Generation Interconnection
Feasibility Study Report

For

PJM Generation Interconnection Request Queue
Position Y3-087

Beaver Brook 13kV

August 2013

General

The Interconnection Customer (IC), is proposing to install 5.0 of Solar generation to be located in Gloucester County, New Jersey and has requested to be studied as a 5.0 MW Energy 1.9 MW Capacity) resource interconnecting into the PSE&G area. The IC has proposed in-service date is for June 1, 2015. The IC has requested a backfeed date of April 1, 2015.

This Generation Interconnection Feasibility Study provides analysis results to aid the IC in assessing the practicality and cost of incorporating the facility into the PJM system. This study was limited to load flow analyses of probable contingencies. If the IC elects to pursue a System Impact Study, a more comprehensive analysis will be performed.

Direct Connection Cost Estimate

The total interconnection cost will be as shown in Table 1 below.

		Option 1	**Option 2**
		13-Kv	**26-Kv**
Project Item		**Lines**	**Single Line**
Inside Plant			
	Line Position/Feeder Row	-	-
	Relay Protection	-	-
	Manholes/Conduit	-	-
	Other/Misc.	-	-
	Sub Total	$0	$0
Outside Plant			
	Overhead Line	$174,735	$5,508,300
	Underground Line	-	-
	Manholes/Conduit	-	-
	Other/Misc.	-	-
	Sub Total	$174,735	$5,508,300
Metering/Monitoring			
	Revenue Metering/Telemetering/SCADA	$62,100	$69,100
	Feeder Metering	$175,000	$0
	Other/Misc.	-	-
	Sub Total	$237,100	$69,100
	Total Cost	**$411,835**	**$5,577,400**
Acceptable Generation Level		**Up to 3.0 MW**	**Up to 5.0 MW**

Table 1 –Estimated Costs

Please note: the interconnection is limited to a maximum output of approximately 3.0 MW on 13 kV line and 5.0 MW on 26 kV line.

This cost is exclusive of work required to be performed by the developer as specified in PSE&G's Information & Requirements for Electric Service Handbook. This work includes, but may not be limited to, the following:

- Developer is responsible for purchase and installation of all high voltage (13-kV, 26-kV, and 69-kV) service equipment as required
- Developer will adhere to specifications detailed in the PSE&G Information and Requirements for electric service handbook
- Developer is responsible for all trenching and the installation of conduits and manholes as normally required and specified by PSE&G
- Developer must obtain all permits and easements required to install the interconnection facilities
- Developer must provide access for the installation, maintenance and operation of all service equipment

It is anticipated that material procurement and construction will require 5-6 months from the date of project approval and authorization.

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.

For PSE&G:

The Interconnection Customer will be required to comply with all PSE&G Revenue Metering Requirements for Generation Interconnection Customers.

OPTION 2

Network Impacts -

The Queue Project #Y3-087 was studied as a 5.0MW (Capacity 1.3MW) injection at the Beaver Brook 13 kV substation in the PSEG area. Project #Y3-087 was evaluated for compliance with reliability criteria for summer peak conditions in 2017. Potential network impacts were as follows:

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

None

Light Load Analysis

Not required

Multiple Facility Contingency
(Double Circuit Tower Line, Failed Breaker and Bus Fault contingencies for the full energy output)

None

Short Circuit
(Summary form of Cost allocation for breakers will be inserted here if any)

None

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

Steady-State Voltage Requirements
(Results of the steady-state voltage studies should be inserted here)

Not required

Stability and Reactive Power Requirement
(Results of the dynamic studies should be inserted here)

None

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)
(Summary form of Cost allocation for transmission lines and transformers will be inserted here if any)

None

Delivery of Energy Portion of Interconnection Request
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.
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 will study all overload conditions associated with the overloaded element(s) identified.

None

Appendices

The following appendices contain additional information about each flowgate presented in the body of the report. For each appendix, a description of the flowgate and its contingency was included for convenience. However, the intent of the appendix section is to provide more information on which projects/generators have contributions to the flowgate in question. Although this information is not used "as is" for cost allocation purposes, it can be used to gage other generators impact.

It should be noted the generator contributions presented in the appendices sections are full contributions, whereas in the body of the report, those contributions take into consideration the commercial probability of each project.

