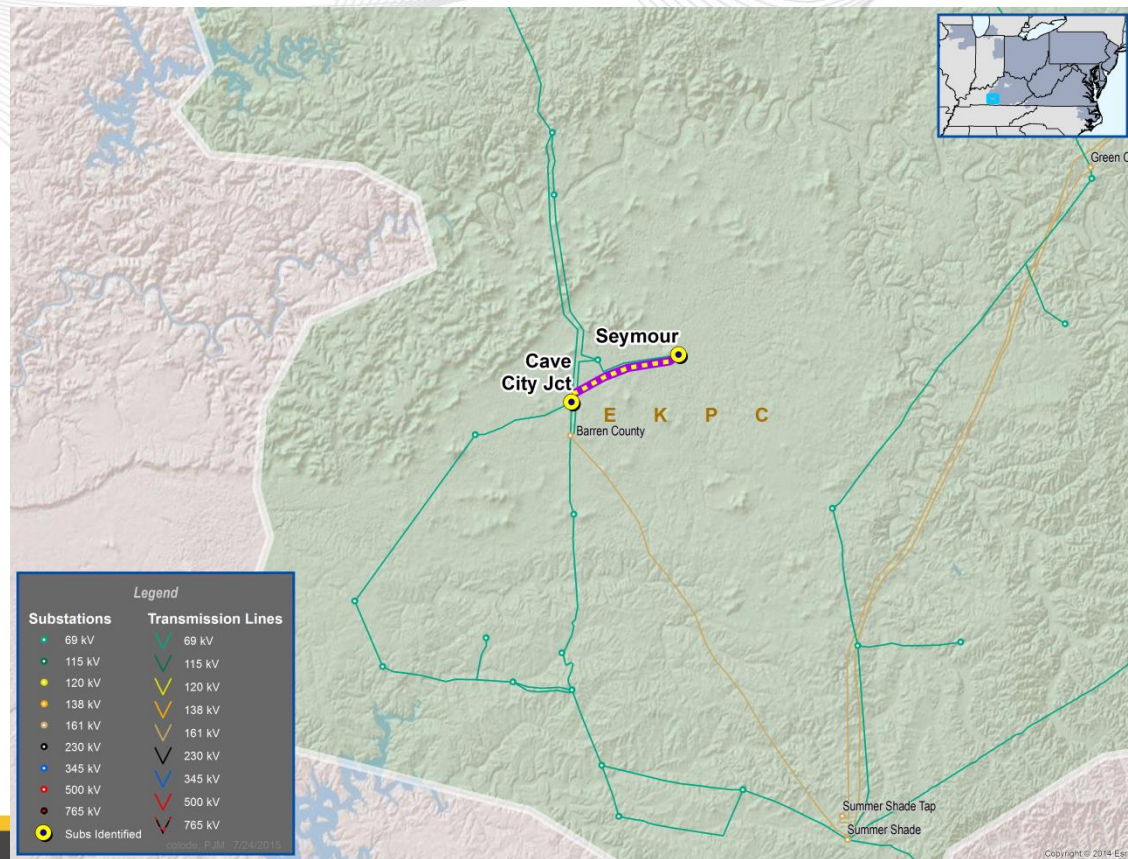
Add 69kV breaker at Thelma - AEP Thelma 69kV Tie (B2657)

Estimated Cost: \$0.2M

Required IS Date: 12/1/2016



- **TO Criteria Violation**
- The Barren Co. – Horse Cave Jct. 69kV line for the loss of the Bonnaville – Bonnieville Distribution 69kV line section and the loss of the Cooper 1 and Cooper 2 generators
- This need is time sensitive due to the criteria violation in the immediate need time frame
- The overload violates EKPC planning criteria in the 2016 summer screening of the 2015 series case. Load forecast changes from the 2014 series to 2015 series case led to the increased post-contingency line flow.
- **Alternatives Considered:** Given the timing and cost of the proposed solution, no alternative was evaluated
- **Proposed Immediate Need Solution**
- Due to the immediate need, a proposal window is infeasible. The local Transmission Owner will be the Designated Entity
- Increase the zone 3 distance relay setting at Barren County associated with the Barren Co-Horse Cave Jct. line to at least 103 MVA.(B2658)
- **Estimated Cost:** \$0
- **Required IS Date:** 6/1/2016



TO Criteria Violation

The Seymour Tap-KU Horse Cave Tap 69kV line is overloaded for the loss of the Barren Co. – Horse Cave Jct. 69kV line section coupled with the switching operation of closing the normally open Horse Cave Jct – Horse Cave Tap switch and the loss of the Cooper 1 and Cooper 2 generators

This need is time sensitive due to the criteria violation in the immediate need time frame

The overload violates EKPC planning criteria in the 2016 summer screening of the 2015 series case. This overload has been noted in past studies but load forecast changes from the 2014 series to 2015 series case led to the increased post-contingency line flow.

Alternatives Considered: A high temperature upgrade was considered for the Cave City Jct. – Seymour 69kV line section. A re-conductor of the line section would then be scheduled for June of 2018. It is more economical to re-conductor the 0.51 mile line section initially.

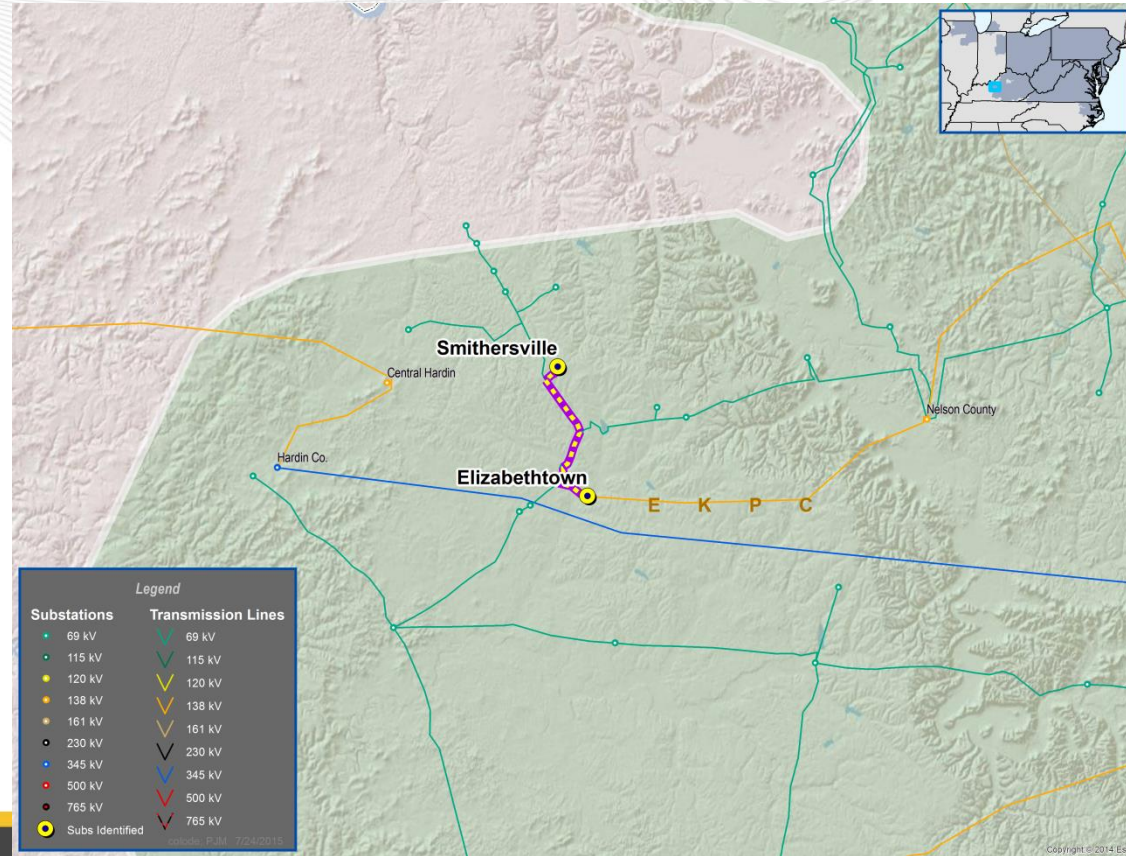
Proposed Immediate Need Solution

Due to the immediate need, a proposal window is infeasible. The local Transmission Owner will be the Designated Entity

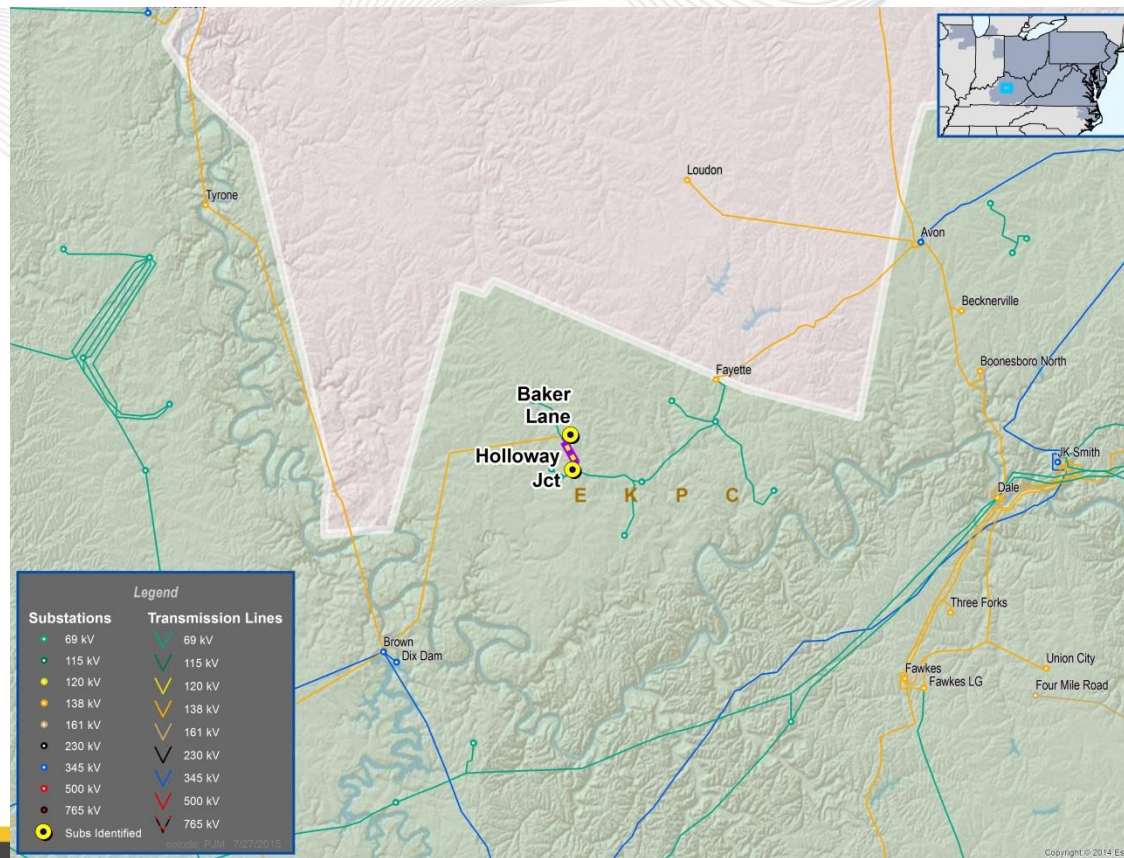
Rebuild the Seymour Tap-KU Horse Cave Tap 69 KV line section (1.98 miles) to 302°F. (LTE at 284°F) (B2659)

Estimated Cost: \$0.4M

Required IS Date: 6/1/2016



- **TO Criteria Violation**
- The Elizabethtown-Smithersville 69kV line is overloaded for the loss of the Rogersville 69kV tie line and the loss of the Cooper 2 generator
- This need is time sensitive due to the criteria violation in the immediate need time frame
- The overload violates EKPC planning criteria in the 2016/17 winter screening of the 2015 series case. Load forecast changes from the 2014 series to 2015 series case led to the increased post-contingency line flow.
- **Alternatives Considered:** Given the cost of the proposed solution, no alternative is needed
- **Proposed Immediate Need Solution**
- Due to the immediate need, a proposal window is infeasible. The local Transmission Owner will be the Designated Entity
- Increase the zone 3 distance relay setting at Elizabethtown associated with the Elizabethtown-Smithersville line section to at least 100 MVA. (B2660)
- **Estimated Cost:** \$0
- **Required IS Date:** 12/1/2016



TO Criteria Violation

The Baker Lane-Holloway Jct. 69kV line is overloaded for the loss of the Avon – Fayette 138kV line section and the loss of the Cooper 1 and Cooper 2 generators

This need is time sensitive due to the criteria violation in the immediate need time frame

The overload violates EKPC planning criteria in the 2016/17 winter screening of the 2015 series case. This overload has been noted in past studies in the 2023/24 winter case but load forecast changes from the 2014 series to 2015 series case led to the increased post-contingency line flow.

