PJM Generation Interconnection
Queue W4-035
New Vienna 69kV
Feasibility/ System Impact Study

644174v3
November 2011

Preface

The intent of this System Impact Study is to determine a plan, with cost and construction time estimates, to connect the subject generation to the PJM network at a location specified by the Interconnection Customer. The Interconnection Customer may request the interconnection of generation as a capacity resource or as an energy-only resource. As a requirement for interconnection, the Interconnection Customer may be responsible for the cost of constructing: (1) Direct Connections, which are new facilities and/or facilities upgrades needed to connect the generator to the PJM network, and (2) Network Upgrades, which are facility additions, or upgrades to existing facilities, that are needed to maintain the reliability of the PJM system.

The PJM Reliability Planning Process utilizes PJM planning criteria, NERC Planning Standards, NERC Regional Council planning criteria, and the individual Transmission Owner FERC filed planning criteria. In all cases, PJM applies the most conservative of all applicable planning criteria when identifying reliability problems and determining the need for system upgrades on the PJM system. The application of the NERC Planning Standards is adapted to the specific needs of the PJM system.

In some instances an interconnection customer may not be responsible for 100% of the identified network upgrade cost because other transmission network uses, e.g. another generation interconnection or merchant transmission upgrade, may also contribute to the need for the same network reinforcement. All facilities required for interconnection of a generation interconnection project must be designed in compliance with the technical specifications (on PJM web site) for the appropriate Transmission Owner.

After the System Impact Study Agreement is executed and prior to execution of the Interconnection Service Agreement, an Interconnection Customer may modify its project to reduce the electrical output (MW) (in the case of a Generation Interconnection Request) of the proposed project by up to the larger of 20 percent of the capability considered in the System Impact Study or 50 MW.

The System Impact Study estimates do not include the feasibility, cost, or time required to obtain property rights and permits for construction of the required facilities. The project developer is responsible for the right of way, real estate, and construction permit issues. For properties currently owned by Transmission Owners, the costs may be included in the study.

General

The queue W4-035 project is proposing a solar pv facility to be located in Clinton County, OH and has requested to be studied at 20 MW (11.9 MW Capacity) injection into Dayton's (DP&L) system at the 69kV line that feeds the radial distribution substation in New Vienna. The proposed in-service date is **May 31, 2012**.

Attachment Facilities

The proposed generation project will tap the existing radial Martinsville – New Vienna 69kV circuit. It is assumed that the Interconnect Customer will build a new substation adjacent to the existing 69kV transmission line. The direct connect cost for DP&L work will be to install the transmission drop into the substation and to install interconnect metering (Interconnection Customer to provide structure for the metering). This interconnection also will require installing transfer trip and carrier relaying at the Wilmington and Highland (AEP-owned) Substations. The Interconnection Customer will be responsible for building a new 69kV substation with one 69kV breaker. The Interconnection Customer will be responsible for installing an RTU to provide real time information to DP&L to send to PJM. The estimated cost for this interconnection is:

Upgrade Description	**Cost Estimate**
Wilmington 69kV Substation – Install Transfer Trip Relaying	$107,000
Transmission drop into new substation	$38,000
Interconnect metering at new substation	$87,000
Total DP&L Costs	**232,000**

Upgrade Description	**Cost Estimate**
Highland 69kV substation – relaying work	$92,000
Total AEP Costs	**$92,000**

If the Interconnection Customer would like for DP&L to build the new substation, the total cost estimate including the above work required is $1,650,000 (Interconnection Customer must provide land for the substation). These costs do not include CIAC Tax Gross-up.

The Interconnection Customer is responsible for constructing all of the facilities on the Interconnection Customer's side of the Point of Interconnection. It will be the Interconnection Customer's responsibility to obtain any right-of-way between the Collector Substation and the Interconnection Substation.

Revenue Metering and SCADA Requirements

For PJM: IC will be required to install equipment necessary to provide Revenue Metering (KWH, KVARH) and real time data (KW, KVAR) for IC's generating Resource. See PJM Manuals M-01 and M-14D, and PJM Tariff Sections 24.1 and 24.2.

