# EAST POINT ENERGY CENTER

## Case No. 17-F-0599

## 1001.5 Exhibit 5

## Electric System Effects

# Contents

## Appendices

# Exhibit 5: Electric System Effects

This Exhibit will track the requirements of proposed Stipulation 5, dated August 20, 2019, and therefore, the requirements of 16 NYCRR § 1001.5.

## 5(a) System Reliability Impact Study

A System Reliability Impact Study (SRIS) was completed in September 2018 for the East Point Energy Center (the Project) by ABB Inc. for the New York Independent System Operator (NYISO). The SRIS evaluates a number of power flow base cases, as provided by the NYISO, including expected flows on the system under normal, peak, and emergency conditions, to evaluate the effects on stability of the interconnection for the proposed collection substation and interconnection facilities, as well as any upgrades that may be deemed necessary for the Project. Additionally, technical analyses of thermal, voltage, short circuit, and stability were performed to evaluate the impact of interconnection.

The SRIS, attached hereto as Appendix 5-1, contains proprietary, confidential, and critical energy infrastructure information; therefore, the Applicant will seek the requisite trade secret and confidential commercial information protection for this information pursuant to Public Officers Law (POL) Section 87(2)(d) and 16 NYCRR § 6-1.3.

## 5(b) Potential Significant Impacts

The SRIS shows that the Project will have no significant impacts on the reliability of New York's transmission system. This conclusion is based on the following understandings and assumptions:

- The Project will be operated in accordance with all applicable requirements, including Article 10 Certificate conditions and NYISO and Transmission Owner day-ahead and real-time operational procedures and limitations. The Project will be operated in a manner that does not negatively impact reliability of the New York State Transmission System; this may include dispatching patterns that eliminate potential reliability issues that may exist during certain system contingency conditions.
- The Project and associated interconnection facilities will be designed in accordance with all applicable reliability standards.

### 5(c) Ancillary Services and Electric Transmission Systems Impacts

The SRIS analysis does not show the Facility will have any significant adverse impact to the New York State Transmission System. For the Summer Peak, the steady state analyses did not observe any significant thermal overloads under system-intact and post-contingency conditions. The steady state analyses identified existing high post-contingent voltages at several 34.5 kV buses downstream of the Churchtown 115 kV bus. These high voltages can be mitigated, however, by adjusting the Craryville 115/34.5 kV transformer taps under pre-contingency conditions.

For the Winter Peak, the steady state analyses did not show any significant impact on the system-intact and post-contingency voltages. The steady state analyses for the Winter Peak showed the loading on Delhi to Fraser Tap 115 kV line increases by about 1% for several different contingencies (pre- to post-Project). For most of the contingencies, the post-contingent loading on this facility remains below its Long-Term Emergency (LTE) rating except for stuck breaker contingencies (R40 or R220) at Clarks Corners 345 kV.

### 5(d) Reasonable Alternatives to Mitigate Adverse Reliability Impacts

As noted above, the Project does not present any significant adverse impacts to the reliability of the affected transmission systems. Under the Minimum Interconnection Standard (MIS), any potential adverse reliability impact identified by the Interconnection Study that can be managed through the normal operating procedures of the NYISO, will not be identified as a degradation of system reliability or noncompliance with North American Electric Reliability Corporation (NERC), Northeast Power Coordinating Council (NPCC), or New York State Reliability Council (NYSRC) reliability standards. It is assumed that the Facility will be subject to, and shall abide by, the applicable NYISO operating procedures (e.g., security constrained economic dispatch, meaning that pre-contingency the system will be dispatched at all times in such way as to not violate the post-contingency applicable limits). Consequently, under the NYISO MIS requirements, no System Upgrade Facilities (SUF) other than local upgrades are required. The Facility does not present any significant adverse impacts to the reliability of the affected transmission systems.

### 5(e) Estimate of the Total Transfer Capacity across each Affected Interface

Based on the Steady State Analyses within Appendix 5-1, the Project was evaluated for the Winter Peak of 2022. This evaluation determined that the loading on Delhi to Fraser Tap 115 kV line increases by approximately 1%. This increase can be mitigated by reducing the dispatch of the

Gilboa plant by 50 MW on a pre-contingency basis and simultaneously increasing the Niagara generation. The Project was also evaluated for the Summer Peak of 2022 and it was determined that high post-contingent voltages were observed at several 34.5 kV buses downstream of the Churchtown 115 kV bus. This may be mitigated by adjusting the Craryville 115/34.5 kV transformer taps under pre-contingency conditions. As a result of the Stability Analyses, it was concluded that the Project will not adversely impact stability performance of the NYISO. Additionally, no stability criteria violations were observed when evaluating the addition of the Project.