Alternatives Considered: A high temperature upgrade was considered for the Baker Lane-Holloway Jct. 69 kV line section but did not relieve the overload.

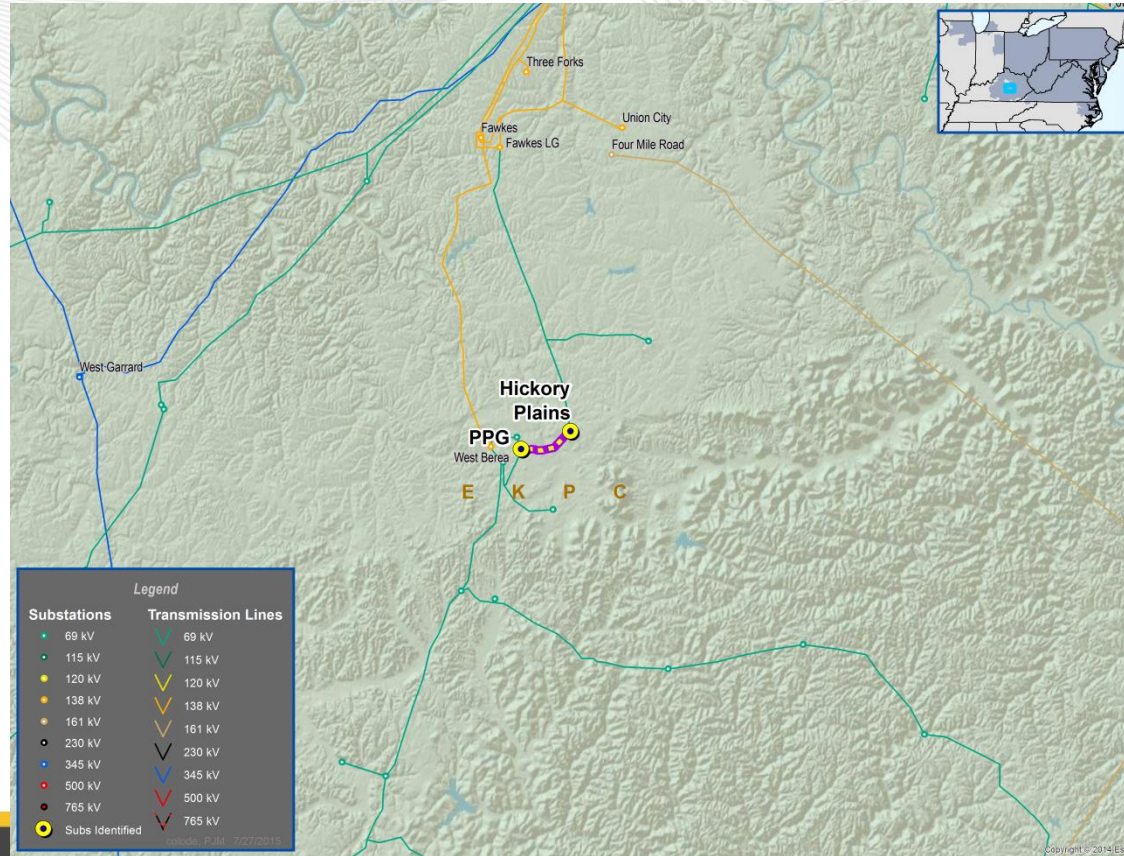
Proposed Immediate Need Solution

Due to the immediate need, a proposal window is infeasible. The local Transmission Owner will be the Designated Entity

Re-conductor the Baker Lane - Holloway Jct. 69 kV 1.28 mi line section using 556.5 MCM ACTW wire. (B2661)

Estimated Cost: \$0.335M

Required IS Date: 12/1/2016



TO Criteria Violation

The Hickory Plains - PPG 69kV line is overloaded for the loss of the West Berea 138-69 kV Transformer and the loss of the Cooper 1 and Cooper 2 generators

This need is time sensitive due to the criteria violation in the immediate need time frame

The overload violates EKPC planning criteria in the 2017 summer screening of the 2015 series case. Load forecast changes from the 2014 series to 2015 series case led to the increased post-contingency line flow.

Alternatives Considered: A re-conductor was considered for the Hickory Plains-PPG 69 kV line section however a high temperature upgrade is more economical.

Proposed Immediate Need Solution

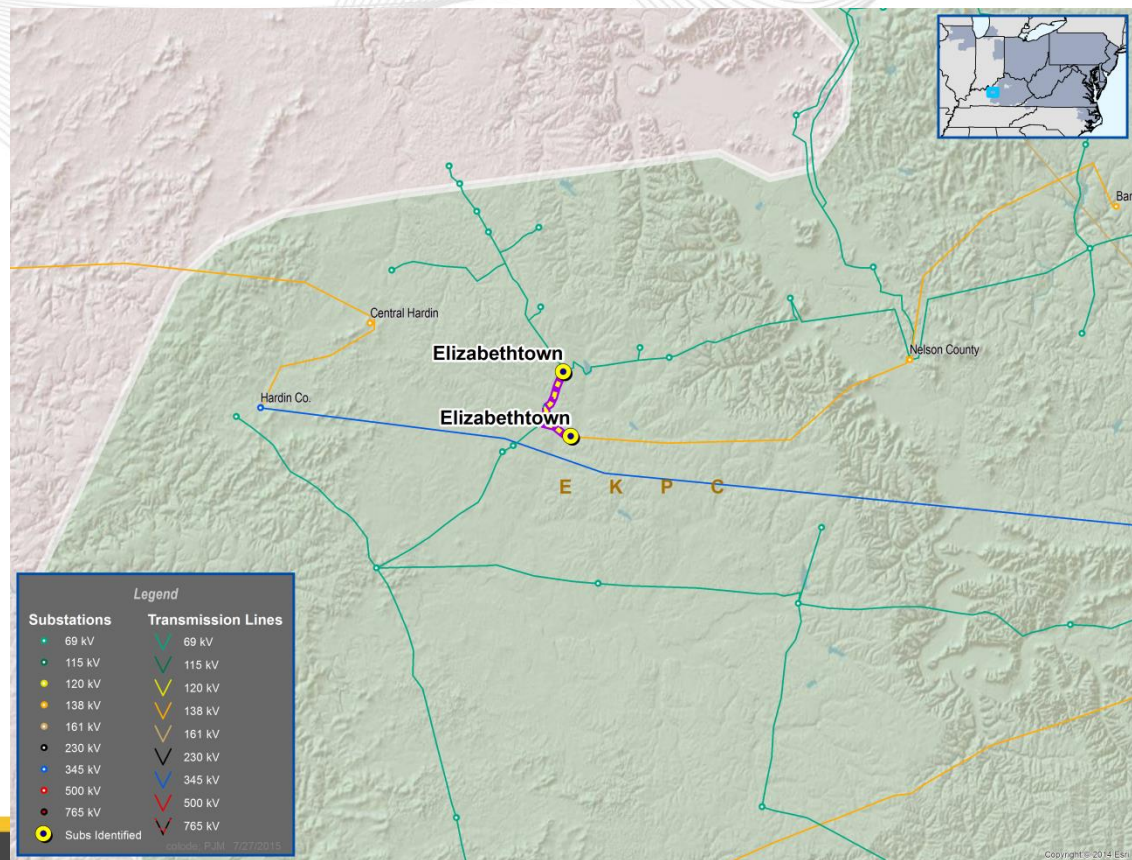
Due to the immediate need, a proposal window is infeasible. The local Transmission Owner will be the Designated Entity

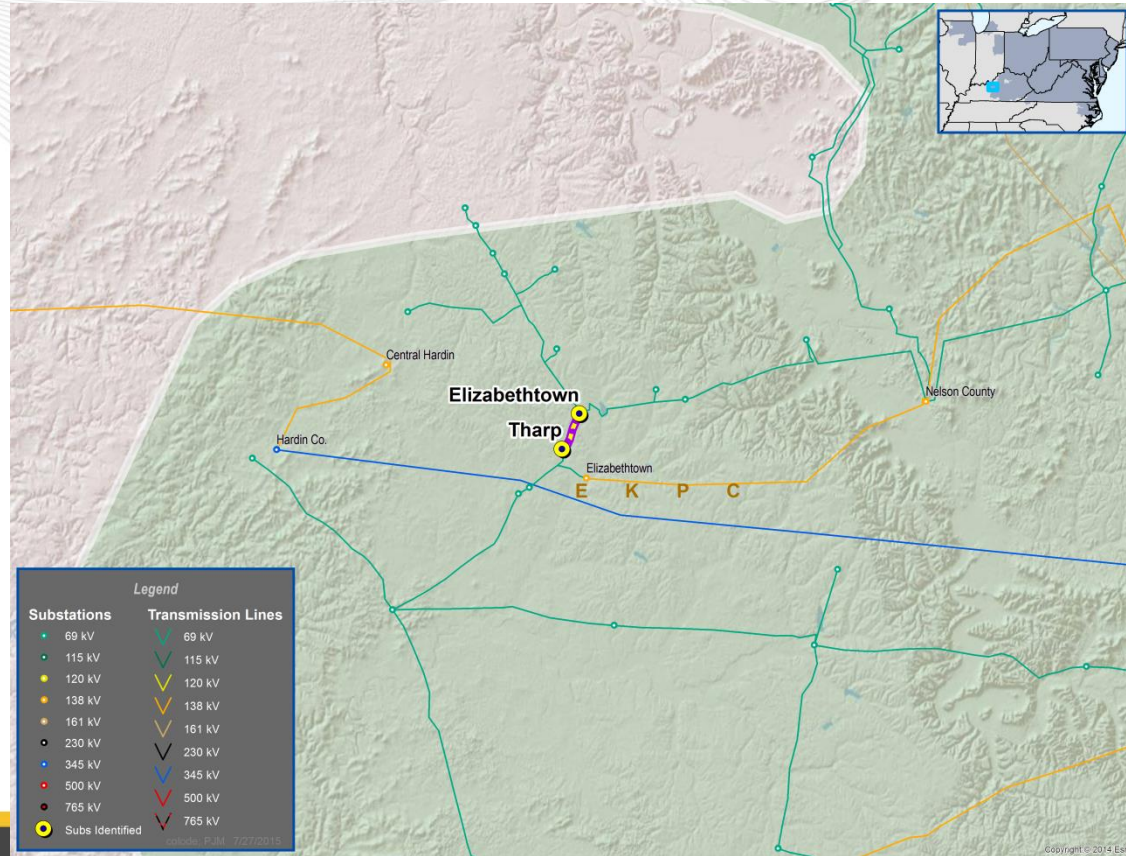
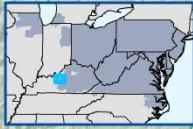
Increase the MOT of the Hickory Plains - PPG 69 KV line section (0.21 miles) to 266F. (LTE at 248F) (B2662)

