Transmission Expansion Advisory Committee
Market Efficiency Update

July 9, 2015
Market Efficiency Long Term Proposal Window Update
2014/15 RTEP Long Term Proposal Window: Market Efficiency

- 93 Market Efficiency Proposals
  - 35 Transmission Owner Upgrades
    - Cost range of $0.1M to $68M
  - 58 Greenfield Projects
    - Cost range of $9.2M to $432.5M
### 2014/15 RTEP Long Term Proposal Window: Market Efficiency

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Proposed Market Efficiency / Reliability Upgrades
2014/15 RTEP Long Term Proposal Window – Progress Update

Completed:

• Step 1: Review projects - completed.
• Step 2: Benefit/Cost tests - completed.
  - Completed first round of runs using the 2014 published assumptions.
  - Completed sensitivity runs using updated 2015 assumptions: load forecast, fuel forecast, reactive limits, in-service date, etc.

Next steps:

August TEAC:

1. Recommendations for projects from Groups 2 thru 19
   - Requires Reliability and Constructability Analysis

2. Reduced list for projects from Group 1 (ApSouth/AEP-DOM)
   - Perform additional sensitivities, Reliability, and Constructability Analysis

- 2015 sensitivity assumptions applied to 2014 base case assumptions
- Projects must pass B/C test using 2015 sensitivity assumptions to be considered for further evaluation.

2015 sensitivity assumptions includes:

- Generation expansion update:
  - Includes new major ISA units
  - Includes deactivations that impact forecasted congestion
- Updated load forecast.
- Updated gas forecast.
- Significant RTEP upgrades that may impact congestion drivers.
Group / Review projects

Perform B/C test using 2014 and 2015 sensitivity

Did project pass B/C test using 2015 sensitivity?

Yes

Does project reduce or fix congestion driver?

Yes

Does project require additional upgrades?

Yes

Costs
Constructability
B/C Ratio
Congestion
In-service date
Sensitivities

Compare Projects

Recommendation

Finish

No

Project Not Recommended

No

Project Not Recommended

No

Perform Reliability and Constructability Analysis

No

Does project cause additional unacceptable congestion?

Yes

Project Not Recommended

No

Project Not Recommended
Group 1: AP SOUTH / AEP-DOM
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Notes:
- **ME Constraints Identified**:
  - AP SOUTH L/O BED-BLA
  - Brunner Island to Yorkana 230 kV
  - Taneytown to Carroll 138 kV
  - Safe Harbor to Graceton 230 kV
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<td>317.00</td>
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<td>0.56</td>
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<td>Lower Voltage</td>
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<td>201415_1-9A</td>
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<td>300.66</td>
<td>Peco/Dominion/AEP</td>
<td>AP SOUTH L/O BED-BLA Other Interfaces. Brunner Island to Yorkana 230 kV. Taneytown to Carroll 138 kV. Safe Harbor to Graceton 230 kV. Conastone to Northwest 230 kV.</td>
<td>Lower Voltage</td>
<td>6.21</td>
<td>5.07</td>
<td>Further Evaluation Necessary</td>
<td></td>
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Group 2: COMED - Loretto to Wilton Center

- 9 Projects:
  - 1-10C, 1-10D, 1-10E, 1-10F, 1-10G, 1-10H, 1-16A, 1-16B, 1-19H
- Cost:
  - From $11.5M to $290M
- Constraints:
  - Loretto to Wilton CTR
  - 345 kV
<table>
<thead>
<tr>
<th>Project ID</th>
<th>Upgrade/Greenfield</th>
<th>Cost ($M)</th>
<th>Target Zone</th>
<th>kV Level</th>
<th>ME Constraints Identified</th>
<th>Evaluation Type</th>
<th>B/C Ratio Base</th>
<th>B/C Ratio 2015 Sens.</th>
<th>Status</th>
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<tr>
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<td>345</td>
<td>Lorreto to Wilton CTR 345 kV</td>
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<td>1.79</td>
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<td>Upgrade</td>
<td>14.00</td>
<td>ComEd</td>
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<td>Lorreto to Wilton CTR 345 kV</td>
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<td>1.38</td>
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<td>201415_1-16A</td>
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<td>1.63</td>
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<td>201415_1-19H</td>
<td>Greenfield</td>
<td>42.90</td>
<td>ComEd</td>
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<td>Lorreto to Wilton CTR 345 kV</td>
<td>Lower Voltage</td>
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<td>19.90</td>
<td>ComEd</td>
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Group 3: DEOK / ATSI

- **8 Projects:**

- **Cost:**
  - From $11.4M to $91M

- **Constraints:**
  - Miami Fort to Willey 138 kV
  - Miami Fort to 08HEBTAP 138 kV

- **Notes:**
  - Congestion removed due to base line upgrades required by retirement of Miami Fort 6.
  - Proposals submitted will not be evaluated
Group 4: APS / METED

- 5 Projects:

- Cost:
  - From $5.2M to $107M

- Constraints:
  - Brunner Island to Yorkana 230 kV
  - Safe Harbor to Gracetown 230 kV
  - Taneytown to Carroll 138 kV

- Impacted by Group 8
<table>
<thead>
<tr>
<th>Project ID</th>
<th>Upgrade/ Greenfield</th>
<th>Cost ($M)</th>
<th>Target Zone</th>
<th>kV Level</th>
<th>ME Constraints Identified</th>
<th>Evaluation Type</th>
<th>B/C Ratio Base</th>
<th>B/C Ratio 2015 Sens.</th>
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<th>Comments</th>
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<tr>
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<td>Taneytown to Carroll 138 kV</td>
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<td>APS/Meted</td>
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<td>201415_1-20I</td>
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<td>70.80</td>
<td>APS/Dominion</td>
<td>138</td>
<td>Taneytown to Carroll 138 kV Brunner Island to Yorkana 230 kV Safe Harbor to Graceton 230 kV</td>
<td>Lower Voltage</td>
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<td>5.36</td>
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<td>APS/Meted</td>
<td>230</td>
<td>Taneytown to Carroll 138 kV</td>
<td>Lower Voltage</td>
<td>34.66</td>
<td>34.21</td>
<td>Further Evaluation Necessary</td>
<td>Increases Congestion</td>
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</table>
Group 5: APS / DUQ

- 4 Projects:
  - 1-12A, 1-19I, 1-20B, 1-20H
- Cost:
  - From $1M to $64M
- Constraints:
  - Dravosburg to West Mifflin 138 kV
  - Krendale to Shanor Manor 138 kV
  - Woodville to 15USAP 138 kV
<table>
<thead>
<tr>
<th>Project ID</th>
<th>Upgrade/Greenfield</th>
<th>Cost ($M)</th>
<th>Target Zone</th>
<th>kV Level</th>
<th>ME Constraints Identified</th>
<th>Evaluation Type</th>
<th>B/C Ratio Base</th>
<th>B/C Ratio 2015 Sens.</th>
<th>Status</th>
<th>Comments</th>
</tr>
</thead>
</table>
| 201415_1-19I | Greenfield        | 9.20      | APS/DUQ      | 138      | Dravosburg to West Mifflin 138 kV  
Woodville to 15USAP 138 kV  
Krendale to Shanor Manor 138 kV | Lower Voltage       | 8.08         | 2.71                          | Further Evaluation Necessary | Increases Congestion |
| 201415_1-12A | Upgrade           | 11.18     | DUQ          | 138      | Dravosburg to West Mifflin 138 kV  
Woodville to 15USAP 138 kV | Lower Voltage       | 5.76         | 1.98                          | Further Evaluation Necessary |                                  |
| 201415_1-20H | Greenfield        | 14.40     | APS/DUQ      | 138      | Dravosburg to West Mifflin 138 kV  
Woodville to 15USAP 138 kV  
Taneytown to Carroll 138 kV | Lower Voltage       | 5.08         | 0.93                          | Not Recommended               |                                  |
| 201415_1-20B | Greenfield        | 64.30     | APS/DUQ      | 138      | Dravosburg to West Mifflin 138 kV  
Woodville to 15USAP 138 kV | Lower Voltage       | 3.22         | 3.33                          | Further Evaluation Necessary |                                  |
Group 6: ATSI – Black River to Lorain

- 1 Project:
  - 1-18K
- Cost:
  - $9.6M
- Constraints:
  - 02Blkrvr to Lorain 138 kV
- Duplicate of Baseline Reliability Upgrade (B2559)
- Proposal will not be evaluated.
Group 7: ATSI - Crestwood to Astor

- **1 Project:**
  - 1-18L – no upgrade required

- **Cost:**
  - No cost information

- **Constraints:**
  - Crestwood to Astor 138 kV

- **Notes:**
  - Transmission owner rating update removes congestion.
  - Proposal will not be evaluated.
Group 8: PPL / METED