## 5(f) Criteria, Plans, and Protocols for Generation and Ancillary Facilities

### *(1) Engineering Codes, Standards, Guidelines and Practices*

The Project will be designed in accordance with applicable standards, codes, guidelines, and using best industry practices.

The Project will generate electricity using photovoltaic solar panels. The panels generate power at a low voltage, which will be converted from DC to AC at the Project's inverters. The Project's collection system will consist of approximately 32,650 feet of underground 34.5kV lines. The collection lines will feed into an onsite collection substation that will step up power to 69 kV. The collection line will be directly buried in soil to a minimum depth of 48 inches. The type and size of the cable conductor will be determined to carry the required load with the conductor not to exceed 90 degrees Celsius during normal operation. The collection substation will connect to the point-of-interconnection (POI) facilities, which will consist of an onsite 69 kV switchyard that will be transferred to National Grid to own and operate. The Project Components will be designed in accordance with (but not limited to) the following design codes, guides, and references:

- Rural Utilities Service (RUS) Bulletin 1724E-200
- ACI – American Concrete Institute
    - ACI 318 – Building Code Requirements for Reinforced Concrete
    - ACI Manual of Standard Practice
    - ACI 350R – Environmental Engineering Concrete Structures
- AEIC CS8
- AISC – American Institute of Steel Construction
- AISI – American Iron and Steel Institute "Specification for Design of Cold-Formed Steel Structural Members," Parts 1 and 2

- ANSI – American National Standards Institute
- ASCE – American Society of Civil Engineers
    - ASCE 7 – Minimum Design Loads for Buildings and Other Structures
- ASNT – American Society for Nondestructive Testing
- ASTM – American Society for Testing and Materials
- AWS – American Welding Society
- Building Code of New York
- FM – Factory Mutual
- ICEA S-93-639
- IEC – International Electric Code
- IEEE – Institute of Electrical and Electronic Engineers
- IESNA – Illuminating Engineering Society of North America
- LPC – Lightning Protection Code
- MSS – Manufacturers Standardization Society
- NEC – National Electric Code
- NEMA – National Electrical Manufacturers Association
- NERC – North American Electric Reliability Council
- NESC – National Electrical Safety Code
- NFPA – National Fire Protection Association
- NPCC – Northeast Power Coordinating Council, Inc.
- NYSCR – New York State Reliability Council
- SSPC – Steel Structures Painting Council
- OSHA – Occupational Safety and Health Administrator
- PTC – Power Test Codes
- UL – Underwriters Laboratories
- NESC – National Electric Safety Code

In addition, the point-of-interconnection (POI) facilities, collection lines, and collection substation the Applicant will adhere to all applicable National Grid requirements. A complete list of all engineering codes, standards, guidelines, and practices with which the Applicant will conform is provided in Exhibit 11(i) (see Appendix 5-2).

### *(2) Generation Facility Criteria*

The materials and equipment used in the final Project configuration will be new and will meet applicable requirements. The equipment will be investment-grade to facilitate the long-term, reliable operation of the Facility. Type certification, as commonly provided for wind turbines, is not applicable for PV solar power equipment; however, some equipment, such as the PV modules or the inverters, may be listed per the requirements of the National Electric Code. Several PV module and inverter suppliers will be considered. A representative inverter and solar module are presented in Appendices 2-3 and 2-1, respectively. Each of these equipment types under consideration have received an Underwriters Laboratories (UL) certification. Final selection of the major solar equipment will be completed prior to construction and will depend on a variety of factors including market conditions; all equipment must comply with the applicable standards and requirements.