Estimated Cost: \$0.01M

Required IS Date: 6/1/2017

- **TO Criteria Violation**
- The EKPC Elizabethtown – KU Elizabethtown 69kV line is overloaded for the loss of the Rogersville – Rogersville Jct. 69kV line section and the loss of the LGE/KU Brown 3 generator.
- This need is time sensitive due to the criteria violation in the immediate need time frame
- The overload violates EKPC planning criteria in the 2017/18 winter screening of the 2015 series case. Load forecast changes from the 2014 series to 2015 series case led to the increased post-contingency line flow.
- **Alternatives Considered:** Given the cost and timing of the proposed solution, no alternative is needed
- **Proposed Immediate Need Solution**
- Due to the immediate need, a proposal window is infeasible. The local Transmission Owner will be the Designated Entity
- Increase the zone 3 distance relay setting at EKPC Elizabethtown associated with the EKPC Elizabethtown to KU Elizabethtown 69kV line to at least 126MVA. (B2663)
- **Estimated Cost:** \$0
- **Required IS Date:** 12/1/2017





- **TO Criteria Violation**

- The Tharp Tap - KU Etown 69kV line is overloaded for the loss of the Rogersville Jct. – Rogersville 69kV line section and the loss of the LGE/KU Brown 3 generator.

- This need is time sensitive due to the criteria violation in the immediate need time frame

- The overload violates EKPC planning criteria in the 2017/18 winter screening of the 2015 series case. Load forecast changes from the 2014 series to 2015 series case led to the increased post-contingency line flow.

- **Alternatives Considered:** A re-conductor was considered for the Tharp Tap-KU ETown 69 kV line section but a high temperature upgrade is more economical.

- **Proposed Immediate Need Solution**

- Due to the immediate need, a proposal window is infeasible. The local Transmission Owner will be the Designated Entity

- Increase the MOT of the Tharp Tap - KU Etown 69 KV line section (2.11 miles) to 266F. (LTE at 248F) (B2664)

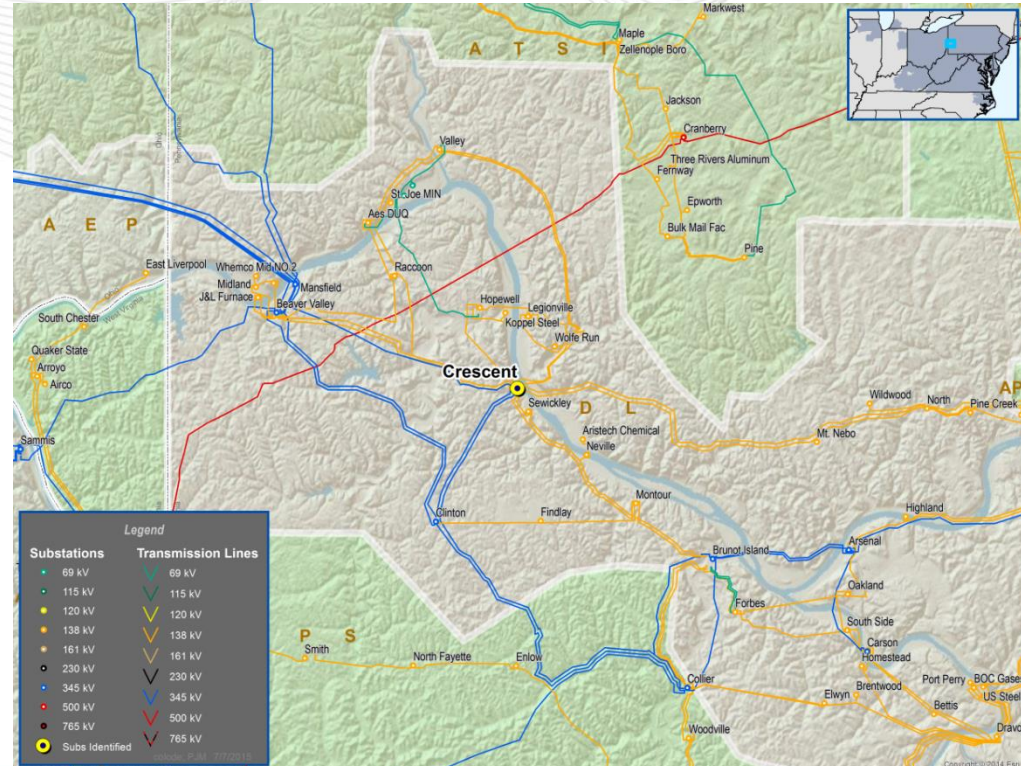
- **Estimated Cost:** \$0.075M

- **Required IS Date:** 12/1/2017

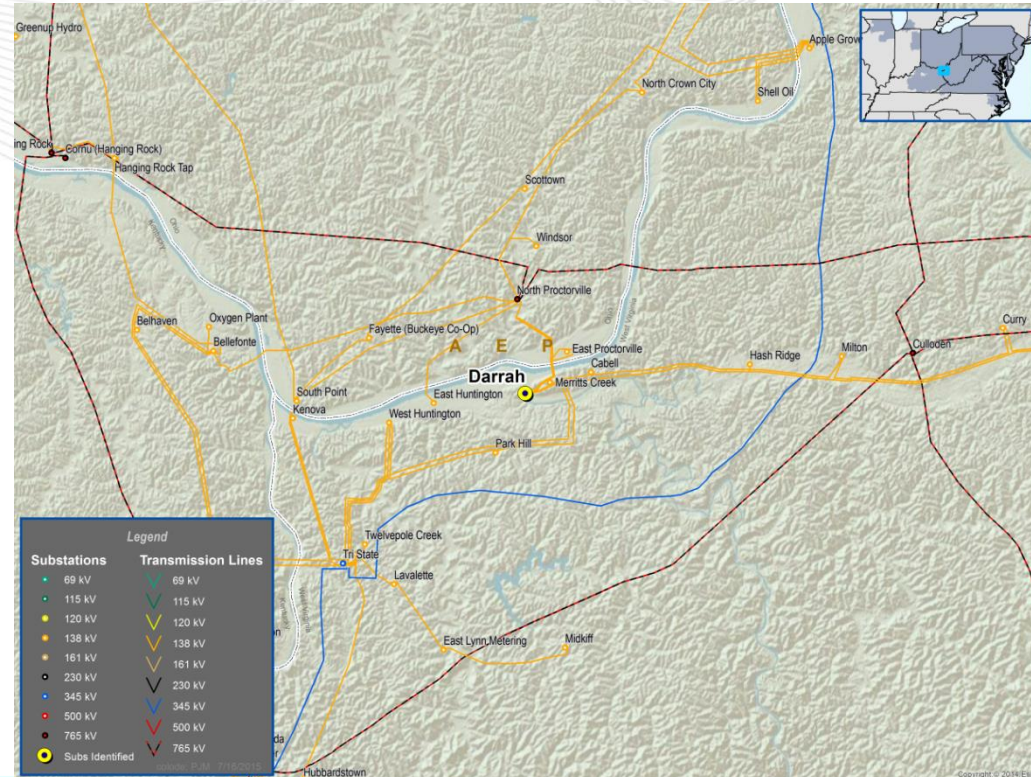


Short Circuit

- The Crescent 138kV breakers ‘NO3 - 4 138’, ‘Z143 SWCKLY’, ‘Z-24 MONTOUR’, and ‘Z-28 BEAVER’ are overstressed
- Proposed Solution: Replace the Crescent 138kV breakers ‘NO3 - 4 138’, ‘Z143 SWCKLY’, ‘Z-24 MONTOUR’, and ‘Z-28 BEAVER’ with 63kA breakers (b2639 – b2642)
- Estimated Project Cost: \$0.33M per breaker
- Required IS Date: 6/1/2019



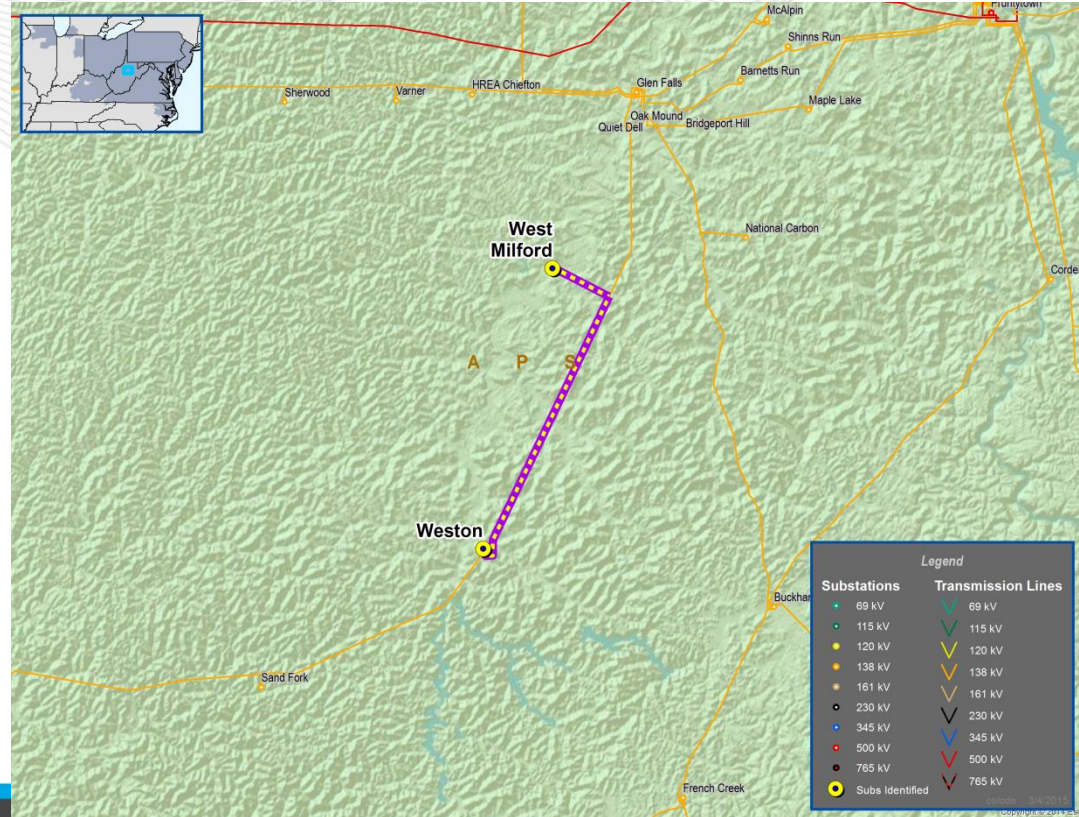
- The Darrah 138kV breaker 'L' is overstressed
- Proposed Solution: Replace the Darrah 138kV breaker 'L' with a 40kA breaker (b2643)
- Estimated Project Cost: \$0.9M
- Required IS Date: 6/1/2019



