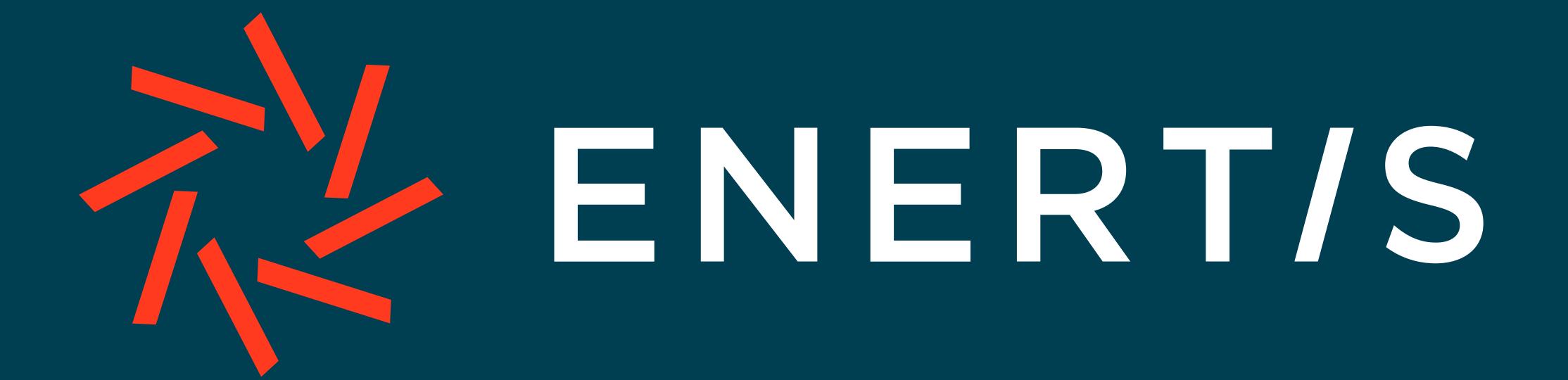
Driving Solar · RELIABILITY Success · RELIABILITY







THE PV MOBILE LABORATORY WORLDWIDE REFERENCE TECHNOLOGY

ENERT/S

Quality Control of Modules

The quality of the solar photovoltaic modules received is not always as expected. For this reason and in order to reduce investment risks and thereby increase the reliability and profitability of projects, it is essential to conduct rigorous quality controls.

Previously, the PV modules were shipped to conventional stationary laboratories, implying difficult logistical work. If modules are already operating at the facility, they needed to be uninstalled, cleaned, packed and sent to an accredited laboratory, usually located away from the facility. With the time it takes to ship to the testing location and then reship back to the project, production and profitability is lost. The increased activity may also delay the completion of the plant which is unacceptable.

In addition to the problem of deadlines, we must add the disadvantage of possible damage that may be caused to the modules by improper handling during transportation. Thus the quality of the module is unknown, which becomes questionable once it leaves the laboratory. So any damage during transport could never have been detected.

