

Large Generating Facility - Interconnection System Reliability Impact Study Scope

Queue #1493: *Queensboro Renewable Express Circuit A Project*

1. Purpose

The purpose of this Interconnection System Reliability Impact Study (“SRIS” or “Study”) is to evaluate the impact of the proposed interconnection of Queensboro Renewable Express Circuit A (“Project”), which is being developed by Queensboro Development, LLC (“Developer”), on the reliability of the New York State Transmission System (“NYSTS”). The Study will be performed in accordance with Attachment X of the NYISO Open Access Transmission Tariff (“OATT”).

The Project will be located in Queens County, New York. The proposed Points of Interconnection (“POI”) will be at a 345 kV four-breaker ring bus connected to the existing Rainey 345 kV substation¹ and connected to elective System Upgrade Facilities discussed in further detail herein.² The Connecting Transmission Owner (“CTO”) is Consolidated Edison Company of New York, Inc. (“Con Edison”).

The Project is an offshore wind generation plant. The Project, as proposed, will consist of eighty-two (82) 20-MVA wind turbines. It is expected to have a maximum net potential generating capacity of 1,310 MW at the POIs during summer and winter periods.³ Collector strings will connect at 66 kV and stepping up to 320 kV HVDC converter station. Power is transferred via 320 kV HVDC cables to 320 kV converter station at a new Ravenswood Generating Station and interconnecting via underground feeders to the Rainey substation and to the elective System Upgrade Facilities that connect to the existing Vernon substation.

The Project ~~will consist of~~ proposes the following interconnection-related components where their classification of either Attachment Facilities or System Upgrade Facilities will be identified during the Study:

- New Ravenswood ring bus substation with four (4) breakers 345 kV,
- Two (2) 345 kV underground circuits from new Ravenswood 345 kV substation to Rainey 345 kV substation, approximately 800 feet in length, as follows:
 - Circuit 1 tied into Rainey 345 kV between new breakers 8E1 and 8E2, and

¹ The POI may be updated to be consistent with the Attachment Facilities and System Upgrade Facilities during the Study and to the extent permissible under Section 30.4.4 of Attachment X to the NYISO OATT and applicable ISO Procedures.

² Developer sought a modification of its Large Facility Interconnection Request on October 19, 2023 adding the elective System Upgrade Facilities consistent with Section 30.4.4.1 of ~~the~~ Attachment X to the NYISO OATT.

³ For temperature sensitive output projects, the MW values represent the Maximum Summer Peak Net Output that can be achieved between 85 and 95°F, and the Maximum Winter Peak Net Output that can be achieved between 10 and 35°F.

- Circuit 2 tied into Rainey 345 kV between new breakers 8W1 and 8W2,
 - One (1) 345 kV gas-insulated substation (GIS) bus connection from a new Ravenswood 345 kV substation to onshore converter station,
 - Onshore converter station and associated equipment,
 - Offshore converter station and associated equipment,
- A 105-mile 320-kV symmetrical monopole HVDC cable that connects the offshore converter station to the onshore converter station.

The Project proposes the following components as **elective** System Upgrade Facilities:

- 345 kV PAR,
- 345 kV/138 kV transformer,
- 345 kV bus, which connects the 345 kV/138 kV transformer and 345 kV PAR, and
- Two (2) 138 kV circuits, each approximately 1,500 feet, from the 345 kV/138 kV transformer and 345 kV PAR to the Vernon 138 kV substation, as follows:⁴
 - Circuit 1 tied into Vernon 138 kV at breaker G1E (currently ST1 position), and
 - Circuit 2 tied into Vernon 138 kV at breaker G1W (currently ST1 position).

The Project proposes an In-Service Date of April 2029, an Initial Synchronization Date of April 2029, and a Commercial Operation Date of April 2029.

The Study will assess the impact of the Project on the base case power system including NYPA and PJM as Affected Systems. It will provide a list of the facilities (CTO Attachment Facilities and System Upgrade Facilities) required to reliably interconnect the Project, and non-binding good faith estimates of cost and time to construct those facilities.

The Study will be conducted in accordance with the Applicable Reliability Standards.

2. Interconnection Plan

The Study will include a description of the proposed facilities and the conceptual design of the interconnection to the system representation. The description will include a breaker one-line diagram depicting the proposed facilities and their integration with the existing facilities. The Study will also identify potential issues with the feasibility/constructability of the conceptual design of the proposed interconnection to the extent known based on the Study assumptions.

3. Study Period

The Study will be based on NYISO Class Year 2023 ATBA base cases (“Base Cases”) that have the 2023 FERC 715 2028 system representation. The Study will be conducted using the steady state, and short circuit Base Cases provided by the NYISO, and will include the representation of

⁴ The Developer proposes to retire Ravenswood Steam Turbine Unit 01 (“ST1”) and to use ST1 breaker positions (1E, 8E, G1E, 8W,1W and G1W) at Vernon 138 kV substation for the elective System Upgrade Facilities.

proposed projects that have already been cost allocated, up to and including Class Year 2021 (as listed in Appendix A of this scope).