- **4 Projects:**
  - 1-2A, 1-2B, 1-3A, 1-5A
- **Cost:**
  - $1.1M to $40M
- **Constraints:**
  - Brunner Island to Yorkana 230 kV
  - Safe Harbor to Graceton 230 kV
- **Impacted by Group 4**
<table>
<thead>
<tr>
<th>Project ID</th>
<th>Upgrade/ Greenfield</th>
<th>Cost ($M)</th>
<th>Target Zone</th>
<th>kV Level</th>
<th>ME Constraints Identified</th>
<th>Evaluation Type</th>
<th>B/C Ratio Base</th>
<th>B/C Ratio 2015 Sens.</th>
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<td>PPL/Meted</td>
<td>500</td>
<td>Brunner Island to Yorkana 230 kV</td>
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<td>BGE/PPL</td>
<td>230</td>
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<td>Lower Voltage</td>
<td>1.45</td>
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Group 9: COMED - Cordova to Nelson

- **3 Projects:**
  - 1-10I, 1-10J, 1-10K
- **Cost:**
  - $2M to $25M
- **Constraints:**
  - Cordova to Nelson 345 kV
<table>
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<tr>
<th>Project ID</th>
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<th>Target Zone</th>
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<th>ME Constraints Identified</th>
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<th>B/C Ratio 2015 Sens.</th>
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<td>345</td>
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Group 10: COMED - Wayne to South Elgin

- 1 Project:
  - 1-10B
- Cost:
  - $0.1M
- Constraints:
  - Wayne to South Elgin 138 kV
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<th>Cost ($M)</th>
<th>Target Zone</th>
<th>kV Level</th>
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<td>Wayne to South Elgin 138 kV</td>
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Group 11: PECO

- 5 Projects:
- Cost:
  - From $0.2M to $21M
- Constraints:
  - Peach Bottom 500 kV
  - Peach Bottom to Conastone 500 kV
<table>
<thead>
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<th>Project ID</th>
<th>Upgrade/ Greenfield</th>
<th>Cost ($M)</th>
<th>Target Zone</th>
<th>kV Level</th>
<th>ME Constraints Identified</th>
<th>Evaluation Type</th>
<th>B/C Ratio Base</th>
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<td>PECO</td>
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<td>Peach Bottom 500 kV</td>
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<td>Further Evaluation Necessary</td>
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</table>
Group 12: PSEG RPM

- **3 Projects:**
  - 1-15A, 1-20F, 1-21G
- **Cost:**
  - From $2.8M to $125M
- **Constraints:**
  - Roseland-Cedar Grove-Clifton 230 kV corridor
- **Note:**
  - RPM project pending BRA results.
Group 13: COMED - Oglesby to Mazon

- **1 Project:**
  - 1-10A
- **Cost:**
  - From $0.7M to $1M
- **Constraints:**
  - Oglesby to Mazon 138 kV
- **Duplicate of B2613 baseline upgrade.**
- **Proposal will not be evaluated.**
Group 14: DPL

- 1 Project:
  - 1-13E

- Cost:
  - $2.4M

- Constraints:
  - Worcester to Ocean Pines 69 kV
<table>
<thead>
<tr>
<th>Project ID</th>
<th>Upgrade/ Greenfield</th>
<th>Cost ($M)</th>
<th>Target Zone</th>
<th>kV Level</th>
<th>ME Constraints Identified</th>
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Group 15: ATS/ATSI - Krendale to Shanor Manor

- 1 Project:
  - 1-18I
- Cost:
  - $0.6M
- Constraints:
  - Krendale to Shanor Manor 138 kV
## Group 15 Analysis

<table>
<thead>
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<th>Cost ($M)</th>
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Group 16: ATSI - CLEVELAND INTERFACE

- **1 Project:**
  - 1-18J

- **Cost:**
  - $22.4M

- **Constraints:**
  - CLEVELAND Interface

- **Baseline projects b2557, b2559, and b2560 may remove driver**
  - B2557: At Avon substation, replace the existing 345/138kV #92 transformer
  - B2559: Re-conductor the Black River-Lorain 138kV line
  - B2560: Second 138kV line between West Fremont and Hayes substation
Group 17: AEP / CE / NIPS

- 1 Project:
  - 1-16C
- Cost:
  - $81.2M
- Constraints:
  - Various M2M Facilities
<table>
<thead>
<tr>
<th>Project ID</th>
<th>Upgrade/Greenfield</th>
<th>Cost ($M)</th>
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Group 18: AEP - Fieldale to Thornton

- **2 Projects:**
  - 1-4I, 1-20E
- **Cost:**
  - From $0.8M to $19M
- **Constraints:**
  - Danville to East Danville 138 kV
  - Fieldale to Thornton 138 kV
<table>
<thead>
<tr>
<th>Project ID</th>
<th>Upgrade/Greenfield</th>
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<th>Target Zone</th>
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<td>Lower Voltage</td>
<td>114.18</td>
<td>101.19</td>
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<td>201415_1-20E</td>
<td>Greenfield</td>
<td>19.00</td>
<td>AEP</td>
<td>138</td>
<td>Fieldale to Thornton 138 kV</td>
<td>Lower Voltage</td>
<td>2.41</td>
<td>2.67</td>
<td>Further Evaluation Necessary</td>
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</table>
Group 19: AEP – Jackson’s Ferry to Cloverdale

- 1 Project:
  - 4J

- Cost:
  - $0.5M

- Constraints:
  - Jackson’s Ferry to Cloverdale 765 KV
<table>
<thead>
<tr>
<th>Project ID</th>
<th>Upgrade/ Greenfield</th>
<th>Cost ($M)</th>
<th>Target Zone</th>
<th>kV Level</th>
<th>ME Constraints Identified</th>
<th>Evaluation Type</th>
<th>B/C Ratio Base</th>
<th>B/C Ratio 2015 Sens.</th>
<th>Status</th>
<th>Comments</th>
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<tr>
<td>201415_1-4J</td>
<td>Upgrade</td>
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<td>AEP</td>
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<td>Jacksons Ferry to Cloverdale 765 KV</td>
<td>Regional</td>
<td>15.81</td>
<td>61.98</td>
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<td>Further Evaluation Necessary</td>
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</table>
2014-2015 24-Month Market Efficiency Cycle Timeline

- **Long Term proposal window:** November 2014 - February 2015

- **Analysis of proposed solutions:** March 2015 - November 2015
  - Determination of major assumptions (i.e. Load forecast, Fuel prices, Generators) that are significantly different in 2015 and can be used in sensitivity analysis for proposed projects: March 2015
  - Independent consultant review of cost and ability to build
  - Review of analysis with TEAC: June 2015-November 2015

- **Determination of Final projects:** December 2015
  - Final review with TEAC and Board approval
    - Projects may be approved earlier if analysis and review complete
Appendix A
Individual Projects
Project ID: 201415_1-2A

Proposed by: PPL

Proposed Solution: Reconductor two spans of the Graceton-Safe Harbor 230kV transmission line.
Includes termination point upgrades

kV Level: 230

Cost ($M): 1.1

IS Date: 2019

Target Zone: PPL/BGE

ME Constraints: Safe Harbor to Graceton 230 kV

Notes:
Project ID: 201415_1-2B

Proposed by: PPL

Proposed Solution: Reconductor three spans limiting the Brunner Island - Yorkana 230kV line, add 2 breakers to Brunner Island Switchyard, upgrade associated terminal equipment

kV Level: 230

Cost ($M): 3.1

IS Date: 2019

Target Zone: PPL/Meted

ME Constraints: Brunner Island to Yorkana 230 kV

Notes:
Project ID: 201415_1-2C

Proposed by: PPL

Proposed Solution: Install 500kV -100/+500 MVAR SVC addition and associated terminal hardware at New Juniata SVC Substation Yard with Approx. 300ft of 500kV transmission linking the existing Juniata Substation to the new SVC yard

kV Level: 500

Cost ($M): 33.95

IS Date: 2018

Target Zone: PPL

ME Constraints: AP SOUTH L/O BED-BLA

Notes:

PJM TEAC 7/9/2015
**Project ID: 201415_1-3A**

- **Proposed by:** PPL/FE
- **Proposed Solution:** Expand existing Yorkana substation in Met-Ed. Install 500/230 kV transformer, construct a 500 kV ring bus, install two 230 kV breakers and loop TMI-Peach Bottom 500 kV line into new 500 kV ring bus.
- **kV Level:** 500
- **Cost ($M):** 40.2
- **IS Date:** 2019
- **Target Zone:** PPL/Meted
- **ME Constraints:** Brunner Island to Yorkana 230 kV

**Notes:**

PJM TEAC 7/9/2015
**Project ID: 201415_1-4I**

**Proposed by:** AEP

**Proposed Solution:** Operate the Fieldale - Thornton - Franklin overhead at maximum operating temperature. Replace terminal equipment at Danville and East Danville substations.

