



## LG Solar - Quality & Reliability for the Future

LG's focus on quality control sits at the heart of our manufacturing philosophy. This quality-first philosophy has been developed through decades of creating top class electronic equipment.

Today LG Electronics has a team of more than one hundred engineers working in solar research and development. Our module manufacturing plant located in Gumi, Korea uses the latest state-of-the-art equipment to manufacture solar panels that deliver product reliability and high performance for decades to come.

It means every component from PV cells to glass and framing undergoes individual performance testing and separate quality control. If the quality of any component does not meet our industry leading standards, then it will not be used.

LG's Mono X™ range has been a huge success in the market and proven to be an investment in superior standards of design, manufacture, back up support and warranties.

LG Solar's high quality has been further proven when our previous model, LG Multi X, passed independent quality testing conducted by Fraunhofer Centre. Full details and results of the report are highlighted below where LG was proud to be one of four manufacturers to not show any degradation after being subjected to high voltage stress testing.

## LG Modules world class when it comes to PID resistance

Outstanding quality and reliability make LG one of only four manufacturers from 13 leading module manufacturers to pass the German Fraunhofer Centre for Silicon Photovoltaics (CSP) high-voltage stress test with zero degradation.

Early in 2012 the world renowned Fraunhofer Centre performed an accelerated high voltage test to characterize the PID susceptibility of commercial solar modules. Potential induced degradation is one of the most significant negative influences on the energy yield of solar modules. The PID effect can cause a solar module's output to decrease permanently when the module is subject to high negative voltage between the solar cell and the ground during use, including in large solar farms. It therefore can have a direct correlation to the output available from a solar system over many years. The less degradation, the more output by the modules/system.



Fraunhofer CSP anonymously acquired and independently tested modules from 13 well-known module manufacturers. In the test the temperature (+50 °C) and the relative humidity (50 %) was increased and the test took place for over 48 hours. A negative voltage bias of -1000 V was applied. The modules were covered with a thin aluminium foil on the glass side to generate a homogeneous electric field. The module power of the solar modules was measured before and after the test. After the test only four out of the 13 modules showed no degradation. LG was top of the class. Recently both Kyocera and Q-cells also announced that their modules were also one of the top four.

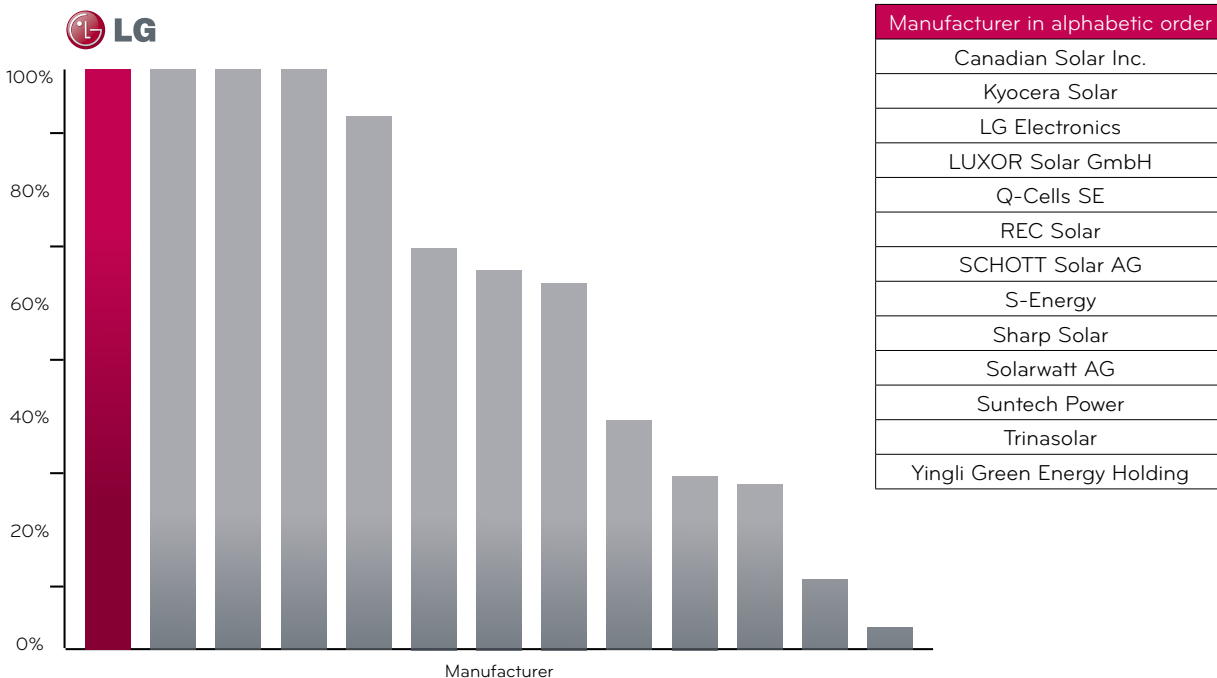
Professor Jörg Bagdahn, director of Fraunhofer CSP, said: "We were surprised that so many modules showed such a high degradation". Nine modules showed an output loss – partially in excess of 90%. On average, nominal output decreased by 56%.

"As a leader in the industry LG has focused on producing high quality, reliable solar modules and our strict and constant manufacturing processes ensure the high quality and long-term durability of our products," said Markus Lambert, National Solar Manager of LG Electronics Australia. He added "These results highlight a stark divide between different companies' modules" – while confirming LG among a select number to be proven as PID resistant.

"The high failure rate of the investigated brand modules from other manufacturers confirms how relevant the PID topic is."

### High Voltage Stress Test - Conditions

- Homogeneous electric field at glass front side using a Al foil, 1000 V bias
- Temperature 50°C
- Humidity 50% rel.
- Duration 48h



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