4. Study Area

The Study will identify and evaluate the impact of the Project on the 138 kV and above portions of the NYSTS in the following New York load zones: Zone **I** (Dunwoodie) and Zone **J** (New York City) that are most likely to be affected by the Project. The Study will also evaluate the impact of the Project on the local system below 138 kV in the electrical proximity to the POI.

5. Base Case Conditions

The impact of the proposed Project will be evaluated for **summer peak** and **light load** cases for the following base case conditions, and as specified under the subsequent sections of this Scope:

Case 1 - Base Case without the Project. The Base Cases will include the baseline system and the proposed projects listed in Appendix A of this scope. The short circuit Base Case will model all the projects as in-service. The steady state Base Case will normally model all projects in-service and at full output but may model some projects as out-of-service or less than full output as necessary to establish a feasible base dispatch. Generation will be dispatched in accordance with the NYISO Minimum Interconnection Standard.⁵

Case 2 - Case 1 with the Project modeled as in-service at full output of 1,310 MW at the Rainey 345 kV. The Project PAR will be modeled within the phase angle limits of +/-40 degrees. Unit and facility reactive resources for the Project will be represented. Generation will be re-dispatched in the steady state case, as needed, in accordance with the NYISO Minimum Interconnection Standard.

Case 2a - Case 2 with the Project PAR flowing in the direction towards Vernon 138 kV substation at maximum angle (+40 degrees). Unit and facility reactive resources for the Project will be represented. Generation will be re-dispatched in the steady state case, as needed, in accordance with the NYISO Minimum Interconnection Standard. This case will be used only for thermal analyses (N-0, N-1, and N-1-1) under **summer peak** load condition.

Case 2b - Case 2 with the Project PAR flowing in the direction towards Rainey 345 kV substation at minimum angle (-40 degrees). Unit and facility reactive resources for the Project will be represented. Generation will be re-dispatched in the steady state case, as needed, in accordance with the NYISO Minimum Interconnection Standard. This case will be used only for thermal analyses (N-0, N-1, and N-1-1) under **summer peak** load condition.

⁵ As defined in the NYISO Transmission Expansion and Interconnection Manual (NYISO TEI Manual).

6. Analysis

Thermal, voltage, stability and short circuit analyses will be conducted to assess the performance of the base system conditions within the Study Area, with and without the Project, in accordance with Applicable Reliability Standards, guidelines and study practices. Modifications to Base Cases, during analyses, will be documented in the Study Report.

6.1 Steady State Analyses: N-0 and N-1

Thermal and voltage steady state analyses, using PSS/E or a comparable load flow program, will be conducted for **summer peak** and **light load** cases, pre-contingency and also for relevant Design Criteria Contingencies conditions, and will be limited to the Study Area.

Thermal limits will be assessed under both Normal Criteria and Emergency Criteria, using normal ratings pre-contingency and applicable post-contingency ratings (*e.g.*, Long-Term-Emergency, LTE, ratings or Short-Term-Emergency, STE, ratings).

Voltage limits will be assessed, pre- and post-contingency, using the applicable voltage limits.

6.2 Steady State Analyses: N-1-1

The Study will evaluate a limited selection of N-1-1 contingencies around the POI. Steady state analyses (**summer peak** and **light load**) will be performed based on the N-1-1 contingency descriptions provided by the CTO(s) and/or the NYISO.

6.3 Transfer Assessments

The transfer assessment will determine the incremental impact of the Project on the Normal and Emergency transfer limits of the Dunwoodie South, and NY-PJM/PJM-NY⁶ interfaces (opened and closed definitions, as applicable) in accordance with Applicable Reliability Standards, Guidelines and NYISO study practices. The transfer limits will be evaluated in the predominant north-to-south direction, unless otherwise specified. Sufficient analyses will be conducted to determine the most limiting of the thermal, voltage, or stability limits under **summer peak** load conditions.

6.4 Short Circuit Analysis

⁶ Thermal limit impacts only.

Short circuit analysis will be performed, using ASPEN, to evaluate the impact of the Project on system protection and adequacy of existing circuit breakers, other fault current interrupting devices, and related equipment. All Project impacts of 100 A or more will be identified.

This analysis will be performed in accordance with the NYISO Guideline for Fault Current Assessment (Attachment I of the NYISO Transmission Expansion and Interconnection Manual), and in accordance with Connecting Transmission Owner and Affected System(s) criteria, to the extent such criteria are recognized as Applicable Reliability Standards.