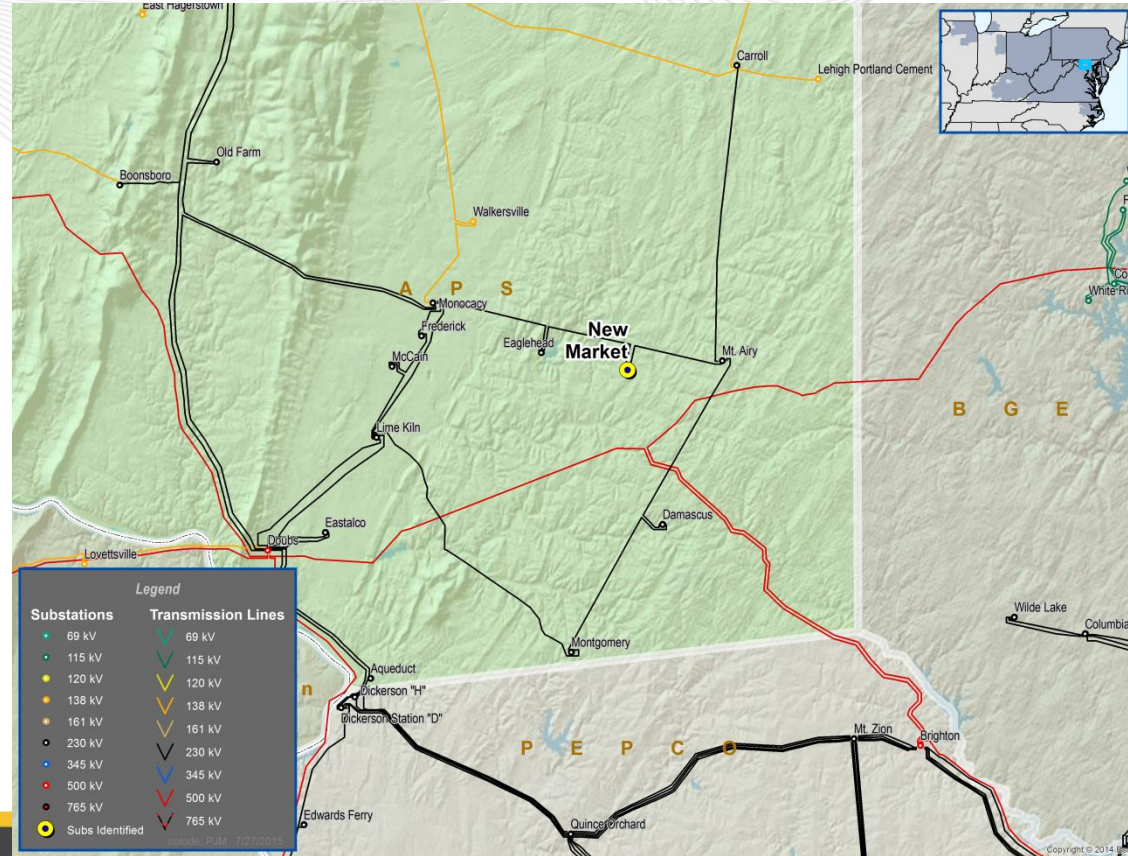


Supplemental Projects

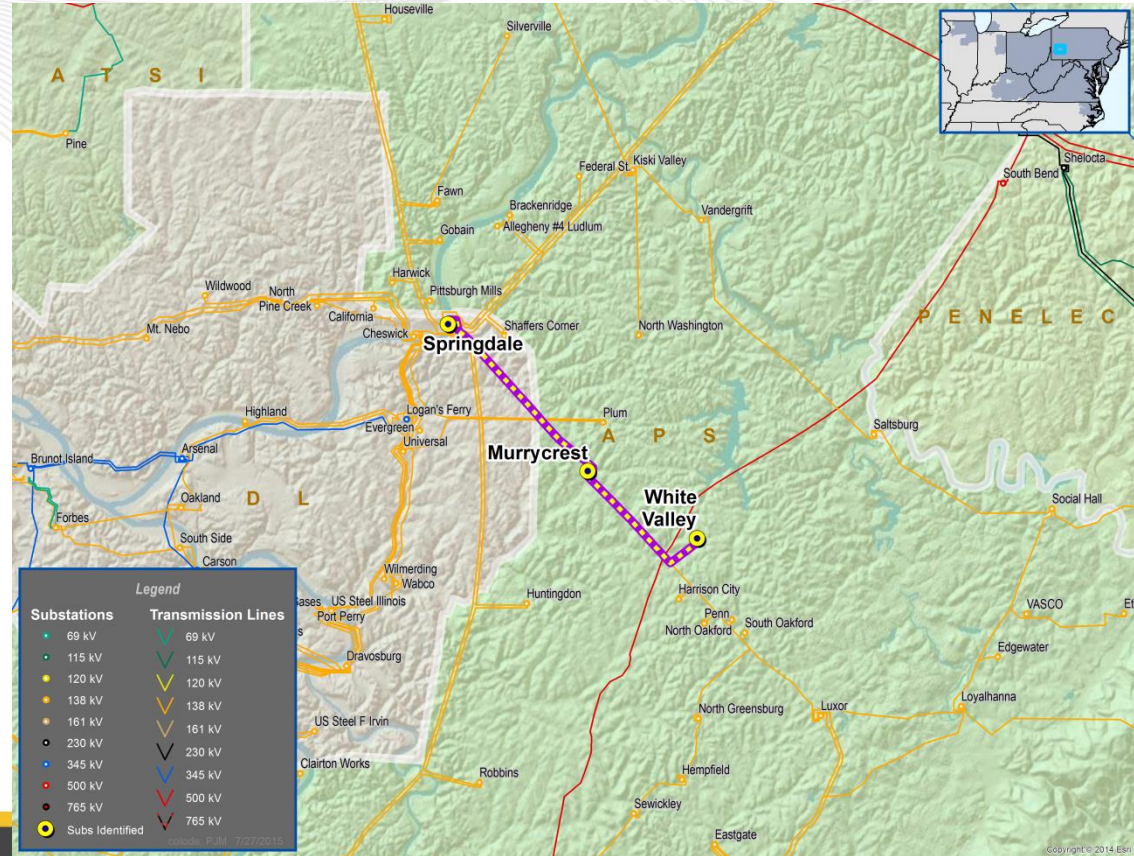
- **Supplemental Project**
- Load Growth
- Construct a new 138/12kV substation (New Substation) on the Weston – West Millford No.6 138kV line. (S0983)
- Estimated Cost: \$3.6M
- Projected IS Date: 12/31/2017



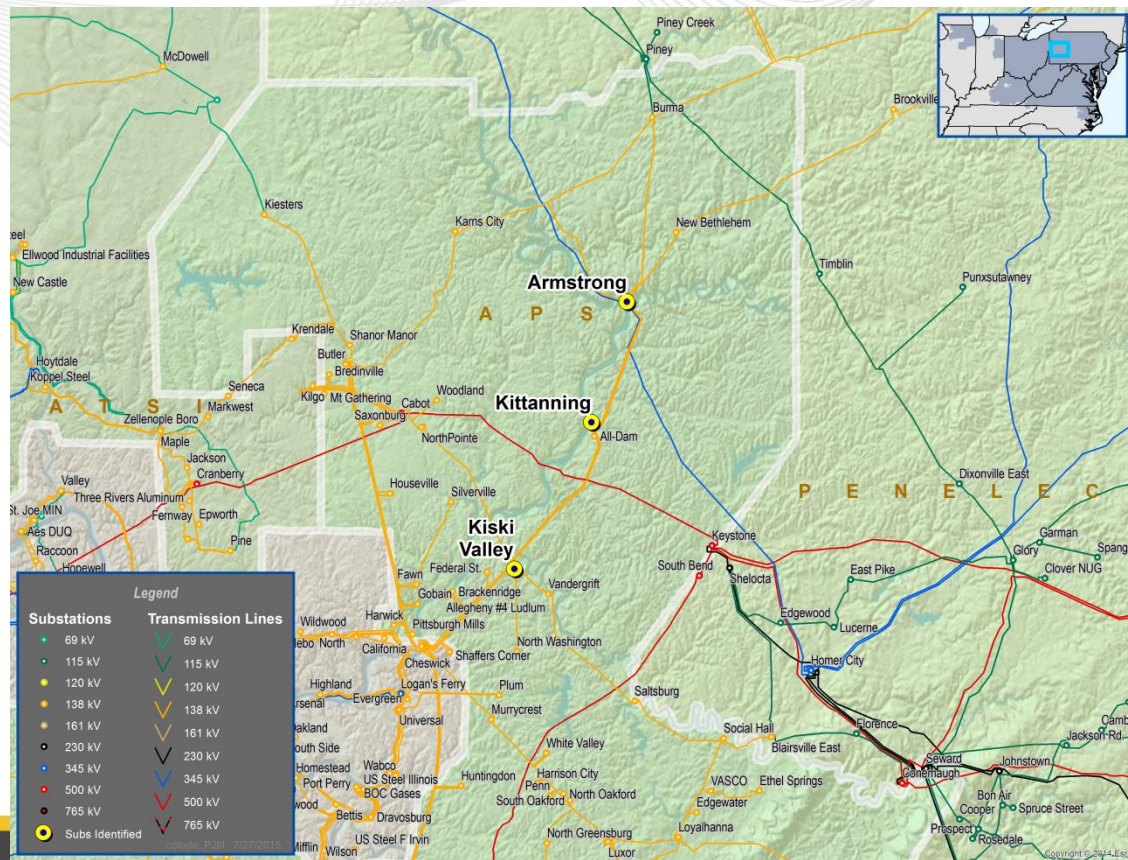
- **Supplemental Project**
- Distribution Reliability
- Install a new 230/34.5kV substation (New Market Substation) and construct 34.5kV line to Green Valley Substation. (S0984)
- Estimated Cost: \$4.1M
- Projected IS Date: 12/31/2015