### *(3) Procedures and Controls for Facility Inspection, Testing and Commissioning*

The purpose of completing the inspection, testing, and commissioning process is to validate electrical connections, validate panel operation, and perform appropriate field tests to ensure the integrity of the Project's Components. Panel commissioning will occur once the panels, collection substation, and switchyard are fully constructed and the NYISO is ready to accept transport of power to the New York State grid. The commissioning activities are comprised of testing and inspecting the electrical, mechanical, and communications systems associated with the Project. All inspection, testing, and commissioning will be completed in accordance with all applicable engineering, design, and manufacturer standards. Upon completion of all applicable commissioning processes, a detailed report will be finalized ensuring that all processes were completed in accordance with all appropriate engineering and manufacturer standards.

The Project Components have inspection, testing, and commissioning procedures post-construction as described below.

***Panels***

The inspection, testing, and commissioning process for the Project's panels includes, but is not limited to:

- Abiding by employee safety requirements;

- De-energized verification to ensure no current is flowing through panel electrical Components;
- Verifying all wires and cable have been routed properly without sharp bends;
- Confirming all protective equipment has been properly installed;
- Checking that all fuses, connections, safety switches, breakers, inverters, and all other systems/components are appropriately installed and securely fastened;
- Ensuring that there are no short circuits or short protections to confirm Components are ready to receive power; and
- Panel and inverter testing.

***Collection System***

All materials used in the construction and installation of the collection system will be visually inspected for any defects and to ensure that all design specifications are met. The Applicant and its contractor(s) will ensure proper installation of this system using Best Management Practices outlined in the QAQC Plans found in Appendix 12-1.

The commissioning process for the collection substation includes, but is not limited to:

- Visual, mechanical, and electrical testing of power transformers and high-voltage breakers;
- Testing of all metering units;
- Testing of all surge breakers, transformers, switches, relays, computer systems, valves, and other instruments;
- Switchgear and switchboard inspections and testing;
- Testing and diagnostics of all cables;
- Testing of the grounding systems; and
- Substation integration into the data collection system.

### *(4) Maintenance and Management Plans, Procedures, and Criteria*

During the operation and maintenance period of the Project, vegetation will be mowed at least twice a year within array fence lines and will not be allowed to grow over the height of the lowest portion of the panels. Vegetation around the outside of fence lines will be mowed, maintained or brush-hogged periodically to prevent shading on the panels and to facilitate maintenance along

the fence line; this brush removal or mowing will likely take place every two to three years. All brush removal and mowing clippings will be left on-site.

Selective use of herbicides may be used as a secondary means of control where necessary. All applications would be handled in spot treatment method and target specific discrete locations; broadcast aerial application of herbicides is not proposed. If necessary, herbicides are anticipated to treat invasive species as needed. All herbicide use will comply with the regulations and requirements of NYSDEC's Pesticide Control Regulations. Project maintenance and management plans, procedures, and criteria are further described in Exhibit 5(i) below.

## 5(g) Heat Balance Diagrams

The Project will not have a thermal component, and, therefore, heat balance diagrams are not applicable.

## 5(h) Substation and Interconnection Standards and Requirements

### *(1) Description of Substation Facilities to be Transferred and Timetable for Transfer*

Interconnection facilities will include a 69-kV switchyard, which will be transferred to National Grid to own, maintain, and operate. National Grid, the transmission owner, will control the operational and maintenance responsibilities of the interconnection facilities.

### *(2) Transmission Owner's Requirements*

The switchyard will be designed in accordance with National Grid's requirements.

### *(3) Operational and Maintenance Responsibilities*

National Grid will define and complete the operational and maintenance responsibilities for the switchyard.

## 5(i) Maintenance, Management, and Procedures

### *(1) Solar Panel Maintenance, Safety Inspections, and Racking and Mounting Post Integrity*

All scheduled and unscheduled service and required preventative maintenance of all equipment will be performed according to the PV module and inverter O&M Manuals. Scheduled and unscheduled services will be provided to the electrical system from the inverters to the substation

including the pad-mount transformers and collection system. Appendix 5–3 provides a description of the preventive maintenance task and schedule.

#### *(2) Electric Transmission, Gathering and Interconnection Line Inspections, Maintenance, and Repairs*

##### *i. Vegetation clearance requirements*

Vegetation control will be conducted in accordance with Article 10 certificate conditions and BMPs approved thereunder and is required immediately adjacent to the overhead 69 kV interconnection line connecting the collection substation to the switchyard to ensure safe operation and prevent damage. All vegetation within the clear-cut boundary, with the exception of low-lying growth, will be completely cleared. As the Project's point of interconnection is located within an existing agricultural field, minimal vegetation clearing will be required.

