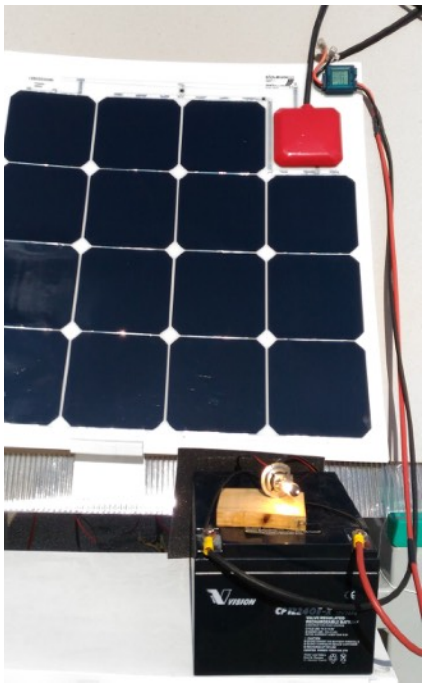
TECHNICAL REPORT

# POWER NEED STORAGE



The power output of a photovoltaic panel is well defined, but customers often have a hard time understanding its meaning and measuring its value. When a solar panel is labeled with a certain power, let's say 100 W, the proper label should be 100 Wp (Watt Peak), or the maximum power that can be obtained in standard condition (so called STC), namely at 25 °C of temperature, with a sunlight power of 1 kW/sqm, and with sun rays hitting the panel surface orthogonally. All those conditions do not come together all that frequently, often the cells are much warmer than 25 °C, sunrays are not perpendicular and even more important, eyes are not a good instrument to say how strong the sun is. A full sun as perceived by the human eye can be quite less strong than the standard 1 kW/sqm sun. Obviously there are method and tools to measure the power in the field, but they are not usually available to most customers.

Thus, when a customer is complaining that he's not able to obtain the expected power from our panels we start explaining all that, but sometimes this is not enough, just because there are other and, sometimes, more important reasons preventing the panel to unleash its full power. One is trivial, we need some place where to store the solar energy: if the panel is connected to a full battery, even under the clearest sky the solar panel will stay idle. At least if there is not any load connected, able to drain some energy from the battery/panel system.

That can be shown quite easily with a Solbian ALLinONE solar panel, a simple wattmeter, a battery and an automobile lamp.



Viale Gandhi 21b - 10051 Avigliana (TO) - ITALY - Telefono: +39 011.966.35.12 - Fax: +39 011.966.47.20 - sales@solbian.eu - www.solbian.eu

The ALLinONE solar panel has a built in charge controller that works precisely as expected, namely, it decreases the current toward the battery as soon as the battery voltage approaches the value known to show a full charge status. That voltage depends on the battery type, and for a 12 Volt Lead Battery is about 14 volt.

The experiment was thus quite simple. We connected a SP47 ALLinONE to a 12 volt battery and inserted a wattmeter between the two, to have a real-time measure of all the electrical parameters. The battery was half charged, the sun was strong and the sky clear, cool weather, optimal to obtain the most from the solar panel. The first measure showed the following values:

Current: 1.7 A
Battery Voltage: 12.3 V
Power: 21 W


We should have expected more from a 47W panel and even trying to find the best panel orientation toward the sun did not improve the result.

Was the problem in the panel efficiency or where else?

We had got an automobile lamp with a power of 55W and we connected it to the battery: the lamp started to shine and the current suddenly increased; the new values on the wattmeter were

Current: 3.7 A
Battery Voltage: 11.9 V
Power: 44 W

**44W for a 47Wp panel is a really good result!**

Conclusions: the panel was working, the built-in electronic board was doing his job with high efficiency, all the troubles were due to a too full or too small battery, not able to accept all the solar power. Adding a load (very easy to do on your boat or your caravan) can give a better feeling about the power of the Sun.