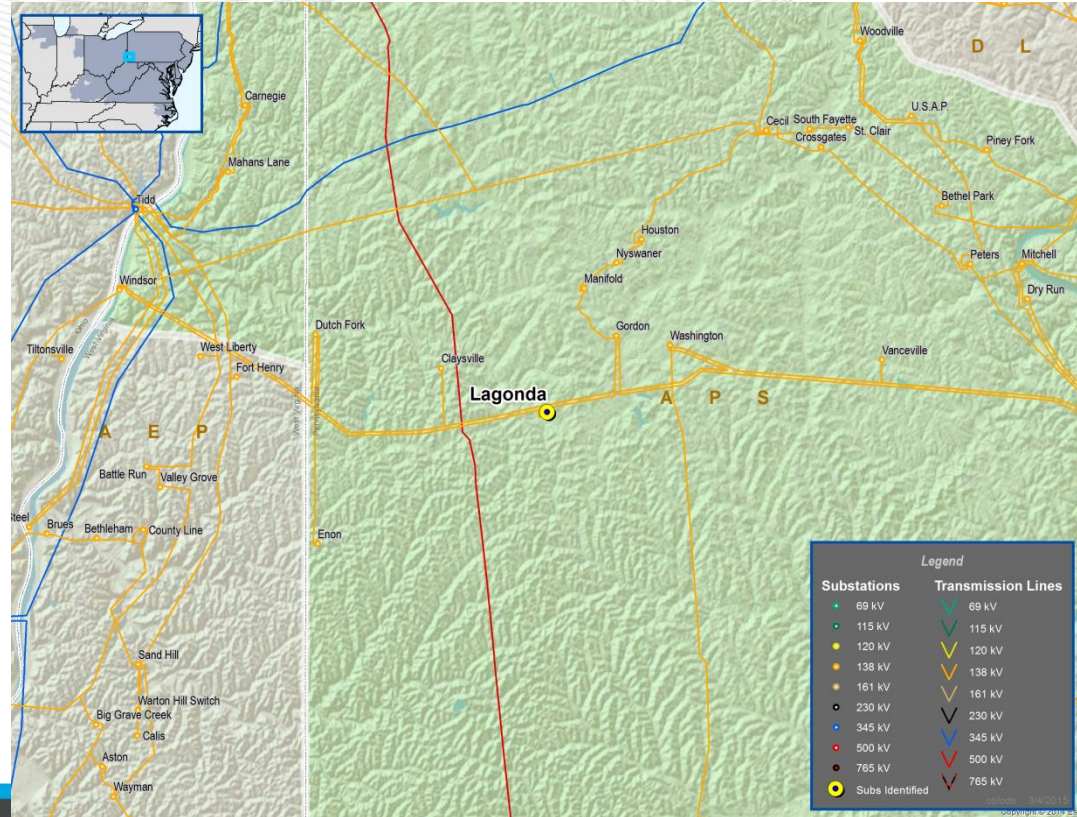
- **Supplemental Project**
- Provide 138 kV service to new customer.
- Tap the Murrycrest - White Valley 138 kV line and install a 138 kV meter. Upgrade terminal equipment at White Valley and Springdale 138KV. (S0985)
- Estimated Cost: \$5.5M
- Projected IS Date: 12/01/2016



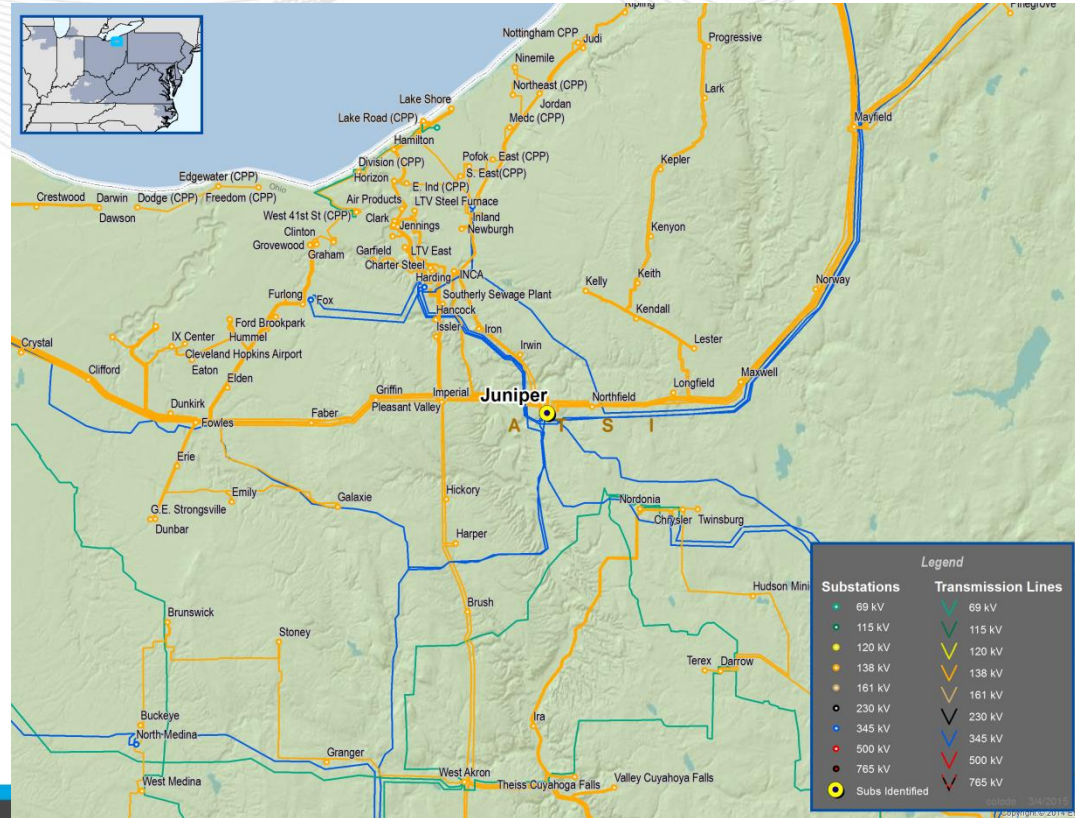
- **Supplemental Project**
- Provide 138 kV service to new customer.
- Tap the Kiski Valley - Garretts Run Jct. 138 kV line and install a 138 kV meter. Upgrade terminal equipment at Armstrong, Kiski Valley, and Kittanning. 138kV. (S0986)
- Estimated Cost: \$1.6M
- Projected IS Date: 06/01/2016



- **Supplemental Project**
- New Customer
- Install a new 138/69kV transformer at Lagonda substation and provide 69 kV meter to new customer. (S0987)
- Estimated Cost: \$4.5M
- Projected IS Date: 6/1/2016



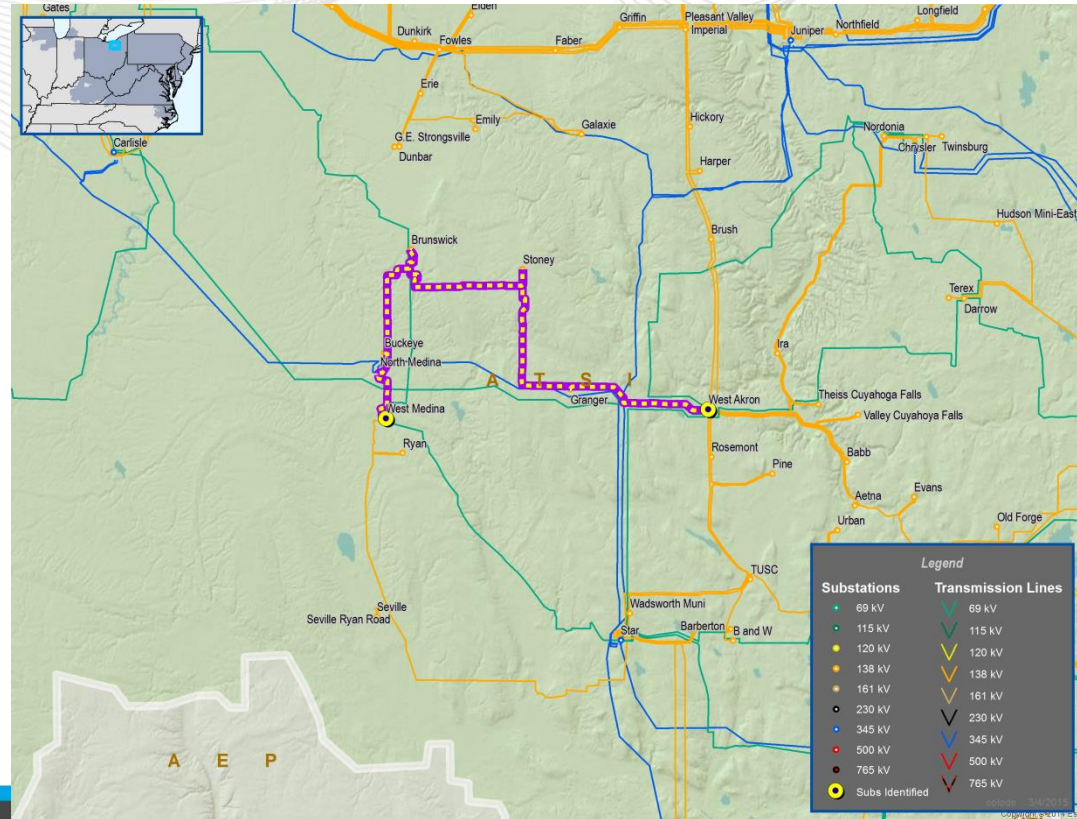
- **Supplemental Project**
- Condition/Reliability
- Replace the Juniper 345/138 kV #4 and #5 Transformers with a new single unit transformer (345/138kV 280MVA Transformer). (S0988)
- Estimated Cost: \$4.0M
- Projected IS Date: 10/30/2015



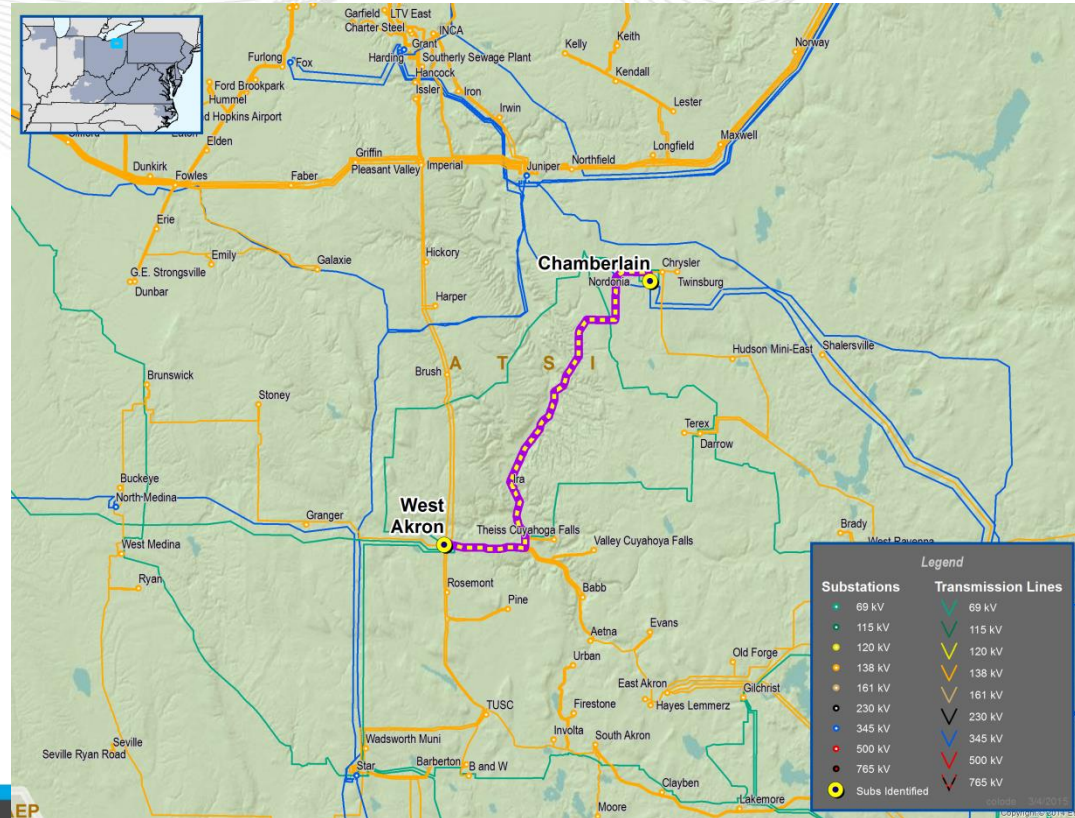
- **Supplemental Project**
- New Customer
- New Bentley Mod Sub: Connect a 138/13KV substation on Avon –Fowles Q-1/Q-3 138kV Lines. (S0989)
- Estimated Cost: \$6.0M
- Projected IS Date: 12/31/2015



