Standardisation in PV and associated inverter trends

Standardisation | Standardising PV modules will help reduce developer uncertainty, while at the same time, larger more efficient modules help reduce the size of photovoltaic plants, which continues to be one of the industry's biggest challenges, writes Victor Navarrete, grid connection manager at Atlas Renewable Energy.

As announced by several major PV module manufacturers, photovoltaic modules will now have a standard size; 182/210mm. This will be applied to different module designs, such as cell type or half-cell. The standardisation of modules will help to reduce uncertainty for large-scale renewable energy developers, who design massive projects and need to make sure that all components in the design of the project, such as trackers and inverters, are compatible with the modules. Having a standard size makes designing and developing sizable solar plants much more effective and efficient.

The standardisation of PV modules is as revolutionary as the debut of bifacial panels. Larger modules imply better use of the surface of large-scale projects and represents an improvement in efficiency and overall better production of photovoltaic plants. Larger, more efficient modules means that these large solar plants won't need to be as big as before and allow renewable energy developers to innovate and find creative solutions.

With new larger and standardised PV modules, we must also think about finding ways to update inverters, which are one of the most fundamental components of a photovoltaic plant. Larger panels imply more power, which can be reflected in an increase in the maximum power current (Imp, Maximum Power Current) and short-circuit current (Ish, Short-Circuit Current).

More power could cause a problem for traditional string inverters because they are multistring and/or multi–Maximum Power Point Tracking (MPPT), which mostly share two string inputs per MPPT, where each input has a maximum capacity of 30 Amperes (15 Amperes per string input).

This is a problem when using 182/210 mm panels, with currents up to 13.5 Amperes, without considering the extra contribution of bifacial technology, which under good environmental conditions could raise the current above 15 Amperes. When this is the case, the inverter limits the generation to keep the current under the 15 Amp limit, which would represent an energy production waste when using larger solar panels.

Credit: Sungrow.

Inverter technologies and capacities are adapting to module trends.

This represents an opportunity for inverter manufacturers to adapt to new trends in PV modules – those being larger, more powerful panels – and energy generation. Recently, new inverters have been launched that consider a higher current capacity per string input, reaching up to 40 Ampere (20 Amperes per string input), which are now challenging traditional string inverters.

With this new capacity, it is possible to take advantage of the extra power generated by the larger solar panels and the possibility of energy curtailment is minimised. From the point of view of a large-scale project developer increasing the capacity of the string inputs is a good solution, as it helps to reduce uncertainty in the face of the urgent need to close panel purchase contracts with the manufacturers.

Another tendency that has caught the eye of the market for a while now has been central inverters. Depending on the model, these inverters have one or two Maximum Power Point Tracking (MPPT) and do not have the input current restrictions of string inverters; in this case the restriction is for the maximum input current, which depending on the power of the inverter, can withstand 4,000 Amperes DC or more, thus achieving greater flexibility to work with large panels and take advantage of the extra power they deliver, which reduces the possibility of power cuts in the inverter itself.

It is evident that panel manufacturing technology will continue to advance, making them increasingly larger and more powerful, which requires inverters to evolve at a similar pace, becoming more flexible and allowing the best use of the photovoltaic resource.

The trend among inverter manufacturers seems to be to produce higher capacity string inverters and very flexible central inverters for large panel size applications. There is also a tendency to build increasingly modular equipment, reducing operating and maintenance costs and shortening replacement times in the event of failure. Overall, it is estimated that larger panels and modular inverters will significantly lower balance of system and levelised cost of energy costs, which will ultimately result in a boost to PV economics.

At Atlas Renewable Energy, we've stayed on top of these trends to push forward future photovoltaic project developments that could help heavy energy consumers to reduce their CO2 emissions, while at the same time reducing costs of energy for the long-term benefit of the environment. ■

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