Submission of Supplemental Projects for Inclusion in the Local Plan
Need Number: APS-2019-009
Process Stage: Submission of Supplemental Project for inclusion in the Local Plan 2/19/2020
Previously Presented:
Need Meeting 6/28/2019 (PN-2019-025)
Need Meeting 7/24/2019 (APS-2019-009)
Solutions Meeting 7/31/2019 (PN-2019-025)
Solutions Meeting 12/18/2019 (APS-2019-009)
Project Driver:
Equipment Material Condition, Performance and Risk
Operational Flexibility and Efficiency
Specific Assumption Reference:
System Performance Projects Global Factors
  - System reliability and performance
  - Substation/line equipment limits
Upgrade Relay Schemes
  - Relay schemes that have a history of misoperation
  - Obsolete and difficult to repair communication equipment (DTT, Blocking, etc.)
  - Communication technology upgrades
  - Bus protection schemes
Need Number: APS-2019-009  
Process Stage: Submission of Supplemental Project for inclusion in the Local Plan 2/19/2020  

Problem Statement:
- FirstEnergy has identified protection schemes using a certain vintage of relays and communication equipment that have a history of misoperation.
- Proper operation of the protection scheme requires all the separate components perform adequately during a fault.
- In many cases the protection equipment cannot be repaired due to a lack of replacement part and available expertise in the outdated technology.
- Transmission line ratings are limited by terminal equipment.

<table>
<thead>
<tr>
<th>Need Number</th>
<th>Transmission Line / Substation Locations</th>
<th>Existing Line Rating (SN / SE)</th>
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</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>New Bethlehem – Brookville 138 kV Line</td>
<td>295/342</td>
<td>308/376</td>
<td>Line Trap, Substation Conductor, Circuit Breaker</td>
</tr>
<tr>
<td>PN-2019-025</td>
<td></td>
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**Need Number:** APS-2019-009  
**Process State:** Submission of Supplemental Project for inclusion in the Local Plan 2/19/2020  
**Selected Solution:**

<table>
<thead>
<tr>
<th>Need Number</th>
<th>Transmission Line / Substation Locations</th>
<th>New MVA Line Rating (SN / SE)</th>
<th>Supplemental Project ID</th>
<th>Scope of Work</th>
<th>Estimated Costs ($ M)</th>
<th>Target ISD</th>
</tr>
</thead>
</table>
New Bethlehem – Brookville 138 kV Line | 308/376  
308/376 | s2045.2 (APS)  
S2045.1 (PN) | • Armstrong 138 kV Substation – Replace line trap and substation conductor | $0.4M | 4/1/2020 |

**Model:** 2018 Series 2023 Summer RTEP 50/50
Process Stage: Submission of Supplemental Project for inclusion in the Local Plan 2/19/2020
Previously Presented:
Need Meeting 07/11/2019
Solution Meeting 08/08/2019
Project Driver:
Equipment Material Condition, Performance and Risk
Operational Flexibility and Efficiency
Specific Assumption Reference:
System Performance Projects Global Factors
- System reliability and performance
- Substation/line equipment limits
Upgrade Relay Schemes
- Relay schemes that have a history of misoperation
- Obsolete and difficult to repair communication equipment (DTT, Blocking, etc.)
- Communication technology upgrades
- Bus protection schemes

Continued on next slide…

**Process Stage:** Submission of Supplemental Project for inclusion in the Local Plan 2/19/2020

**Problem Statement:**
- FirstEnergy has identified protection schemes using a certain vintage of relays and communication equipment that have a history of misoperation.
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**Process Stage:** Submission of Supplemental Project for inclusion in the Local Plan 2/19/2020  
**Selected Solution:**

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<th>Target ISD</th>
</tr>
</thead>
</table>
| PN-2019-026 APS-2019-011 | Shawville – Shingletown 230 kV Line | 546/666 | s2051.1 (PN), s2051.2(APS) | • Shawville 230 kV Substation – Replace line trap and substation conductor (s2051.1)  
• Shingletown 230 kV Substation – Replace line relaying, line trap, and substation conductor (s2051.2) | $0.9M | 12/1/2020 |
| PN-2019-034 APS-2019-010 | Elko – Shawville 230 kV Line | 546/666 | s2052.2 (PN), s2052.1 (APS) | • Elko 230 kV Substation – Replace line relaying, line trap, and substation conductor (s2052.1)  
• Shawville 230 kV Substation – Replace line relaying and line trap (s2052.2) | $1.3M | 6/15/2020 |