**kV Level:** 138

**Cost ($M):** 0.75

**IS Date:** 2019

**Target Zone:** AEP

**ME Constraints:** Fieldale to Thornton 138 kV  
Danville to East Danville 138 kV

**Notes:**
Project ID: 201415_1-4J

Proposed by: AEP

Proposed Solution: Replace relays at AEP's Cloverdale and Jackson's Ferry substation to improve the thermal capacity of Cloverdale - Jackson's Ferry 765 kV line

kV Level: 765

Cost ($M): 0.5

IS Date: 2019

Target Zone: AEP

ME Constraints: Jackson’s Ferry to Cloverdale 765 KV

Notes:

PJM TEAC 7/9/2015

55
Project ID: 201415_1-5A

Proposed by: BGE

Proposed Solution: Rebuild 1.4 miles of the Graceton-Safe Harbor 230kV line. BGE and PPL projects together will achieve a combined tie line facility ratings of 648/802 MVA SN/SE and 746/903 MVA WN/WE

kV Level: 230

Cost ($M): 5.6

IS Date: 2019

Target Zone: BGE/PPL

ME Constraints: Safe Harbor to Graceton 230 kV

Notes:
Project ID: 201415_1-6A

Proposed by: Dominion

Proposed Solution: Build one 500kV Thyristor Controlled Series Capacitors (TCSC) at Mt Storm substation on the Mt Storm - Pruntytown (554) transmission line to reduce congestion on AP South and other PJM interfaces

kV Level: 500

Cost ($M): 25

IS Date: 2019

Target Zone: Dominion

ME Constraints: AP SOUTH L/O BED-BLA

Other Interfaces

Notes:
### Project ID: 201415_1-6B

**Proposed by:** Dominion  
**Proposed Solution:** Build one 500kV Thyristor Controlled Series Capacitors (TCSC) at Loudoun substation on the Loudoun - Meadowbrook line to reduce congestion on AP South and other PJM interfaces  
**kV Level:** 500  
**Cost ($M):** 25  
**IS Date:** 2019  
**Target Zone:** Dominion  
**ME Constraints:** AP SOUTH L/O BED-BLA  
**Other Interfaces:**

**Notes:**

---

[Map of the proposed project]
Project ID: 201415_1-6C

Proposed by: Dominion

Proposed Solution: Build one 500kV Thyristor Controlled Series Capacitor (TCSC) at Loudoun substation on the Loudoun - Meadowbrook (535) line and build five (5) 230 kV capacitor banks at five (5) DVP substations to alleviate congestion on AP South and other PJM interfaces

kV Level: 500

Cost ($M): 39.06

IS Date: 2019

Target Zone: Dominion

ME Constraints: AP SOUTH L/O BED-BLA

Other Interfaces

Notes:
Project ID: 201415_1-6D

Proposed by: Dominion

Proposed Solution: Build a new 500kV station (Palmyra) by connecting at the intersection of two (2) 500kV lines of North Anna - Midlothian 500kV line and Cunningham - Elmont 500kV line and build five (5) capacitor banks in DVP zone to alleviate AP South and AEP-DOM congestions

kV Level: 500

Cost ($M): 42.7

IS Date: 2019

Target Zone: Dominion

ME Constraints: AP SOUTH L/O BED-BLA

Other Interfaces

Notes:
Project ID: 201415_1-7A

Proposed by: Transource

Proposed Solution: Construct a double circuit 230 kV line between AEP's Axton Station to AEP's East Danville Station. Install breakers and a transformer at Axton and East Danville Station. A total of 1,550 MVARs of new capacitance will also be installed at Brambleton, Ashburn, Lexington, Dooms, Jackson’s Ferry and Broadford substations.

kV Level: 765
Cost ($M): 139
IS Date: 2020
Target Zone: AEP
ME Constraints: AP SOUTH L/O BED-BLA, Other Interfaces, Danville to East Danville 138 kV, Fieldale to Thornton 138 kV

Notes:
Project ID: 201415_1-7B

Proposed by: Transource

Proposed Solution: Construct a double circuit 230 kV line between Meadow Brook Station and Doubs Station. Additional upgrades in AEP will also be included in this proposal. A total of 1,550 MVARs of new capacitance will also be installed at Brambleton, Ashburn, Lexington, Dooms, Jackson’s Ferry and Broadford substations.

kV Level: 230

Cost ($M): 237

IS Date: 2021

Target Zone: AEP

ME Constraints: AP SOUTH L/O BED-BLA

Other Interfaces
Taneytown to Carroll 138 kV

Notes:
**Project ID:** 201415_1-7C

**Proposed by:** Transource

**Proposed Solution:** Construct a new 500 kV line from Meadow Brook to Doubs. Install a single 500 kV breaker in the existing ring arrangement at Meadow Brook Station. Additional upgrades in AEP will also be included in this proposal. 1,750 MVARs of new capacitance will also be installed with 350 MVAR of capacitor banks each at Brambleton, Loudoun, Lexington, Jackson’s Ferry and Broadford substations.

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<th>Cost ($M): 210</th>
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<tr>
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<tr>
<td>ME Constraints: AP SOUTH L/O BED-BLA</td>
<td>Other Interfaces</td>
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<tr>
<td>Taneytown to Carroll 138 kV</td>
<td>Notes:</td>
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Project ID:  201415_1-8A

Proposed by: Dominion/Transource

Proposed Solution: Construct a 500 kV station between North Anna - Midlothian and Cunningham - Elmont line. Construct a 75 mile circuit 765 kV line between Palmyra -Joshua Falls 765 kV station. Install 350 MVAR cap bank at Jackson's Ferry -Broadford 765 kV stations.

kV Level: 765

Cost ($M): 384

IS Date: 2020

Target Zone: AEP/Dominion

ME Constraints: AP SOUTH L/O BED-BLA
AEP-DOM L/O BED-BLA

Other Interfaces
Danville to East Danville 138 kV
Fieldale to Thornton 138 kV

Notes:

PJM TEAC 7/9/2015
Project ID: 201415_1-8B

Proposed by: Dominion/Transource

Proposed Solution: Construct a 500 kV station between North Anna - Midlothian and Cunningham - Elmont lines. Construct a 75 mile 500 kV line between Palmyra and Joshua Falls 765 kV station. Install cap banks at Liberty, Cannon Branch, Shellhorn, Dooms, and Morrisville stations.

kV Level: 500
Cost ($M): 293
IS Date: 2020
Target Zone: AEP/Dominion
ME Constraints: AP SOUTH L/O BED-BLA
AEP-DOM L/O BED-BLA
Other Interfaces
Fieldale to Thornton 138 kV

Notes:

PJM TEAC 7/9/2015
Project ID: 201415_1-8C

Proposed by: Dominion/Transource

Proposed Solution: Construct a 765kV line between Axton and Dominion’s Clover Station. Install 765kV breakers and shunt reactor at Axton Station. Install 765/500 kV transformer at Clover Station. Complete sag remediation on the Fieldale - Thornton - Franklin 138 kV line. Install cap banks at Liberty, Cannon Branch, Shellhorn, Dooms, and Morrisville stations.

kV Level: 765
Cost ($M): 317
IS Date: 2020

Target Zone: AEP/Dominion
ME Constraints: AP SOUTH L/O BED-BLA
AEP-DOM L/O BED-BLA

Other Interfaces
Danville to East Danville 138 kV
Fieldale to Thornton 138 kV

Notes:
Project ID: 201415_1-8D

Proposed by: Dominion/Transource

Proposed Solution: Build a single circuit 500kV AC overhead line from Axton - Clover substations, build a 765/500kV TX at Axton, and build five (5) capacitor banks in DVP zone to alleviate AP South and AEP-DOM congestions

kV Level: 500

Cost ($M): 222

IS Date: 2019

Target Zone: AEP/Dominion

ME Constraints: AP SOUTH L/O BED-BLA

AEP-DOM L/O BED-BLA

Other Interfaces

Fieldale to Thornton 138 kV

Notes:

PJM TEAC 7/9/2015
Project ID: 201415_1-8E

Proposed by: Dominion/Transource

Proposed Solution: Build a double circuit 230kV AC overhead line from Joshua Falls - Farmville substations, build a 765/230kV TX at Joshua Falls, and build five (5) capacitor banks in DVP zone to alleviate AP South and AEP-DOM congestions

kV Level: 230

Cost (M): 181

IS Date: 2019

Target Zone: Dominion

ME Constraints: AP SOUTH L/O BED-BLA
AEP-DOM L/O BED-BLA

Other Interfaces
Fieldale to Thornton 138 kV

Notes: PJM TEAC 7/9/2015
Project ID: 201415_1-8F

Proposed by: Dominion/Transource

Proposed Solution: Build a single circuit 230kV AC overhead line from Joshua Falls - Farmville substations, build a 765/230kV TX at Joshua Falls, upgrade portions of the 84 line, and build five (5) capacitor banks in DVP zone to alleviate AP South and AEP-DOM congestions

kV Level: 230
Cost ($M): 193
IS Date: 2019
Target Zone: Dominion
ME Constraints: AP SOUTH L/O BED-BLA
Other Interfaces
Notes:
Project ID: 1-9A

