



To: SUNDA Project Cooperatives

From: February 3, 2015

Re: Reference Block Design for Utility Scale PV Solar System

Purpose: Provides a reference block design with simple, convenient features, which is intended to reduce field time and provides monitoring features. This is a reference design and will need to be adjusted for the particulars of a field site, including electrical string length (based on minimum site temperatures), climatic conditions (such as wind and snow loads), row spacing (based on latitude), land contours, shading, and others. Typical engineering time for such adjustment is intended to be, and historically has been, under 100 hrs for site specific modifications.

What's included: a cover sheet that provides a drawing sheet list, six site plans (layouts, trenching and grounding), single line diagrams, schedules, labels, partial plans for inverter pad, conduit details and stringing plans for arrays.

Design Criteria and Attributes used in creating this design:

- Maximize ground coverage ratio, expandable symmetric block
- Fixed, non-tracking design for cost effective construction and low O&M costs
- Efficient design, allows for most of the array construction to be duplicated
- Combiner box locations optimized to reduce DC conductors, avoiding jumpers or other pull boxes in unusual locations
- Equipment pad centrally located, driving reduced feeder cost and transformation local to solar inverters – configurable with other variations
- Immediate transformation drives lower cost of AC MV conductors
- Access roads can be on either side
- Grounding and Surge Protection: metallic array parts, pad halo grounding, fence grounding, surge arrestors in gear
- MV switch is used as site AC disconnect, reduces pad footprint
- Racking system is ETL listed for grounding, reducing significant bonding requirements and on-site labor
- Racking has integrated wire management
- Racking design is very modular, fast to install and accessible height good for install
- AC Switchgear contains the AC bus, the step down transformer for local 120V power and the revenue meter for DAS
- Using 500kw inverters allows for a centralized electrical equipment pad
- Electrical equipment pad is conveniently accessible. Designed to provide easy service access, minimize concrete, optimize feeder stub ups, 1MW pad is cost effective and allows ability to use shared transformer.
- Expandability and flexible re-design options to meet site specific issues
- Track environmental offsets

- Public view website to view performance online or any internet device
- Remotely troubleshoot and track on-site weather data
- Option features: cell-modem, online storage of data, historical data exports, monthly reporting, alarms, curtailment, fault codes and sensors (horizontal/plane of array pyranometers, wind speed/direction, humidity, ambient temp, cell temp, revenue grade meters, load or bus kw meters)

DISCLAIMER

While significant effort has been made to incorporate all applicable standards and ensure good engineering and correct practice in the development of this design, and this design has been used to develop actual field deployed, utility-scale, solar PV systems, no warranty or guaranty is made on this design for its fitness, suitability, safety or applicability for any purpose. Utilities must employ a trained engineer to interpret and adjust this reference design for the specific requirements of their application.

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