6.5 Stability Analysis

Stability analysis, using PSS/E v34, will be performed for **summer peak** and **light load** conditions to determine the impact of the Project on system performance within the Study Area. This analysis will evaluate the performance of the system for Design Criteria Contingencies and will address issues including, but not limited to, transient stability, dynamic stability (*i.e.*, damping), critical clearing time, coordination of protection and control systems, and performance of any Special Protection Systems that may be affected. These analyses will explicitly consider the voltage and frequency ride-through capabilities of the facility.

6.6 Feasibility Analysis

Bus Flow Analysis will be performed by the CTO.

Bus Flow Analysis, using PSS/E or a comparable load flow program, will be conducted for **summer peak** case, and will determine thermal adequacy of the major existing and proposed equipment (buswork, circuit breaker and disconnect switches) at the Rainey 345 kV and Vernon 138 kV substations.

Physical Feasibility Analysis will identify physical feasibility of the proposed Project's interconnection at the CTO(s) substation(s) or facility(ies) in accordance with the Developer provided one-line diagram.

6.7 PARs Impacts

The Project's impact on the ABCJK Phase Angle Regulator ("PARs") schedule, and control ranges will be assessed and reported. The B and C PARs will be modeled as out-of-service.

6.8 Preliminary Non-Binding Deliverability Analysis

The Study will include a preliminary non-binding deliverability analysis performed under the NYISO Deliverability Interconnection Standard.

7. Modeling Assumptions

- 7.1** Phase angle regulators (“PARs”), switched shunts, and LTC transformers will be modeled as regulating pre-contingency and non-regulating post-contingency. The Study will use PAR schedules established by the NYISO in coordination with the neighboring ISOs through the NERC and NPCC base case development processes. PARs may be adjusted as necessary to relieve pre-contingency overloads.
- 7.2** SVC and FACTS devices will be set to zero pre-contingency and allowed to operate to full range post-contingency.

8. Evaluation and Identification of Upgrades

If the Study results indicate that the Project, as proposed, would result in violations of Applicable Reliability Standards, analyses will be performed to identify any System Upgrade Facilities or Distribution Upgrades (if applicable) that would be required to meet the NYISO Minimum Interconnection Standard. When such upgrades are identified, sufficient re-assessments (among those identified in this scope) should be performed in order to assure that the upgrades do not cause any adverse reliability impact on the Study Area.

9. Cost Estimates of Facilities and Time to Construct

A description of facilities (*i.e.*, CTO Attachment Facilities and System Upgrade Facilities, if any) required to interconnect the Project to the NYSTS, or the Distribution System (if applicable), and non-binding good faith estimates of cost and time to construct those facilities, will be provided.

10. Report

The Study Report will document the summary of the results relevant to the project impacts, project description, project modeling, study assumptions, criteria and methodology, mitigation solutions and their impact assessment, and conclusions, for each of the analyses identified in this scope.

Appendix A

List of Other Proposed Projects to be Modeled in the Base Case

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Queue Pos.	Owner / Project Name	MW (S W)
521	Bull Run Energy LLC / Bull Run II Wind	449 449
571	Heritage Renewables, LLC / Heritage Wind	200.1 200.1
629	Silver Lake Solar, LLC / Silver Lake Solar	24.9 24.9
631	CHPE LLC / NS Power Express	1000 1000
710	Horseshoe Solar Energy LLC/ Horseshoe Solar	180 180
717	EDF Renewables Development, Inc. / Morris Ridge Solar Energy Center	177 177
758	Sithe/Independence Power Partners, LP / Sithe Independence	9 27
766	Sunrise Wind LLC / Sunrise Wind	880 880
783	ConnectGen Chautauqua County LLC / South Ripley Solar and BESS	270 270
787	Levy Grid, LLC / Levy Grid, LLC	150 150
801	Prattsburgh Wind, LLC / Prattsburgh Wind Farm	147 147
805	Oxbow Hill Solar, LLC / Oxbow Hill Solar	140 140
811	Hecate Energy Cider Solar LLC / Cider Solar	500 500
815	Bayonne Energy Center / Bayonne Energy Center III	49.8 49.8
835	Astoria Generating Company, LP / Luyster Creek Energy Storage 1	56 56
840	Hecate Energy LLC / Swiftsure Energy Storage	650 650
864	Greens Corners Solar LLC / NY38 Solar	120 120
883	Garnet Energy Center, LLC / Garnet Energy Center	200 200
887	CHPE LLC / CH Uprate	250 250
907	Harlem River ESS, LLC / Harlem River Yard	100 100
929	EDF Renewables Development, Inc. / Morris Ridge Battery Storage	83 83
931	East River ESS, LLC / Astoria Energy Storage	100 100
956	Holtsville 138 kV Energy Storage	110 110
959	Empire Offshore Wind LLC / El Oceanside 2	1260 1260
965	Yaphank Energy Storage LLC / Yaphank Energy Storage	76.8 77.6
987	Sunrise Wind LLC / Sunrise Wind 2	44 44