Proposed by: Dominion / Transource

Proposed Solution: Tap the Conemaugh - Hunterstown 500 kV line and build new 230 kV double circuit line between Rice and Ringgold. Build new 230 kV double circuit line between Furnace Run and Conastone. Add cap banks to Jackson's Ferry, Broadford, Lexington, Dooms, Ashburn and Brambleton stations. Rebuild the Conastone - Northwest 230 kV line.

kV Level: 230

Cost ($M): 269

IS Date: 2020

Target Zone: PECO/Dominion/AEP

ME Constraints: AP SOUTH L/O BED-BLA, Brunner Island to Yorkana 230 kV, Taneytown to Carroll 138 kV, Safe Harbor to Graceton 230 kV, Conastone to Northwest 230 kV

Notes:
Project ID: 201415_1-10A

Proposed by: ComEd

Proposed Solution: Replace relays at Mazon substation

kV Level: 138

Cost ($M): 0.7

IS Date: 2019

Target Zone: ComEd

ME Constraints: Oglesby to Mazon 138 kV

Notes: B2613 removes driver

Proposal will not be evaluated.
Project ID: 201415_1-10B

Proposed by: ComEd

Proposed Solution: Replace L7815 B phase line trap at Wayne substation

kV Level: 138

Cost ($M): 0.1

IS Date: 2019

Target Zone: ComEd

ME Constraints: Wayne to South Elgin 138 kV

Notes:
Project ID: 201415_1-10C

Proposed by: ComEd

Proposed Solution: The solution consists of the installation of a new ~14.5 mile 345 kV single circuit overhead transmission line from ComEd’s existing Loretto 345kV substation to ComEd’s existing Katydid 345kV substation. Additionally, 345 kV L0303 from ComEd’s Powerton to Goodings Grove 345 kV substations would be brought into and split at Katydid.

kV Level: 345
Cost ($M): 37.8
IS Date: 2019
Target Zone: ComEd
ME Constraints: Loretto to Wilton CTR 345 kV
Notes:
Project ID: 201415_1-10D

Proposed by: ComEd

Proposed Solution: Mitigate sag limitations on Loretto-Wilton Center Line, and replace station conductor at Wilton Center.

kV Level: 345

Cost ($M): 11.5

IS Date: 2019

Target Zone: ComEd

ME Constraints: Loretto to Wilton CTR 345 kV

Notes:
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<tbody>
<tr>
<td>Proposed by: ComEd</td>
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<tr>
<td>Proposed Solution: Mitigate sag limitations on Loretto-Wilton Center Line and replace station conductor and circuit breakers at Wilton Center.</td>
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<td>kV Level: 345</td>
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<td>Proposed by: ComEd</td>
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<td>Proposed Solution: Loretto to Wilton Center Sag Mitigation and Station Conductor Replacement; Pontiac Midpoint to Dresden Station Conductor Replacement</td>
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<td>ME Constraints: Loretto to Wilton CTR 345 kV</td>
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![Map showing the proposed project locations and lines]
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<tr>
<td>Proposed by: ComEd</td>
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<tr>
<td>Proposed Solution: Loretto to Wilton Center Sag Mitigation, Station Conductor Replacement, Circuit breaker replacements at Wilton Center and Replace station conductor at Pontiac Midpoint and Dresden</td>
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<td>kV Level: 345</td>
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Project ID: 201415_1-10H

Proposed by: ComEd

Proposed Solution: Loretto to Wilton Center Sag Mitigation, Station Conductor Replacement at Wilton Center, Circuit breaker replacements at Wilton Center and Pontiac Midpoint, and Replace station conductor at Pontiac Midpoint and Dresden.

kV Level: 345

Cost ($M): 25.9

IS Date: 2019

Target Zone: ComEd

ME Constraints: Loretto to Wilton CTR 345 kV

Notes:
Project ID: 201415_1-10I

Proposed by: ComEd

Proposed Solution: Reconductor Cordova to Nelson 345kV line and replace station conductor. NOTE: This project (s0704) is scheduled to complete on March 13, 2015

kV Level: 345
Cost ($M): 2
IS Date: 2019
Target Zone: ComEd
ME Constraints: Cordova to Nelson 345 kV

Notes:
Project ID: 201415_1-10J

Proposed by: ComEd

Proposed Solution: Replace station equipment at three stations and upgrade conductor rating of three lines by re-conductoring and mitigating sag limitations. NOTE: Component 1 of this project (s0704) is scheduled to complete on March 13, 2015

kV Level: 345
Cost ($M): 24.6
IS Date: 2019
Target Zone: ComEd
ME Constraints: Cordova to Nelson 345 kV

Notes:
### Project ID: 201415_1-10K

**Proposed by:** COMED

**Proposed Solution:** Replace station equipment at three stations and reconductor Cordova to Nelson 345kV line.

| KV Level: | 345 |
| Cost ($M): | 15.5 |
| IS Date: | 2019 |
| Target Zone: | COMED |
| ME Constraints: | Cordova to Nelson 345 kV |

**Notes:**
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<td>Proposed by: PECO</td>
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<tr>
<td>Proposed Solution: Increase ratings of 5012 Peach Bottom-Conastone 500 kV line to 2490 MVA normal / 2815 MVA emergency</td>
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<td>kV Level: 500</td>
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<td>Cost ($M): 1.8</td>
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<td>ME Constraints: Peach Bottom to Conastone 500 kV</td>
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<td>Notes:</td>
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<tr>
<td>Proposed by: PECO</td>
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<tr>
<td>Proposed Solution: Increase ratings of 5012 Peach Bottom-Conastone 500 kV line to 2826 MVA normal / 3525 MVA emergency</td>
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<td>kV Level: 500</td>
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<td>ME Constraints: Peach Bottom to Conastone 500 kV</td>
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</table>

![Map of PJM network with highlighted project area]
Project ID: 201415_1-11G

Proposed by: PECO

Proposed Solution: Increase ratings of Peach Bottom 500-230 kV transformer to 1245 MVA normal / 1387 MVA emergency

kV Level: 230

Cost ($M): 0.2

IS Date: 2019

Target Zone: PECO

ME Constraints: Peach Bottom 500 kV

Notes:
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<tbody>
<tr>
<td>Proposed by: PECO</td>
</tr>
<tr>
<td>Proposed Solution: Increase ratings of Peach Bottom 500-230 kV transformer to 1479 MVA normal / 1839 MVA emergency</td>
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<td>kV Level: 230</td>
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<td>ME Constraints: Peach Bottom 500 kV</td>
</tr>
<tr>
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</table>
Project ID: 201415_1-11I

Proposed by: PECO

Proposed Solution: Install a 2nd 500-230 kV transformer at Peach Bottom substation

kV Level: 230

Cost ($M): 21.1

IS Date: 2020

Target Zone: PECO

ME Constraints: Peach Bottom 500 kV

Notes:
Project ID: 201415_1-12A

Proposed by: Duquesne Light

Proposed Solution: Reconductor approximately 7 miles of the Woodville-Peters (Z-117) 138kV circuit, reconfigure the West Mifflin-USS Clairton (Z-15) 138kV circuit to establish the Dravosburg-USS Clairton (Z-14) 138kV circuit and the West Mifflin-Wilson (Z-15) 138kV circuit

kV Level: 138

Cost ($M): 11.184

IS Date: 2018

Target Zone: DUQ

ME Constraints: Dravosburg to West Mifflin 138 kV
Woodville to 15USAP 138 kV

Notes:
Project ID: 201415_1-13E

Proposed by: PHI

Proposed Solution: Rebuild Worcester - Ocean Pine 60 kV ckt 1 to 1400A capability summer emergency

kV Level: 69

Cost ($M): 2.4

IS Date: 2016

Target Zone: DPL

ME Constraints: Worcester to Ocean Pines (I) 69 kV

Notes:

PJM TEAC 7/9/2015

PJM©2015 www.pjm.com
Proposed by: DATC

Proposed Solution: A hybrid series capacitor and thyristor controlled series capacitor near the midpoint of Conemaugh to Hunterstown 500 kV line in southern Pennsylvania. Add a phase angle regulator on the Messick to Morgan 138 kV line and close the circuit in Maryland.