None for Option1

OPTION 2

Network Impacts

The Queue Project #Y3-087 was studied as a 5.0 MW (Capacity 1.3 MW) injection at the Deptford 230 kV substation in the PSEG area. Project #Y3-087 was evaluated for compliance with reliability criteria for summer peak conditions in 2017. Potential network impacts were as follows:

Generator Deliverability

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

1. (PSEG - PSEG) The DEPTFORD-GLOUCSTR 230 kV line (from bus 219109 to bus 219110 ckt 1) loads from 99.92% to 100.02% (**DC power flow**) of its normal rating (850 MVA) for non-contingency condition. This project contributes approximately 0.86 MW to the thermal violation.

Please refer to Appendix 1 for a table containing the generators having contribution to this flowgate.

Light Load Analysis

Not required

Multiple Facility Contingency

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

None

Short Circuit

(Summary form of Cost allocation for breakers will be inserted here if any)

None

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

Steady-State Voltage Requirements

(Results of the steady-state voltage studies should be inserted here)

Not required

Stability and Reactive Power Requirement
(Results of the dynamic studies should be inserted here)

Not required

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)
(Summary form of Cost allocation for transmission lines and transformers will be inserted here if any)

None

Delivery of Energy Portion of Interconnection Request
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None

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It should be noted the generator contributions presented in the appendices sections are full contributions, whereas in the body of the report, those contributions take into consideration the commercial probability of each project.

Appendix 1

(PSEG - PSEG) The DEPTFORD-GLOUCSTR 230 kV line (from bus 219109 to bus 219110 ckt 1) loads from 99.92% to 100.02% (**DC power flow**) of its normal rating (850 MVA) for non-contingency condition. This project contributes approximately 0.86 MW to the thermal violation.

Bus Number	Bus Name	Full Contribution
228200	CARL#1CT	0.19
228201	CARL#2CT	0.19
228251	CARLLS#4	0.03
228309	CCLP NUG	1.89
213400	COVANTA DELA	0.62
228301	D/W 1 ST	11.27
228302	D/W 6 ST	11.56
227881	GRENWCHG	0.02
228304	LOGAN	2.22
228334	MANNMILG	0.05
228400	MICK 1CT	0.55
228307	PCLP GT	0.53
228306	PCLP STM	0.53
295841	Q-090 2	7.82
228343	QUINTN#1	0.01
291017	S-107 1CT	42.94
291019	S-107 1ST	69.77
291018	S-107 2CT	42.94
291413	S43	1.65
292200	T-059	0.13

Bus Number	Bus Name	Full Contribution
292827	U1-066 1CT	0.1
292828	U1-066 2CT	0.1
291995	U4-036 C	0.01
292104	V1-030 C6	< 0.01
297082	V2-035 C	0.09
297103	V2-046 C	0.04
904081	V4-009 C1	0.02
904083	V4-009 C2	0.02
904221	V4-023 C1	0.83
904223	V4-023 C2	0.11
904231	V4-024 C1	0.54
904233	V4-024 C2	0.53
904241	V4-025 C1	0.74
904243	V4-025 C2	0.32
904245	V4-025 C3	0.07
904247	V4-025 C4	0.12
904281	V4-029 C	1.19
904401	V4-041 C	0.81
904411	V4-042 C1	0.41
904413	V4-042 C2	0.53
904531	V4-054 C	0.04
904611	V4-062 C	0.14
228471	VALERO1	0.23
228472	VALERO2	0.11
228473	VALERO3	0.11

Bus Number	Bus Name	Full Contribution
228484	VALERO4	0.13
901001	W1-021 C OP1	0.88
901011	W1-022 C	0.88
901021	W1-023 C	0.88
901181	W1-039	0.1
901271	W1-048C	0.26
901471	W1-068 C	1.04
901641	W1-085 C	0.78
901651	W1-086 C	0.78
901661	W1-087 C	0.78
901671	W1-088 C	0.78
901681	W1-089 C	0.72
901461	W1-117 C	0.81
900471	W1-118 C	0.81
902091	W1-130 C	0.37
902481	W2-035 C	0.78
902601	W2-047C	0.68
903141	W2-101 C	1.05
903281	W3-009 C	0.46
904763	W3-157 C	0.08
904911	W3-175	61.71
905131	W4-015 C	36.5
905151	W4-016	91.24
905271	W4-027 C	0.29
905391	W4-040 C	0.51

Bus Number	Bus Name	Full Contribution
907051	X1-021 C	0.06
909071	X2-027 C	0.11
909081	X2-028 C	0.16
914401	Y2-102	27.9
915511	Y3-087 C OP2	0.86