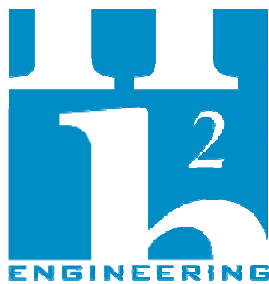


Leon County Sustainable Demonstration Center

PROJECT MANUAL – BID PACKAGE NO. 4 – Photovoltaic Equipment

September 12, 2011

Engineer Project No. 11-05



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SECTION 263100 - PHOTOVOLTAIC ENERGY EQUIPMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions, apply to this Section.

1.2 SUMMARY

- A. Section Includes Owner Furnished, Contractor Installed:
 - 1. PV modules (laminates in mounting frames).
 - 2. Inverters.

1.3 DEFINITIONS

- A. CEC: California Energy Commission.
- B. IP Code: Required ingress protection to comply with IEC 60529.
- C. MPPT: Maximum power point tracking.
- D. PTC: USA standard conditions for PV.
- E. PV: Photovoltaic.
- F. STC: Standard Test Conditions defined in IEC 61215.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product. Products shall meet the Made in America Act.
 - 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for PV panels.
 - 2. Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.
- B. Shop Drawings: For PV modules.
 - 1. Include plans, elevations, sections, and mounting details.
 - 2. Include details of equipment assemblies. Indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
 - 3. Detail fabrication and assembly.
 - 4. Include diagrams for power, signal, and control wiring.

1.5 INFORMATIONAL SUBMITTALS

- A. Field quality-control reports.
- B. Sample Warranty: For manufacturer's special materials and workmanship warranty and minimum power output warranty.

1.6 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For PV modules to include in operation and maintenance manuals.

1.7 WARRANTY

- A. Manufacturer's Special Materials and Workmanship Warranty: Manufacturer agrees to repair or replace components of PV modules that fail in materials or workmanship within specified warranty period.
 - 1. Manufacturer's materials and workmanship warranties include, but are not limited to, the following:
 - a. Faulty operation of PV modules.
 - 2. Warranty Period: Five years from date of Substantial Completion.
- B. Manufacturer's Special Minimum Power Output Warranty: Manufacturer agrees to repair or replace components of PV modules that fail to exhibit the minimum power output within specified warranty period. Special warranty, applying to modules only, applies to materials only, on a prorated basis, for period specified.
 - 1. Manufacturer's minimum power output warranties include, but are not limited to, the following warranty periods, from date of Substantial Completion:
 - a. Specified minimum power output to 80 percent or more, for a period of 25 years.
 - b. Specified minimum power output to 90 percent or more for a period of 10 years.

PART 2 - PRODUCTS

2.1 MANUFACTURED UNITS

- A. **Basis-of-Design Product:** Subject to compliance with requirements, provide Grape Solar GS-S-230-CS (230W) or comparable product by one of the following:
 - 1. [BP Solar USA.](#)
 - 2. [Evergreen Solar, Inc.](#)
 - 3. [GE Energy; General Electric Company.](#)
 - 4. [Kyocera International, Inc.](#)
 - 5. [Mitsubishi Electric Corporation.](#)
 - 6. [Sanyo North America Corporation.](#)

7. [Sharp Electronics Corporation.](#)
8. [SunPower Corporation.](#)
9. [Suntech Power.](#)

2.2 SYSTEM DESCRIPTION

A. Grid-Tied PV System:

1. Connected via a utility meter to the electrical utility.
2. An array of 264 modules to generate a total nominal 60,000 rated W.
3. System Components:
 - a. Cell materials.
 - b. PV modules.
 - c. Array frame.
 - d. Inverter.
 - e. Overcurrent protection/combiner box.
 - f. Mounting structure.

2.3 MANUFACTURED UNITS

A. Cell Materials: Monocrystalline.

1. c-Si.

B. Module Construction:

1. Nominal Size: 42 inches wide by 63 inches long.
2. Weight: 44 lb .

C. Front Panel: Low iron tempered glass.

D. Junction Box:

1. IP Code: IP65 .

E. Series Fuse Rating: 10A.

2.4 CAPACITIES AND CHARACTERISTICS

A. Minimum Electrical Characteristics:

1. Rated Open Circuit Voltage (V_{oc}): 59.1dc.
2. Maximum System Voltage: 600V.
3. Short-Circuit Temperature Coefficient: 3.1mA/degC.
4. Rated Short-Circuit Current (I_{sc}): 5.18A.
5. Maximum Power at STC (P_{max}): 230W.

B. Additional Electrical Characteristics:

1. PTC Rating: 209.4W.
 2. Module Efficiency: 13.5 percent.
- C. Normal Operating Temperature Characteristics (NOTC):
1. Temperature Coefficient (NOTC P_{max}): -1.03W/C.
 2. Temperature Coefficient (NOTC V_{oc}): -0.207V/C.

2.5 MODULE FRAMING

- A. PV laminates mounted in anodized extruded-aluminum frames.
1. Finish: Anodized aluminum.
 - a. Alloy and temper recommended by framing manufacturer for strength, corrosion resistance, and application of required finish.
 - b. Color: As indicated by manufacturer's designations.

2.6 INVERTER: Basis of Design: Sunny Boy SB 5000 US

- A. Control Type: Maximum power point tracker control.
- B. Inverter Electrical Characteristics:
1. Maximum Recommended PV Input Power: 6250W.
 2. Maximum Voc: 600V.
 3. PV Start Voltage: 300V.
 4. MPPT Voltage Range: 250V-480V.
 5. Maximum Input Current: 21A.
 6. CEC Rated Power: 5000W.
 7. Nominal Output Voltage: 208V.
 8. Maximum Output Current: 24A.
 9. Peak Efficiency: 96.7 percent.
 10. CEC Weighted Efficiency: 95.5 percent.
- C. Operating Conditions:
1. Operating Ambient Temperatures: 13 to 113 deg F.
 2. Storage Temperature: Minus 40 to plus 122 deg F (minus 40 to plus 50 deg C).
 3. Relative Humidity: 0 to 95 percent, noncondensing.
- D. Communication:
1. RS 485 Serial Network Protocol
- E. Enclosure:
1. NEMA 250, Type 3R.
 2. Enclosure Material: Stainless steel.
 3. Cooling Methods:

- a. Fan convection cooling.
4. Protective Functions:
- a. AC over/under voltage.
 - b. AC over/under frequency.
 - c. Ground over current.
 - d. AC and dc overcurrent.
 - e. DC over voltage.
- F. Regulatory Approvals:
- 1. IEEE 1547.1.
 - 2. IEEE 1547.3.
 - 3. UL 1741.

PART 3 - EXECUTION (NOT USED)

END OF SECTION 263100