PJM Regional Transmission Expansion Planning (RTEP) Process

IPSAC
May 18, 2018
• Planning Committee (PC)
  http://www.pjm.com/committees-and-groups/committees(pc.aspx
• Transmission Expansion Advisory Committee (TEAC)
  http://www.pjm.com/committees-and-groups/committees/teac.aspx
• Interregional Planning
  http://www.pjm.com/planning/interregional-planning.aspx
• Services and Requests
  http://www.pjm.com/planning/services-requests.aspx
• RTEP Development
• Manual 14B
  http://www.pjm.com/-/media/documents/manuals/m14b.ashx
System Expansion Drivers

- Load Forecast, Demand Resources
- Public Policy
- Transmission Service
- Resilience
- Operational Performance
- Capacity Resources, RPM
- Aging Infrastructure
- Market Efficiency
- Interregional Coordination

RTEP Development

Reliability Criteria
PJM’s 2-year Reliability

Cycle 1

- Yr -1
- Develop assumptions
- Reliability criteria analysis for years 5 - 15
- 18-month cycle
- Identify and evaluate solution options
- Review with TEAC and approval by the PJM Board

Cycle 2

- Yr 0
- Develop assumptions and build Year 8 base case
- Perform criteria analysis for years 8 - 15
- 24-month cycle
- Perform reliability and market efficiency analysis for Year 8 - 15
- Identify proposed solutions

Year 0

- Develop assumptions
- Reliability criteria analysis for years 5 - 15
- 18-month cycle
- Identify and evaluate solution options
- Review with TEAC and approval by the PJM Board

PJM’s 2-year Market Efficiency

Planning Cycles

Year 1

- Develop assumptions (Year 1 and Year 5)
- Market Efficiency Analysis (Year 1 and Year 5) accelerations and modifications
- Identify and evaluate solution options accelerations and modifications
- Final review with TEAC and approval by the PJM Board

- Develop assumptions (Year 1, Year 5, Year 8, Year 11, Year 15)
- Market Efficiency Criteria Analysis (Year 1, Year 5, Year 8, Year 11, Year 15)
- Market Efficiency Analysis (Year 1, Year 5, Year 8, Year 11, Year 15)
- Identify proposed solutions
- Update significant assumptions (Year 8, Year 9, Year 10, Year 14)
- Analysis of market solutions and support of benefits of reliability solutions (Year 8, Year 9, Year 10, Year 14)
- Independent consultant reviews of buildability
- Adjustments to solution options by PJM based on analysis

- Develop assumptions (Year 1, Year 5)
- Market Efficiency Analysis (Year 1, Year 5) Accelerations and Modifications
- Identify and evaluate solution options Accelerations and Modifications
- Final review with TEAC and approval by the PJM Board
2017 RTEP Proposal Window #1
2017 RTEP Proposal Window 1 - Violations

- 40 flowgates were window eligible
- Window Opened: July 11th, 2017
- Window Closed: August 25th, 2017
- 51 Proposals received from 10 entities addressing 9 target zones
  - 29 Greenfield
  - 22 Transmission Owner Upgrade

www.pjm.com
2017 RTEP Proposal Window 1 - Results

- 2017 RTEP Proposal Window 1 Projects Electrically Near the PJM-NYISO Interface
# 2017 RTEP Proposal Window 1 - Results

