

Large Generating Facility - Interconnection System Reliability Impact Study Scope

Queue #1349: Gemma Storage 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 Gemma Storage (“Project”), which is being developed by Hanwha Q CELLS USA (“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 Steuben County, New York. The proposed Point of Interconnection (“POI”) will be at the Stoney Ridge 230 kV station. The Connecting Transmission Owner (“CTO”) is New York State Electric and Gas Corporation (“NYSEG”).

The Project is a battery energy storage plant. The Project, as proposed, will consist of fifty-two (52) 4.105-MVA Power Electronics HEM FP4105M storage inverters. It is expected to have a maximum potential discharging and charging capacity of 190 MW during summer and winter periods. The minimum time for charging and discharging will be four (4) hours.

The Project proposes an In-Service Date of June 2025, an Initial Synchronization Date of November 2025, and a Commercial Operation Date of December 2025.

The Study will assess the impact of the Project on the base case power system including **PJM** as an Affected System. 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 2021 ATBA base cases (“Base Cases”) that have the 2021 FERC 715 2026 system representation, or the Class Year 2023 ATBA base cases that have the 2023 FERC 715 2028 system presentation if available prior to the start of the analyses identified in this scope (“Base Cases”). The Study will be conducted using the steady state, stability, and short circuit Base Cases provided by the NYISO, and will include the representation of 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 115kV and above portions of the NYSTS in the following New York load zone: Zone C (Central) that is most likely to be affected by the Project. The Study will also evaluate the impact of the Project on the local 115kV and below system 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.¹

Case 2- Case 1 with the Project modeled as in-service in discharging mode and injecting 190 MW at the POI. 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 3- Case 1 with the Project modeled in-service in charging mode at a withdrawal of 190 MW at the POI. 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.

¹ 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**) 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 **NY-PJM/PJM-NY²** and **Volney East** 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

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

² Thermal limits only

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.

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

Queue#1349: *Gemma Storage Project*

| 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 / EI Oceanside 2 | 1260 1260 |
| 987 | Sunrise Wind LLC / Sunrise Wind 2 | 44 44 |