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Fraunhofer CSE and Fraunhofer ISE Joint Testing Venture Ranks Performance of PV Modules

Boston, MA – June 18, 2013 – The Fraunhofer Center for Sustainable Energy Systems CSE in Boston and the Fraunhofer Institute for Solar Energy Systems ISE in Freiburg announce the release of the first report from their PV Durability Initiative (PVDI). PVDI's robust testing protocol generates scores that enable the credible rating of PV modules based on their likelihood to perform reliably under different kinds of stress. The report provides solar PV financiers, developers, and other industry players with the first widely available quantitative dataset to assess long-term durability.

"The potential for PV modules to fail in advance of their intended service life is a key factor that increases the perceived risk, and therefore the cost, of funding PV installations," explains Geoffrey Kinsey, Director of PV Technologies at Fraunhofer CSE. "PVDI addresses this issue." PVDI rates PV modules on a scale of zero to five relative to their likelihood to perform reliably with regard to the performed tests. Modules are subjected to accelerated stress testing intended to approach the wear-out regime for a given set of environmental conditions. The modules are rated for both performance and safety.

In parallel with the accelerated tests, modules are subjected to long-term outdoor exposure; the correlation between the accelerated tests and operation in the field will be determined over time. The accelerated test component in PVDI is an extension of familiar reliability stress tests and includes combined effects. Where possible, the program requires that commercial modules be purchased on the open market, to avoid selection bias.

In this first round of testing, five of the top ten Si-crystalline module producers were selected to be tested. The results show a substantial spread in thermal cycling durability, while all tested module types proved very good stability in the damp heat/UV test sequence. Though participants have the option to remain anonymous, the data generated becomes a permanent part of the ongoing PVDI dataset for continuing comparison with the rest of the field as well as future modules. These durability ratings for commercial PV modules will enable PV system developers and financiers to assess the technical bankability of PV modules and make more informed deployment decisions. For manufacturers, the data also encourages continuous improvements toward more durable modules.

Current tests according to IEC and UL protocols address the question of early field failure and safety of solar PV modules, but do not yet yield information about durability – the rate of degradation of power output. PVDI's expanded, comprehensive indoor and outdoor testing addresses durability, exceeding the demands of IEC standard module certification with extended accelerated testing, UV irradiation, damp-heat with positive and negative voltage bias as well as dynamic and static mechanical stresses at different temperatures. Also included are typical stresses such as temperature cycling, humidity-freeze, and damp-heat, which have been extended in order to come closer to the actual stress on a module.

“Accelerated innovation cycles as well as a highly increased cost pressure throughout the PV industry prove qualification beyond basic standards to be absolutely essential” says Dr. Harry Wirth, Director Division Photovoltaic Modules, Systems and Reliability at Fraunhofer ISE in Freiburg.

PV module manufacturers, system developers, and financiers can participate in the PVDI program. Among the benefits of participation are the ability to propose specific modules for testing, access to quantitative testing data for all modules, and the option to participate in a workshop that meets yearly to discuss improvements to the testing protocol. For more information, please visit the [PVDI website](#) or see the article in *Photovoltaics International*, May 2013.

About Fraunhofer CSE

The Fraunhofer Center for Sustainable Energy Systems (CSE) is a not-for-profit applied R&D laboratory dedicated to the commercialization of technologies for a sustainable energy future. CSE engages in collaborative research with private companies, government entities, and academic institutions, and works with emerging sustainable energy startups to help develop their technologies, bridging the gap from laboratory to production.

In 2013, CSE moved into a state-of-the-art facility in the Boston Seaport District. The new facility – known as the Building Technology Showcase – is a living laboratory for R&D of advanced building technologies and houses CSE's advanced laboratories for building energy efficiency, solar photovoltaics, and distributed electrical energy systems as well as the TechBridge early-stage commercialization program. Fraunhofer CSE is a subsidiary of Fraunhofer USA, a 501 (c) (3) non-profit contract R&D organization, affiliated with Fraunhofer Gesellschaft, Europe's largest contract R&D group.

About Fraunhofer ISE

With a staff of 1300, the Fraunhofer Institute for Solar Energy Systems ISE, based in Freiburg, is the largest solar energy research institute in Europe. Fraunhofer ISE is committed to promoting energy supply systems which are sustainable, economic, safe and socially just. It creates the technological foundations for supplying energy efficiently and on an environmentally sound

basis in industrialized, threshold and developing countries. To this end, the institute develops materials, components, systems and processes for a total of eight different business areas: Energy-Efficient Buildings, Applied Optics and Functional Surfaces, Solar Thermal Technology, Silicon Photovoltaics, Photovoltaic Modules and Systems, Alternative Photovoltaic Technology, Renewable Power Supply and Hydrogen Technology.

Fraunhofer ISE also has numerous accredited test facilities. Based on 20 years of experience in PV module and system quality assurance, Fraunhofer ISE offers comprehensive support in module technology development, characterization and testing, assisted by our accredited TestLab PV Modules and CalLab PV Modules.

Further Information

- [Publication: "The PV Durability Initiative"](#)