

Logistical Considerations and Solar System Design

Installation Site Features Affect Packaging and Transportation

In previous engineering bulletins we have discussed a variety of factors associated with the design and performance of solar (photovoltaic – PV) systems. SunWize takes factors into account related to load levels, solar radiation conditions, battery autonomy, temperature extremes, statistical probabilities, etc. in an effort to ensure every PV system we build is engineered at the optimum level for a given application.

In addition to these design and performance factors there are logistical factors that must be considered such as transporting equipment from point A to point B and the deployment of that equipment at the receiving site. Anyone involved in the daily shipment of goods to a broad customer base appreciates the logistical factors associated with shipping goods across the country and the world.

In most cases points A and B are commercial facilities making the handling of the equipment at each point straightforward. For us point A is our production facility in Kingston, New York. However, in the world of remote-site PV, point B often is a very rugged, very remote site, where access for equipment and personnel is limited. Now the logistics associated with the transport and installation of a PV system to such a site represent a whole new set of special considerations.

We were presented with transportation challenges on a recent project. We were commissioned to build several large SunWize® Power Stations which use our large-scale galvanized steel A-frame structures supporting PV arrays of several thousand watts each. We have a series of established techniques for the pre-assembly and packing of these systems including solid wooden crates to protect the PV arrays, carefully wrapped battery enclosures housing the batteries and control electronics, and bundled collections of steel structure. These techniques provide two basic benefits: they fully protect the equipment during transport and they represent a level of pre-assembly in our factory that greatly simplifies the on-site installation process.

Normally we would utilize the above pre-assembly and packaging strategies relying on lifting equipment at our location and the



Example of SunWize system installed in a rocky location requiring special logistical considerations.

installation site to upload and download the equipment. Our customers would typically have personnel and equipment available on site to work with the pre-assemblies in terms of their weight and dimensions.

In this case, the sites are isolated mountain top locations. Access is either by relatively small vehicles or, in at least one case, by helicopter only. The transport of both equipment and personnel is subject to very specific and relatively small weight, size and time restrictions. At the same time, the customer wants to minimize the required detailed assembly work on site to minimize the time on site for their installation crew.

These site restrictions change the strategy required for the pre-assembly and packing of these systems. For example, rather than pre-assemble the solar modules into multi-module PV assemblies, we have to consider reducing those down to either

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SunWize® Power Station battery enclosures and control enclosures ready for transport.



Modules packed for transportation prior to crating.



Custom module array packaging prior to crating.

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smaller panel assemblies and/or shipment at the PV module level. With the latter we must think through how to pre-configure interconnect cabling for ease of installation on site, how to set up a panel assembly process on site (taking into account significant wind conditions) and how to test the panels once the assemblies are complete.

Likewise, the battery bank would typically be pre-outfitted into heavy-duty enclosures and lifted and placed in position on site with special lifting/hoisting gear. In this situation that gear isn't available, meaning the battery modules must be transported individually and placed in the protective enclosure on site. Thought has to be put in to how to physically carry the battery modules to the enclosure, how to lift them into the enclosure, how to place them in the enclosure, and how to wire them.

Striking the proper balance, a balance between pre-assembly of equipment in the SunWize factory and creating size and weight payloads that meet the requirements of remote mountain-top sites, requires a serious level of planning and dialogue between the customer's project management staff and the SunWize technical/logistical team.

When that level of planning is done well the result is a carefully laid out system that arrives on site safely and is successfully commissioned. The careful system packaging is well marked and identified for site personnel, has clear and concise installation steps, and optimizes the effort and time associated with completing the installation.

For more information, contact any one of our sales managers and visit www.sunwize.com/industrial-solar.



Crated module array for SunWize® Power Station.