## 2017 RTEP Proposal Window 1 Projects Electrically Near PJM-NYISO Interface

<table>
<thead>
<tr>
<th>Upgrade Number</th>
<th>TO</th>
<th>Status</th>
<th>Description</th>
<th>Required In Service Date</th>
<th>Projected In Service Date</th>
<th>Current Cost Estimate</th>
<th>Original TEAC Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>b2944</td>
<td>PENELEC</td>
<td>EP</td>
<td>Install two 345 kV 80 MVAR shunt reactors at Mainesburg station</td>
<td>6/1/2017</td>
<td>10/1/2019</td>
<td>$11.49</td>
<td>9/14/2017</td>
</tr>
<tr>
<td>b2952</td>
<td>PENELEC</td>
<td>EP</td>
<td>Replace the North Meshoppen #3 230/115kV transformer eliminating the old reactor and installing two breakers to complete a 230kV ring bus at North Meshoppen</td>
<td>6/1/2022</td>
<td>6/1/2022</td>
<td>$6.80</td>
<td>10/31/2017</td>
</tr>
<tr>
<td>b2955</td>
<td>PSEG</td>
<td>EP</td>
<td>Wreck and re-build the VFT – Warinanco – Aldene 230 kV circuit with paired conductor.</td>
<td>6/1/2018</td>
<td>12/31/2020</td>
<td>$90.40</td>
<td>10/12/2017</td>
</tr>
<tr>
<td>b2956</td>
<td>PSEG</td>
<td>EP</td>
<td>Replace existing cable on Cedar Grove-Jackson Rd. with 5000kcmil XLPE cable.</td>
<td>6/1/2018</td>
<td>12/31/2020</td>
<td>$80.00</td>
<td>10/12/2017</td>
</tr>
</tbody>
</table>
Baseline Analysis Voltage (Summer, Winter and Light Load) and Operational High Voltage Issue
Presented: 9/14/2017 TEAC

Problem Statement: The Mainesburg 345 kV station has been experiencing a high voltage issue in the last couple of years. In addition, the 2022 RTEP analysis shows high voltage issue for several contingencies, for all seasonal basecases.

Immediate Need: Due to the immediate need, the timing required for an RTEP proposal window is infeasible. As a result, the local Transmission Owner will be the Designated Entity.

Recommended Solution: Install two 345 kV 80 MVAR shunt reactors at Mainesburg station. (B2944)

Estimated Project Cost: $11.493 M
Required In Service Date: 6/1/2017
2017 RTEP Window #1 Recommendation
Generation Deliverability (Summer):

Previously Presented: 8/31/2017 and 10/31/2017

Problem Statement:
• The North Meshoppen 230/115 kV transformer #3 along with the 115 kV series reactor are overloaded for single contingency loss of the North Meshoppen – Canyon – E. Towanda 230 kV circuit and the North Meshoppen 230/115 kV transformer #4. (FG# GD-W35 and GD-W75):

Recommended Solution:
• Replace the North Meshoppen #3 230/115 kV transformer eliminating the old reactor and installing two breakers to complete a 230 kV ring bus at North Meshoppen. (B2952)

Estimated Cost: $6.802 M

Required In-service: 6/1/2022
Generation Deliverability (Summer and Winter):
Presented: 9/14/2017 and 10/12/2017

Problem Statement:
- The VFT – Warinanco 230 kV circuit is overloaded for several contingencies. (FG# GD-S26, GD-S27, GD-S28, GD-S33, GD-S556, GD-W37, GD-W38, GD-W39, and GD-W348)
- The Warinanco – Aldene 230 kV circuit is overloaded for tower contingency loss of the Linden to Deans and Linden to Sewaren 230 kV circuits. (FG# GD-W353)

Immediate Need:
- Due to the immediate need, the timing required for an RTEP proposal window is infeasible. As a result, the local Transmission Owner will be the Designated Entity.

Recommended Solution:
- Wreck and re-build the VFT – Warinanco – Aldene 230 kV circuit with paired conductor. Addresses tower age. Does not require new right of way. Paired conductor can address load requirement with room for future growth. (B2955)

Alternative Solutions:
- Install parallel towerline - Dense, industrial area with limited property available. Would require new right of way and new station terminations.
- Install parallel XLPE cable - Requires opening the street. Adjacent to a railroad. Requires two new terminations. Create an impedance imbalance with the parallel overhead circuit. Cable will have lower impedance and lower capacity than the overhead circuit.