The minimum distance of vegetation clearance will be based on line voltage, sag, blowout, and wind loading, plus an additional 2-foot buffer.

##### *ii. Vegetation management plans and procedures*

The vegetation management practices are to use an integrated vegetation management approach to achieve program objectives through:

- Identification of compatible and incompatible vegetation through inspection;
- Implementation of appropriate selective control methods to discourage incompatible vegetation; and
- Promotion of compatible vegetation.

Control methods are based on environmental impact and anticipated effectiveness, along with site characteristics, security, economics, current land use and other factors. These methods include, but are not limited to pruning, removal, selective herbicide application and mowing.

Vegetation management objectives:

- Managing vegetation, prior to encroachment, into Vegetation Action Threshold for NERC and Non-NERC lines.
- Minimizing fire hazard by reducing fuel levels to acceptable limits.
- Compliance with governmental vegetation related regulations and restrictions.

### *iii. Inspection and maintenance schedules*

Generally, scheduled work will be determined by the inspection process. Routine inspections will occur via ground patrols, aerial patrols, LiDAR and/or imagery analysis. NERC applicable lines and lines designated as critical to the reliability of the electrical system in the region shall be inspected, at a minimum, annually with no more than 18 months between inspections. The timing and number of inspections may be adjusted in order to respond to changing conditions such as fuel loading, heavy rain falls, high winds, landowner intervention and tree mortality.

### *iv. Notification and public relations for work in public right-of-way (ROW)*

The electrical system will require periodic preventative maintenance. Notification will be addressed with the appropriate agencies prior to starting the work.

### *v. Minimization of interference with electric and communications distribution systems*

The collection lines will conform with applicable safety standards, including those that provide for separation distances from existing electric and communications lines.

## 5(j) Vegetation Management Practices

Vegetation management and maintenance of the Project Area will be incorporated into the overall long-term O&M plan for the Project. The Project Area will be routinely visited for various tasks, during which general site conditions will be checked. These checks will help monitor the vegetation and site stabilization conditions within the Project Area. A long term vegetation management plan will be filed with the Secretary to the Siting Board after issuance of a certificate.

Ensuring stable site ground conditions and functioning storm water management features are among the goals of the vegetation management plan. Effective vegetation management is also important to avoid risk of damage to the solar Components and shading of the PV modules. The plan will also incorporate long-term maintenance of any perimeter landscaping required for visual screening of the Project. All work should be restricted to within the limits of disturbance (LOD); however, inspections and checks may be warranted anywhere in the Facility Area.

<u>Initial Operation Period:</u>

During the early months of operation, special attention will be paid to promoting early stage growth of the site ground cover, landscaping features, and stormwater management features. The

stormwater management features will be more frequently checked during that time.

The seed mix used during initial site seeding may require a different mix depending on the time of year, and reseeding in subsequent seasons as needed. The site grass or other ground cover will be checked more often during the first year of operation to ensure it fully establishes growth. Bare areas may require scarifying of additional topsoil, and re-seeding.

Special attention may be required to manage faster growing weeds that may initially grow among the PV arrays during the initial growing period until the primary ground cover takes hold and dominates the desired area. Particular attention must be paid to monitor and manage invasive species throughout the entire Project Area. The regular vegetation inspections will include periodic inspection for invasive species as per the Invasive Species Management and Control Plan (ISMCP) to be filed with the Secretary after issuance of a certificate.. The initial operation period site checks will consider the previous invasive species reports that may have identified invasive species presence locations. The Certificate Holder will consult a vegetation expert to assist with checks for invasive species and consider focused ISMP training of Facility staff to facilitate more frequent checks for invasive species by the regular vegetation management staff.

Depending on the season, weather conditions, and the conditions of any newly planted trees and shrubs, watering of the newly planted landscaping vegetation may be performed during the first several weeks. The newly planted trees and shrubs will be inspected more often during the early months and then again in the spring season when they exit the dormant period. Repairs and/or replacement of trees may be implemented, as necessary.

Perimeter trees identified for removal/pruning to avoid shading will be addressed during construction period. During the initial operation period, the O&M staff will continually check the status of the ground stability in those areas and generally check for perimeter tress that may be causing excessive shading or present risk of falling damage, and as required manage any additional pruning or removal.