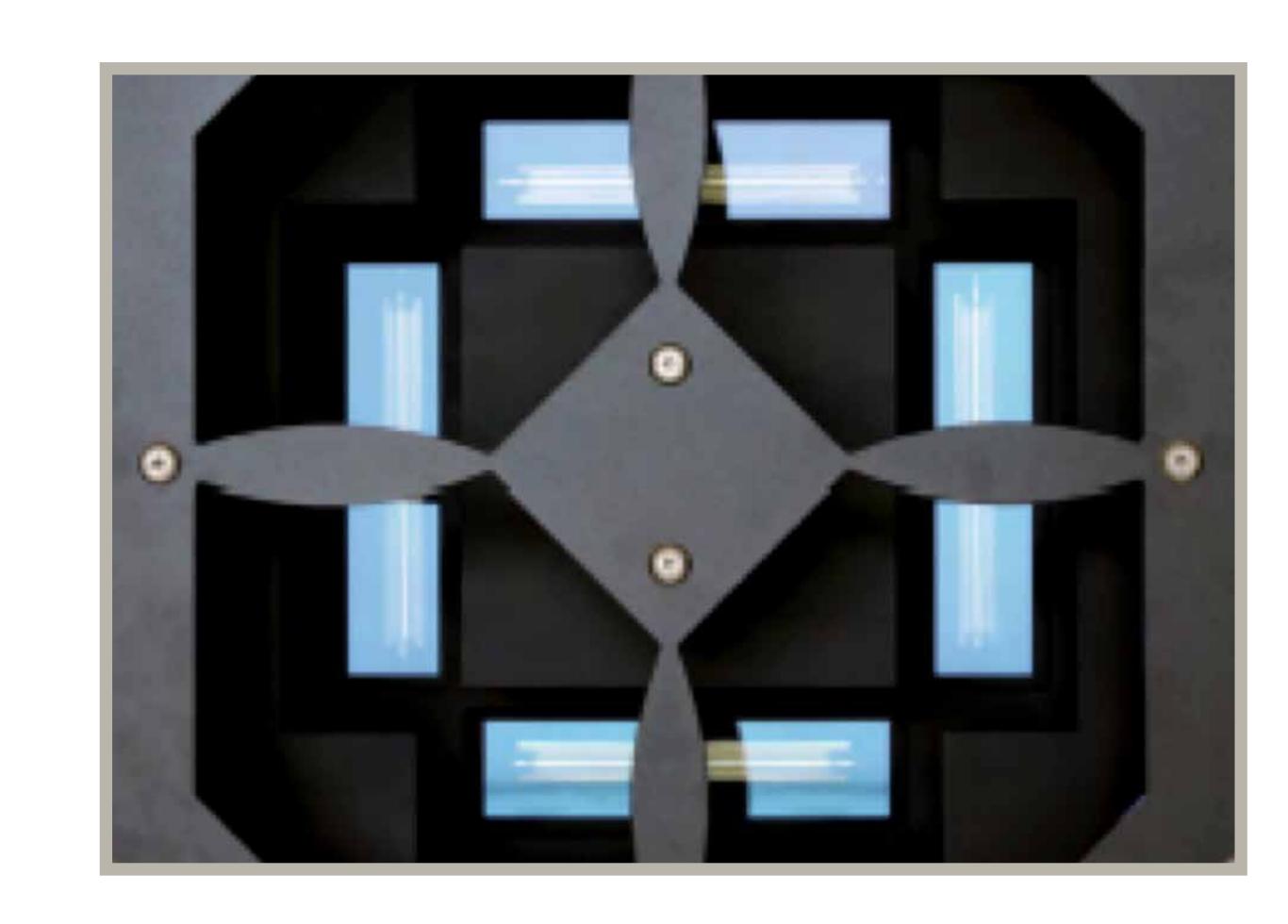
Highly Developed On-Site Measurement

To resolve this issue, Enertis has developed a mobile laboratory (PV Mobile Lab) equipped with the latest technology on photovoltaic equipment. The PV Mobile Lab enables quality control on modules at plants, eliminating the risks inherent in transportation of modules and production losses of energy caused by the unavailability of plant modules.

PV Mobile Lab Capabilities

Power Measurement

This test determines the output power from a PV module in Standard Test Conditions (STC), that is, Irradiation equal to 1,000 W/m2, Solar Spectrum AM 1.5G and Cell Temperature equal to 25 °C. The PV Mobile Lab incorporates a solar simulator AAA class according to IEC 60904-9 or A+A+A+ according to TÜV, being that the best accuracy and reliability.