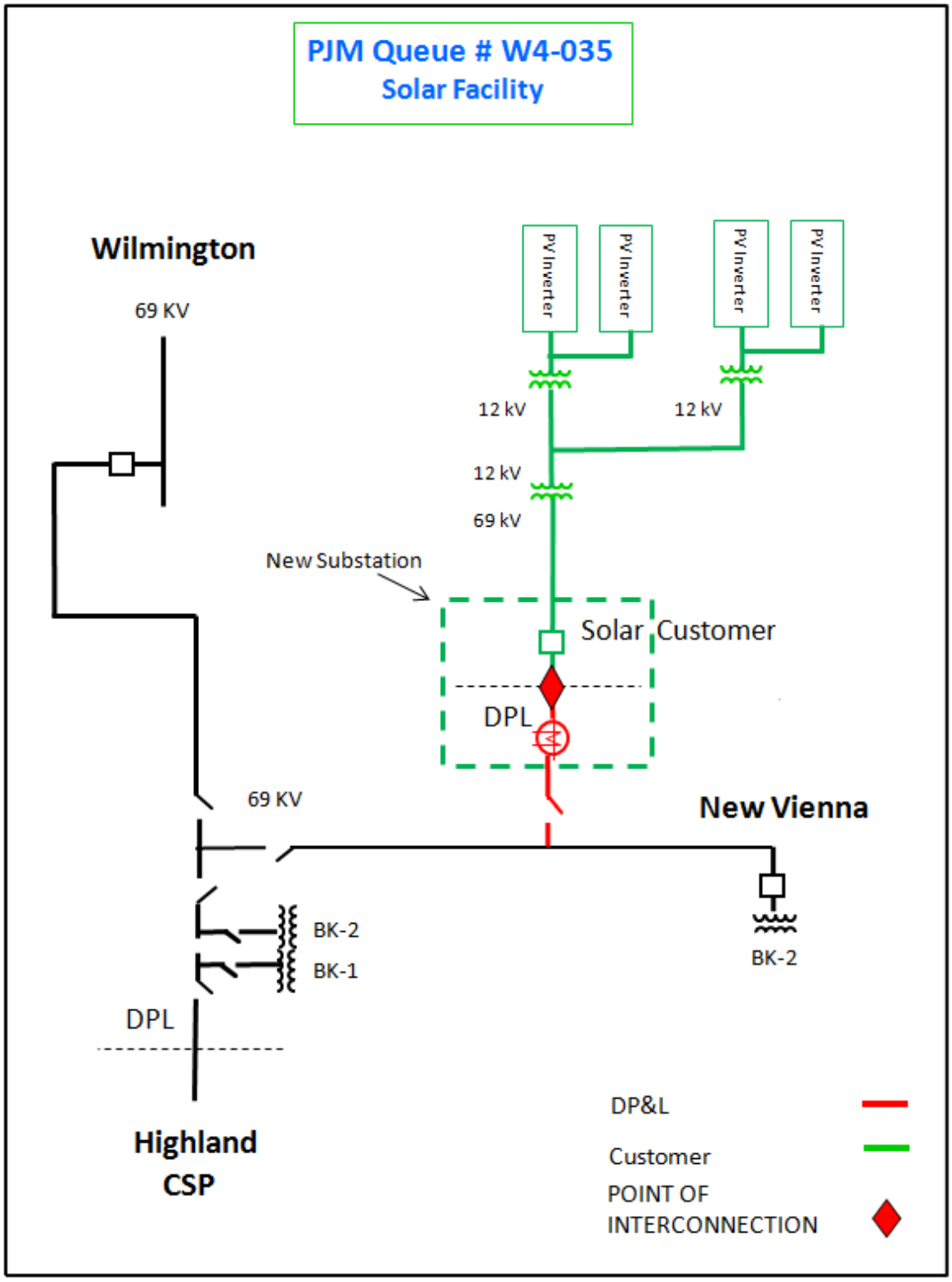

Figure 1. Proposed Interconnection Single Line Diagram

Network Impacts

Queue project W4-035 was studied as a 20.0 MW (11.9 MW Capacity) injection into Dayton's system at the 09MRTNSV 69.0 kV substation. Project W4-035 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, Stuck breaker and Bus Fault contingencies for the full energy output)

No problems identified.

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)

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.)

None.

Short Circuit

Not required.

Potential Congestion due to Local Energy Deliverability

(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 below. There is no guarantee of full deliverability 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 identified overloaded element(s).

As a result of the aggregate energy resources in the area, there were no violations identified.