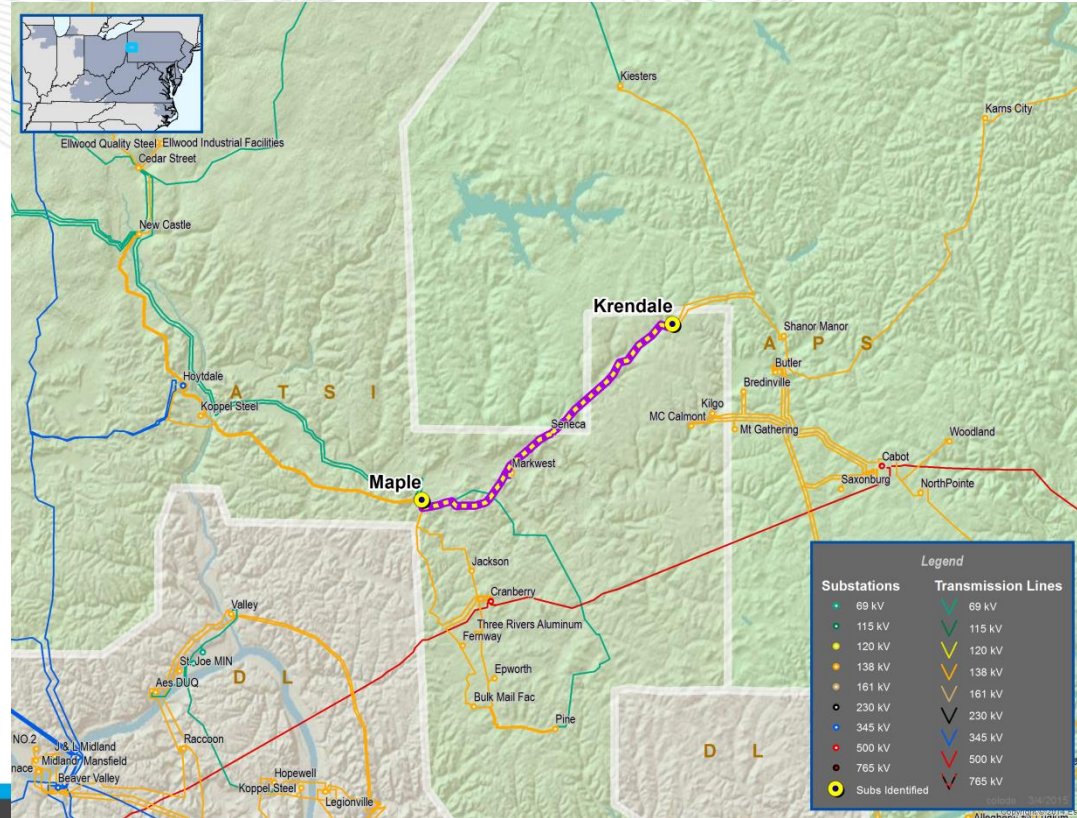
- **Supplemental Project**
- New Customer
- Laurel Mod Sub: Connect a 138/12KV substation on West Akron – West Medina 138kV Lines. (S0990)
- Estimated Cost: \$3.4M
- Projected IS Date: 12/31/2015



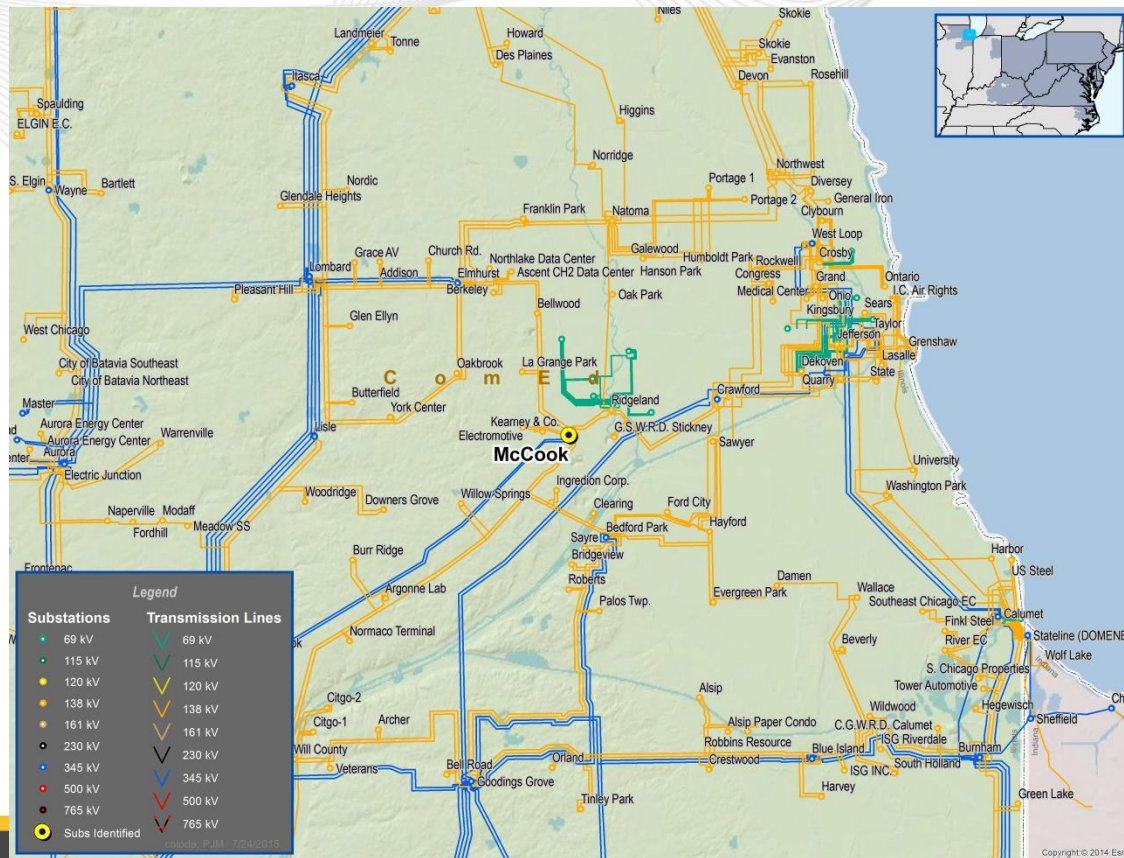
- **Supplemental Project**
- New Customer
- Sourek Mod Sub: Connect a 138/12KV substation on Chamberlain – West Akron 138kV Lines. (S0991)
- Estimated Cost: \$3.3M
- Projected IS Date: 12/31/2015



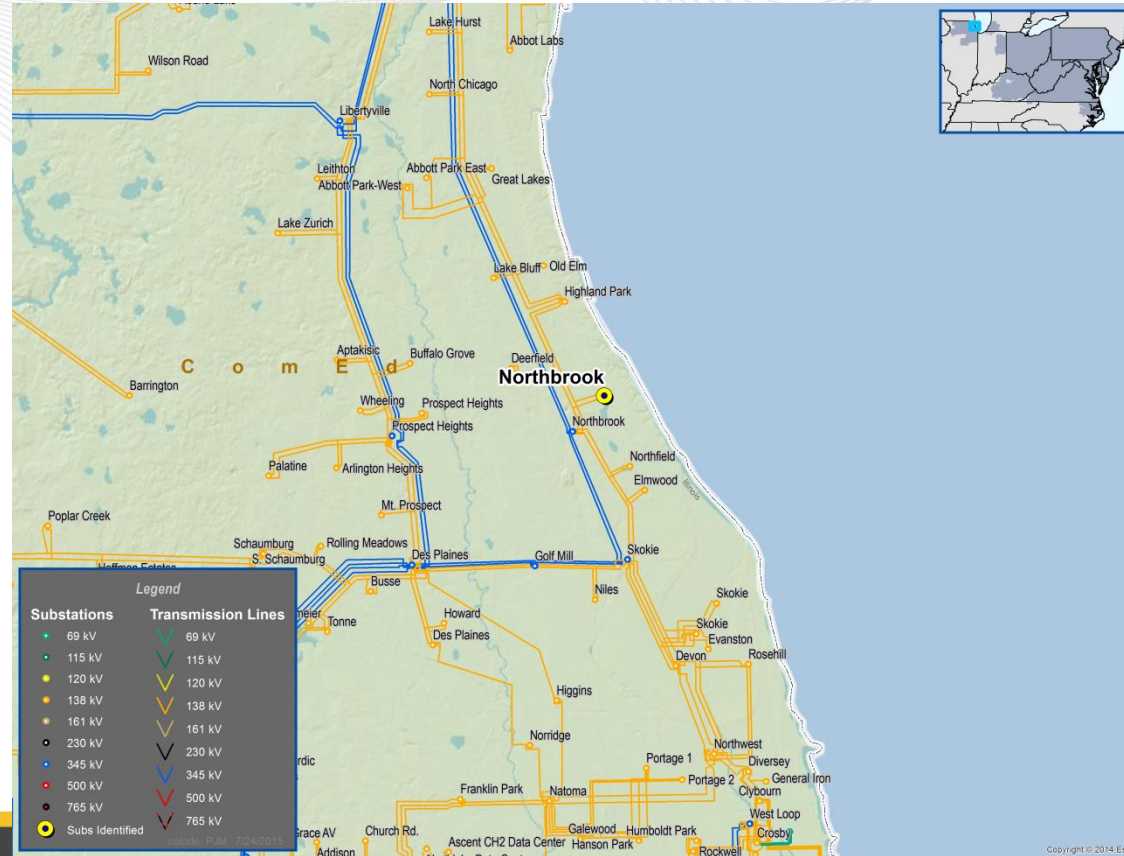
- **Supplemental Project**
- New Customer
- Tap the Krendale – Maple 138kV line and provide 138kV meter to new customer Bluestone #2. (S0992)
- Estimated Cost: \$0.9M
- Projected IS Date: 8/1/2015