Estimated Project Cost: $90.4 M
Required IS date: 6/1/2018
Project Status: Conceptual
Generation Deliverability (Summer):
Presented: 9/14/2017 and 10/12/2017

Problem Statement:
• The Cedar Grove – Jackson Rd. 230 kV circuit is overloaded for tower contingency loss of the Cedar Grove – Athenia 230 kV circuits B2228 and K2263. (FG# GD-S601)

Immediate Need:
• Due to the immediate need, the timing required for an RTEP proposal window is infeasible. As a result, the local Transmission Owner will be the Designated Entity.

Recommended Solution:
• Replace existing cable with 5000kcmil XLPE cable. (B2956)

Alternative Solution:
• Re-conductor circuit with HPFF with 3500kcmil underground, pipe-type cable. Address age but not age of pipe. Alternative not recommended. Only one vendor for HPFF remains. Future availability of HPFF in question due to supply chain availability
• Abandon circuit - would leave a single transmission source from Waldwick 230kV for 215MW of load at Waldwick/Hawthorne/Hinchman/Jackson Rd. Violates FERC 715 criteria by leaving two sources to Jackson Rd. Would also render Waldwick PAR ineffective; 69kV would be the only outlet/inlet for PAR adjustments. Thermal overload on 69kV system for n-1-1.
• Replace with overhead construction - need right of way. Surrounding area is developed and densely populated. Requires two river crossings, interstate highway crossing, and a U.S. route crossing. Airport nearby. The construction of this alternative is not feasible.

Estimated Project Cost: $80 M
Required IS date: 6/1/2018
Project Status: Conceptual
2017 RTEP Projects Electrically Near the PJM-NYISO Interface (Not Part of 2017 RTEP Proposal Window #1)
## 2017 RTEP Projects Electrically Near the PJM-NYISO Interface
(Not Part of 2017 RTEP Proposal Window #1)

<table>
<thead>
<tr>
<th>Upgrade Number</th>
<th>TO</th>
<th>Status</th>
<th>Description</th>
<th>Required In Service Date</th>
<th>Projected In Service Date</th>
<th>Current Cost Estimate</th>
<th>Original TEAC Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>b2825.1</td>
<td>PSEG</td>
<td>EP</td>
<td>Install 2X50 MVAR shunt reactors at Kearny 230 kV substation</td>
<td>9/1/2018</td>
<td>5/1/2019</td>
<td>$17.80</td>
<td>1/12/2017</td>
</tr>
<tr>
<td>b2825.2</td>
<td>PSEG</td>
<td>EP</td>
<td>Increase the size of the Hudson 230 kV, 2X50 MVAR shunt reactors to 2X100 MVAR</td>
<td>9/1/2018</td>
<td>9/1/2019</td>
<td>$13.50</td>
<td>1/12/2017</td>
</tr>
<tr>
<td>b2825.3</td>
<td>PSEG</td>
<td>EP</td>
<td>Install 2X100 MVAR shunt reactors at Bayway 345 kV substation</td>
<td>9/1/2018</td>
<td>5/1/2019</td>
<td>$30.60</td>
<td>1/12/2017</td>
</tr>
<tr>
<td>b2825.4</td>
<td>PSEG</td>
<td>EP</td>
<td>Install 2X100 MVAR shunt reactors at Linden 345 kV substation</td>
<td>9/1/2018</td>
<td>6/1/2019</td>
<td>$28.50</td>
<td>1/12/2017</td>
</tr>
<tr>
<td>b2835</td>
<td>PSEG</td>
<td>EP</td>
<td>Convert the R-1318 and Q1317 (Edison – Metuchen) 138 kV circuits to one 230 kV circuit</td>
<td>6/1/2017</td>
<td>6/1/2019</td>
<td>$125.00</td>
<td>1/12/2017</td>
</tr>
<tr>
<td>b2836</td>
<td>PSEG</td>
<td>EP</td>
<td>Convert the N-1340 and T-1372/D-1330 (Brunswick – Trenton) 138 kV circuits to 230 kV circuits</td>
<td>6/1/2017</td>
<td>12/31/2021</td>
<td>$302.00</td>
<td>1/12/2017</td>
</tr>
<tr>
<td>b2837</td>
<td>PSEG</td>
<td>EP</td>
<td>Convert the F-1358/Z1326 and K1363/Y-1325 (Trenton - Burlington) 138 kV circuits to 230 kV circuits</td>
<td>6/1/2017</td>
<td>6/1/2022</td>
<td>$312.00</td>
<td>1/12/2017</td>
</tr>
</tbody>
</table>
2017 RTEP Projects Electrically Near the PJM-NYISO Interface (Not Part of 2017 RTEP Proposal Window #1)
Potential High Voltage Issue in PSEG During Light Load

