SOMERSET SOLAR, LLC

MATTER NO. 22-00026

§900-2.22 Exhibit 21

Electric Systems Effects and Interconnection

CONTENTS

LIST OF APPENDICES

ACRONYM LIST

§	Section
AC	alternating current
AES	The AES Corporation, Inc.
ANSI	American National Standards Institute
ASCE	American Society of Civil Engineers
ASTM	American Society of Testing of Materials
ATBA	Annual Transmission Baseline Assessment
CEII	Critical Energy Infrastructure Information
DC	direct current
EPC	engineering, procurement, and construction
Facility Substation	Somerset Collector Substation
IEEE	Institute of Electrical and Electronic Engineers
IETA	International Electrical Testing Association
kV	kilovolts
MV	medium voltage
MW	megawatts
NDA	non-disclosure agreement
NEC	National Electric Code
NESC	National Electrical Safety Code
NFPA	National Fire Protection Association
NYSEG	New York State Electric & Gas
NYISO	New York Independent System Operator
O&M	Operation & Maintenance
PCS	power conversion systems
POI	point of interconnection
PPE	personal protective equipment
PV	photovoltaic
SCADA	Supervisory Control and Data Acquisition
SRIS	System Reliability Impact Study

Glossary Terms

Applicant	Somerset Solar, LLC, a subsidiary of The AES Corporation, Inc. (AES), the entity seeking a siting permit for the Facility Site from the Office of Renewable Energy Siting (ORES) under Section (§) 94-c of the New York State Executive Law.
Application	Application under §94-c of the New York State Executive Law for review by the ORES for a Siting Permit.
Facility	The proposed components to be constructed for the collection and distribution of energy for the Somerset Solar Facility, which includes solar arrays, inverters, electric collection lines, and the collection substation.
Facility Site	The limit of disturbance (LOD) that will be utilized for construction and operation of the Facility, which totals about 696 acres on the Project Parcels in the Town of Somerset, Niagara County, New York (Figure 2-1).
Project Parcels	The parcels that are currently under agreement with the Applicant and Landowner, totaling about 1,784 acres in the Town of Somerset, Niagara County, New York, on which the Facility Site will be sited (Figure 3-1).
Project Site	The acreage of the Project Parcels under agreement between the Applicant and the Landowner, consisting of approximately 1,396 acres, in which the Applicant has performed diligence, surveys and assessments in support of Facility design and layout.

EXHIBIT 21 ELECTRIC SYSTEM EFFECTS AND INTERCONNECTION

This exhibit addresses the requirements specified in 19 New York Codes, Rules and Regulations (NYCRR) Section (§) 900-2.22 regarding electric system effects.

The Somerset Solar Facility (Facility) components will utilize industry best practices, and will be installed in accordance with applicable standards, codes, guidelines, and requirements. The System Reliability Impact Study (SRIS) determined that the Facility and its interconnection will not cause adverse thermal, voltage, short circuit, and transient stability impacts to the reliability of the New York State Transmission System. The SRIS did not evaluate the impact of the Facility to the ancillary services market. However, the Facility will be designed and operated within its full capability and it will have the ability to contribute renewable power to the New York Independent System Operator (NYISO) ancillary services market. Inspection, testing, and commissioning will be conducted to validate the electrical connections, panel operation, and to perform the appropriate field tests to ensure the integrity of the Facility components. The Facility has been designed to comply with 19 NYCRR §900-2.22 and the Uniform Standards and Conditions and impacts related to the electric system and interconnection have been avoided and minimized to the maximum extent practicable.

21(a) Electric Interconnection

(1) Design Voltage and Voltage of Initial Operation

The electric system proposed for the Facility will carry the power generated by the Facility's solar photovoltaic (PV) modules at a voltage of up to approximately 1,494.2 volts direct current (DC).

The DC power from the PV modules will be collected by inverters, which will convert power from DC to alternating current (AC) power at 630 volts, which will be directed to inverters' medium voltage (MV) transformers that increase the voltage to 34.5 kilovolts (kV) for the collection system. The collection system includes underground cables, which will collect and transmit power at 34.5 kV to the Somerset Collector Substation (Facility Substation). The main power transformer in the Facility Substation will raise the collection system voltage of 34.5 kV to the interconnection utility transmission voltage of 345-kV for the interconnection to the point of interconnection (POI) to New York State Electric and Gas Corporation's (NYSEG's) Kintigh Substation via a new 345-kV generator tie line. The Facility will interconnect to Kintigh Substation via an existing bay position. From the POI, the power from the Facility will be conveyed to the rest of the New York State Transmission System.