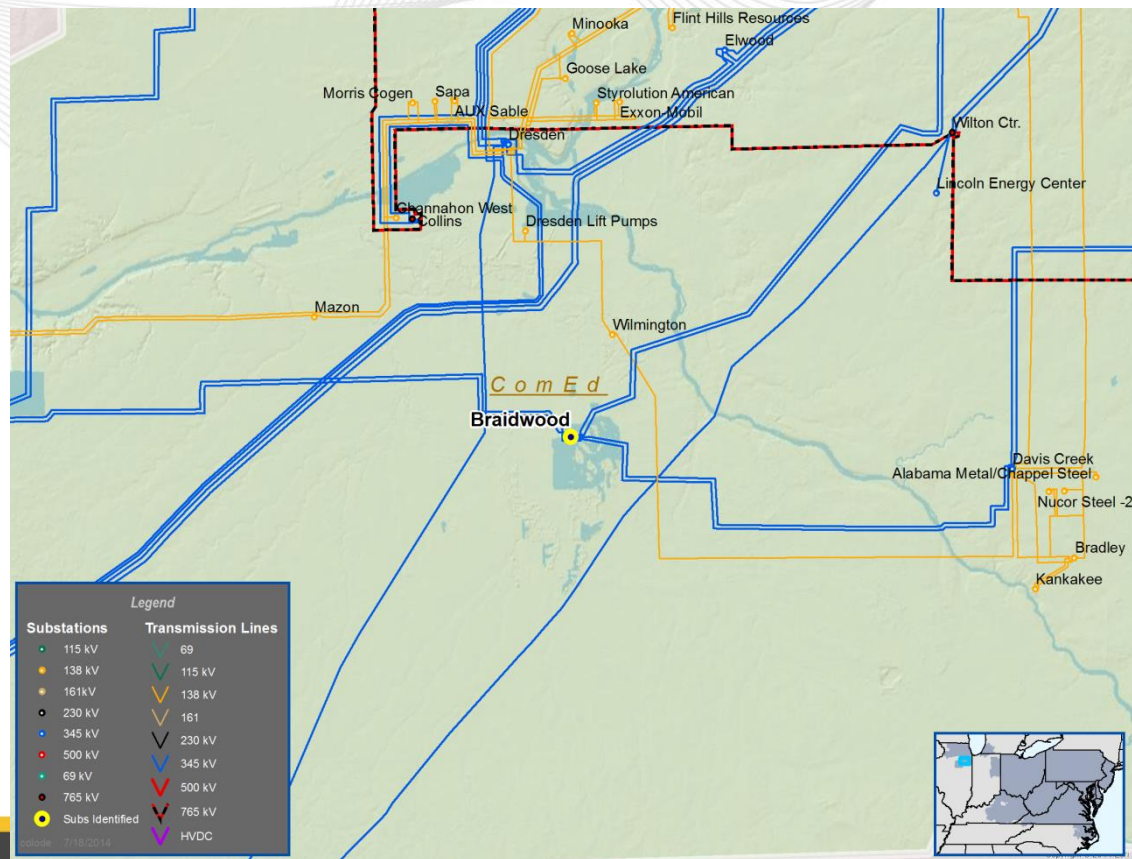
- **Supplemental Project**
- Material condition
- Remove 138 kV tertiary cap bank from TR82 at McCook and replace it with a 138 kV bus cap on 138 kV bus 2 (S0993)
- Estimated Cost: \$4.9M
- Projected IS Date: 12/31/2015



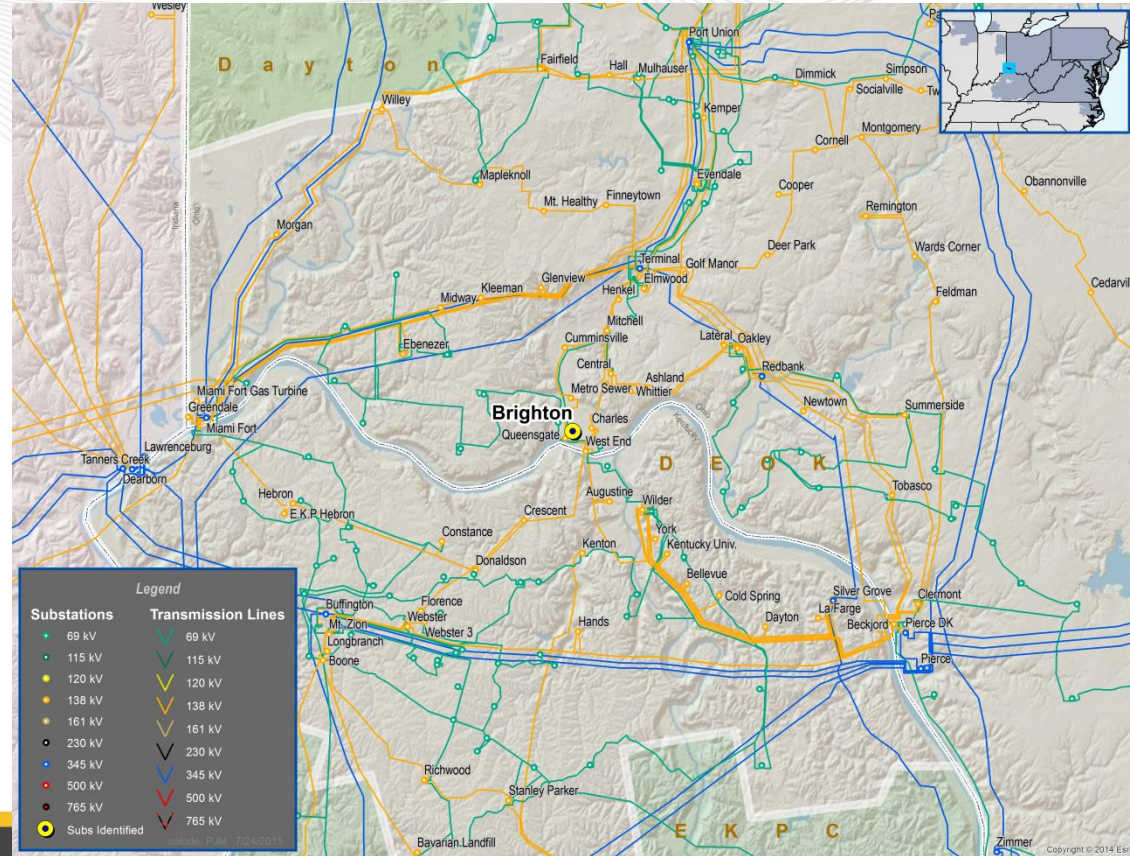
- **Supplemental Project**
- Material condition
- Remove 138 kV tertiary cap bank from TR81 at Northbrook and replace it with a 138 kV bus cap on 138 kV bus 4 (S0994)
- Estimated Cost: \$4.8M
- Projected IS Date: 12/31/2015



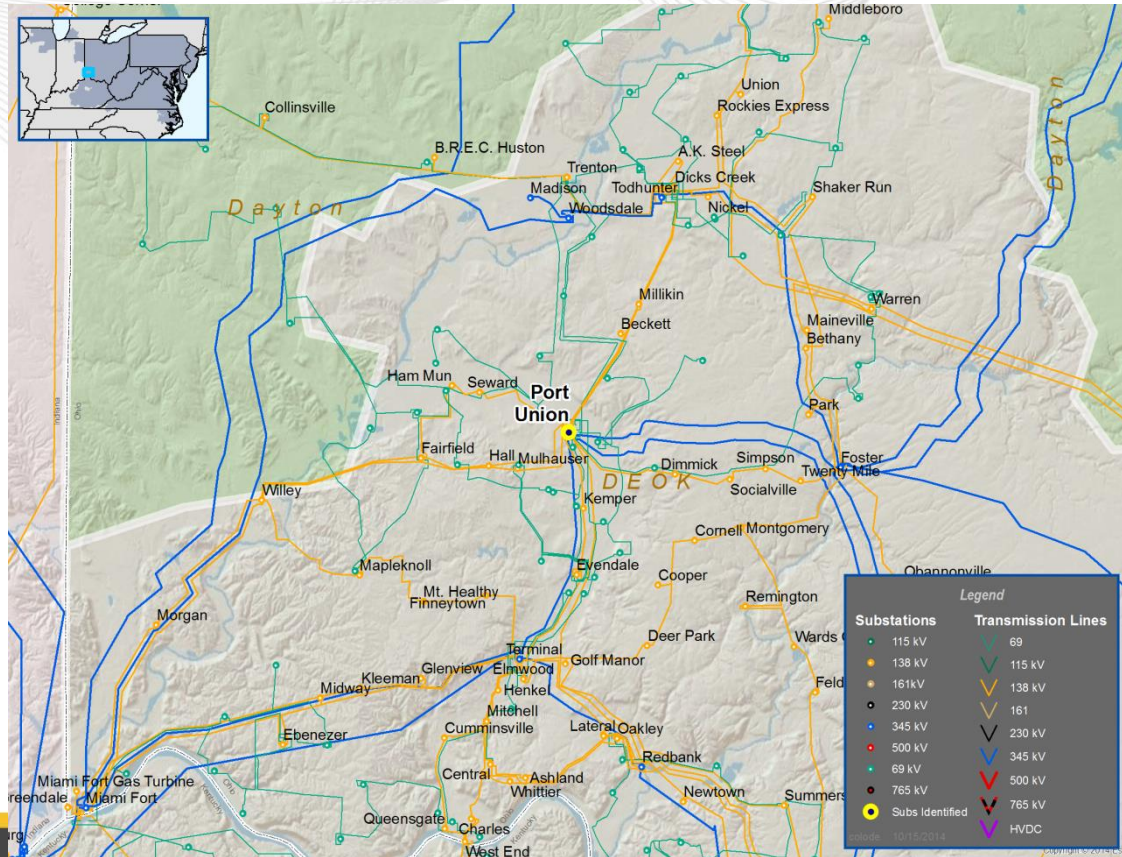
- **Supplemental Project**
- Potential generation retirement mitigation project
- Replace 345 kV CB 7-11 at Braidwood (S0995)
- Estimated Cost: \$1.8M
- Projected IS Date: 12/31/2015



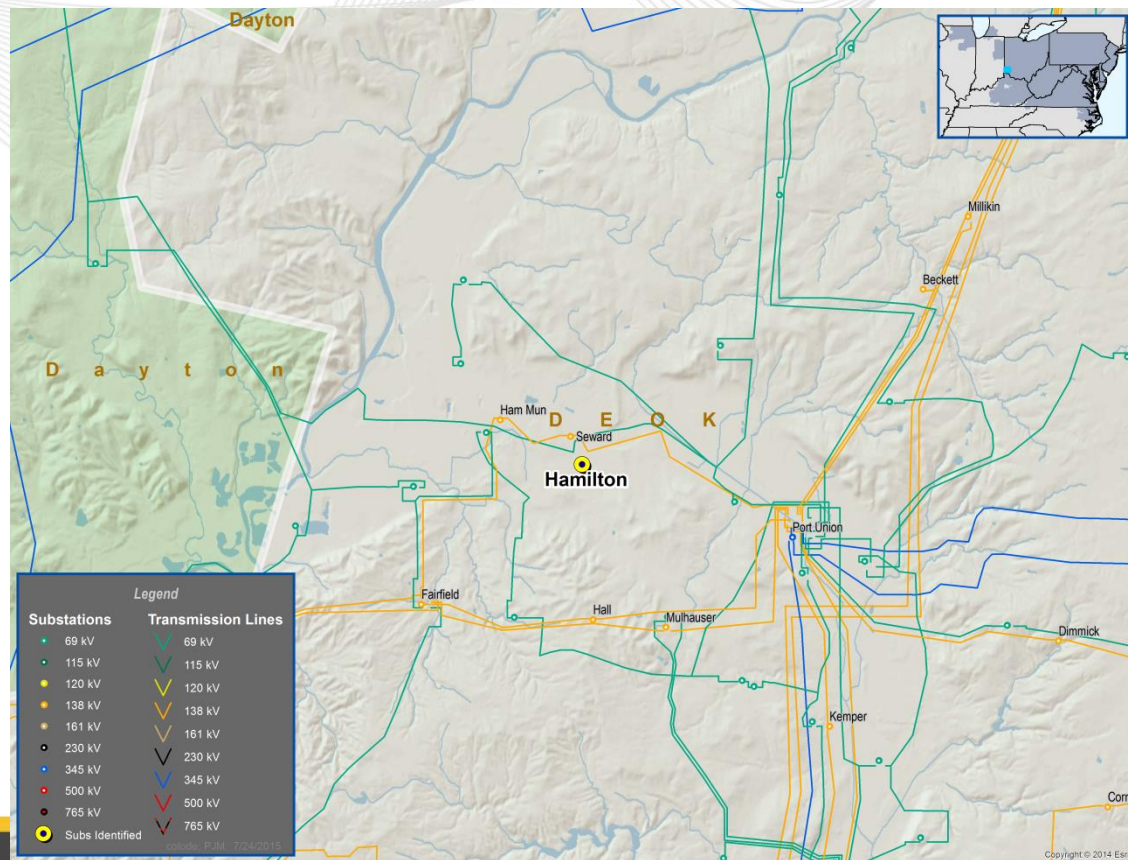
- **Supplemental Project**
- Reliability
- Replace TB3 and TB4 at Brighton 69kV substation with 33.6MVA, 69/13.2kV w/ LTC (S0996)
- Estimated Cost: TBD
- Projected IS Date: 12/31/2016



