Generation Interconnection
PJM Combined Feasibility/Impact Study and APS Feasibility Study Report

For

PJM Generation Interconnection Request Queue Position W1-104

Bellefonte 12kV Project

PJM DOCS No. 603654 v1
July, 2010

Overview

Sustainable Energy Holdings, LLC (IC) has submitted an Attachment N to propose the interconnection of 0.65 MW of solar generation for the purpose of selling up to 0.65 MW energy and 0.25 MW of Capacity into the PJM market. The Commercial Operation date for this project was requested to be October 1, 2011. The base year for the analysis of this project was 2014.

Since this project is FERC non-jurisdictional, this report will present a combined feasibility/impact study prepared by PJM, followed by a feasibility study prepared by the Transmission Owner, APS.

PJM Combined Feasibility/Impact Study Report

Network Impacts

Queue project W1-104 was studied as a 0.65MW (0.25MW of which is Capacity) injection into APS's system at the Milesburg 46kV substation. Project W1-104 was evaluated for compliance with reliability criteria for summer peak conditions in 2014. Potential network impacts were as follows:

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

No problems identified.

Multiple Facility Contingency
(Double Circuit Tower Line Contingencies only with full energy output. Stuck Breaker and Bus Fault contingencies will be applied during the Impact Study)

No problems identified.

Contribution to Previously Identified Overloads
(Overloads initially caused by prior Queue positions with additional contribution to overloading by this project. This project may have % allocation of cost responsibility which will be calculated and reported for the Impact Study.)

No problems identified.

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

None.

Contribution to Previously Identified System Reinforcements
(Overloads initially caused by prior Queue positions with additional contribution to overloading by this project. This project may have a % allocation cost responsibility which will be calculated and reported for the Impact Study)

None.

Short Circuit

Not required for the transmission level protection system.

Energy Portion of Interconnection Request

PJM also studied the delivery of the energy portion of the surrounding generation. Any potential 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 Transmission Interconnection request.

Note: 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 analyzes all overload conditions associated with the overloaded element(s) identified. As a result of the aggregate energy resources in the area, the following violations were identified.

No problems identified.

APS Feasibility Study Report

This feasibility study has been prepared for PJM queue project W1-104 (Bellefonte 12kV Project) by Allegheny Power

Injection into the Benner Pike 12.5kV Circuit

Attachment Facilities and Related Network Upgrades

- Install one (1) three-phase junction and 12.47 kV metering. Note: All rights-of-way must be obtained by the IC and transferred, at no cost, to AP.

Estimated Cost: $40,189 in 2010 dollars

The estimated project duration is **5 months** after the receipt of an executed Interconnection Agreement and Construction Agreement.

While the information in this transmittal is reasonable for the scope of work defined, it should, however, be noted that the cost figures are conceptual in nature at this stage, as an engineering team has not been assigned to the project. Obviously, any change to the scope of work will require that the estimates be revisited. The costs are a best estimate, but the IC will be charged for actual costs. Any under-runs or over-runs will be reconciled at the conclusion of the project. The estimates in this report do not include tax gross-up.

The developer will interconnect via a new customer-owned 12.5 kV underground line from the customer facility. The above cost estimates do not include construction of that line. Route selection, line design, rights-of-way acquisition and construction of such lines will be entirely the responsibility of the IC. It is assumed that the IC's main step up transformer will conform to the AP standard with a grounded wye on both sides (high voltage and low voltage) as illustrated in the AP Engineering Manual:

http://www.alleghenypower.com/PowerQuality/Attachments/e1935_00.pdf.

Short Circuit

No breakers were identified as being over their maximum interrupting rating.

AP reserves the right to review the electrical protection design and relay settings for IC facilities to ensure that the protective relaying equipment will be compatible with that installed on AP facilities. The relaying package will likely include both primary and backup protection. AP personnel must be present at the time of commissioning to inspect and witness proper function of the control scheme and related coordination. The estimated cost to perform this engineering review and field test effort is **$5,000 in 2010 dollars**.

Note: The purchase and installation of protective relaying and associated equipment at the generation site is the responsibility of the IC and is not included in this scope of work.

The IC will be required to install metering and telemetry equipment to provide revenue metering and real-time telemetry data to PJM. The requirements for this equipment are listed in Appendix 2, Section 8 of Attachment O to the PJM Tariff, as well as PJM Manuals 01 and 14D. Protective relaying and metering design and installation must comply with the AP applicable standards.

Overloads and Required Reinforcements

No Generator Deliverability overloads were identified.

Other Supporting Facilities Charge

The Other Supporting Facilities Charge (OSFC) may include non-transmission facilities directly assigned and/or a general (rolled-in) facilities charge. The guidelines apply to all wholesale customers and all generators selling into or through the PJM market, regardless of capacity, not connected directly to the AP Transmission System.

The Other Supporting Facilities Charge for the W1-104 generator interconnection project has been estimated to be **$613/month** in 2010 dollars. The estimate is based on a direct assigned rate and an average (or rolled-in) rate for West Penn's distribution and sub-transmission systems.

Single Line Diagram