kV Level: 500
Cost ($M): 47.14
IS Date: 2019
Target Zone: PECO/Meted/APS
ME Constraints: AP SOUTH L/O BED-BLA
Notes:
Project ID: 201415_1-14B

Proposed by: DATC

Proposed Solution: The project cuts into the Germantown - Straban 115 kV line near Germantown. It loops 11 miles of double circuit 115 kV from the cut-in section to Fairview substation and back, tying in to the 115 kV line up to Straban (using the existing circuit).

kV Level: 115
Cost ($M): 21.11
IS Date: 2020
Target Zone: Meted
ME Constraints: Taneytown to Carroll 138 kV
Notes:
### Project ID: 201415_1-14C

**Proposed by:** DATC  
**Proposed Solution:** Build a new 345 kV substation in Northern Kentucky to tie together the Miami Fort – Tanners Creek 345 kV line and the Miami Fort – Terminal 345 kV line  
**kV Level:** 138  
**Cost ($M):** 11.35  
**IS Date:** 2019  
**Target Zone:** DEOK  
**ME Constraints:** Miami Fort to Willey 138 kV  
**Notes:** Deactivation project removes driver  

**Proposal will not be evaluated.**
Project ID: 201415_1-15A

Proposed by: Grid America

Proposed Solution: Create a six-mile underground 230 kV 5000 kcmil transmission line between the West Orange 230 kV Substation to Cook Road 230 kV Substation. The underground 230 kV line will be connected to the Cook Road 230 kV bus “C”.

kV Level: 230

Cost ($M): 125

IS Date: 2019

Target Zone: PSEG

ME Constraints: Roseland-Cedar Grove-Clifton 230 kV corridor

Notes:
Project ID: 201415_1-16A

Proposed by: Nipsco

Proposed Solution: Wilton Center to Reynolds Single Circuit 345 kV and a 765/345 kV Xfmr at Gwynneville by Splitting Greentown to Jefferson 765 kV line at Gwynneville to form a new 765 kV Substation with 765/345 kV Xfmr

kV Level: 345
Cost ($M): 240
IS Date: 2022
Target Zone: AEP/CE/NIPS
ME Constraints: None Specified
Notes:
Project ID: 201415_1-16B

Proposed by: Nipsco

Proposed Solution: Double Circuit 345 kV line section from Pontiac to Reynolds (~100 miles)

kV Level: 345

Cost ($M): 290

IS Date: 2022

Target Zone: AEP/CE/NIPS

ME Constraints: Loretto to Wilton CTR 345 kV

Notes:
Project ID: 201415_1-16C

Proposed by: Nipsco

Proposed Solution: Several upgrades and rebuilds to the NIPSCO system: Burnham-Munster 345 kV, Burnham-Sheffield 345kV, Dumont-Stillwell 345kV, Michigan City-LA Porte 138 kV; Rebuild Michigan City – Trail Creek 138 kV. Rebuild Trail Creek – New Carlisle 138 kV. Rebuild Maple-New Carlisle 138 kV.

kV Level: 345
Cost ($M): 81.164
IS Date: 2019
Target Zone: AEP/CE/NIPS
ME Constraints: Various M2M facilities
Notes:
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<tr>
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<tbody>
<tr>
<td><strong>Proposed by:</strong> Nextera</td>
</tr>
<tr>
<td><strong>Proposed Solution:</strong> Build new Cochran Mill 230 kV switchyard with 600 MVAR Capacitors, and a new 230 kV line from Cochran Mill - Pleasant View 230 kV</td>
</tr>
<tr>
<td><strong>kV Level:</strong> 230</td>
</tr>
<tr>
<td><strong>Cost ($M):</strong> 16.5</td>
</tr>
<tr>
<td><strong>IS Date:</strong> 2019</td>
</tr>
<tr>
<td><strong>Target Zone:</strong> Dominion</td>
</tr>
<tr>
<td><strong>ME Constraints:</strong> AP SOUTH L/O BED-BLA</td>
</tr>
<tr>
<td><strong>Notes:</strong></td>
</tr>
<tr>
<td>Project ID: 201415_1-17B</td>
</tr>
<tr>
<td>--------------------------</td>
</tr>
<tr>
<td>Proposed by: Nextera</td>
</tr>
<tr>
<td>Proposed Solution: Build new Cochran Mill 230 kV switchyard with 300MVAR SVC, 300 MVAR Capacitors, and a new 230 kV line from Cochran Mill - Pleasant View 230 kV</td>
</tr>
<tr>
<td>kV Level: 230</td>
</tr>
<tr>
<td>Cost ($M): 41</td>
</tr>
<tr>
<td>IS Date: 2019</td>
</tr>
<tr>
<td>Target Zone: Dominion</td>
</tr>
<tr>
<td>ME Constraints: AP SOUTH L/O BED-BLA</td>
</tr>
<tr>
<td>Notes:</td>
</tr>
</tbody>
</table>
# Proposed Project Information

**Project ID:** 201415_1-17C  
**Proposed by:** Nextera

**Proposed Solution:** Build new Cochran Mill 230 kV switchyard with 400 MVAR Capacitors, and a new 230 kV line from Cochran Mill - Pleasant View 230 kV

<table>
<thead>
<tr>
<th><strong>kV Level:</strong></th>
<th>230</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cost ($M):</strong></td>
<td>15.7</td>
</tr>
<tr>
<td><strong>IS Date:</strong></td>
<td>2019</td>
</tr>
<tr>
<td><strong>Target Zone:</strong></td>
<td>Dominion</td>
</tr>
<tr>
<td><strong>ME Constraints:</strong></td>
<td>AP SOUTH L/O BED-BLA</td>
</tr>
</tbody>
</table>

**Notes:**

PJM TEAC 7/9/2015
**Project ID:** 201415_1-17D

**Proposed by:** Nextera

**Proposed Solution:** Build new Cochran Mill 230 kV switchyard with 200MVAR SVC, 200 MVAR Capacitors, and a new 230 kV line from Cochran Mill - Pleasant View 230 kV

<table>
<thead>
<tr>
<th>kV Level: 230</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost ($M): 36.4</td>
</tr>
<tr>
<td>IS Date: 2019</td>
</tr>
<tr>
<td>Target Zone: Dominion</td>
</tr>
<tr>
<td>ME Constraints: AP SOUTH L/O BED-BLA</td>
</tr>
</tbody>
</table>

**Notes:**
**Project ID:** 201415_1-17E

**Proposed by:** Nextera

**Proposed Solution:** Build new Hunterstown - Brighton 500 kV line, Build new Conastone - Peach Bottom 500 kV line

**kV Level:** 500

**Cost ($M):** 297

**IS Date:** 2019

**Target Zone:** PECO

**ME Constraints:** AP SOUTH L/O BED-BLA
Brunner Island to Yorkana 230 kV
Taneytown to Carroll 138 kV
Safe Harbor to Graceton 230 kV

**Notes:**
<table>
<thead>
<tr>
<th><strong>Project ID:</strong> 201415_1-17F</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Proposed by:</strong> Nextera</td>
</tr>
<tr>
<td><strong>Proposed Solution:</strong> Build new Conastone - Peach Bottom 500 kV line</td>
</tr>
<tr>
<td><strong>kV Level:</strong> 500</td>
</tr>
<tr>
<td><strong>Cost ($M):</strong> 76.2</td>
</tr>
<tr>
<td><strong>IS Date:</strong> 2019</td>
</tr>
<tr>
<td><strong>Target Zone:</strong> PECO</td>
</tr>
<tr>
<td><strong>ME Constraints:</strong> AP SOUTH L/O BED-BLA Brunner Island to Yorkana 230 kV Safe Harbor to Graceton 230 kV</td>
</tr>
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Notes:
<table>
<thead>
<tr>
<th>Project ID: 201415_1-17G</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proposed by: Nextera</td>
</tr>
<tr>
<td>Proposed Solution: Build new Atom 500 kV substation, Build new Conastone - Peach Bottom 500 kV line, Loop York - Peach Bottom 500 kV line into Atom</td>
</tr>
<tr>
<td>kV Level: 500</td>
</tr>
<tr>
<td>Cost ($M): 86.3</td>
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<tr>
<td>IS Date: 2019</td>
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<tr>
<td>Target Zone: PECO</td>
</tr>
<tr>
<td>ME Constraints: AP SOUTH L/O BED-BLA Brunner Island to Yorkana 230 kV Safe Harbor to Graceton 230 kV</td>
</tr>
<tr>
<td>Notes:</td>
</tr>
<tr>
<td>Project ID: 201415_1-18E</td>
</tr>
<tr>
<td>--------------------------</td>
</tr>
<tr>
<td>Proposed by: FirstEnergy</td>
</tr>
<tr>
<td>Proposed Solution: Install series capacitors on the Doubs-Mt. Storm 500 kV line</td>
</tr>
<tr>
<td>kV Level: 500</td>
</tr>
<tr>
<td>Cost ($M): 66</td>
</tr>
<tr>
<td>IS Date: 2019</td>
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<tr>
<td>Target Zone: Dominion/APS</td>
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<tr>
<td>ME Constraints: AP SOUTH L/O BED-BLA</td>
</tr>
<tr>
<td>Notes:</td>
</tr>
</tbody>
</table>

