

DIVISION 48 Electrical Power Generation

Section 48 14 00 Solar Energy Electrical Power Generation System

1. General

1.1 References

1.1.1 American Society for Testing and Materials (ASTM) latest edition of the following:

1.1.1.1 ASTM E1038, Standard Test Method for Determining Resistance of Photovoltaic Modules to Hail by Impact with Propelled Ice Balls.

1.1.1.2 ASTM E772 Standard Terminology of Solar Energy Conversion.

1.1.2 Canadian Standards Association (CSA) latest edition of the following:

1.1.2.1 CSA C22.1 , Canadian Electrical Code, Part 1.

1.1.3 Institute of Electrical and Electronics Engineers (IEEE):

1.1.3.1 IEEE 519-14 Recommended Practices and Requirements for Harmonic Control in Electric Power Systems.

1.1.3.2 IEEE 1547-08 Standard for Interconnecting Distributed Resources with Electric Power Systems.

1.1.4 Nova Scotia Power Incorporated, latest version of the following

1.1.4.1 NSPI Guidelines for Metering Installations

1.1.4.2 NSPI Interconnection Guideline: Systems Not Exceeding 100 kW

1.1.4.3 NSPI Utility Services Requirements

2. Products

2.1 Photovoltaic (PV) systems are to be sized under 100KW, systems exceeding 100KW to be pre-approved by DTIR.

2.2 Include any required applications, submissions, and all associated fees for Utility net metering in the contract documents.

2.3 The electrical characteristics (voltage / phase) of the PV system shall match the electrical characteristics of the service entrance for the facility.

2.4 Individual photovoltaic strings / arrays are not to exceed 5kw total output power.

2.5 Maximum string / array input DC voltage shall be less than 50v.

2.6 Each photovoltaic string / array is to be provided with a disconnect switch.

- 2.7 Wiring from each string / array disconnect switch to the branch circuit panelboard is to be run using PVC or galvanized rigid steel conduit.
 - 2.8 Provide a dedicated panel board(s) for photovoltaic distribution. Each PV string / array is to be connected to its own dedicated branch circuit breaker in the panelboard(s). Provide lock-off devices for each circuit breaker. Identify panelboard(s) with a lamicon reading “PV Panel connection only”. Provide dedicated PV distribution panelboard(s) where multiple, individual branch circuit panelboards are required for PV distribution.
 - 2.9 Provide a “Reverse Feed” dry core transformer for the PV array distribution connection. This transformer is to be specifically designed for a reverse feed application, do not use a standard dry type transformer connected in reverse. The PV distribution system will feed the primary of the transformer.
 - 2.10 The photovoltaic system shall include anti-islanding equipment and / or grid dependent inverter(s) except where electrical storage systems are used. Where electrical storage systems are included in the distribution system, the distribution system shall be equipped with an automatic transfer switch to isolate this power supply.
 - 2.11 Total Harmonic Distortion of the PV system is not to exceed 5%.
3. Execution
- 3.1 Ground mounted solar arrays are the preferred method of system installation. Building mounting of solar arrays is to be pre-approved by DTIR.
 - 3.2 Provide a PV system single line diagram 600 by 600 mm framed in Plexiglas. Locate in main electrical room.
 - 3.3 Provide a permanent, weather proof, UV resistant, PV system single line diagram sized 300 by 300 mm located adjacent to the solar array.
 - 3.4 Provide safety signage.
 - 3.5 Warranties:
 - 3.5.1 Solar photovoltaic modules and inverter: 10-year manufacturer’s warranty against defects in materials and workmanship.
 - 3.5.2 Solar photovoltaic power output: 25-year manufacturer’s power output warranty, with the first 10 years at 90% minimum rated power output and the balance of the 25 years at 80% minimum rated power output.
 - 3.5.3 Where batteries are used as an PV electrical storage system, they shall be provided with a 10 year warranty; the first two (2) years following substantial performance

shall be full replacement of equipment with the remaining 8 years of the warranty to be prorated.

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