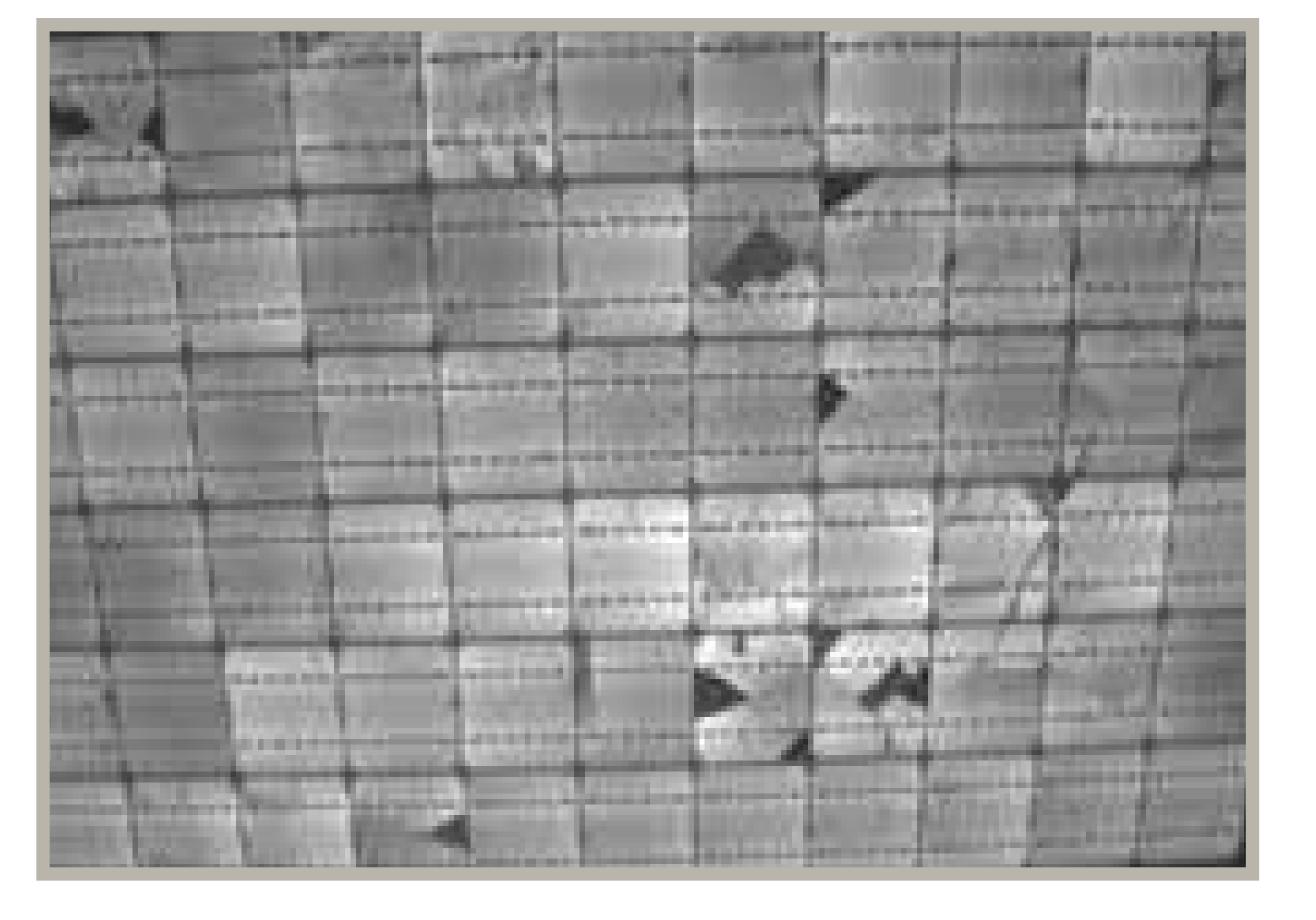
Insulation Measurement

For safety and module performance reasons, the conducting elements in a module must be sufficiently isolated from the frame. This high voltage test, also called Hi-Pot test, is made to stress the module to a high DC voltage in order to check that no breakdowns or perforations are present. If a solar module exhibits problems with stray current, it is recommendable to carry out this test.

