# Generation Interconnection

# Queue Project AE1-136

# McConnellsburg-Guildford 138 kV

# Feasibility Study Report

# Capacity : 32 MW / Energy : 53.32 MW

February, 2019

# General

Interconnection Customer has proposed a new solar generating facility located in Franklin County, Pennsylvania. The installed facilities will have a total capability of 53.3 MW with 32 MW of this output being recognized by PJM as Capacity Interconnection Rights. The proposed in-service date for this project is December 31, 2021. **This study does not imply a West Penn Power Company (Transmission Owner or WPP) commitment to this in-service date.**

# Point of Interconnection

The AE1-136 solar facility will interconnect with the WPP transmission system by tapping the McConnellsburg – Guilford 138 kV line at a point located approximately 9.5 miles from McConnellsburg sub and 7.5 miles from Guilford sub. A three-breaker ring bus station is required to tap the line.

# etwork Impacts

The Queue Project AE1-136 was evaluated as a 53.32 MW (Capacity 32.0 MW) injection tapping the McConnellsburg – Texas Eastern 6 Tap 138 kV line in the APS zone (West Penn Power, FirstEnergy). Project AE1-136 was evaluated for compliance with applicable reliability planning criteria (PJM, NERC, NERC Regional Reliability Councils, and Transmission Owners). Project AE1-139 was studied with a commercial probability of 53%. Potential network impacts were as follows:

# Primary POI: Summer Peak Analysis – 2022

**Generator Deliverability**
(Single or N-1 contingencies for the Capacity portion only of the interconnection)

None

**Multiple Facility Contingency**
(Double Circuit Tower Line, Fault with a Stuck Breaker, and Bus Fault contingencies for the full energy output)

| ID | FROM BUS# | FROM BUS | FROM BUS AREA | TO BUS# | TO BUS | TO BUS AREA | CKT ID | CONT NAME | Type | Rating MVA | PRE PROJECT LOADING % | POST PROJECT LOADING % | AC\|DC | MW IMPACT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **705703** | 200532 | 26ROXBURY | PENELEC | 200520 | 26ROXBURY | PENELEC | 2 | AP-P7-1-WPP-138-57 | tower | 150.0 | 108.15 | 116.11 | DC | 11.94 |
| **704526** | 235189 | 01GUILFD | AP | 235136 | 01ANTRIM | AP | 1 | AP-P2- | breaker | 306.0 | 90.83 | 101.95 | DC | 34.04 |

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | 3-WP-138-272T | | | | | | |
| **705804** | 235189 | 01GUILFD | AP | 235187 | 01GRANDP | AP | 1 | AP-P7-1-WPP-138-57 | tower | 228.0 | 96.46 | 108.89 | DC | 28.35 |

### Contribution to Previously Identified Overloads

(This project contributes to the following contingency overloads, i.e. "Network Impacts", identified for earlier generation or transmission interconnection projects in the PJM Queue)

| ID | FROM BUS# | FROM BUS | FROM BUS AREA | TO BUS# | TO BUS | TO BUS AREA | CKT ID | CONT NAME | Type | Rating MVA | PRE PROJECT LOADING % | POST PROJECT LOADING % | AC\|DC | MW IMPACT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **704195** | 200532 | 26ROXBURY | PENELEC | 200520 | 26ROXBURY | PENELEC | 2 | ME_P4-500-002H | breaker | 150.0 | 124.79 | 129.72 | DC | 7.39 |

### Short Circuit

None. (No overdutied circuit breakers identified)

### Potential Congestion due to Local Energy Deliverability

PJM also studied the delivery of the energy portion of this interconnection request. Any problems identified below are likely to result in operational restrictions to the project under study. The developer can proceed with network upgrades to eliminate the operational restriction at their discretion by submitting a Merchant Transmission Interconnection request.

Only the most severely overloaded conditions are listed. There is no guarantee of full delivery of energy for this project by fixing only the conditions listed in this section. With a Transmission Interconnection Request, a subsequent analysis will be performed, which will study all overload conditions associated with the overloaded element(s) identified.

| ID | FROM BUS# | FROM BUS | FROM BUS AREA | TO BUS# | TO BUS | TO BUS AREA | CKT ID | CONT NAME | Type | Rating MVA | PRE PROJECT LOADING % | POST PROJECT LOADING % | AC\|DC | MW IMPACT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **705121** | 200532 | 26ROXBURY | PENELEC | 200520 | 26ROXBURY | PENELEC | 2 | Base Case | operation | 124.0 | 111.66 | 117.46 | DC | 7.2 |
| **705122** | 200532 | 26ROXBURY | PENELEC | 200520 | 26ROXBURY | PENELEC | 2 | AP-P2-2-PE-138-074 | operation | 150.0 | 105.42 | 113.38 | DC | 11.94 |
| **705382** | 235189 | 01GUILFD | AP | 235187 | 01GRANDP | AP | 1 | AP-P2-2-PE-138-071 | operation | 228.0 | 92.67 | 105.09 | DC | 28.31 |

# System Reinforcements:

### Short Circuit

None.

### Stability and Reactive Power Requirement

Will be determined at a later study stages.

### Summer Peak Load Flow Analysis Reinforcements

### New System Reinforcements

(Upgrades required to mitigate reliability criteria violations, i.e. Network Impacts, initially caused by the addition of this project generation)

| ID | Index | Facility | Upgrade Description | Cost |
|---|---|---|---|---|
| 704526 | 2 | 01GUILFD 138.0 kV - 01ANTRIM 138.0 kV Ckt 1 | **AP**<br>Description : a) Replace limiting substation components at Guilford Substation b) Replace wavetrap at Grand Point c) Replace breaker failure relays at Guilford on Antrim terminal<br>Time Estimate : 14.0 Months<br>Cost : $450,100 | $450,100 |
| 705804 | 3 | 01GUILFD 138.0 kV - 01GRANDP 138.0 kV Ckt 1 | | |
| 704195,705703 | 1 | 26ROXBURY 138.0 kV - 26ROXBURY 115.0 kV Ckt 2 | **PENELEC**<br>Description : Supplemental upgrade s1643: Replace the existing Roxbury 100 MVA 138/115 kV transformer with a 224 MVA unit. Convert Roxbury 115 kV substation into a four (4) breaker ring bus. The supplemental project has an projected in-service date of 12/31/2019.<br>Time Estimate : Months<br>Cost : $0 | $0 |
| | | | **TOTAL COST** | **$450,100** |