![Map showing the project location]
Project ID: 201415_1-18F

Proposed by: FirstEnergy

Proposed Solution: Complete the existing Jacks Mountain baseline RTEP project (b0284.1, b0284.3, b0285.1, and b0285.2), Install 500 kV Series Capacitors at Jacks Mountain.

kV Level: 500

Cost ($M): 68

IS Date: 2019

Target Zone: Penelec

ME Constraints: AP SOUTH L/O BED-BLA

Other Interfaces

Taneytown to Carroll 138 kV

Pruntytown to 8MTSTORM 500 kV

Notes:
<table>
<thead>
<tr>
<th>Project ID: 201415_1-18G</th>
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</thead>
<tbody>
<tr>
<td>Proposed by: FirstEnergy</td>
</tr>
<tr>
<td>Proposed Solution: Upgrade terminal equipment on the Lincoln - Carroll 115/138kV path.</td>
</tr>
<tr>
<td>kV Level: 138</td>
</tr>
<tr>
<td>Cost ($M): 5.2</td>
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<tr>
<td>IS Date: 2019</td>
</tr>
<tr>
<td>Target Zone: APS/Meted</td>
</tr>
<tr>
<td>ME Constraints: Taneytown to Carroll 138 kV</td>
</tr>
<tr>
<td>Notes:</td>
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</table>

![Map of Lincoln to Carroll 138 kV path]
<table>
<thead>
<tr>
<th>Project ID: 201415_1-18H</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proposed by: FirstEnergy</td>
</tr>
<tr>
<td>Proposed Solution: Rebuild and Reconductor the Lincoln - Carroll 115/138kV path. Line will be constructed for future 230kV operation.</td>
</tr>
<tr>
<td>kV Level: 138</td>
</tr>
<tr>
<td>Cost ($M): 58</td>
</tr>
<tr>
<td>IS Date: 2019</td>
</tr>
<tr>
<td>Target Zone: APS/Meted</td>
</tr>
<tr>
<td>ME Constraints: Taneytown to Carroll 138 kV</td>
</tr>
<tr>
<td>Notes:</td>
</tr>
</tbody>
</table>

![Map showing project location](image-url)
Project ID: 201415_1-18I

Proposed by: FirstEnergy

Proposed Solution: Upgrade 138 kV substation equipment at Butler, Shanor Manor, and Krendale substations. New rating of the line will be 353 MVA summer normal and 422 MVA summer emergency

kV Level: 138

Cost ($M): 0.6

IS Date: 2019

Target Zone: APS/Meted

ME Constraints: Krendale to Shanor Manor 138 kV

Notes:
<table>
<thead>
<tr>
<th>Project ID: 201415_1-18J</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proposed by: FirstEnergy</td>
</tr>
<tr>
<td>Proposed Solution: Replace the existing 345/138kV 448MVA transformer at Avon substation. Reconductor the Black River-Lorain 138kV line. Upgrade terminal end equipment. Construct second 138kV line between West Fremont and Hayes substations.</td>
</tr>
<tr>
<td>kV Level: 345</td>
</tr>
<tr>
<td>Cost ($M): 22.4</td>
</tr>
<tr>
<td>IS Date: 2019</td>
</tr>
<tr>
<td>Target Zone: ATSI</td>
</tr>
<tr>
<td>ME Constraints: CLEVELAND INTERFACE</td>
</tr>
<tr>
<td>Notes:</td>
</tr>
</tbody>
</table>
Project ID: 201415_1-18K

Proposed by: FirstEnergy

Proposed Solution: b2559 Reconductor the Black River-Lorain 138kV line and upgrade Black River and Lorain substation terminal end equipment. (once the Baseline RTEP projects are completed. No additional Upgrades are required.)

kV Level: 138
Cost ($M): 9.6
IS Date: 2019
Target Zone: ATSI
ME Constraints: 02BLKRVR to Lorain 138 kV
Notes: B2559 removes driver

Proposal will not be evaluated.
<table>
<thead>
<tr>
<th><strong>Project ID:</strong> 201415_1-18L</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proposed by: FirstEnergy</td>
</tr>
</tbody>
</table>

Proposed Solution: No upgrade required. The rating utilized in the model was incorrect. (once the Baseline RTEP projects are completed. No additional Upgrades are required.)

<table>
<thead>
<tr>
<th>kV Level: 138</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost ($M): N/A</td>
</tr>
<tr>
<td>IS Date: 2019</td>
</tr>
<tr>
<td>Target Zone: ATSI</td>
</tr>
<tr>
<td>ME Constraints: Crestwood to Astor 138 kV</td>
</tr>
<tr>
<td>Notes: Increased base ratings removes driver</td>
</tr>
</tbody>
</table>

Proposal will not be evaluated.
<table>
<thead>
<tr>
<th>Project ID: 201415_1-19A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proposed by: Northeast Transmission Development</td>
</tr>
<tr>
<td>Proposed Solution: Build 345 kV Switching Station (Garrison Creek) Interconnecting Miami Fort-Tanners Creek 345 kV Line and Miami Fort-Terminal 345 kV Line.</td>
</tr>
<tr>
<td>kV Level: 345</td>
</tr>
<tr>
<td>Cost ($M): 18.6</td>
</tr>
<tr>
<td>IS Date: 2019</td>
</tr>
<tr>
<td>Target Zone: DEOK</td>
</tr>
<tr>
<td>ME Constraints: Miami Fort to Willey 138 kV</td>
</tr>
<tr>
<td>Miami Fort to 08HEBTAP 138 kV</td>
</tr>
<tr>
<td>Notes: Deactivation project removes driver Proposal will not be evaluated.</td>
</tr>
<tr>
<td>Project ID: 201415_1-19B</td>
</tr>
<tr>
<td>---------------------------</td>
</tr>
<tr>
<td>Proposed by: Northeast Transmission Development</td>
</tr>
<tr>
<td>Proposed Solution: Approximately 6-mile 138 kV Line from Grand Point to a new 500/138 kV substation on the Conemaugh-Hunterstown 500 kV Line (&quot;Green Ridge&quot;)</td>
</tr>
<tr>
<td>kv Level: 138</td>
</tr>
<tr>
<td>Cost ($M): 38.9</td>
</tr>
<tr>
<td>IS Date: 2020</td>
</tr>
<tr>
<td>Target Zone: Meted/Penelec</td>
</tr>
<tr>
<td>ME Constraints: AP SOUTH L/O BED-BLA</td>
</tr>
<tr>
<td>BED-BLA L/O MTS-DOU</td>
</tr>
<tr>
<td>Taneytown to Carroll 138 kV</td>
</tr>
<tr>
<td>Conastone to Northwest 230 kV</td>
</tr>
<tr>
<td>Peach Bottom 500 kV</td>
</tr>
<tr>
<td>Notes:</td>
</tr>
</tbody>
</table>

![Map Image]
**Project ID: 201415_1-19C**

**Proposed by:** Northeast Transmission Development

**Proposed Solution:** Approximately 6-mile 138 kV Line from Grand Point to a new 500/138 kV substation on the Conemaugh-Hunterstown 500 kV Line ("Green Ridge") with a series reactor at Green Ridge.

- **kV Level:** 138
- **Cost ($M):** 41.9
- **IS Date:** 2020
- **Target Zone:** Meted/Penelec
- **ME Constraints:**
  - AP SOUTH L/O BED-BLA
  - L/O MTS-DOU
  - Taneytown to Carroll 138 kV
  - Conastone to Northwest 230 kV
  - Peach Bottom 500 kV
  - Jacksons Ferry to Cloverdale 765 kV

**Notes:**

---

**Legend:**
- **Substations:**
  - 69 kV
  - 115 kV
  - 138 kV
  - 154 kV
  - 230 kV
  - 345 kV
  - 500 kV
  - 765 kV

- **Transmission Lines:**
  - 50 kV
  - 115 kV
  - 120 kV
  - 138 kV
  - 154 kV
  - 230 kV
  - 345 kV
  - 500 kV
  - 765 kV
  - Study Identified
### Project ID: 201415_1-19D

**Proposed by:** Northeast Transmission Development

**Proposed Solution:** Approximately 26-mile 230 kV Line from Ringgold to a new 500/230 kV substation on the Conemaugh-Hunterstown 500 kV Line ("Green Ridge").