(2) Type, Size, Number, and Materials of Conductors

The Facility Substation (125 megawatts [MW] output) will be located near the existing Kintigh Substation. An overhead transmission line (approximately 159 feet in length) would connect the Facility Substation to Kintigh Substation. The transmission line conductors will be 3-phase, double-bundled, non-specular, aluminum conductor steel reinforced 26/7 stranded, 795 kcmil ”Drake” attached to a deadend wood or steel H-frame structure. Further details include one circuit with 3-phases per circuit, with two conductors per phase separated by 18 inches, for a total of six conductors. Each conductor is approximately 1.11 inches in diameter. Appendix 5-B, Sheets TL-P.01.01 and TL-P.02.01 provide an overview of these structure details. Further details regarding the Facility Substation are provided in Appendix 5-B, Sheets HV-P.01.01, HV-P.02.01, HV-P.02.02, and HV-P.08.01.

(3) Insulator Design

Typical utility-grade polymer insulators, designed and constructed in accordance with American National Standards Institute (ANSI) C29, will be used for the transmission line. Insulators in the Facility Substation will be porcelain, station post, and ANSI 70 gray.

(4) Length of Transmission Line

The Facility Substation will connect to the Kintigh Substation via an approximately 159-foot long 345-kV overhead transmission line.

(5) Typical Dimensions and Construction Materials of Towers

The new structure for the transmission line connecting the Kintigh Substation and the Facility Substation will be an 80-foot AGL wood or steel H-frame structure directly embedded into the ground and will have a total span length of approximately 159 feet between the terminal structures located in the Facility Substation and Kintigh Substation. Further details of the structures are provided in Appendix 5-B, Sheets HV-P.01.01, HV-P.02.01, TL-P.01.01, and TL-P.02.01.

(6) Tower Design Standards

The towers and foundations were designed in accordance with the following standards:

- Institute of Electrical and Electronics Engineers (IEEE) C2 - National Electrical Safety Code;

- American Society of Civil Engineers Manual 72, “Design of Steel Transmission Pole Structures”, and Standard 48, “Design of Steel Transmission Pole Structures”;
- ANSI;
- American Society of Testing of Materials; and
- Occupational Safety and Health Administration.

The foundation for each wooden pole will be tamped native soil backfill or other industry standard method based on geotechnical analysis and foundation design.

(7) Underground Cable System and Design Standards

No underground cabling for the 345-kV connection is anticipated. However, if required, then it will be approved by NYSEG and designed in accordance with its standards.

(8) Underground Lines Profile and Oil Pumping Stations/Manhole Locations

No underground cabling for the 345-kV connection is anticipated. Regardless, at this time no oil pumping stations or manholes are anticipated for the Facility. The transformer oil retention system will be confirmed during the final civil and electrical engineering phase and is anticipated to include either a sump pump in the oil retention basin or an imbiber bead system. If a sump pump design is chosen it will consist of one sump pump and an oil detection probe. The rainwater will be pumped out of the basin only when there is no oil present, which will be monitored by the detection probe. An alarm will be triggered if oil is detected, and the operations and maintenance staff will investigate and resolve the issue. The final design will be based on the specific requirements of the site.

(9) Equipment to be Installed in Substations or Switching Stations

The Facility Substation will include 34.5 kV and 345 kV busses, a main power transformer, 38 kV and 362 kV rated circuit breakers, coupling capacitor voltage transformer, instrument transformer and revenue metering, air-break disconnect switches, 362 kV rated motor operated disconnect switch, a capacitor bank, station service transformer, a generator, surge arrestors, a ground switch, steel structures, and a control house, as depicted on the IFP Design Drawings provided in Appendix 5-B. The control house is a non-habitable equipment structure to be used for operation and maintenance of the Facility. These Facility components allow for the delivery of the energy produced by the Facility to the existing electric power grid.

The equipment and structures required for the Facility will be designed in accordance with the requirements of NYSEG, the transmission operator and owner of the existing NYSEG 345-kV Rochester to Somerset transmission line.

