UL Fire Rating Standards

Issue: Proposed UL Fire Rating Standards would add $.50 - $1.50 / Watt to nearly all Roof Mounted Solar Installations in the United States

Specifics: Proposed changes to UL 1703 are designed to evaluate whether a roof with solar adequately slows or prevents the spread of fire (testing protocol assumes a fire has already reached, or started on, the roof.) Effectively, UL directs a blowtorch over the roof, and examines how quickly the flame spreads.

Problem: No Rack-Mounted PV Systems Would Currently Pass This Test

Since PV systems create an "air space" between the PV system and the roof, it is effectively impossible for any existing residential install method to pass this new UL test. UL code experts have advised that even if PV panels were inert concrete blocks, they would not be approved under this testing method. The effect would be to immediately derail planned commercial roof mounts and the disruptive impact would quickly spread to residential roof mounts; the impact would not be limited to areas of the country prone to wildfires.

The Proposed Mitigation Methods Would Add 30% or More to the Cost of a Solar Installation – In Many Cases More Than the Cost of the Solar Panels Themselves

UL has proposed 3 different paths that would permit compliance. However, all of these are impractical with current technology. Based on internal industry conversations, estimated costs are very approximate:

UL Proposed Prescriptive Path	Projected Cost Increase	Cost Explanation	Further Concerns
Mount directly to roof (no rack)	$1.00 to $1.50/W	Modules cannot simply be laid on the roof with any existing rack product, as most framed modules require an air space in their user manual; only BIPV could be installed. This is a typical premium of a BIPV zero clearance rack system.	Low power density; unknown effects due to module heating; water and ice damming. Very low product diversity and availability.
Mount modules minimum 12" above the roof	$1.50/W	Dramatic decrease in aesthetics; could increase customer acquisition costs 10x.	Major rack costs associated with dramatically increased wind loading. Unacceptable aesthetics.
Mount modules with barrier	$0.50/W	Similar to "In-Roof" racking systems which cost $0.30 to $0.50/W more than traditional racks. Added roofing costs also exist.	Low power density; unknown effects due to module heating and water and ice damming.

The UL Proposed Measures Would Cost Nearly 400 Times as Much as They Would Save

With just .286% of US single family homes involved in a fire per year, and .014% of homes having a PV installation, we would expect less than 0.00004% of US homes per year to experience a fire while having PV on the roof, i.e. statistically about forty (40) US houses with PV on the roof. Remember – this could well mean a dryer fire or kitchen fire, nowhere near the PV. With more than 200,000 total systems installed to date in the US, current US Fire Administration data indicates only 7 fires have actually been reported in PV-equipped structures to date; California's Fire Marshal is aware of one additional incident. An average single-family home fire causes on average $21,129 of damage. Assuming that the proposed UL measures reduced this damage by 50%, **society would save perhaps $827,592 per year**. Meanwhile a best-case $.50 / Watt increase in the cost of the 162.8 MW residential US solar market would cost society **$81.4 Million dollars per year. This is a 393:1 cost: benefit ratio.**

Compare to items such as residential sprinkler systems, which have a **zero-point-3-3:1 cost-to-benefit ratio.**[1] Residential sprinkler systems are not required by code standards because of the high cost and corresponding minimal relative benefit.

Further, it is important to recognize the ways in which a roof hosting a PV system is *less* likely to end up in the situation tested for by UL. For a fire to spread on a roof, it must first start there – either from internal to the house or (as drives the roof rating concerns in forest fire and urban interface areas) due to embers or brands falling onto the roof from a neighboring fire. Logically, a roof partially covered with tempered glass solar panels is far less likely to ignite in the first place. However, this fire deterrent capacity is in no way considered by UL.

Conclusions and Recommended Actions:

Given the safety record of the industry to date and the grossly disproportionate costs-to-benefits in this case, we request that the UL cease usage of the current "spread of flame" test and release a schedule and process by which a more appropriate set of prescriptive measures and /or testing standards can be developed in full partnership with the industry and DOE.

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[1] US residential cumulative solar installs as of 2011 and size of 2011 residential solar market per GreentechMedia Research / SEIA; number of single family homes in US per US Census QuickFacts. Direct Property Damage per fire http://www.nfpa.org/assets/files/PDF/OS.fireloss.pdf . Number of 1- and 2- family home fires per year Nat'l Fire Protection Association: http://www.nfpa.org/itemDetail.asp?categoryID=953&itemID=23858&URL=Research/Fire%20statistics/The%20U.S.%20fire%20problem