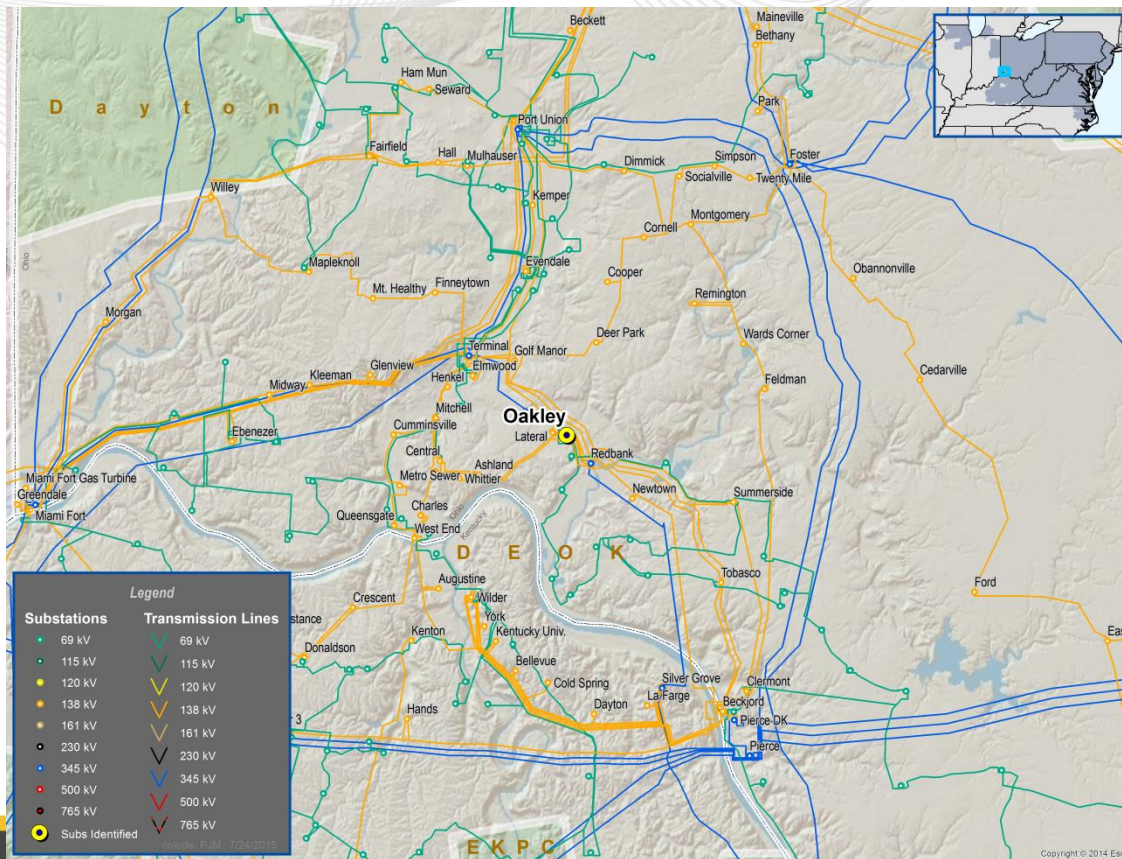
- **Supplemental Project**
- Reliability
- Replace TB1 at Port Union
138kV substaion w/ 138-69kV,
150MVA autotransformer
(S0997)
- Estimated Cost: TBD
- Projected IS Date: 12/31/2016



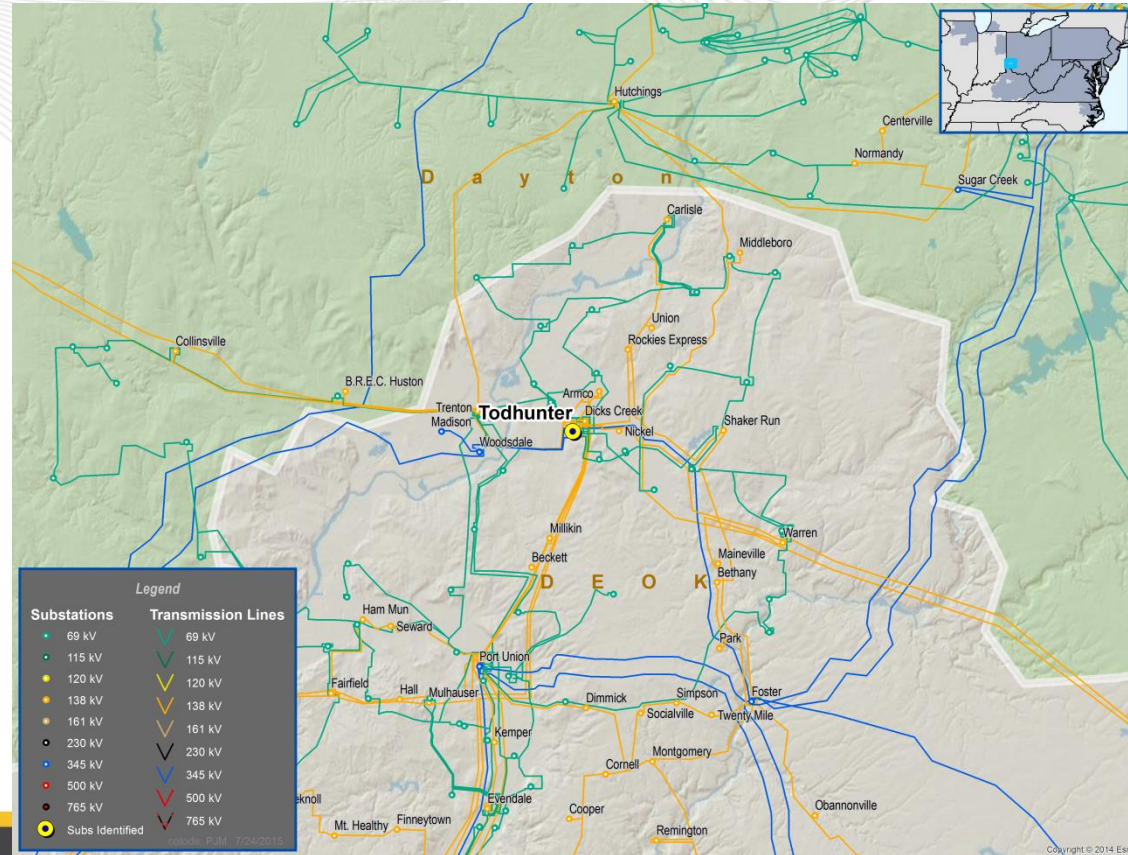
- **Supplemental Project**
- Reliability
- Install 69KV circuit breakers to create ring bus at City of Hamilton 69KV (S0998)
- Estimated Cost: \$4.9M
- Projected IS Date: 6/1/2018



- **Supplemental Project**
- Reliability
- Install two 138-13kV, 60MVA transformers at Oakley 138KV (S0999)
- Estimated Cost: TBD
- Projected IS Date: 6/1/2018



- **Supplemental Project**
- System Capacity Upgrade
- Replace 138kV CBs 913,919,925,931 at Todhunter 138kV with 80kA interrupting, (S1000)
- Estimated Cost: TBD
- Projected IS Date: 12/31/2020

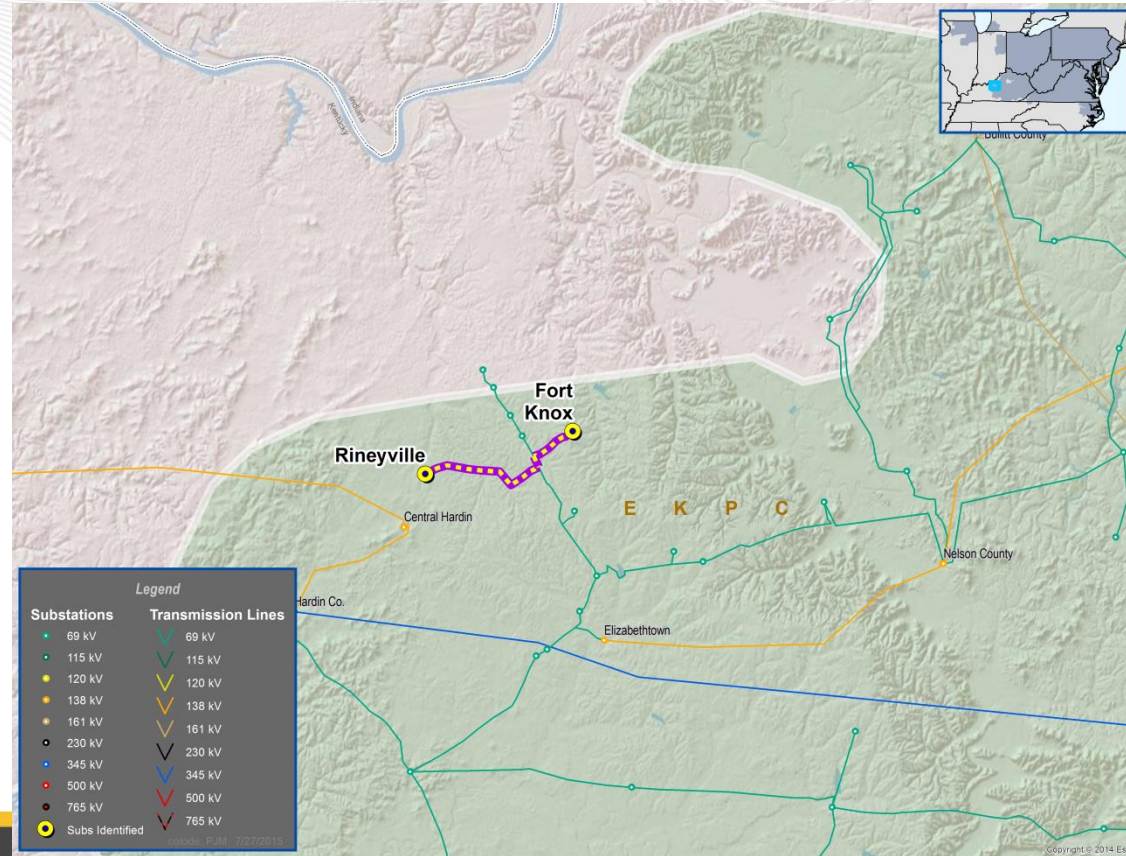




EKPC Transmission Zone

- **Supplemental Project**

- Re-conductor the Fort Knox Tap-Rineyville Tap –Smithersville Tap 69 KV line section (3.11 miles) using 556.5 MCM ACTW conductor. (S1001)
- EKPC encountered operational issues during the 2014/2015w that resulted in load shed in the area of Fort Knox
- Estimated Cost: \$0.76M
- Required IS Date: 12/1/2015



Questions?

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