To accommodate the 125 MW rated output from the Facility, the Facility Substation will use MV (34.5 kV) underground feeder risers connected to 34.5-kV feeder breakers via 34.5-kV disconnect switches, which will be connected to the 34.5-kV main bus bar. The 34.5-kV main bus bar is connected to the 345-kV step-up power transformer via a 34.5-kV disconnect switch. The step-up transformer will raise the voltage to 345-kV utility voltage level. The high voltage side of the transformer will connect to the generator tie line that connects to the Kintigh Substation via a 345-kV breaker and a 345-kV disconnect switch. Additional equipment within the Facility Substation will include a control building, instrument transformers, capacitor banks, outdoor type overhead bus or cable connecting the devices, steel support structures, lightning masts, surge arrestors, and shield wires.

The final selection of the equipment for inclusion in the Facility design will be determined during the final design process. The Facility Substation will include a grounding grid designed in accordance with IEEE 80, Guide for Safety in AC Substation Grounding. Additional details regarding the Facility Substation are provided in Appendix 5-B (Sheets HV-E.02.01, HV-P.01.01, HV-P.02.01, HV-P.02.02, HV-P.15.01 and HV-P.08.01).

A set of instrument transformers located in the Facility Substation will be paired with protection relays to monitor the current and voltage. Any fault or abnormal condition detected by the protection relays will open the appropriate circuit breaker to protect the Facility electrical equipment, the grid, and any personnel within the Facility Substation.

The control building will house all local controls, protection relays and communication infrastructure required to deliver the energy safely on the existing NYSEG transmission grid.

Air disconnect switches will be installed in the Facility Substation for isolation and maintenance purposes.

(10) Any Terminal Facility

The Facility Substation will include a dead-end structure to connect to the 345-kV transmission line to Kintigh Substation. These are further detailed in drawings provided in Appendix 5-B, Sheets HV-P.01.01 and HV-P.02.01.

(11) Cathodic Protection Measures

No metallic pipelines will be installed as part of the Facility, and no Facility cables are planned in parallel with existing underground pipelines. Therefore, no cathodic protection measures are required.

21(b) System Reliability Impact Study

CF Power Limited performed a SRIS for the Facility on behalf of the NYISO. The Facility is planned to be included in the NYISO Class Year 2023. Information for the final (approved) SRIS report is provided in Appendix 21-A. The SRIS was approved by the Operating Committee on January 13, 2022.

NYISO has classified the SRIS as Critical Energy Infrastructure Information (CEII). Due to this classification, it is subject to the CEII non-disclosure agreement (NDA) the Applicant has executed with NYISO which prohibits the Applicant from sharing CEII with non-CEII approved third parties. Access to the SRIS report via the NYISO website requires the viewer to have a Mynyiso.com account and execute a CEII NDA with the NYISO.

21(c) Impact on Transmission System Reliability

The SRIS evaluated the impact of the Facility to the transmission system under steady state N-0, N-1, and N-1-1 system conditions. The SRIS also evaluated the Facility's short circuit impact and transient stability impact to the New York State Transmission System. The SRIS utilized the Annual Transmission Baseline Assessment (ATBA) base cases from the NYISO Class Year 2019. The ATBA cases had the 2019 Federal Energy Regulatory Commission 715 2024 system representation. The study area included Zone A (West) and Zone B (Genesee) regions that are most likely to be affected by the Facility.

N-0 case

The SRIS determined that the addition of the Facility does not cause any adverse impacts to the New York State Transmission System under N-0 system conditions.

N-1 case

The SRIS determined that the addition of the Facility does not cause any adverse impacts to the New York State Transmission System under N-1 system conditions.

N-1-1 case

The SRIS determined that the addition of the Facility does not cause any adverse impacts to the New York State Transmission System under N-1-1 system conditions.

Short Circuit

The SRIS determined that the addition of the Facility does not cause any adverse short circuit impacts to the New York State Transmission System.

Transient Stability

The SRIS determined that the addition of the Facility does not cause any adverse transient stability impacts to the New York State Transmission System.

21(d) Impact on Ancillary Services

The SRIS scope did not include evaluation of the impact of the Facility to the Ancillary Services in the NYISO Electricity Market. However, the proposed Facility will be designed and operated within its full capability range. The Facility's power will contribute renewable power to the reactive power requirements in the Ancillary Market and if necessary contribute renewable power to the regulation requirements in the NYISO Electricity Market.

