Generation Interconnection

Feasibility Study Report

for

Queue Project AF1-174

NEWLINVILLE 34.5 KV II

12 MW Capacity / 20 MW Energy

January 2020

1 Preface

The intent of the feasibility study is to determine a plan, with ballpark 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.

In some instances a generator interconnection may not be responsible for 100% of the identified network upgrade cost because other transmission network uses, e.g. another generation interconnection, may also contribute to the need for the same network reinforcement. Cost allocation rules for network upgrades can be found in PJM Manual 14A, Attachment B. The possibility of sharing the reinforcement costs with other projects may be identified in the feasibility study, but the actual allocation will be deferred until the impact study is performed.

The Interconnection Customer seeking to interconnect a wind or solar generation facility shall maintain meteorological data facilities as well as provide that meteorological data which is required per Schedule H to the Interconnection Service Agreement and Section 8 of Manual 14D.

PJM utilizes manufacturer models to ensure the performance of turbines is properly captured during the simulations performed for stability verification and, where applicable, for compliance with low voltage ride through requirements. Turbine manufacturers provide such models to their customers. The list of manufacturer models PJM has already validated is contained in Attachment B of Manual 14G. Manufacturer models may be updated from time to time, for various reasons such as to reflect changes to the control systems or to more accurately represent the capabilities turbines and controls which are currently available in the field. Additionally, as new turbine models are developed, turbine manufacturers provide such new models which must be used in the conduct of these studies. PJM needs adequate time to evaluate the new models in order to reduce delays to the System Impact Study process timeline for the Interconnection Customer as well as other Interconnection Customers in the study group. Therefore, PJM will require that any Interconnection Customer with a new manufacturer model must supply that model to PJM, along with a $10,000 fully refundable deposit, no later than three (3) months prior to the starting date of the System Impact Study (See Section 4.3 for starting dates) for the Interconnection Request which shall specify the use of the new model. The Interconnection Customer will be required to submit a completed dynamic model study request form (Attachment B-1 of Manual 14G) in order to document the request for the study.

The Feasibility 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.

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2 General

The Interconnection Customer (IC) has proposed a Solar generating facility located in Chester County, Pennsylvania. The installed facilities will have a total capability of 20 MW with 12 MW of this output being recognized by PJM as Capacity. The proposed in-service date for this project is June 1, 2022. **This study does not imply a TO commitment to this in-service date.**

Queue Number	**AF1-174**
Project Name	NEWLINVILLE 34.5 KV II
State	Pennsylvania
County	Chester
Transmission Owner	PECO
MFO	20
MWE	20
MWC	12
Fuel	Solar
Basecase Study Year	2023

2.1 Point of Interconnection

AF1-174 will interconnect with the PECO distribution system via one of the following options:

Option 1: at the Newlinville 35 kV substation via 35 kV circuit 361

Option 2: at the Newlinville 35 kV substation via 35 kV circuits 353

2.2 Cost Summary

The AF1-174 project will be responsible for the following costs for the physical interconnection:

Description	**Total Cost**
Transmission Owner Scope of Work	$ 799,000
Total Costs	**$ 799,000**

In addition, the AF1-174 project may be responsible for a contribution to the following costs for Network Upgrades to mitigate overloads identified in this report:

Description	**Total Cost**
System Upgrades	$ 0

Cost allocations for these upgrades will be provided in the System Impact Study Report.

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3 Transmission Owner Scope of Work

Detailed scope, cost, and schedule will be provided in a separate two party Interconnection Agreement (IA) between PECO and the Interconnection Customer.

AF1-174 was estimated based on being connected to the Newlinville 361 34kV distribution circuit. The total estimate for AF1-174 is **$799,000**.

4 Interconnection Customer Requirements

The Interconnection Customer facilities must be designed in accordance with the "Exelon Utilities Transmission Facility Interconnection Requirements" document dated January 1, 2016. This document is located at the following link:

http://www.pjm.com/~/media/planning/plan-standards/private-ce/exelon-utilities-transmission-facility-interconnection-requirements.ashx

5 Revenue Metering and SCADA Requirements

5.1 PJM Requirements

The Interconnection Customer 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 Section 8 of Attachment O.

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6 OPTION 1: Network Impacts

The Queue Project AF1-174 was evaluated as a 20.0 MW (Capacity 12.0 MW) injection at the Newlinville 35 kV substation in the PECO area. Project AF1-174 was evaluated for compliance with applicable reliability planning criteria (PJM, NERC, NERC Regional Reliability Councils, and Transmission Owners). Project AF1-174 was studied with a commercial probability of 1.00. Potential network impacts were as follows:

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Summer Peak Load Flow

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7 Generation Deliverability

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

None

8 Multiple Facility Contingency

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

None

9 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)

None

10 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.

Note: Only the most severely overloaded conditions are listed below. 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 shall study all overload conditions associated with the overloaded element(s) identified.

None

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Affected Systems

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11 Affected Systems

11.1 LG&E

LG&E Impacts to be determined during later study phases (as applicable).

11.2 MISO

MISO Impacts to be determined during later study phases (as applicable).

11.3 TVA

TVA Impacts to be determined during later study phases (as applicable).

11.4 Duke Energy Progress

Duke Energy Progress Impacts to be determined during later study phases (as applicable).

11.5 NYISO

NYISO Impacts to be determined during later study phases (as applicable).

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Short Circuit

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12 Short Circuit

The following Breakers are over duty

None

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14 Generation Deliverability

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

None

15 Multiple Facility Contingency

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

None

16 Contribution to Previously Identified Overloads

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18 Affected Systems

18.1 LG&E

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18.2 MISO

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18.4 Duke Energy Progress

Duke Energy Progress Impacts to be determined during later study phases (as applicable).

18.5 NYISO

NYISO Impacts to be determined during later study phases (as applicable).

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None

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20 OPTION 2: Network Impacts

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21 Generation Deliverability

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

None

22 Multiple Facility Contingency

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

None

23 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)

None

24 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.

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None

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Affected Systems

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25 Affected Systems

25.1 LG&E

LG&E Impacts to be determined during later study phases (as applicable).

25.2 MISO

MISO Impacts to be determined during later study phases (as applicable).

25.3 TVA

TVA Impacts to be determined during later study phases (as applicable).

25.4 Duke Energy Progress

Duke Energy Progress Impacts to be determined during later study phases (as applicable).

25.5 NYISO

NYISO Impacts to be determined during later study phases (as applicable).

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