Generation Interconnection Feasibility Study Report

For

PJM Generation Interconnection Request Queue Position W2-094

Straban 13.2 kV Project

PJM DOCS No. 618062v1
October, 2010

Introduction

This Feasibility Study report provides the documentation of a system assessment performed by PJM Interconnection, LLC and FirstEnergy (FE) in response to a request made by the Interconnection Customer (IC) for the connection of a solar power project with a total capability of 3 MW energy (of which 1.1 MW is Capacity) to the Met-Ed network. This project was originally 5MW Energy, 1.9 MW Capacity and reduced prior to study. The project has a scheduled in service date of October 1, 2011

PJM Report on the Transmission System

This portion of the report addresses the impacts on and the required reinforcements to that part of the transmission system under PJM jurisdiction.

Network Impacts

Queue project W2-094 was studied as a(n) 5.0MW (1.9MW of which was Capacity) injection into METED's system at the Straban 115kV substation. Project W2-094 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
(Report Overdutied breakers here)

Not required.

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.

MetEd (FirstEnergy) Feasibility Analysis Report

This portion of this Feasibility Study Report has been prepared for PJM queue project W1-075 by MetEd (FirstEnergy). It addresses the impacts on and required reinforcements to that portion of the network, including the attachment and direct connection facilities.

Scope:

This portion of the Feasibility Study W2-094 for IC examines the capability of Metropolitan Edison Co.'s (Met-ED) electric distribution system to accept the output of the proposed 3.0 MW solar panel generation located near 150 Coleman Rd. Gettysburg, PA. This site is northeast of Gettysburg.

Local Distribution Circuit Information

- This area is presently served by Distribution Circuit 00675-4, a three phase 13.2 kV grounded wye distribution circuit originating from Met-Ed's Straban Substation. The proposed project site is located 5.9 circuit miles from the Straban Substation.

- Load Flow analysis was conducted to determine the impact of the generation project on the Straban substation and the 00675-4 line. The study was completed using a projected 2011 summer peak. The findings and recommendations from this study are based on identifying abnormal conditions that violate FE Planning Criteria and are associated with this project.

  The study found no overloads and no voltage conditions caused by the generator that would require system upgrades.

- A short circuit analysis was conducted to determine the fault duty contribution by the generator. The study found that no Met-Ed interrupting device will exceed its interrupting capacity due to the fault duty contribution from the generator. Therefore no reinforcements will be required.

Circuit infrastructure, protection, and coordination:

Main Line: To accommodate the proposed 3 MW capacity, Met-Ed first needs to install a new single phase recloser and install a new single phase voltage regulator downstream of pole 17196-19319. An existing single phase recloser and an existing single phase regulator will be retired.

The section of line between pole 17259-19233 and pole 17196-19319 will need to be reconductored from single phase to three phase using 336.4 ACSR. Total distance is 1,075 ft over three spans.

Two additional fault finders will need to be installed on the two new phases at pole 17259-19233.

SM4 150E protective fuses will be installed on pole 17196-19319 for the three phase primary tap to the facility allowing a nominal current of 130 amps of primary current from the 3 MW of project. These fuses will coordinate with the upstream ABB Recloser on pole 16659-19025.

At Substation: No upgrades necessary

At PV Facility: Customer protection scheme must coordinate with the SM4 150E fuses

Additional requirements:

- Interconnect Customer (IC) will install a pole near Met-Ed's pole as point of interconnection (consider directly across Coleman Rd.). On this pole, the IC will install a primary metering transformer bracket. Met-Ed shall provide, own, operate, test, and

maintain the revenue metering equipment at the IC's expense. Customer is responsible for installing the metering equipment.

- IC must comply with all requirements of the FirstEnergy Distribution Engineering Practice 02-280

- IC must provide a phone line connection for Met-Ed to the Primary Meter installation.

- IC provides all trenching, cables and conduit from MET-ED's point of interconnection pole to connect his PV generation facilities.

- IC must meet all applicable MET-ED/FirstEnergy standards and requirements which are included in the current Tariff for Service.

- IC's main breaker shall have a SEL 351 Multi-function relay (or equivalent) which is required for interconnection protection. The main breaker must be on the high side of the customer's transformer. All breakers, lightning protection etc. should meet MET-ED/FE's minimum BIL Ratings.

- The IC's transformer must be grounded Wye on the high side.

- IC must meet requirements of FERC Docket No. RM02-12-000 Order No. 2006, PJM Open Access Transmission Tariff Subpart G, PJM Manual 14A, IEEE 1547 or UL certified, and IEEE 1547.1.

- IC must meet applicable FE Distributed Generation Technical requirements for the interconnection of generation to the FE Distribution system.

- IC must provide a means for a visible open point on the customer side of the metering equipment.

- IC must operate the 3 MW solar array at unity power factor, under normal conditions.