21(e) Impact on Total Transfer Capacity

The SRIS evaluated the Facility's impact on the Total Transfer Capability of the Volney-East, Ontario-New York and New-Ontario interfaces that are most likely to be impacted by the Facility. The evaluation determined that the addition of the Facility does not adversely degrade the Total Transfer Capability of any of the analyzed interfaces beyond the NYISO *de minimis* criteria of more than 25 MW.

21(f) Criteria, Plans, and Protocols

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

The Applicant intends to contract with an engineering, procurement, and construction (EPC) contractor(s) to design, build, and commission the Facility. The Facility will be designed and built in accordance with applicable standards, codes, guidelines and using industry best practices. For the POI switchyard (Kintigh Substation), NYSEG requirements will be followed.

The Facility components will be designed in accordance with (but not limited to) the following design codes, guides, and references. Refer to Exhibit 5 for additional information on applicable engineering codes, standards, and guidelines, and practices.

345-kV Overhead Transmission System

A span of approximately 159 feet 345-kV overhead transmission line will be constructed between the POI switchyard (Kintigh Substation) and the Facility Substation. This overhead transmission line is anticipated to be designed and operated in accordance with the Interconnection Agreement, approved tariffs and applicable rules and protocols of NYSEG, NYISO, New York State Reliability Council, Northeast Power Coordinating Council, North American Electric Reliability Corporation and successor organizations. In addition, the Facility is anticipated to be designed in accordance with (but not limited to):

- National Electrical Safety Code (NESC)
- ANSI
- ASTM – American Society of Testing and Materials
- Occupational Safety and Health Administration
- IEEE
- ASCE – American Society of Civil Engineers

The transmission span will utilize one (1) self-supported wood H-Frame dead-end. The limits for the tension of the conductor and shield wires will be based on NESC standards. The insulator selection will take into consideration the design of the line and switchyard.

Facility Substation

The Facility Substation design will incorporate, but is not limited to, the following standards and codes when applicable:

- IEEE C2 - NESC
- National Fire Protection Association (NFPA) 70 - National Electric Code (NEC)
- NEC
- NFPA 850 - Recommended Practice for Fire Protection for Electric Generating Plants and High Voltage Direct Current Converter Stations
- American Concrete Institute
- ANSI
- ASCE
- ASTM
- International Building Code
- IEEE 80 - IEEE Guide for Safety in AC Substation Grounding
- IEEE C37.2 - IEEE Standard Electrical Power System Device Function Numbers and Contact Designation
- IEEE C37.90 - IEEE Standard for Relays and Relay Systems Associated with Electrical Power Apparatus

- IEEE C37.110 - Guide for the Application of Current Transformers Used for Protective Relaying Purposes
- IEEE C57.13 - IEEE Standard Requirements for Instrument Transformers
- IEEE 485 - IEEE Recommended Practice for Sizing Lead-Acid Batteries for Stationary Applications
- IEEE C57.12.10 - IEEE Standard Requirements for Liquid-Immersed Power Transformers
- IEEE 998 - IEEE Guide for Direct Lightning Stroke Shielding of Substations
- IEEE C37.119 - IEEE Guide for Breaker Failure Protection of Power Circuit Breakers
- IEEE 605 - IEEE Guide for Design of Substation Rigid-Bus Structures
- IEEE 693 - IEEE Recommended Practices for Seismic Design of Substations
- IEEE 980 - IEEE Guide for Containment and Control of Oil Spills in Substations
- IEEE 998 - IEEE Guide for Direct Lightning Stroke Shielding of Substations
- IEEE 1313.2 – IEEE Guide for the Application of Insulation Coordination

34.5-kV Underground Collection System

The underground line design shall incorporate, but is not limited to, the following standards and codes when applicable:

- ANSI
- ASTM
- IEEE 48 - Standard Test Procedures and Requirements for Alternating-Current Cable Terminations 2.5 kV through 765 kV
- IEEE 80 - Guide for safety in AC substation grounding
- IEEE 400 - Guide for Field Testing and Evaluation of the Insulation of Shielded Power Cable Systems
- IEEE 400.1 - Guide for Field Testing of Laminated Dielectric, Shielded Power Cable Systems Rated 5 kV and Above with High Direct Current Voltage
- IEEE 400.3 - Guide for Partial Discharge Testing of Shielded Power Cable Systems in a Field Environment
- IEEE C2 - NESC
- IEEE C57.12.10 - American National Standards for Transformers
- NFPA 70 - NEC
- TIA/EIA - Telecommunications Industry Association/Electric Industry Alliance
- National Electrical Manufacturer’s Association