• Background
  – The BLC (Bergen – Linden Corridor) project in the Northern PSEG is under construction to be completed by June 2018. The project includes several pieces of underground cable.
  – The northern PSEG area previously experienced high voltage issues.
  – The last three years average load in PSEG was about 4000 MW during light load. The 2015-2016 load average was about 3900 MW during light load hours.

Purpose:
  – The purpose of this analysis was to determine if a high voltage violations exist after the Bergen – Linden Corridor is fully energized.
<table>
<thead>
<tr>
<th>138 kV substation</th>
<th>230 kV substation</th>
<th>345 kV substation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Doremus Place 138 kV</td>
<td>49TH Street R 230 kV</td>
<td>Newark Airport 345 kV</td>
</tr>
<tr>
<td>Fair Lawn 138 kV</td>
<td>49th Street Y 230 kV</td>
<td>Bayonne 345 kV</td>
</tr>
<tr>
<td>Federal Square 138 kV</td>
<td>Essex 230kV</td>
<td>Bayway 345 kV</td>
</tr>
<tr>
<td>Foundry Street 138 kV</td>
<td>Hoboken 230 kV</td>
<td>Bergen 345kV</td>
</tr>
<tr>
<td>Newark 138 kV</td>
<td>Homestead 230 kV</td>
<td>Linden 345kV</td>
</tr>
<tr>
<td>Kearny 230 kV</td>
<td>Marion 345 kV</td>
<td></td>
</tr>
<tr>
<td>Madison 230kV</td>
<td>North Avenue 345 kV</td>
<td></td>
</tr>
<tr>
<td>Newport 230 kV</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NJT Meadows 230 kV</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Penhourn 230 kV</td>
<td></td>
<td></td>
</tr>
<tr>
<td>South Water Front 230 kV</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Install shunt reactors in the following stations

<table>
<thead>
<tr>
<th>Baseline #</th>
<th>Location</th>
<th>Size</th>
<th>Cost</th>
<th>In-Service</th>
</tr>
</thead>
<tbody>
<tr>
<td>B2825.1</td>
<td>Kearny 230kV</td>
<td>2x50 MVAR</td>
<td>$17.8M</td>
<td>May-19</td>
</tr>
<tr>
<td>B2825.2</td>
<td>Hudson 230kV</td>
<td>2x100 MVAR</td>
<td>$13.5M</td>
<td>Sep-19</td>
</tr>
<tr>
<td>B2825.3</td>
<td>Bayway 345kV</td>
<td>2x100 MVAR</td>
<td>$30.6M</td>
<td>May-19</td>
</tr>
<tr>
<td>B2825.4</td>
<td>Linden 345kV</td>
<td>2x100 MVAR</td>
<td>$28.5M</td>
<td>Jun-19</td>
</tr>
</tbody>
</table>