No topology changes, no bubble diagram required.  
**Model:** 2018 Series 2023 Summer RTEP 50/50
**Need Number:** APS-2019-014

**Process Stage:** Submission of Supplemental Project for inclusion in the Local Plan 05/22/2020

**Previously Presented:**
Need Meeting 12/18/2019
Solution Meeting 3/19/2020

**Project Driver:**
*Equipment Material Condition, Performance and Risk*
*Operational Flexibility and Efficiency*

**Specific Assumption Reference:**
System Performance Projects Global Factors
- System reliability and performance
- Substation/line equipment limits

Upgrade Relay Schemes
- Relay schemes that have a history of misoperation
- Obsolete and difficult to repair communication equipment (DTT, Blocking, etc.)
- Communication technology upgrades
- Bus protection schemes

Continued on next slide…
Problem Statement:

- FirstEnergy has identified protection schemes using a certain vintage of relays and communication equipment that have a history of misoperation.
- Proper operation of the protection scheme requires all the separate components perform adequately during a fault.
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**Selected Solution:**

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<th>Scope of Work</th>
<th>Estimated Costs ($ M)</th>
<th>Target ISD</th>
</tr>
</thead>
</table>
| APS-2019-014 | Pittsburgh Mills – Springdale 138 kV Line | s2205                    | 296/302                       | • Pittsburgh Mills 138 kV Substation – Replace line trap and line relaying  
• Springdale 138 kV Substation – Replace line trap and line relaying | $0.8M                 | 5/29/2020 |

No topology changes, no bubble diagram required.  
**Model:** 2019 RTEP model for 2024 Summer (50/50)
Need Number: APS-2019-012
Process Stage: Submission of Supplemental Project for inclusion in the Local Plan 10/05/2020
Previously Presented:
Need Meeting 04/20/2020
Solution Meeting 05/22/2020
Project Driver:
Customer Service
Specific Assumption Reference:
New customer connection request will be evaluated per FirstEnergy’s “Requirements for Transmission Connected Facilities” document and “Transmission Planning Criteria” document.
Problem Statement:
New Customer Connection – A customer requested 138 kV service, anticipated load is 27 MW, location is near the Buckhannon – Corder Crossing (Pruntytown) 138 kV line.

Requested in-service date is December 2020.

Geographic Map:
Include all facilities mentioned on slide, small locator map and a legend.
**Need Number:** APS-2019-012  
**Process Stage:** Submission of Supplemental Project for inclusion in the Local Plan 10/05/2020  
**Selected Solution:**  
- Tap the Buckhannon-Corder Crossing 138 kV line approximately 9.6 miles from Buckhannon substation and build a 138 kV line one span toward the proposed customer substation  
- Install two (2) 138 kV in-line switches on either side of the new customer tap connection  
- Install one (1) 138 kV in-line switch on the line extension towards the customer substation  
**Estimated Cost:** $0.8M  
**Projected In-Service:** 12/31/2020  
**Supplemental Project ID:** s2288  
**Model:** 2019 Series 2024 Summer RTEP 50/50
Need Number: APS-2020-002

Process State: Submission of Supplemental Project for inclusion in the Local Plan 10/05/2020

Previously Presented:
Need Meeting 04/20/2020
Solution Meeting 07/17/2020

Project Driver:
Equipment Material Condition, Performance and Risk
Operational Flexibility and Efficiency

Specific Assumption Reference:
System Performance Projects Global Factors
• System reliability and performance
• Substation/line equipment limits
Upgrade Relay Schemes
• Relay schemes that have a history of misoperation
• Obsolete and difficult to repair communication equipment (DTT, Blocking, etc.)
• Communication technology upgrades
• Bus protection schemes