- NEC

(2) Generation Facility Type Certification

The PV solar panel modules currently under consideration by the Applicant have been Certified by CSA Group, a Nationally Recognized Testing Laboratory. This certification confirms that the modules have been tested for conformance with Underwriters Laboratories standards 61730-1 and 61730-2. The equipment specifications of these modules are included in the Preliminary Electrical Design Drawings (Appendix 5-A, Sheet PV-E.12.01).

(3) Inspection, Testing, and Commissioning Procedures and Controls

During construction, a quality control plan will be prepared by the EPC contractor in collaboration with The AES Corporation, Inc. (AES). The various aspects of the Facility will have a written inspection, and testing and commissioning plan, which will be adhered to during all stages of construction. Post-construction inspection, testing and commissioning also will be performed.

During commissioning, a commissioning plan will be prepared by the EPC contractor in collaboration with AES. The commissioning plan will include (but will not be limited to) the following:

- Visual and mechanical inspections of all equipment, structures, and systems;
- As-built verifications;
- Checkout and commissioning of the power inverter skids according to the manufacturer requirements;
- Electrical cabling testing (continuity, megger, phase rotation, etc.);
- DC string testing, open circuit voltage testing, and operating current testing;
- Checkout and commissioning of trackers according to manufacturer’s requirements;
- Checkout and commissioning of medium and high voltage transformers including dissolved gas analysis oil sample testing;
- Hi-pot testing of high voltage equipment;
- Substation Supervisory Control and Data Acquisition (SCADA) and relay protection checks;
- Fall of potential measurement, grounding, and continuity checks;
- Commissioning of Facility’s SCADA remote communication system; and
- Facility reliability and performance testing.

345-kV Overhead Transmission Line

The overhead lines will be inspected, tested, and commissioned in accordance with various ANSI, IEEE, NFPA, International Electrical Testing Association (IETA), ASTM, and other requirements, as necessary.

34.5-kV Underground Collection System

The collection system will be inspected, tested and commissioned in accordance with various ANSI, IEEE, NFPA, IETA, ASTM, etc. requirements, as necessary. All tests shall be performed with the equipment de-energized, except where specifically required for it to be energized for functional testing.

Underground cables systems have comparatively fewer components than the overhead lines or substation described above. All material received for construction of the underground lines will be visually inspected for defects and compatibility with the design/specifications. This includes, but is not limited to, cables, transformers, fiber, splices/junction boxes and grounding material.

During installation, materials used for cable trench installation will be tested for conformance with the design, including backfill material (gradation, compaction, thermal resistivity, etc.). The cables themselves will be installed in the proper configuration, at the proper depth and the proper spacing. Care must be taken to ensure that the required/minimum/maximum bending radius or pulling tension (if installed in conduit/duct) of the cable is met to avoid damage.

Hardware/terminations at the ends of the cables will be installed in accordance with manufacturer requirements to ensure adequate mechanical strength and electrical continuity. Cable shields/neutrals will be installed per the design and solidly connected to the grounding system or surge arresters, or taped/insulated, where applicable. Phasing of the conductors will be checked to ensure that the end-to-end connection of each conductor is correct per the design of the station/equipment at each end of the cable.

Very Low Frequency, at a minimum, or Partial Discharge testing will be performed on cables, in accordance with IEEE recommendations, in order to identify any deficiencies or damage in the cable system that could result in outages or failure. Testing of transformers will be performed in accordance with applicable ANSI/IEEE specifications.

Facility Substation

The Facility Substation will be inspected, tested and commissioned in accordance with various ANSI, IEEE, NFPA, IETA, ASTM, etc. requirements, as necessary.

