

10/23/2020

**Large Generating Facility - Interconnection System Reliability Impact Study Scope**  
**Queue # 873: Verona Solar Energy Center II Project**

**1. Purpose**

The purpose of this System Reliability Impact Study (“SRIS” or “Study”) is to evaluate the impact of the proposed interconnection of the Verona Solar Energy Center II Project (“Project”), which is being developed by Invenergy Solar Project Development, LLC (“Developer”), on the reliability of the New York State Transmission System (“NYSTS”). This Project is being proposed as an uprate to the proposed 250 MW Verona Solar Energy Center I (Q#871)<sup>1</sup> project. The Study will be performed in accordance with Attachment X of the NYISO Open Access Transmission Tariff (“OATT”).

The proposed Point of Interconnection(s) (“POI”) will be on New York Power Authority (“NYPA”)’s Edic to Clay 345 kV line #2 (line 2-15), approximately 17.95 miles from Edic and 29.69 miles from Clay. The Project will be located in Oneida County, New York.

The Connecting Transmission Owner(s) (“CTO”) is NYPA.

The Project is a solar plant and consists of eighty three (83) TMEIC 3360 inverters. The Project, as proposed, is expected to have a maximum<sup>2</sup> potential generating capacity of 250 MW in summer and winter periods. In addition to the Q#871 maximum output, a total of 500 MW will be evaluated at the POI.

The Project proposes an In-Service Date of October 2023, an Initial Synchronization Date of October 2023 and a Commercial Operation Date of December 2023.

The Study will assess the impact of the Project on the base case power system, including the following Affected Systems: *National Grid*, and 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.

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<sup>1</sup> Q#871 is a proposed 250 MW solar photovoltaic plant that is proposed to interconnect at the Project’s proposed Point of Interconnection (“POI”).

<sup>2</sup> 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.

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. The description will include a breaker one-line diagram depicting the proposed facilities and their integration with the existing facilities.

## **3. Study Period**

The Study will be based on the system representation in the 2024 power flow base cases from the NYISO Class Year 2019 ATBA (“Base Cases”). The Study will be conducted using the power flow, 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 2017 (as listed in Appendix A of this scope).

## **4. Study Area**

The Study will identify and evaluate the impact of the Project on the 115 kV and above portions of the NYSTS in the following NY load zones: **Central (Zone C)**, **Mohawk Valley (Zone E)** and **Capital (Zone F)**, that are most likely to be affected by the Project. The Study will also evaluate the impact of the Project on the local (*i.e.*, below 115 kV, as applicable) system in the electrical proximity to the POI.

## **5. Base Case Conditions**

The impact of the proposed Project will be evaluated for **summer peak**, **winter peak**, and **light load** 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 power flow Base Case will normally model all projects in-service and at full output, but may model some projects as out-of-service or at less than full output as necessary to establish a feasible base dispatch. Generation will be dispatched in accordance with

the NYISO Minimum Interconnection Standard.<sup>3</sup>

Case 2 – Case 1 with the Project, together with the Q#871 project, modeled in-service at the POI. The Project, together with the Q#871 Project, will be modeled as in-service and at full output of 500 MW. Generation will be re-dispatched in the power flow case, as needed, in accordance with the NYISO Minimum Interconnection Standard.

## 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 Power Flow 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** and **winter** peak 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 Power Flow Analyses: N-1-1

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

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<sup>3</sup> As defined in the NYISO Transmission Expansion and Interconnection Manual (“TEI Manual”).

### **6.3. Transfer Assessments**

The transfer assessment will determine the incremental impact of the project on the Normal and Emergency transfer limits of the **Volney East, Central East and Total 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 west-to-east/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.

In order to determine transfer limits, the analysis will simulate generation re-dispatches according to the standard proportions used in NYISO transmission planning studies, for NYISO interfaces. Where applicable, for local interfaces, generation re-dispatching will be done in accordance with Transmission Owner standards and practices.

### **6.4 Stability Analysis**

Stability analysis, using PSS/E 33, 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.

### **6.5 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 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.

## **6.6 NPCC A-10 Testing**

The Study will review the NPCC Bulk Power System (BPS) classification of existing and proposed stations within the proximity of the Project to identify any existing or new stations that could be classified as BPS due to the addition of the Project. This testing will be performed for **summer** peak cases, and in accordance with the latest NPCC A-10 criteria (npcc.org).

## **6.7 Extreme Contingency Assessment**

The Study will evaluate the summer peak system performance under representative Extreme Contingencies within the Study Area, discuss significant steady-state and stability analyses, showing the post-fault conditions in the Study Area, and report on pre- and post-Project system response for the most severe contingencies, as specified in the NPCC Directory # 1 (npcc.org), and also in the NYSRC Reliability Rules (nysrc.org).

## **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.
- 7.3** For evaluating projects located in Long Island (Zone K), the dynamic devices within Long Island area will be offline in both pre- and post- contingency conditions in power flow analysis, while set to zero at dynamic initialization.

## **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’s 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 Modeled in the Base Case Queue # 873: Verona Solar Energy Center II Project**

<b>Queue Pos.</b>	<b>Owner / Project Name</b>	<b>MW (S W)</b>
349	Taylor Biomass Energy, LLC / Taylor Biomass	19.0   22.5
387	Cassadaga Wind, LLC / Cassadaga Wind	126   126
393	NRG Energy, Inc. / Berrians East	508   584
396	Baron Winds, LLC / Baron Winds	300   300
422	NextEra Energy Resources, LLC / Eight Point Wind Energy Center	101.2   101.2
444	Cricket Valley Energy Center, LLC / Cricket Valley Energy Center	1020   1132
505	RES America Developments, Inc. / Ball Hill Wind	100   100
545A	Empire State Line Alternative	N/A
543	Segment B Knickerbocker - Pleasant Valley 345 kV	N/A
556	Segment A Double Circuit	N/A