Continued on next slide…

Geographic Map:
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Problem Statement:
- FirstEnergy has identified protection schemes using a certain vintage of relays and communication equipment that have a history of misoperation.
- Proper operation of the protection scheme requires all the separate components perform adequately during a fault.
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</thead>
<tbody>
<tr>
<td>APS-2020-002</td>
<td>Roxbury – Greene 138 kV Line</td>
<td>164 / 206</td>
<td>221 / 268</td>
<td>Disconnect Switch, Substation Conductor</td>
</tr>
<tr>
<td></td>
<td>Greene – Letterkenny 138 kV Line</td>
<td>221 / 268</td>
<td>221 / 268</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td>Letterkenny – Grand Point 138 kV Line</td>
<td>196 / 228</td>
<td>221 / 268</td>
<td>Line Trap</td>
</tr>
</tbody>
</table>
## Selected Solution:

<table>
<thead>
<tr>
<th>Need Number</th>
<th>Transmission Line / Substation Locations</th>
<th>Supplemental Project ID</th>
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<tbody>
<tr>
<td>APS-2020-002</td>
<td>Roxbury – Greene 138 kV Line</td>
<td>s2289</td>
<td>221 / 268</td>
<td>• Roxbury 138 kV Substation – Replace line relaying, disconnect switch, and substation conductor</td>
<td>$0.5 M</td>
<td>4/29/2021</td>
</tr>
<tr>
<td></td>
<td>Greene – Letterkenny 138 kV Line</td>
<td></td>
<td>221 / 268</td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Letterkenny – Grand Point 138 kV Line</td>
<td></td>
<td>221 / 268</td>
<td>• Grand Point 138 kV Substation – Replace line relaying and line trap</td>
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<td></td>
</tr>
</tbody>
</table>

**Model:** 2020 RTEP model for 2025 Summer (50/50)
Need Number: APS-2020-004, APS-2020-005, APS-2020-006, APS-2020-008, PN-2020-015

Process Stage: Submission of Supplemental Project for inclusion in the Local Plan 10/05/2020

Previously Presented:
Need Meeting 05/22/2020
Solution Meeting 07/17/2020

Project Driver:
Equipment Material Condition, Performance and Risk
Operational Flexibility and Efficiency

Specific Assumption Reference:
System Performance Projects Global Factors
• System reliability and performance
• Substation/line equipment limits
Upgrade Relay Schemes
• Relay schemes that have a history of misoperation
• Obsolete and difficult to repair communication equipment (DTT, Blocking, etc.)
• Communication technology upgrades
• Bus protection schemes

Continued on next slide…

Geographic Map:
Include all facilities mentioned on slide, small locator map and a legend.
Problem Statement:
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</thead>
<tbody>
<tr>
<td></td>
<td>Fawn – Lawson Junction 138 kV Line</td>
<td>294 / 342</td>
<td>308 / 376</td>
<td>Substation Conductor, Line Trap</td>
</tr>
<tr>
<td>APS-2020-005</td>
<td>Charleroi – Union Junction 138 kV Line</td>
<td>274 / 302</td>
<td>296 / 302</td>
<td>Substation Conductor, Line Trap</td>
</tr>
<tr>
<td></td>
<td>Mitchell – Union Junction 138 kV Line</td>
<td>295 / 342</td>
<td>308 / 376</td>
<td>Substation Conductor, Line Trap</td>
</tr>
<tr>
<td></td>
<td>Peters – Union Junction 138 kV Line</td>
<td>294 / 342</td>
<td>308 / 376</td>
<td>Substation Conductor, Line Trap</td>
</tr>
<tr>
<td>PN-2020-015</td>
<td>Blairsville East – Social Hall 138 kV Line</td>
<td>225 / 287</td>
<td>243 / 294</td>
<td>Substation Conductor, CTs, Line Relaying, Line Trap</td>
</tr>
</tbody>
</table>
## Selected Solution:

