

## ENMESH ENabling Micro-ConcEntrator Photovoltaics with Novel Interconnection MetHods

*Project duration: from 02.2018 to 02.2020*

*Report submitted: 11.2019*

### **Publishable Summary**

The Swiss company Insolight is developing a patented PV module that promises a reduction in LCOE for roof-based solar from 0.16€/kWh to 0.011€/kWh. The system uses an array of micro-solar cells with optics and integrated microtracking to produce a low-profile rooftop-compatible solar system with an independently demonstrated efficiency of over 36%, a 100% efficiency gain over cSi. This high efficiency is made possible through the use of advanced multi-junction cells under concentrated light, a technology known as CPV. Specifically, the product represents one of the first commercial examples of micro-CPV ( $\mu$ CPV), wherein the cells are 1mm<sup>2</sup> in size or less.  $\mu$ CPV increases performance (due to reduced cell operating temperature, higher optical efficiency and lower series resistance losses) and lowers costs. Insolight innovation has further improved the  $\mu$ CPV concept by embedding sun tracking internally in a 50mm-thick panel, enabling roof-top or BIPV installations and avoiding bulky and expensive trackers. An outstanding technological challenge in  $\mu$ CPV is the need to use massive cell interconnection processes due to the large number of micro-cells involved, 5000 cells/m<sup>2</sup> for the Insolight module. The current state of the art is wire bonding, however this inherently serial process is prohibitive for thousands of cells. The Universidad Politécnica de Madrid, in collaboration with Dycotec Materials Ltd, offer an innovative cell interconnection process involving direct printing of ultra-durable nano-particle coatings systems to allow the massively parallel connection of solar cells in a cost-effective high volume roll-to-roll or sheet fed printing process, paving the way for the low-cost manufacture of  $\mu$ CPV. We will partner with Insolight in order to develop, test, and validate this interconnection technology for their module, leading to the production of a demonstrator system making use of this process.

## Project consortium

Coordinator and all contact details:

Full name of organisation	Universidad Politécnica de Madrid
First and family name of coordinator:	Ignacio Antón Hernández
Full address:	Avda. Complutense, 30, 28040 Madrid, Spain
E-mail:	i.anton@ies.upm.es

Participating countries and financing:

Country	Number of organisations involved	Project costs in EUR	Public funding in EUR
Spain	1	176'000	125'000
United Kingdom	1	425'399	297'779
Switzerland	1	200'400	91'200
<i>Total</i>	3	801'799	513'979

## Funding agencies involved and contracts

Funding Agency	Contract N° and Title
MINECO	PCI2018-093168 "ENabling Micro-ConcEntrator PhotovoltaicS with Novel Interconnection MetHods"
Innovate	620137 "ENabling Micro-ConcEntrator PhotovoltaicS with Novel Interconnection MetHods"
SFOE	SI/501620-01 "Enabling Micro-Concentrator Photovoltaics with Novel Interconnection Methods"