Various industry standard tests are performed on equipment before leaving the manufacturers' facilities. All equipment and structure received for the Facility Substation will be visually inspected for defects and compatibility with the design/specifications. Additional field tests will be performed on specific equipment including, but not limited to:

- Main transformer
- High/MV voltage circuit breakers
- Disconnect switches
- Instrument transformers (current transformer, voltage transformer, etc.)
- Surge arresters
- Station service transformer
- High/MV cables
- Capacitor bank banks
- DC battery bank and charger
- Grounding grid checks

Other standard tests will be performed to ensure that the components of the design were constructed/installed at the Facility Site in the correct manner. These include, but are not limited to:

- MV bus connections and hardware
- Low voltage protection, control and instrumentation wiring
- Protective relaying systems (latest firmware verifications, commissioning checks)
- SCADA/communication systems

PV Modules

PV System commissioning will commence once the PV modules, combiner boxes, DC collection system, DC conductors and inverters are fully installed. Systems monitoring includes the following strategies and considerations:

- PV system Commissioning will likely proceed as follows:
    - DC cold commissioning with commence once the DC system is completed up to and including the DC bus on the inverter/power conversion system (PCS). Cold commissioning includes insulation resistance testing, Open Circuit Voltage testing, string current testing and I-V cure tracing.
    - AC cold commissioning will commence once the MV collection system is complete from the Facility Substation riser terminations out to the MV terminals on the

inverter/PCS step up transformer. Cold commission usually includes the pre-commission testing of the inverter/PCS equipment by the inverter original equipment manufacturer. Cold commissioning includes MV cable insulation resistance testing, grounding system testing, and Optical Time Domain Reflectometer testing of communications cables.

  - Hot commissioning and testing of the PV system will commence once the Facility Substation is ready to provide backfed power from the grid. Hot commissioning includes the systematic energization of the DC portion, then AC portion of the system, controlled and monitored at the Inverter/PCS as subsystems, then in coordination with the Facility Substation control at the MV circuit and system levels.
- Equipment required: Support trucks will be driven to the construction site for manual inspections and testing. Aerial thermal imaging is typically conducted by manned survey aircraft or unmanned aerial vehicles (National Renewable Energy Laboratory 2018).
- Timing: Commissioning will preferentially be completed in late spring or summer to take advantage of typically drier weather and higher solar irradiance. If necessary, this activity can be completed in the spring, fall, or winter depending on weather conditions (National Renewable Energy Laboratory 2018).

(4) Maintenance and Management

Visual inspections and tests on the components will be performed during construction as well as energization. The test and inspection data will be used as benchmarks for the future checks during Facility operation. Once the Facility is energized, preventative maintenance will be conducted on the PV modules, trackers, SCADA system, MV collection system and Facility Substation. Periodic formal inspections will also occur to ensure the continued life and service of the equipment including but not limited to access road accessibility, Facility Substation and vegetation interference.

345-kV Overhead Transmission System

The overhead 345-kV lines are passive systems that do not require active operation activities. They generally do not have the direct ability to notify or alarm an operator or technician in the event of any material problems or developing problems, such as excessive conductor sag. Any serious issues with the line will likely manifest themselves as an electrical fault, in which case the protection system in the Facility Substation would sense and clear the fault.

The 345-kV transmission line span is anticipated to be visually inspected at regular intervals (annually), as well as after any significant weather events such as extremely high winds, severe snow and ice, etc. Additional details regarding the maintenance of the 345-kV transmission line will be provided as final design information for this component becomes available.

34.5-kV Collection System

The collection system is passive such that it does not require active operations. The underground lines generally do not have the ability to notify or alarm operators of a problem unless it manifests itself as an electrical fault that can be sensed by equipment in the Facility Substation. Equipment that provides remote indication or control includes, but is not limited to:

- Transformers – there is a step-up transformer bus connected to every inverter. The Sungrow inverter package comes standard with transformer alarms, which include alarms for high temperature, low oil level, and pressure/vacuum. The inverter itself includes many different types of alarms, including ground fault (DC and AC), AC transient voltage too high, and AC switch failure as an example.
- Fault Indicator – the MV collection system includes fault indicators for every MV cable segment (Appendix 5-B, Sheet PV-E.02.01) to assist in locating faults on underground cables (that cannot be verified visually). There are options for these detectors to have remote signaling capabilities.

The alarm output from the above is typically captured by the Facility data acquisition system along with weather data, energy production, and other data. Panels in the control building are provided for such equipment which will be installed by a third-party. The fiber optic cable to facilitate the data collection is provided in Appendix 5-B, Sheet PV-E.10.01.