- **kV Level:** 230
- **Cost ($M):** 104.5
- **IS Date:** 2020
- **Target Zone:** Meted/Penelec
- **ME Constraints:**
  - AP SOUTH L/O BED-BLA
  - L/O MTS-DOU
  - 50045005 L/O RCKSPG-KEENY
  - Taneytown to Carroll 138 kV
  - Conastone to Northwest 230 kV
  - Peach Bottom 500 kV
  - Jacksons Ferry to Cloverdale 765 kV 765 kV

**Notes:**

PJM TEAC 7/9/2015
Project ID: 201415_1-19E

Proposed by: Northeast Transmission Development

Proposed Solution: Build 750 MVAR Static VAR Compensation (Harpers Run) Interconnected to Morrisville 500 kV Substation.

kV Level: 500

Cost ($M): 53.7

IS Date: 2020

Target Zone: Dominion

ME Constraints: AP SOUTH L/O BED-BLA L/O MTS-DOU Conastone to Northwest 230 kV

Notes:
<table>
<thead>
<tr>
<th>Project ID: 201415_1-19F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proposed by: Northeast Transmission Development</td>
</tr>
<tr>
<td>Proposed Solution: Approximately 99-mile 500 kV Line from Harrison to Bath County.</td>
</tr>
<tr>
<td>kV Level: 500</td>
</tr>
<tr>
<td>Cost ($M): 432.5</td>
</tr>
<tr>
<td>IS Date: 2019</td>
</tr>
<tr>
<td>Target Zone: APS/Dominion</td>
</tr>
<tr>
<td>ME Constraints: AP SOUTH L/O BED-BLA L/O MTS-DOU 50045005 L/O RCKSPG-KEENY Taneytown to Carroll 138 kV Conastone to Northwest 230 kV Peach Bottom 500 kV Jacksons Ferry to Cloverdale 765 KV 765 kV</td>
</tr>
<tr>
<td>Notes:</td>
</tr>
</tbody>
</table>
Project ID: 201415_1-19G

Proposed by: Northeast Transmission Development

Proposed Solution: Build 500/230 kV Substation (Keysers Run) Interconnecting Conastone-Brighton 500 kV Line to Northwest 230 kV Substation.

kV Level: 230

Cost ($M): 48.6

IS Date: 2020

Target Zone: Pepco/BGE

ME Constraints: AP SOUTH L/O BED-BLA L/O MTS-DOU

50045005 L/O RCKSPG-KEENY

Safe Harbor to Graceton 230 kV

Conastone to Northwest 230 kV

Peach Bottom 500 kV

Notes:
Project ID: 201415_1-19H

Proposed by: Northeast Transmission Development

Proposed Solution: Approximately 22-mile 345 kV Line from Pontiac Midpoint to Katydid Road.

kV Level: 345

Cost ($M): 42.9

IS Date: 2019

Target Zone: COMED

ME Constraints: Loretto to Wilton CTR 345 kV

Notes:

![Map of Project 1-19H]
**Project ID:**  201415_1-19I

**Proposed by:** Northeast Transmission Development

**Proposed Solution:** Build 138 kV Switching Station (Renton) Interconnecting Plum-Cheswick 138 kV Line and Springdale-Huntingdon 138 kV Line.

| kV Level: | 138 |
| Cost ($M): | 9.2 |
| IS Date: | 2020 |
| Target Zone: | APS/DUQ |
| ME Constraints: | Dravosburg to West Mifflin 138 kV Woodville to 15USAP 138 kV Krendale to Shanor Manor 138 kV |

**Notes:**
<table>
<thead>
<tr>
<th>Project ID: 201415_1-20A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proposed by: ITC</td>
</tr>
<tr>
<td>Proposed Solution: New 58-mile 500 kV line from the existing Black Oak substation to existing Front Royal substation.</td>
</tr>
<tr>
<td>kV Level: 500</td>
</tr>
<tr>
<td>Cost ($M): 187.5</td>
</tr>
<tr>
<td>IS Date: 2020</td>
</tr>
<tr>
<td>Target Zone: APS/Dominion</td>
</tr>
<tr>
<td>ME Constraints: AP SOUTH L/O BED-BLA BED-BLA L/O MTS-DOU Fieldale to Thornton 138 kV Brunner Island to Yorkana 230 kV Lorreto to Wilton CTR 345 kV Safe Harbor to Graceton 230 kV</td>
</tr>
<tr>
<td>Notes:</td>
</tr>
</tbody>
</table>
Project ID: 201415_1-20B

Proposed by: ITC

Proposed Solution: Construct approximately 29 miles of new 138kV single-circuit overhead line from the existing Karns City substation in Pennsylvania to the existing McDowell substation in Pennsylvania.

kV Level: 138

Cost ($M): 64.3

IS Date: 2020

Target Zone: APS/DUQ

ME Constraints: Dravosburg to West Mifflin 138 kV

Woodville to 15USAP 138 kV

Notes:

PJM TEAC 7/9/2015
Project ID: 201415_1-20C

Proposed by: ITC

Proposed Solution: Build approximately 11 miles of new 138kV single-circuit overhead line from a new substation near the existing Drewersburg substation in Indiana (AEP) to the existing Willey substation in Ohio (DEO&K).

kV Level: 138
Cost ($M): 25
IS Date: 2020
Target Zone: AEP/DEOK
ME Constraints: Miami Fort to Willey 138 kV

Notes: Deactivation project removes driver

Proposal will not be evaluated.
Proposed by: ITC
Proposed Solution: Construct the new 345kV/138kV “Hamilton” substation near the existing Willey substation (Duke) in Hamilton County, Ohio. Cut the adjacent Woodsdale – Miami Fort 345kV line (Duke) into the new Hamilton substation. Connect the new Hamilton substation 138kV bus to the existing Willey 138kV switchyard.

kV Level: 345
Cost ($M): 16.9
IS Date: 2020
Target Zone: DEOK
ME Constraints: Miami Fort to Willey 138 kV
Notes: Deactivation project removes driver

Proposal will not be evaluated.
Project ID: 201415_1-20E

Proposed by: ITC

Proposed Solution: Construct approximately 5 miles of new 138kV single-circuit overhead line from the proposed Diamond Ave. substation in Virginia (ITC) to the existing Blaine substation in Virginia (AEP).

kV Level: 138

Cost ($M): 19

IS Date: 2020

Target Zone: AEP

ME Constraints: Fieldale to Thornton 138 kV

Notes:
Project ID: 201415_1-20F

Proposed by: ITC

Proposed Solution: Construct approximately 6 miles of underground transmission line from the existing West Orange substation in New Jersey to the existing Cook Road substation in New Jersey.

kV Level: 230
Cost ($M): 102.7
IS Date: 2020
Target Zone: PSEG
ME Constraints: Roseland-Cedar Grove-Clifton 230 kV corridor

Notes:

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www.pjm.com
Project ID: 201415_1-20G

Proposed by: ITC
Proposed Solution: Construct approximately 50 miles of new 500kV single-circuit overhead line from the existing Black Oak substation (First Energy) to the existing Meadow Brook substation (First Energy).

kV Level: 500
Cost ($M): 156
IS Date: 2020
Target Zone: APS/Dominion
ME Constraints: AP SOUTH L/O BED-BLA
AEP-DOM L/O BED-BLA
BED-BLA L/O MTS-DOU
Fieldale to Thornton 138 kV
Conastone to Northwest 230 kV
Pleasant View to Ashburn 230 kV
Notes:

PJM TEAC 7/9/2015
**Project ID: 201415_1-20H**

**Proposed by:** ITC

**Proposed Solution:** Construct approximately 3.6 miles of new 138kV single-circuit overhead line from the existing Enlow substation in Pennsylvania (First Energy) to the existing Findlay substation in Pennsylvania (DQE).

