S-DLE Center to boost durability, lifetime of solar power plants

May 27 2011

Case Western Reserve University and industry are teaming up to dramatically improve the productive lifetime of solar energy technologies, energy-efficient lighting, roofing, building exteriors and more.

The effort received a boost from the state this week, when the Ohio Third Frontier Commission recommended a $2.88 million grant to help fund the Solar-Durability and Lifetime Extension Center at Case Western Reserve. Awarded under the Third Frontier Wright Projects Program, the S-DLE Center will include new labs and a sun farm on campus.

Such a center fills a critical need cited by the U.S. Department of Energy. The Energy Department says establishing and implementing lifetime and degradation science for advanced energy and energy efficiency products, especially early in development, is crucial to U.S. competitiveness.

Case Western Reserve and its partners will provide companies with the indoor and outdoor laboratory facilities needed to expose and evaluate materials, components and products under solar radiation of up to 1,000 suns, and under extremes in temperature, humidity, freezing and thawing cycles and other environmental factors.

"The facilities and equipment will enable users to determine the effects of 25 years of exposure to solar radiation and the environment in a much

shorter time span," said Roger H. French, the F. Alex Nason Professor in materials science and engineering, macromolecular science and physics at the university.

French will be the S-DLE center director. Also from the university, Alexis Abramson is the commercialization director and Frank Ernst, Ken Singer and Dave Schiraldi are co-investigators.

The standards and protocols developed to withstand a quarter-century of weathering will ultimately enable companies to accelerate and lower the cost of product development, provide longer-lasting products with improved product warranties, and lower cost of ownership to consumers.

The S-DLE Center builds on Case Western Reserve's ongoing project with Replex Plastics, a company in Mt. Vernon, Ohio, developing mirrors to boost light intensity on, and power output from, photovoltaic modules and systems. French and Replex are validating the lifetime and durability of mirror augmented PV systems, as this approach can reduce the cost of solar power. The Third Frontier Commission awarded that project a $900,000 grant in February.

The Ohio Third Frontier grant is supplemented by the $3 million cost share commitment made to the center by Case Western Reserve and the S-DLE industrial partners: DuPont Photovoltaic Solutions, Underwriters Laboratories and Ohio-based Q-Lab, eQED and Xunlight26.

The state funding will enable the installation of a dozen solar trackers – essentially a post topped with a motorized platform that uses GPS to automatically follow the sun (the "sun farm"), indoor solar simulators that produce up to 1000 times the sun's intensity, and a variety of environmental test chambers. The center will offer a variety of equipment to evaluate optical, interfacial, thermo-mechanical and electrical properties of materials, components and products exposed to

the elements atop the trackers or in the labs.

The facilities will be available to other industrial and academic users. The center is in discussions with 11 additional companies that would pay for access and services.

To provide broader service, the S-DLE Center is establishing exchange programs with the National Renewable Energy Laboratory, in Golden, Colorado, and with industrial partner Q-Lab, which has facilities in Arizona and Florida, to test materials and products in the different environments.

Provided by Case Western Reserve University

Citation: S-DLE Center to boost durability, lifetime of solar power plants (2011, May 27) retrieved 24 April 2024 from
https://phys.org/news/2011-05-s-dle-center-boost-durability-lifetime.html

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