If manual operation of the collection system is required, such work will be completed by personnel familiar with and trained in the operation and safety hazards of high-voltage electrical equipment. Personal protective equipment (PPE) appropriate for the activities being performed will always be worn/used. Hazards such as arc flash will be present but are mitigated to the extent practical during detailed design. In accordance with industry standards, hazard labels will be installed on electrical equipment that can be operated/accessed to provide guidance for additional PPE required for operational activities.

Most of the underground Facility Substation cannot be inspected visually. There will be "access points" that will allow for a limited amount of visual verification such as riser poles that transition to the Facility Substation, and junction boxes that combine multiple cable sections or splices.

While terminations and cable ends can be inspected at these points, they are more valuable as a point to connect electrical testing equipment.

Some equipment provided by manufacturers will have operation and maintenance (O&M) manuals specific to that product, similar to the substation equipment described below. These maintenance intervals and procedures will be used where applicable and can apply to equipment such as transformers.

Facility Substation

The Facility Substation will have a SCADA system that will send status and alarm signals to the overall Facility SCADA system. These signals will notify the operators of items such as breaker trips, transformer high/low temperature or oil level, battery charger trouble, etc. The SCADA system will also allow for remote operation of electrically operated equipment. The operations team will be able to open and close circuit breakers, motor-operated disconnect switches, the transformer tap changer, etc.

The mode of communication between the collection system equipment and the protection and/or SCADA equipment in the control building shall be multimode fiber cables. The communication to the remote utility substations will be via OPGW fiber cable. The details of this system will be determined during the design phase after certification by the Siting Board.

Since many items in the Facility Substation are large pieces of equipment supplied by major manufacturers, these items will be inspected and maintained in accordance with the manufacturers' O&M manual, which will be stored at the Facility Substation. The requirements will differ depending on which manufacturer is used. These items may include, but are not limited to:

- Main power transformer
- High and MV circuit breakers
- Instrument transformers
- Disconnect switches
- Capacitor banks
- Station service transformers
- Stationary battery and charger
- Protection relays

Many of these items will be designed to send preventative alarm signals to the SCADA system to notify operators of problems before they become more significant or costly.

The Facility Substation will be visually inspected at regular intervals, as well as after any significant weather events such as extremely high winds, severe snow and ice. Substation design adequacy will be monitored during the operations period of the Facility to ensure changes in environmental circumstances, utility changes, or equipment changes are evaluated for impact to the Facility.

21(g) Transfer of Transmission Ownership

Design and construction of the POI inside Kintigh Substation will be done by NYSEG, who is the proposed owner of the interconnecting transmission for this Facility. The interconnection of the Facility will be accomplished via the existing Kintigh Substation, with new equipment to be added to the Kintigh Substation to facilitate this connection. No portion of the new interconnection substation to be built is contemplated to be transferred to another transmission owner. Transfer of transmission ownership is not applicable to the Facility.

21(h) Multi-Use Options for Utilities

The Applicant is not proposing that the Facility share any aboveground infrastructure with other utilities (i.e., communications, cable, phone, cell phone relays, etc.).

21(i) Equipment Availability and Delivery Schedule

The Applicant is not aware of equipment availability restrictions in relation to the Facility at this time and currently plans for the Facility to be operational by Quarter 3 of 2026. Based on this timeframe, major Facility components are expected to arrive onsite beginning in Quarter 1 of 2025 through the commercial operation date.

Availability and delivery times for major Facility components may vary depending on selected equipment, inventory, manufacturer, infrastructure activities and market conditions. The Applicant will maintain contact with the suppliers and monitor availability to guide the final selection of equipment. The delivery of major Facility components may generally be within the ranges identified below:

- PV Modules: 12 – 48 weeks
- Inverters and MV transformers: 26 – 52 weeks
- Electrical switchgear: 14 – 22 weeks
- High voltage transformers: 26 – 52 weeks

Note that the equipment procurement strategy will be firmed up during the final engineering and planning stage and prior to construction. If needed, adjustments to equipment procurement may be made after starting construction.

References

National Renewable Energy Laboratory. 2018. Best Practices for Operation and Maintenance of Photovoltaic and Energy Storage Systems. 3rd Edition. National Renewable Energy Laboratory, SunSpec Alliance, and the SunShot National Laboratory Multiyear Partnership (SuNLaMP) PV O&M Best Practices Working Group. 153 pp. Available online at: Best Practices for Operation and Maintenance of Photovoltaic and Energy Storage Systems; 3rd Edition (nrel.gov). Accessed January 20, 2023.