Alchemi

Project's Full Title

Allow Cost, High Efficiency, Optoelectronic HCPV Module for 1000 Sun Operation.

Description

Project ALCHEMI will demonstrate a new type of low cost, high concentration photovoltaic (HCPV) module which has a DC module efficiency (η) >37% (at Concentrator Standard Test Conditions (CSTC) of 25°C cell temperature and a DNI of 1000W/m2), which operates at a concentration factor of ~1000x. This module efficiency value will be achievable in manufacturing volumes, and not just as a hero result. The module will use small III-V multi-junction solar cells (~1mm x 1mm), no external heat-sinking, and refractive optics – Fresnel Primary Optical Element (POE) and a Silicone Secondary Optical Element (SOE). The receiver element of the module will be a surface mount device (SMD), and the module will take full advantage of cost reductions associated to the LED industry by only using surface mount devices and components, using pick and place assembly. In this respect, this project will demonstrate a low cost route to high concentration photovoltaics, by exploiting existing assembly equipment and processes of the well-established optoelectronic industry. Modules will be extensively tested, both on-sun for around six months to establish performance and reliability, and using environmental testing in -line with the CPV module standard IEC62108. In testing, the performance of these modules will be compared with conventional flat plate c-Si modules and other lower concentration HCPV modules geographically situated at the same location, to demonstrate the performance and energy yield advantage of the modules that will be developed.

Partners

IQE plc (co-ordinator), Fullsun PV, Universidad Politécnica de Madrid, Fraunhofer-Gesellschaft (Fraunhofer ISE).

University of Cyprus Role: Partner

Funding Agency: Solar ERA NET

Funding Amount: €1,242,227

Funding Amount for University of Cyprus: €100,000