

# Journal of Photonics for Energy

[SPIDigitalLibrary.org/jpe](http://SPIDigitalLibrary.org/jpe)

## **Guest Editorial: Special Section on Reliability of Photovoltaic Cells, Modules, Components, and Systems**

Neelkanth G. Dhere  
John H. Wohlgemuth  
Kevin Lynn

# Guest Editorial: Special Section on Reliability of Photovoltaic Cells, Modules, Components, and Systems

**Neelkanth G. Dhere,<sup>a</sup> John H. Wohlgemuth,<sup>b</sup> and Kevin Lynn<sup>c</sup>**

<sup>a</sup>University of Central Florida, Florida Solar Energy Center, 1679 Clearlake Road, Cocoa, Florida 32922-5703

[dhere@fsec.ucf.edu](mailto:dhere@fsec.ucf.edu)

<sup>b</sup>National Renewable Energy Laboratory, 1617 Cole Boulevard, Golden, Colorado 80401-3305

[john.wohlgemuth@nrel.gov](mailto:john.wohlgemuth@nrel.gov)

<sup>c</sup>U.S. DOE, U.S. Department of Energy, 1000 Independence Avenue, SW, Washington, DC 20585

[kevin.lynn@ee.doe.gov](mailto:kevin.lynn@ee.doe.gov)

The field of photovoltaics has undergone dramatic growth over the past few years. This growth has been accompanied by two significant changes in the commercial photovoltaic (PV) market.

1. The major PV market has shifted from the residential and commercial building markets to central station utility power markets. With this switch has come a new focus on the long-term reliability and durability of PV modules and systems. If you are installing tens or even hundreds of megawatts of PV modules, it is absolutely necessary to ensure that they will continue to perform adequately throughout their expected lifetime of at least 25 years.
2. Selling prices for PV modules have decreased from more than \$4 per watt to less than \$1 per watt in the last 5 years. This reduction in selling process has been driven by low-cost production in the developing world. This means that most of today's PV modules are being manufactured by companies that did not exist 10 or, in many cases, even 5 years ago. Yet the modules must carry 25-year warranties and are expected to survive at least that long without having the benefit of long-term field experience.

Based on these two factors, PV module reliability and durability have been even more important over the last few years. Customers are demanding more assurance that the products can survive, while the manufacturers have less actual field data to share with these customers. Therefore it has been critical for the PV industry to better understand the science of PV module reliability, using what field data is available along with accelerated stress testing and modeling to better understand long-term module performance and to provide predictions on module failure and degradation rates.

It is with this background that this special section of the *Journal of Photonics for Energy* on the reliability of PV cells, modules, components, and systems is presented.