Inverter Certification Standards Must Change To Meet New Demands

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Change comes quickly in all equipment segments of the U.S. PV industry, and nowhere is this clearer than in inverters. The demands placed on these vital PV array nerve centers were unimaginable even five years ago.

But those increased demands have put immense pressure on testing organizations like UL (Underwriters Laboratories) to keep pace with these changes to ensure the inverter is safe involved and can be easily integrated into the grid.

UL recently published in July the new US standard ANSI/UL 62109-1 — “Safety of power converters for use in photovoltaic power systems.” This standard is integrated with the international IEC 62109 standard that established the foundation for globally transportable PV inverter safety certifications.

This paper will discuss the new certification and standardizations that meet these rapidly changing needs.

Present PV Inverter Certifications
UL 1741 was published in the late 1990s and has become the accepted product safety standard for PV inverters and electronics within the United States. The standard deals with PV powered electronic equipment - safety issues (electric shock, fire and mechanical hazards), while also providing a certification basis for grid-interconnection for these products.

While UL 1741 addresses most authorities-having-jurisdiction (AHJ) and distributed generation (DG) concerns, PV innovations in the past 20 years, it has become apparent that expansion of these requirements via an international platform will better serve the testing and certification needs of the PV industry.

International PV Inverter Safety Certifications
UL 62109 brings U.S. inverter safety requirements in line with IEC 62109.

Based on UL 1741, the IEC expanded its safety requirements to keep up with the cutting-edge technological changes of the inverter segment. It’s being adopted around the world, and UL 62109 brings the U.S. into international compliance.

UL 62109 ensures PV inverters and other PV electronics:
• Are constructed according to common international industry requirements
• Can be installed in accordance with U.S. codes
• Operated per industry-specific required ratings
• Perform safely under rated, normal worst-case conditions
• Perform safely under foreseeable abnormal operating conditions and failure modes.

But don’t be alarmed: UL 1741 is still the certification standard for grid-interconnection compliance to address the needs of existing state and local grid codes. UL1741 will still be a viable certification option for non PV equipment and for PV equipment mfrs that do not wish to products international products. The UL 1741 Standards Technical Panel (STP) will make sure the two standards are cross-referenced and they will determine the future of the existing UL1741 PV requirements, until then the manufacturers have the choice of either as the basis for their U.S. inverter-product certifications.

**PV Inverter Grid Interconnection Certifications**

As PV power becomes more mainstream, PV inverters must enhance PV’s ability to be more electric utility grid-friendly and actively participate in grid stabilization during abnormal utility grid conditions.

The present IEEE 1547 based interconnection requirements were developed and written assuming a relatively low percentage of Distrusted Generation (DG) on the grid and they have served that purpose well. With the ever increasing number of grid tied PV installations, California electric utilities are concerned that using the low penetration grid interconnection methodologies in large numbers will lead to grid instability as has occurred in other parts of the world. Therefore new advanced grid support utility interactive requirements are being drafted to meet the growing, changing needs of California. These new requirements will be added as a supplement to UL 1741 (UL 1741 Supplement) to bridge the gap until IEEE 1547 and IEEE 1547.1 grid-interconnection protocols are updated.

To ensure these requirements meets the needs of all the stakeholders, UL has convened a task group including PV inverter manufacturers, California’s electric utilities, U.S. national labs, industry experts and UL. Multiple weekly teleconferences are making rapid progress toward a resolution and the development of these new requirements for Grid Support Interactive Inverters, which will be implemented for California in three phases over the next few years.

**Conclusion**

The new certification options before the inverter manufacturers, designed as they are to satisfy local, state, national and international compliance regulations, will save significant design, engineering and certification systems, which lowers the time companies need to bring new products into the market — moving the industry forward more rapidly than ever before.