Electroluminescence

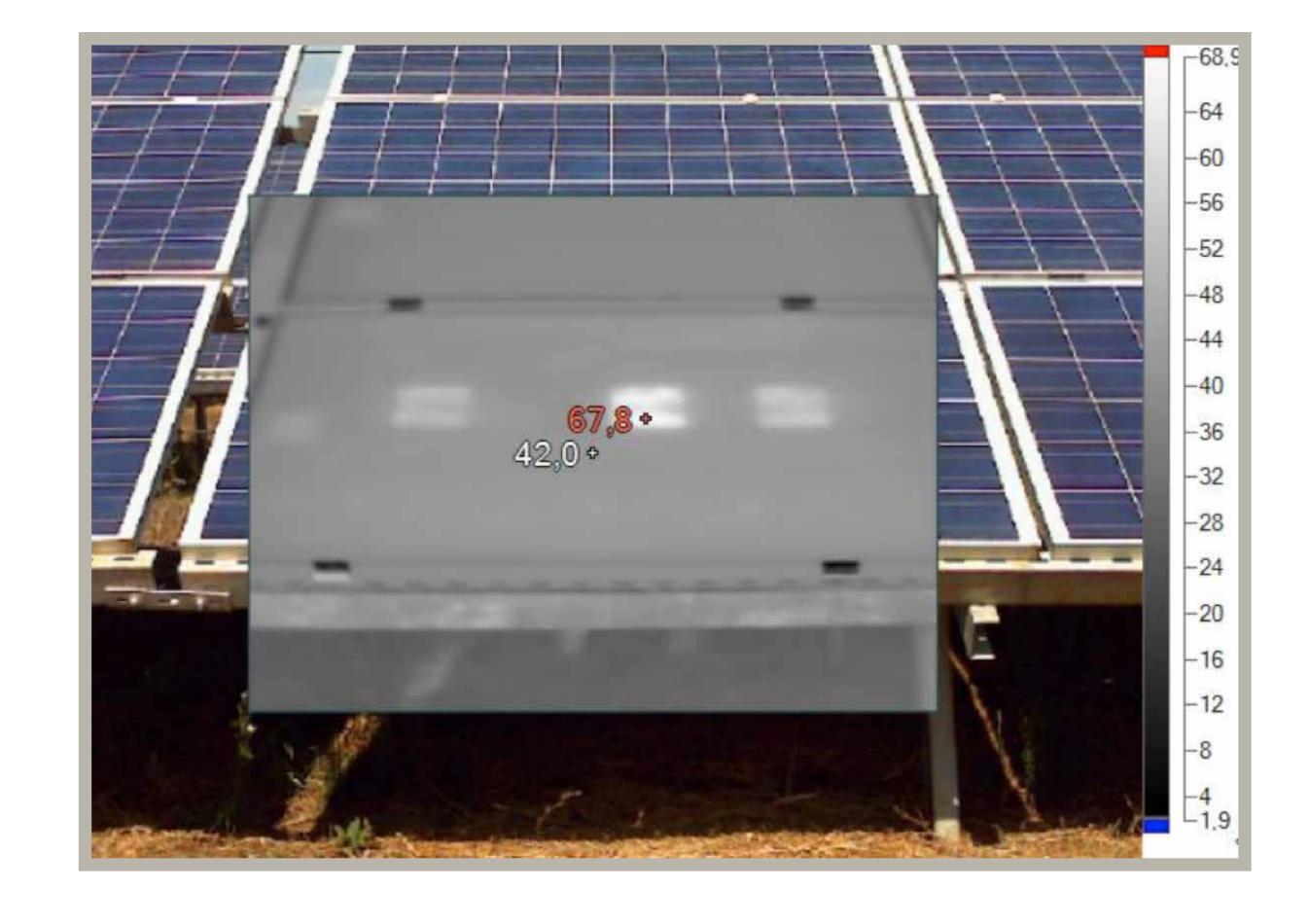
During the electroluminescence test, a voltage is applied to the module connections. The response is a radioactive recombination of electrons in the cells, which in turn produces a photon radiation. The emitted radiation is captured with an Electroluminescence High Resolution Camera.