<u>On Going Operation:</u>

The long-term management plan will continue the efforts described above, but on less frequent basis depending on site conditions. The plan will shift more focus to long-term maintenance of vegetation and site stability. Mowing and target trimming will typically occur more often during late spring early summer period, and then again as needed, typically after autumn rains. Depending

on site conditions, targeted mechanical vegetation trimming may be performed around inverters, substations, fencing, gates, and select portions of roadways. To avoid potential environmental impacts to the maximum extent practicable, herbicides are planned as a targeted strategy as opposed to wide broadcast or aerial treatment, the latter will not be employed.

The long-term vegetation management plan, to be filed with the Secretary post certification, may consist of a variety of measures listed below. The Certificate Holder will prepare the plan considering the Article 10 certificate conditions and advice from an avian expert regarding timing of mows.

- Regular planned routine inspections. Check for:
    - Excessive growth of ground cover grass or weeds;
    - Strive to keep vegetation below bottom edge of PV modules;
    - Bare spots and/or excessive weed growth;
    - Condition of landscaped trees (signs of stress);
    - Deterioration of erosion control and storm water management features;
    - Vegetation that impedes on facility equipment;
    - Condition of the wetland vegetation;
    - Signs of uncontrolled runoff or sedimentation;
    - Signs of damage to the perimeter fence due to vegetation growth;
    - Trash and debris;
    - Inspections for invasive species per ISMCP; and
    - Check road conditions and signs of mud tracking off-site, and address accordingly.
- Periodic mowing and repairs to grassed areas:
    - Based on actual observed growth (typically maintained to below 18-24”);
    - Approximately 3–6 mows annually depending on conditions;
    - Avoid mowing while ground is wet or with 24-48 hours after heavy rain;
    - Mow fenced area and between solar module rows;
    - Mow less often just outside fence (about 5 to 15 feet);
    - Mow select landscaped areas as needed to promote tree growth;
    - Add or repair stakes and support cables for newly planted trees, as needed;
    - After full growth, trimming of shrubs and landscaping trees may be required;
    - Trim targeted storm water management features and ditches;
    - Trim around and within substations;
    - Repair bare or eroded areas as necessary; and

    - Check for and remove loose debris.
- Periodic selective herbicide treatment:
    - Only United States Environmental Protection Agency and New York State Department of Environmental Conservation-approved products; and
    - Used to support vegetation management efforts.
- Periodic management of perimeter landscaping:
    - Trim branches as needed;
    - Repair stakes and guide strings; and
    - Remove dead or fallen trees and limbs, as needed.
- Periodic repairs to storm water management and erosion control features as necessary, which may include vegetation management measures.

The vegetation management inspections and maintenance measures will be periodically summarized by the O&M staff in O&M reports. The O&M plan should include an environmental compliance review that may, amongst other things, address vegetation management requirements as required by the Article 10 certificate conditions. The certificate holder will periodically assess effectiveness of the plan and adjust accordingly.

### 5(k) Sharing Above Ground Facilities with Other Utilities

The Applicant is not proposing that the Project share any above ground facility with other utilities.

### 5(l) Equipment Availability and Component Delivery

The Applicant is not aware of any equipment availability restrictions. The Applicant currently plans to place the Project in service in Q4 of 2021. Based on this in-service time-frame, major Project Components would be expected to arrive onsite starting in Q2 of 2021 through Q4 of 2021.

### 5(m) Blackstart Capabilities

Solar energy generation facilities do not have blackstart capabilities.

### 5(n) Compliance with All Applicable Reliability Criteria

Reliability criteria are identified in the SRIS, which includes input from the NYISO and NYSEG. In addition, the Applicant consulted with DPS regarding reliability criteria and they indicated that the consultation completed through the SRIS is sufficient for compliance with relevant reliability

criteria. The SRIS report shows that the Facility will have no significant adverse impact on the reliability of the existing transmission system.

As part of the interconnection process, the Applicants will execute an interconnection agreement with NYISO and National Grid. The interconnection agreement will require compliance with the National Grid's technical and operating standards, among which the operation and protection settings compliance with Institute of Electrical and Electronics Engineers (IEEE) 1547 (anti-islanding standard). The Applicant will require the procured Facility inverters to comply with this standard and other National Grid standards applicable to the Facility.