1 Existing 2x50 MVAR at Hudson to be replaced with 2X100 MVAR for a net increase of 100 MVAR.
• PSE&G’s FERC 715 Transmission Owner criterion addresses equipment condition assessments
  – PSE&G assessed the condition of the Metuchen to Trenton (MT-T) and Trenton to Burlington (T-BU) 138 kV circuits.
230 kV Rebuild Alternative – Metuchen to Burlington

• Recommended Solution for Metuchen – Brunswick (B2835):
  – Convert the R-1318 and Q1317 (Edison – Metuchen) 138 kV circuits to one 230 kV circuit
    • Metuchen 138 kV will be eliminated
    • The Brunswick 230/138 kV autotransformer will be eliminated
    • The new converted 230 kV circuit will be terminated at the existing Metuchen and Brunswick 230 kV stations.
  – Estimated Project Cost: $ 125 M

• Recommended Solution for Brunswick – Trenton (B2836):
  – Convert the N-1340 and T-1372/D-1330 (Brunswick – Trenton) 138 kV circuits to 230 kV circuits
    • The converted circuits will be terminated at the existing Brunswick 230 kV
    • The new converted 230 kV circuit will be terminated at the Trenton 138 kV station with two 138 kV transformers
  – Estimated Project Cost: $ 302 M

• Recommended Solution for Trenton – Burlington (B2837):
  – Convert the F-1358/Z1326 and K1363/Y-1325 (Trenton - Burlington) 138 kV circuits to 230 kV circuits
    • Trenton 138 kV substation will be replaced with six bay breaker and half 230 kV substation
    • Install 230/138 kV transformer at Trenton to serve the Trenton – US Steele 138 kV circuit.
  – Estimated Project Cost: $ 312
Supplemental Upgrade:
Niles Valley – Wellsboro – Marshall 115 kV
Previously presented: 4/25/2017

Problem Statement:
Niles Valley-Wellsboro-Marshall 115 kV line is needed to (S1350):
- Improve reliability due to multiple outages over past several years
- Reduce loading on contingency constrained facilities

Recommended Solution:
Phase 1: Niles Valley-Wellsboro 115 kV
- Construct ~5 miles of 115 kV line using existing right-of-way (where possible)
- Install new 115 kV bus tie breaker at Niles Valley
- Relocate Potter 115 kV line at Niles Valley
- Install two SCADA controlled switches
- Install switch structure for future network line extension

Phase 2: Wellsboro-Marshall 115 kV (Future)

Estimated Project Cost: Phase 1 - $12.8 M
Projected IS Date: Phase 1 - 6/1/2020
Project Status: Engineering
2018 RTEP Projects Electrically Near the PJM-NYISO Interface
• PSE&G’s FERC 715 Transmission Owner criterion addresses equipment condition assessments
  - PSE&G assessed the condition of the Roseland to Branchburg to Pleasant Valley 230 kV circuits.
Recommended Solution: Roseland - Branchburg – PV Corridor:

Recommended solution:

• Replace the existing Roseland – Branchburg – Pleasant Valley 230 kV corridor with new structures (b2986).

Estimated Project Cost: $ 546 M

Required IS date: 2018

Projected IS date: 6/1/2022

Project status: Engineering
2018 RTEP Analysis Update
• 5018 Interface: Hopatcong – Ramapo 500 kV line
• J & K Interface:
  – Waldwick – South Mahwah – Ramapo 345 kV lines
    • Waldwick – Hawthorne E-2257
    • Waldwick – Hillsdale F-2258
    • Waldwick – Fairlawn O-2267
• ABC Interface:
  – A: Linden – Goethals 230 kV line
  – B: Hudson – Farragut 345 kV line
  – C: Marion – Farragut 345 kV line
Agreement Changes Included in 2018 RTEP