<table>
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<tr>
<th>Need Number</th>
<th>Transmission Line / Substation Locations</th>
<th>Supplemental Project ID</th>
<th>New MVA Line Rating (SN / SE)</th>
<th>Scope of Work</th>
<th>Estimated Cost ($ M)</th>
<th>Target ISD</th>
</tr>
</thead>
<tbody>
<tr>
<td>APS-2020-004</td>
<td>Cabot – Lawson Junction 138 kV Line</td>
<td>s2290</td>
<td>297/365</td>
<td>• Cabot 138 kV Substation – Replace line relaying, breaker, and line trap</td>
<td>$2.5 M</td>
<td>5/19/2022</td>
</tr>
<tr>
<td></td>
<td>McCalmont – Lawson Junction 138 kV Line</td>
<td></td>
<td>297/365</td>
<td>• McCalmont 138 kV Substation – Replace line relaying, breaker, substation conductors, and line trap</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Fawn – Lawson Junction 138 kV Line</td>
<td></td>
<td>308/376</td>
<td>• Fawn 138 kV Substation – Replace line relaying, breaker, substation conductors, and line trap</td>
<td></td>
<td></td>
</tr>
<tr>
<td>APS-2020-005</td>
<td>Charleroi – Union Junction 138 kV Line</td>
<td>s2291</td>
<td>296/302</td>
<td>• Charleroi 138 kV Substation – Replace line relaying, substation conductors, and line trap</td>
<td>$1.6 M</td>
<td>5/28/2022</td>
</tr>
<tr>
<td></td>
<td>Mitchell – Union Junction 138 kV Line</td>
<td></td>
<td>308/376</td>
<td>• Mitchell 138 kV Substation – Replace line relaying, substation conductors, and line trap</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Peters – Union Junction 138 kV Line</td>
<td></td>
<td>308/376</td>
<td>• Peters 138 kV Substation – Replace line relaying, substation conductors, and line trap</td>
<td></td>
<td></td>
</tr>
<tr>
<td>APS-2020-006</td>
<td>Gordon – Lagonda 138 kV Line</td>
<td>s2292</td>
<td>308/376</td>
<td>• Gordon 138 kV Substation – Replace line relaying, substation conductors, and line trap</td>
<td>$1.4 M</td>
<td>6/1/2022</td>
</tr>
<tr>
<td></td>
<td>Lagonda – Windsor 138 kV Line</td>
<td></td>
<td>297/365</td>
<td>• Windsor 138 kV Substation – Replace line relaying, breaker, substation conductors, and line trap</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PN-2020-015</td>
<td>Blairsville East – Social Hall 138 kV Line</td>
<td>s2314.2</td>
<td>243/294</td>
<td>• Social Hall 138 kV Substation – Replace line relaying, breaker, substation conductors, line trap, and current transformers</td>
<td>$1.2 M</td>
<td>6/1/2021</td>
</tr>
</tbody>
</table>

SRRTEP – Western APS Local Plan
Need Number: APS-2020-010

Process Stage: Submission of Supplemental Project for inclusion in the Local Plan 10/05/2020

Previously Presented:
Need Meeting 05/22/2020
Solution Meeting 07/17/2020

Project Driver:
Customer Service

Specific Assumption Reference:
New customer connection request will be evaluated per FirstEnergy’s “Requirements for Transmission Connected Facilities” document and “Transmission Planning Criteria” document.

Problem Statement:
New Customer Connection – A customer requested 138 kV service, anticipated load is 10 MW, location is near the Rider – Weston 138 kV line.

Requested in-service date is December 2020.

Geographic Map:
Include all facilities mentioned on slide, small locator map and a legend.
Need Number: APS-2020-010

Process Stage: Submission of Supplemental Project for inclusion in the Local Plan 10/05/2020

Selected Solution:
- Tap the Rider-Weston 138 kV line approximately 3.5 miles from Rider substation and build a 138 kV line one span toward the proposed customer substation.
- Install two (2) 138 kV in-line switches on either side of the new customer tap connection.
- Install one (1) 138 kV in-line switch on the line extension towards the customer substation.

Estimated Cost: $0.9M

Projected In-Service: 12/31/2020

Supplemental Project ID: s2293

Model: 2019 Series 2024 Summer RTEP 50/50
Revision History

2/19/2020 – V1 – Local Plan posted to pjm.com for s2045.2, s2051.2, s2052.1
5/28/2020 – V2 – Local Plan posted to pjm.com for s2205
10/5/2020 – V3 – Local Plan posted to pjm.com for S2288, S2289, S2290, S2291, S2292, S2314.2, S2293