Generation Interconnection

Feasibility Study Report

for

Queue Project AG1-050

MILTON 69 KV

20 MW Capacity / 20 MW Energy

May 2021

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1 Introduction

This Feasibility Study has been prepared in accordance with the PJM Open Access Transmission Tariff, 36.2, as well as the Feasibility Study Agreement between the Interconnection Customer (IC), and PJM Interconnection, LLC (PJM), Transmission Provider (TP). The Interconnected Transmission Owner (ITO) is PPL.

2 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 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.

3 General

The Interconnection Customer (IC) has proposed a battery storage uprate to a planned solar generating facility located in Northumberland, Pennsylvania. This project is an increase to the Interconnection Customer's AE2-042 project, which will share the same point of interconnection. The AG1-050 queue position is a 20 MW uprate (20 MW Capacity uprate) to the previous project. The total installed facilities will have a capability of 90 MW with 66.8 MW of this output being recognized by PJM as Capacity. The proposed in-service date for this uprate project is June 30, 2022. This study does not imply a TO commitment to this in-service date.

Queue Number	AG1-050
Project Name	MILTON 69 KV
State	Pennsylvania
County	Northumberland
Transmission Owner	PPL
MFO	90
MWE	20
MWC	20
Fuel	Storage
Basecase Study Year	2024

Any new service customers who can feasibly be commercially operable prior to June 1st of the basecase study year are required to request interim deliverability analysis.

4 Point of Interconnection

AG1-050 will interconnect with the PPL Transmission system at the Milton 69 kV substation.

5 Cost Summary

The AG1-050 project will be responsible for the following costs:

Description	Total Cost
Total Physical Interconnection Costs	$0
Total System Network Upgrade Costs	$0
Total Costs	$0

This cost excludes a Federal Income Tax Gross Up charges. This tax may or may not be charged based on whether this project meets the eligibility requirements of IRS Notice 2016-36, 2016-25 I.R.B. (6/20/2016). If at a future date it is determined that the Federal Income Tax Gross charge is required, the Transmission Owner shall be reimbursed by the Interconnection Customer for such taxes.

Cost allocations for any System Upgrades will be provided in the System Impact Study Report.

6 Transmission Owner Scope of Work

The physical interconnection scope proposed under the prior AE2-042 queue project can accommodate this request.

7 Schedule

The schedule for the physical interconnection scope proposed under the prior AE2-042 queue project shall apply.

8 Transmission Owner Analysis

The Transmission Owner identified the violation below:

ID	FROM BUS#	FROM BUS	kV	FROM BUS AREA	TO BUS#	TO BUS	kV	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	Reinforcement
NA	208034	MILT	230	PPL	208109	SUNB	230	PPL	1	PL:08:P42:102893	Breaker	730.0	PPL_s2366

ID	Facility	Upgrade Description	Cost
PPL_s2366	208034 MILT 230.0 kV - 208109 SUNB 230.0 kV Ckt Id 1 208034 MILT 230.0 kV - 208109 SUNB 230.0 kV Ckt Id 2	PPL Supplemental project s2366 mitigates the violation. **S2366:** Rebuild 10.8 miles of MILT-SUNB 230kV #1 & #2 230kV lines. Estimated schedule: 36 Months	$0

9 Interconnection Customer Requirements

The IC will be required to comply with all Interconnected Transmission Owner's requirements for generation interconnection customers located at the following link:

http://www.pjm.com/planning/design-engineering/to-tech-standards/

10 Revenue Metering and SCADA Requirements

10.1 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.

10.2 Interconnected Transmission Owner Requirements

The IC will be required to comply with all Interconnected Transmission Owner's revenue metering requirements for generation interconnection customers located at the following link:

http://www.pjm.com/planning/design-engineering/to-tech-standards/

11 Summer Peak - Load Flow Analysis

The Queue Project AG1-050 was evaluated as a 20 MW (Capacity 20 MW) injection at the Milton 69 kV substation in the PPL area. Project AG1-050 was evaluated for compliance with applicable reliability planning criteria (PJM, NERC, NERC Regional Reliability Councils, and Transmission Owners). Project AG1-050 was studied with a commercial probability of 53.0 %. Potential network impacts were as follows:

11.1 Generation Deliverability

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

None

11.2 Multiple Facility Contingency

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

None

11.3 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

11.4 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.

ID	FROM BUS#	FROM BUS	kV	FROM BUS AREA	TO BUS#	TO BUS	kV	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
167563144	208034	MILT	230.0	PPL	208109	SUNB	230.0	PPL	2	PL:08:P12:001347	operation	730.0	107.57	108.98	DC	10.19
167563146	208034	MILT	230.0	PPL	208109	SUNB	230.0	PPL	1	PL:08:P12:102876	operation	730.0	107.57	108.98	DC	10.19
167563218	208040	MONT	230.0	PPL	208034	MILT	230.0	PPL	1	PL:08:P12:102877	operation	801.0	99.61	100.37	DC	5.97
167563220	208040	MONT	230.0	PPL	208034	MILT	230.0	PPL	2	PL:08:P12:001346	operation	801.0	99.61	100.37	DC	5.97
167563222	208040	MONT	230.0	PPL	207915	GLBR	230.0	PPL	2	PL:08:P12:101738	operation	801.0	99.79	100.24	DC	3.87

11.5 System Reinforcements - Summer Peak Load Flow - Primary POI

Please see Transmission Owner Analysis section of this report.

11.6 Queue Dependencies

The Queue Projects below are listed in one or more indices for the overloads identified in your report. These projects contribute to the loading of the overloaded facilities identified in your report. The percent overload of a facility and cost allocation you may have towards a particular reinforcement could vary depending on the action of these earlier projects. The status of each project at the time of the analysis is presented in the table. This list may change as earlier projects withdraw or modify their requests.

None

11.7 Contingency Descriptions

Contingency Name	Contingency Definition
PL:08:P12:102877	CONTINGENCY 'PL:08:P12:102877' /* MONT-MILT 2 230KV LINE DISCONNECT BRANCH FROM BUS 208034 TO BUS 208040 CKT 2 /* MILT-MONT 2 230KV END
PL:08:P12:102876	CONTINGENCY 'PL:08:P12:102876' /* SUNB-MILT 2 230KV LINE DISCONNECT BRANCH FROM BUS 208034 TO BUS 208109 CKT 2 /* MILT-SUNB 2 230KV END
PL:08:P12:101738	CONTINGENCY 'PL:08:P12:101738' /* MONT-BETA 1 230KV LINE DISCONNECT BRANCH FROM BUS 207915 TO BUS 208040 CKT 1 /* BETA-MONT END

Contingency Name	Contingency Definition
PL:08:P12:001347	CONTINGENCY 'PL:08:P12:001347' /* SUNB-MILT 1 230KV LINE DISCONNECT BRANCH FROM BUS 208034 TO BUS 208109 CKT 1 /* MILT-SUNB 1 230KV END
PL:08:P12:001346	CONTINGENCY 'PL:08:P12:001346' /* MONT-MILT 1 230KV LINE DISCONNECT BRANCH FROM BUS 208034 TO BUS 208040 CKT 1 /* MILT-MONT 1 230KV END

12 Short Circuit Analysis

The following Breakers are overdutied:

None

12.1 System Reinforcements - Short Circuit

None

13 Affected Systems

13.1 NYISO

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

14 Attachment 1: One Line Diagram