**kV Level:** 138

**Cost ($M):** 14.4

**IS Date:** 2020

**Target Zone:** APS/DUQ

**ME Constraints:** Dravosburg to West Mifflin 138 kV
Woodville to 15USAP 138 kV
Taneytown to Carroll 138 kV

**Notes:**

[Map diagram showing the locations of Enlow and Findlay substations with lines connecting them, along with other substations and transmission lines.]
Project ID: 201415_1-20I

Proposed by: ITC

Proposed Solution: Construct approximately 26.5 miles of new 138kV single-circuit overhead line from the existing Germantown substation to the existing Ringgold substation.

kV Level: 138

Cost ($M): 70.8

IS Date: 2020

Target Zone: APS/Dominion

ME Constraints: Taneytown to Carroll 138 kV
Brunner Island to Yorkana 230 kV
Safe Harbor to Graceton 230 kV

Notes:
Project ID: 201415_1-20J

Proposed by: ITC

Proposed Solution: New 58-mile 500 kV line from the existing Black Oak substation to existing Front Royal substation. Add Dooms Cap.

kV Level: 500

Cost ($M): 190.2

IS Date: 2020

Target Zone: APS/Dominion

ME Constraints: AP SOUTH L/O BED-BLA
AEP-DOM L/O BED-BLA
BED-BLA L/O MTS-DOU

Fieldale to Thornton 138 kV
Conastone to Northwest 230 kV
Pleasant View to Ashburn 230 kV

Notes:

PJM TEAC 7/9/2015
### Project ID: 201415_1-20K

**Proposed by:** ITC  
**Proposed Solution:** Construct approximately 50 miles of new 500kV single-circuit overhead line from the existing Black Oak substation (First Energy) to the existing Meadow Brook substation (First Energy). Add Dooms Cap  
**kV Level:** 500  
**Cost ($M):** 158.7  
**IS Date:** 2020  
**Target Zone:** APS/Dominion  
**ME Constraints:** AP SOUTH L/O BED-BLA  
AEP-DOM L/O BED-BLA  
L/O MTS-DOU  
Fieldale to Thornton 138 kV  
Miami Fort to Willey 138 kV  
Brunner Island to Yorkana 230 kV  

**Notes:**
<table>
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<tr>
<th>Project ID: 201415_1-20L</th>
</tr>
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<tbody>
<tr>
<td>Proposed by: ITC</td>
</tr>
<tr>
<td>Proposed Solution: New 58-mile 500 kV line from the existing Black Oak substation to existing Front Royal substation. Add New Station</td>
</tr>
<tr>
<td>kV Level: 500</td>
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<tr>
<td>Cost ($M): 202.5</td>
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<tr>
<td>IS Date: 2020</td>
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<tr>
<td>Target Zone: APS/Dominion</td>
</tr>
<tr>
<td>ME Constraints: AP SOUTH L/O BED-BLA</td>
</tr>
<tr>
<td>AEP-DOM L/O BED-BLA</td>
</tr>
<tr>
<td>BED-BLA L/O MTS-DOU</td>
</tr>
<tr>
<td>Fieldale to Thornton 138 kV</td>
</tr>
<tr>
<td>Conastone to Northwest 230 kV</td>
</tr>
<tr>
<td>Pleasant View to Ashburn 230 kV</td>
</tr>
</tbody>
</table>

Notes:

PJM TEAC 7/9/2015

1-20L
Project ID: 201415_1-20M

Proposed by: ITC

Proposed Solution: New 58-mile 500 kV line from the existing Black Oak substation to existing Front Royal substation. Install a new 240 MVAR capacitor bank at Dooms 500kV Substation. Add Dooms Cap and New Station

kV Level: 500
Cost ($M): 205.2
IS Date: 2020
Target Zone: APS/Dominion

ME Constraints:
- AP SOUTH L/O BED-BLA
- AEP-DOM L/O BED-BLA
- BED-BLA L/O MTS-DOU
- Fieldale to Thornton 138 kV
- Conastone to Northwest 230 kV
- Pleasant View to Ashburn 230 kV

Notes:

PJM TEAC 7/9/2015
### Project ID: 201415_1-20N

- **Proposed by:** ITC
- **Proposed Solution:** Construct approximately 50 miles of new 500kV single-circuit overhead line from the existing Black Oak substation (First Energy) to the existing Meadow Brook substation (First Energy). Add New Station

<table>
<thead>
<tr>
<th>kV Level: 500</th>
<th>Cost ($M): 171</th>
</tr>
</thead>
<tbody>
<tr>
<td>IS Date: 2020</td>
<td>Target Zone: APS/Dominion</td>
</tr>
</tbody>
</table>

**ME Constraints:**
- AP SOUTH L/O BED-BLA
- AEP-DOM L/O BED-BLA
- BED-BLA L/O MTS-DOU

**Fieldale to Thornton 138 kV**
**Miami Fort to Willey 138 kV**
**Brunner Island to Yorkana 230 kV**

**Notes:**

![Project Map](image)
**Project ID: 201415_1-20O**

**Proposed by:** ITC

**Proposed Solution:** Construct approximately 50 miles of new 500kV single-circuit overhead line from the existing Black Oak substation (First Energy) to the existing Meadow Brook substation (First Energy). Add Dooms Cap and New Station.

- **kV Level:** 500
- **Cost ($M):** 173.7
- **IS Date:** 2020
- **Target Zone:** APS/Dominion
- **ME Constraints:**
  - AP SOUTH L/O BED-BLA
  - AEP-DOM L/O BED-BLA
  - BED-BLA L/O MTS-DOU
  - Fieldale to Thornton 138 kV
  - Miami Fort to Willey 138 kV
  - Brunner Island to Yorkana 230 kV

**Notes:**

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### Map

![Map](image)
**Project ID: 201415_1-21C**

**Proposed by:** PSEG

**Proposed Solution:** Build new 138kV line from Miami Fort to Willey

**kV Level:** 138

**Cost ($M):** 47.8

**IS Date:** 2018

**Target Zone:** DEOK

**ME Constraints:** Miami Fort to Willey 138 kV

**Notes:** Deactivation project removes driver

---

Proposal will not be evaluated.
Project ID: 201415_1-21G

Proposed by: PSEG

Proposed Solution: Reconfigure Clifton Source

kV Level: 230

Cost ($M): 2.8

IS Date: 2016

Target Zone: PSEG

ME Constraints: Roseland-Cedar Grove-Clifton 230 kV corridor

Notes:
Project ID: 201415_1-22A

Proposed by: Ameren

Proposed Solution: Construct a +400MVAR/-250 MVAR Static VAR Compensator (SVC) adjacent to the 500 kV Dooms Substation.

kV Level: 500
Cost ($M): 46.56
IS Date: 2019
Target Zone: APS/AEP/DOM
ME Constraints: AP SOUTH L/O BED-BLA
AEP-DOM L/O BED-BLA
Notes:

PJM TEAC 7/9/2015
Project ID: 201415_1-22B

Proposed by: Ameren

Proposed Solution: Construct a +400MVAR/-250 MVAR Static VAR Compensator (SVC) adjacent to the 500 kV Dooms Substation.

kV Level: 500
Cost ($M): 46.56
IS Date: 2020
Target Zone: APS/AEP/DOM
ME Constraints: AP SOUTH L/O BED-BLA
AEP-DOM L/O BED-BLA
Notes:
Project ID: 201415_1-22C

Proposed by: Ameren


kV Level: 230
Cost ($M): 107.2
IS Date: 2020
Target Zone: APS/Meted
ME Constraints: Taneytown to Carroll 138 kV
Notes:
<table>
<thead>
<tr>
<th>Project ID: 201415_1-22D</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proposed by: Ameren</td>
</tr>
<tr>
<td>Proposed Solution:</td>
</tr>
<tr>
<td>Construct a 345 kV substation adjacent to the Willey 138 kV substation. Loop the Miami Fort – Woodsdale and Miami Fort West Milton 345 kV lines into the new substation and install a 345/138 kV transformer. Build a 345 kV switching station and a new 345 kV line from East Bend to the West Buffington station.</td>
</tr>
<tr>
<td>kV Level: 345</td>
</tr>
<tr>
<td>Cost ($M): 91.26</td>
</tr>
<tr>
<td>IS Date: 2020</td>
</tr>
<tr>
<td>Target Zone: DEOK</td>
</tr>
<tr>
<td>ME Constraints: Miami Fort to Willey 138 kV</td>
</tr>
<tr>
<td>Notes: Deactivation project removes driver</td>
</tr>
</tbody>
</table>

Proposal will not be evaluated.
Project ID: 201415_1-22E

Proposed by: Ameren

Proposed Solution: Build a 345 kV switching station. Loop in the existing Clifty Creek – Buffington 345 kV line. Build a new 345 kV line from East Bend to the new West Buffington switching station. Upgrade existing circuit from West Buffington to Buffington.

kV Level: 345
Cost ($M): 56.04
IS Date: 2020
Target Zone: DEOK
ME Constraints: Miami Fort to Willey 138 kV
Notes: Deactivation project removes driver

Proposal will not be evaluated.
Project ID: 201415_1-22F

Proposed by: Ameren

Proposed Solution: Expand Willey 138 kV substation. Create a 5 position 345 kV ring bus. Build a new 345 kV switching station (West Buffington) and loop in the existing Clifty Creek – Buffington 345 kV line. Upgrade existing double circuit line from Willey to Fairfield. Build a 345 kV line from East Bend to the West Buffington switching station.

kV Level: 345
Cost ($M): 91.26
IS Date: 2020
Target Zone: DEOK
ME Constraints: Miami Fort to Willey 138 kV
Notes: Deactivation project removes driver

Proposal will not be evaluated.
Questions?

Email: RTEP@pjm.com