- Linden VFT
- HTP (Hudson Transmission Partners, LLC)
  - Previous agreements:
    - VFT
      - 2017 RTEP 330 MW FTWRs (Firm Transmission Withdrawal Rights) and 315 MW Capacity Transmission Injection Rights
    - HTP
      - 2017 RTEP 320 MW FTWRs and 353 MW NFTWRs (Non Firm Transmission Withdrawal Rights)
  - Current agreement:
    - VFT
      - 2018 RTEP 330 MW NFTWRs and 315 MW Capacity Transmission Injection Rights
    - HTP
      - 2018 RTEP 0 MW FTWRs and 673 MW NFTWRs
- RTEP modeling impact observations
- Next Steps
  - Evaluate updated parameters as part of the 2018 RTEP
• PJM/NYISO “ConEd” Wheel Cancellation
  – The ConEd wheel will not be modeled in the 2018 RTEP consistent with 2017 RTEP due to the cancellation of the corresponding transmission service in 2017.
  – Scheduled MW across the PJM/NYISO PARs will be set according to the procedures in Manual 14B (Attachment B Section B.3) that were approved in 2017.

• Linden VFT
  – Modeled at 330 MW

• HTP
  – Modeled at 0 MW
• PJM/NYISO PAR Coordination process replaced the PSE&G/ConEd Wheel on May 1, 2017

• PAR Coordination process includes the following:
  – An Operational Base Flow (OBF) as a starting point - 400 MW
    – PJM and NYISO have mutually agreed to reduce the OBF to zero on October 31, 2019
  – An AC Interchange percentage distribution:
    • 5018: 32%
    • JK: 15%
    • ABC: 21%
  – RECO Load:
    • 80% applied to the 5018 Target Flow
    • 20% considered to flow over Western ties
• Finalized 2018 Models
• Began 2018 RTEP Analysis

<table>
<thead>
<tr>
<th>May-June</th>
<th>Post violations</th>
</tr>
</thead>
<tbody>
<tr>
<td>May/June to July/August</td>
<td>Reliability Window (60 day window)</td>
</tr>
</tbody>
</table>
Register for the 2018 RTEP Window 1 at http://www.pjm.com/planning/competitive-planning-process.aspx

Everyone must register to access the data regardless of prior participation in the PJM Competitive Process.
Market Efficiency Update
2016/17 RTEP Long-Term Window

- 2016/17 Long-Term Window from November 2016 - February 2017 has concluded except for Congestion Drivers in PPL.
- PJM is currently further evaluating proposals in PPL based on stakeholders feedback.
- 2016/17 Long-Term Window Recommended Congestion Drivers:

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Facility Name</td>
<td>Frequency (Hours)</td>
<td>Market Congestion ($ Millions)</td>
</tr>
<tr>
<td>Conastone to Gracetown 230 kV</td>
<td>972</td>
<td>$58.3</td>
</tr>
<tr>
<td>Gracetown to Bagley 230 kV</td>
<td>1,265</td>
<td>$33.0</td>
</tr>
<tr>
<td>Susquehanna to Harwood 230 kV</td>
<td>166</td>
<td>$4.0</td>
</tr>
</tbody>
</table>
Proposed by: BGE

Proposed Solution:
Reconductor the Conastone to Graceton 230kV lines. Upgrade substation equipment at Conastone. Add bundled conductors to the Graceton-Bagley-Raphael Road 230kV double circuit lines. Reconductor the Raphael Road to Northeast 230 kV double circuit lines. Upgrade substation equipment at Windy Edge substation (B2992.1-B2992.4).

kV Level: 115/230 kV
In-Service Cost ($M): $25.40  B/C: 8.16
PJM Cost Estimate ($M): $39.65  B/C: 5.23
In-Service Date: 2021
Target Zone: BGE

Market Efficiency Constraints:
CONASTONE - GRACETON - BAGLEY 230 kV

Notes: 1-5E was recommended for approval at the April 2018 Board meeting.
• Study Years 2019 and 2023 to study approved RTEP projects for accelerations and modifications
• 2019, 2023, 2026, 2029, and 2033 to study new system enhancements
• Underlying ABB input database based on March 2018 PROMOD IV Data Release
• PJM to update load forecast, generation expansion, demand resources, emissions, fuel prices, transmission topology and flowgates
• Simulations performed using PROMOD IV v11.1 engine
## 2018/19 RTEP Long Term Window Next Steps