- IC must furnish a SCADA remote terminal unit (RTU) which will interface with the FirstEnergy energy management system (EMS). The RTU, the communications channel, and all related equipment will be furnished and maintained by the generator. The RTU must communicate information in a compatible format to the FE transmission system control center via DNP 3.0 protocol. The following status points and metering points will be required:

    - Interconnection breaker position
    - Real and Reactive power output measured at the high side of the solar array step up transformers.
    - Voltage at the point of interconnection.

Infrastructure Upgrade Costs (By MET-ED):

Total Estimated Costs (by MET-ED) is $109,700.00

- Approximate cost to reconductor, install three 150E fuses, and fault indicators is $ 75,000.00 non-refundable. Additional cost to receive permission to work on the railroad crossing section is approximately $5,000 and may require 6 months to obtain permission.

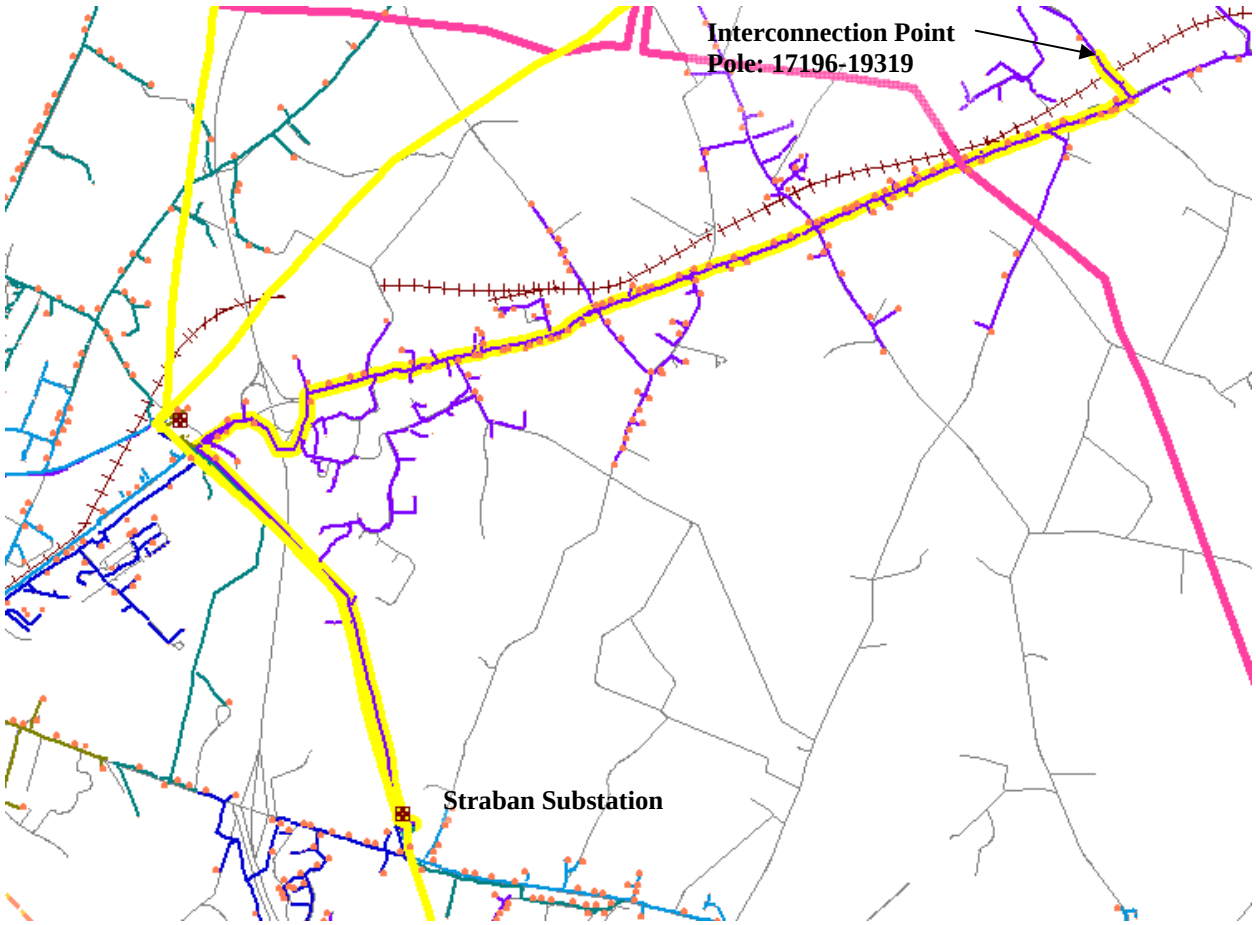
- Cost to install new recloser is $6,000.

- Cost to install new regulator is $17,000.

- Cost to purchase primary metering is $6,700

- All Right of Ways (ROW) are the responsibility of the IC to obtain.


GETTYSBURG
AREA SCHOOL
DISTRICT
STRABAN
TWP
W2-094
COLEMAN RD
CAREY LN
YORK RD
YORK RD
YORK RD
CENTENNIAL RD
LOW
DUTCH RD


Interconnection Point
Pole: 17196-19319
Straban Substation

STRABAN SUBSTATION