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Sustainability Through Product Quality and Compliance

Objective

Standard Development

The codes and standards, protocols and testing methods of solar energy products family are being developed /updated to ensure suppliers will continue providing the products that can meet the product specification, performance and specified warranty obligations.

Overview of new standards

The present article was aimed at providing an overview of important developed and under development standards and test methods that will result in higher durability and reliability of photovoltaic modules, inverters and stability of grid networks.

Quality and Price Trend

PV module prices have dropped 60 to 65 percentage over the last couple years. According to the SunShot vision study (DOE 2012), the target total cost of systems will drop about 75% till 2020(1). This simply indicates the solar hardware manufacturers must lower the prices while increasing the quality by applying new standards and regulations.

The price-quality relationship has a low-high trend, as the prices drop the quality should increase. With that in mind, the consumer behavior has also changed and customers demand higher quality products. In fact, not only do they demand quality products, but they would also like to verify it through extra testing, inspections and going above and behind the existing standards to ensure the specified level

Summary of Plan

As shown in Figure 1, an estimate of ten new changes are expected to occur until 2017-2018. Six are module related standards and testing procedures:

I. Qualification plus testing protocol
II. IEC 62882 dynamic mechanical load testing (DMLT)
III. IEC 62804 Test Method for Detection of Potential Induced Degradation (PID)
IV. IEC 62852 connectors for DC application in photovoltaic systems
V. IEC 62790 junction boxes of photovoltaic modules are being developed for modules
VI. UL1703 new edition

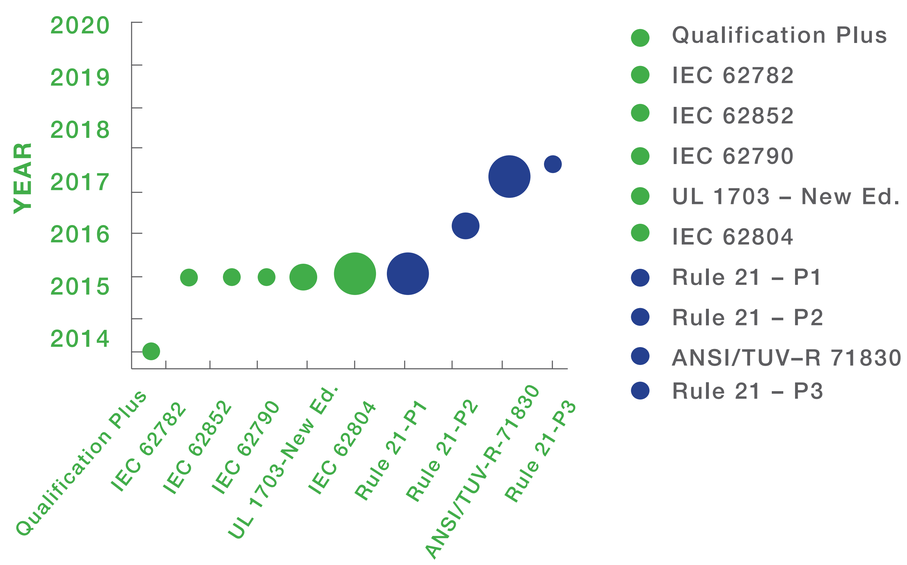

Figure 1- Trajectory of under development standards and testing procedures till 2017-2018

	Existing Qualification Test	Qualification Plus
Component Test		
UV Exposure of Encapsulant	UV-dose of 15 kWh/m2	UV-dose of 224 kWh/m2
UV Exposure of Backsheet	UV-dose of 15 kWh/m2	UV-dose of 320 kWh/m2
UV Exposure of Cables & Connectors	UV-dose of 15 kWh/m2	New-Standard - EN 50521 & IEC 62852
UV Exposure of Junction Box	UV-dose of 15 kWh/m2	New-Standard - EN 50548 & IEC 62790
Bypass Diode and Junction Box Thermal Test	1 hr	95 hours
Module Test		
Thermal Cycling	200 cycles	500 cycles
Dynamic Mechanical Load Test	State Mechanical Load	Dynamic Mechanical Load - IEC 62782
Enhanced Hot Sport Test	IEC 61215	ASTM E2481-06
Potential Induced Degradation	N/A	96h/60ºC ±/85%RH or 168h/25°C/60%RH
Quality Management		
PV - Specific Quality Management	N/A	Quality Management System
Sample Selection Method		
Number of Samples	2	5
Selection Method	Design or Engineering Line	Production Line

As shown in Figure 1, six new inverter related standards and testing procedures are on the way:

I. Rule 21 phase 1, 2, 3
II. ANSI/TUV-R 71830 microinverters and microconverters design qualification and type approval for utility interactive inverters

Table 1 shows the side-by-side comparison of the existing qualification test versus the proposed qualification plus.

Table 1- Summary of the existing qualification test vs. proposed qualification plus

Conclusion

ReneSola, as a leading international solar energy components supplier, is validated as a SATELLITE laboratory. ReneSola has a solid R&D on product optimization and new standard implementations to guarantee high performance and quality that help investors to achieve the fastest and safest possible return on investment.

ReneSola supports the intention of strengthening the quality control and standardization of the solar energy components as the new standards are scientifically approved and developed

Competitiveness qualification tests and new standards can help to identify the top-quality and performing products and differentiate between the quality driven manufacturers from a purely compliance driven one

The costs and time associated with the new standards should be carefully evaluated. Given these facts, although the solar family products will subject to the longer testing hours and additional standards but the outcome ensures a more reliable and efficient, low-risk and defect-free products which results in higher investment in solar sector that will benefit everyone.