<table>
<thead>
<tr>
<th>Step</th>
<th>Timeline</th>
</tr>
</thead>
<tbody>
<tr>
<td>Develop Assumptions</td>
<td>April – May 2018</td>
</tr>
<tr>
<td>Build Base Case</td>
<td>June – July 2018</td>
</tr>
<tr>
<td>Identify Congestion Drivers</td>
<td>August – September 2018</td>
</tr>
<tr>
<td>Post Base Case and Congestion Drivers</td>
<td>October 2018</td>
</tr>
<tr>
<td>Proposal Window</td>
<td>November 2018 - February 2019</td>
</tr>
<tr>
<td>Analysis of Proposed Solutions</td>
<td>March - November 2019</td>
</tr>
<tr>
<td>Final TEAC Review and Board Approval</td>
<td>November - December 2019</td>
</tr>
</tbody>
</table>
Generation Deactivation Notification Near the NYISO Border (as of May 1, 2018)
## Deactivation Status 2017 - 2018

<table>
<thead>
<tr>
<th>Unit(s)</th>
<th>Transmission Zone</th>
<th>Requested Deactivation Date</th>
<th>PJM Reliability Status</th>
<th>Baseline Project</th>
</tr>
</thead>
<tbody>
<tr>
<td>Three Mile Island unit 1 (802.8 MW)</td>
<td>MetEd</td>
<td>9/30/2019</td>
<td>Reliability analysis complete. No impacts identified.</td>
<td></td>
</tr>
<tr>
<td>Colver NUG (110 MW)</td>
<td>PENELEC</td>
<td>9/1/2020</td>
<td>Reliability analysis complete. New baseline upgrade was issued to resolve the identified issue.</td>
<td>b2984</td>
</tr>
<tr>
<td>Laurel Mountain Battery (32 MW)</td>
<td>APS</td>
<td>3/16/2018</td>
<td>Reliability analysis complete. No impacts identified.</td>
<td></td>
</tr>
<tr>
<td>Pleasant Power Station U1 &amp; U2 (1278 MW total)</td>
<td>APS</td>
<td>1/1/2019</td>
<td>Reliability analysis complete. No impacts identified.</td>
<td></td>
</tr>
<tr>
<td>Davis Besse Unit 1 (896 MW)</td>
<td>ATSI</td>
<td>5/31/2020</td>
<td>Reliability analysis underway</td>
<td></td>
</tr>
<tr>
<td>Perry Unit 1 (1247 MW)</td>
<td>ATSI</td>
<td>5/31/2021</td>
<td>Reliability analysis underway</td>
<td></td>
</tr>
<tr>
<td>Beaver Valley Unit 1 (909 MW)</td>
<td>DUQ</td>
<td>5/31/2021</td>
<td>Reliability analysis underway</td>
<td></td>
</tr>
<tr>
<td>Beaver Valley Unit 2 (902 MW)</td>
<td>DUQ</td>
<td>10/31/2021</td>
<td>Reliability analysis underway</td>
<td></td>
</tr>
</tbody>
</table>
• **N-2 Voltage Outage:**
  - Voltage magnitude and drop violations were identified in the vicinity of Glory 115 kV substation for the loss of the Glory to Seward 115 kV line and Shelocta #1 115-34.5 kV XFMR Fault
  - New Baseline Upgrade (b2984)
  - Reconfigure the bus at Glory and install a 50.4 MVAR 115 kV capacitor.
• Cost estimate: $ 3.3M
• Required IS Date: 06/01/2021
• Projected IS Date: 06/01/2021
Questions?

Email: RTEP@pjm.com