This is a test that allows imagery to be taken directly of the cells of a solar module for detecting defects that may affect the performance and module life, mainly cracks, broken fingers in the front metallization and inactive cells.



Infrared Thermography

The IR inspection is performed with the modules in operation. This is the only test conducted out of the PV Mobile Lab. In the test, portable High Resolution Infrared cameras are used.



Visual Inspection

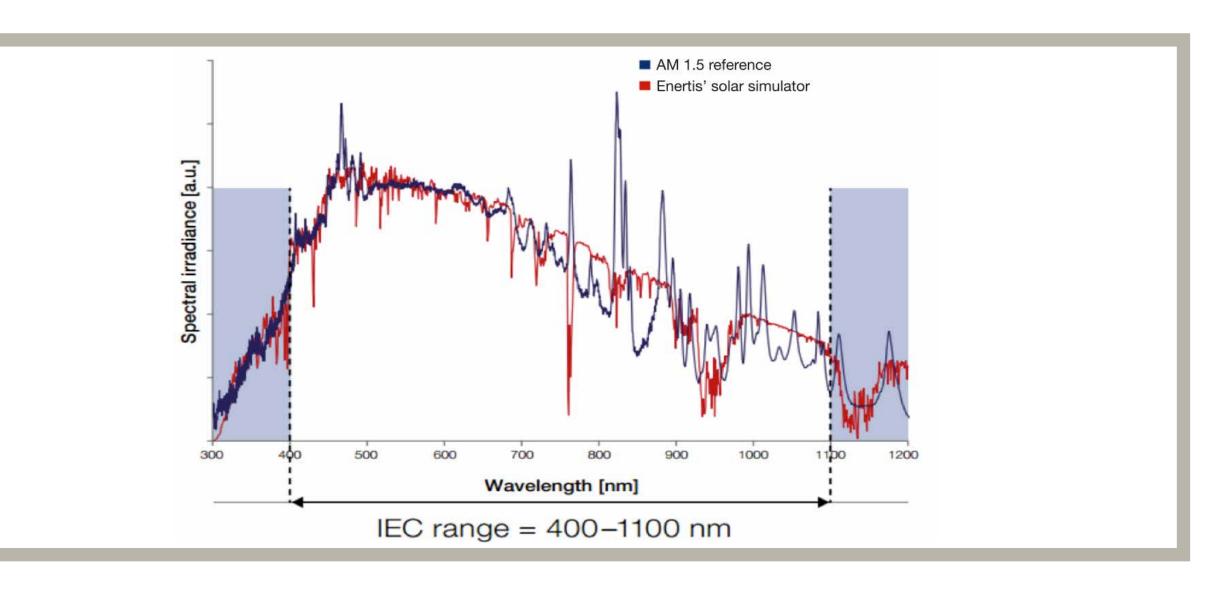
This test aims to detect major visual defects located in the PV module. The visual inspection is performed with the module located in the support structure, just before it is introduced in the laboratory.



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Company Qualifications

All tests conducted with PV Mobile Lab are based on International Standards. Our simulator exceeds the requirements of IEC standards in terms of classification to obtain the AAA grade. This allows us to perform Maximum Power assays based on IEC 61215, especially taking into account the spectral aspects (400-1,100 nm), which is a feature some of our competitors lack as our simulator is Xenon based VS the LED technology generally used in the market which does not meet the spectral requirements. Furthermore, the PV Mobile Lab incorporates a novel climate chamber in order to maintain the module at STC conditions, thus minimizing measurement uncertainty.



Quality Assurance & Independence

Our mobile laboratory is framed within a program to that of a worldwide recognized laboratory. The PV Mobile Lab operates completely independent of manufacturers with the intention of providing services as an unbiased entity.

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