

# Swiss solar panels 50% more efficient thanks to hybrid technology

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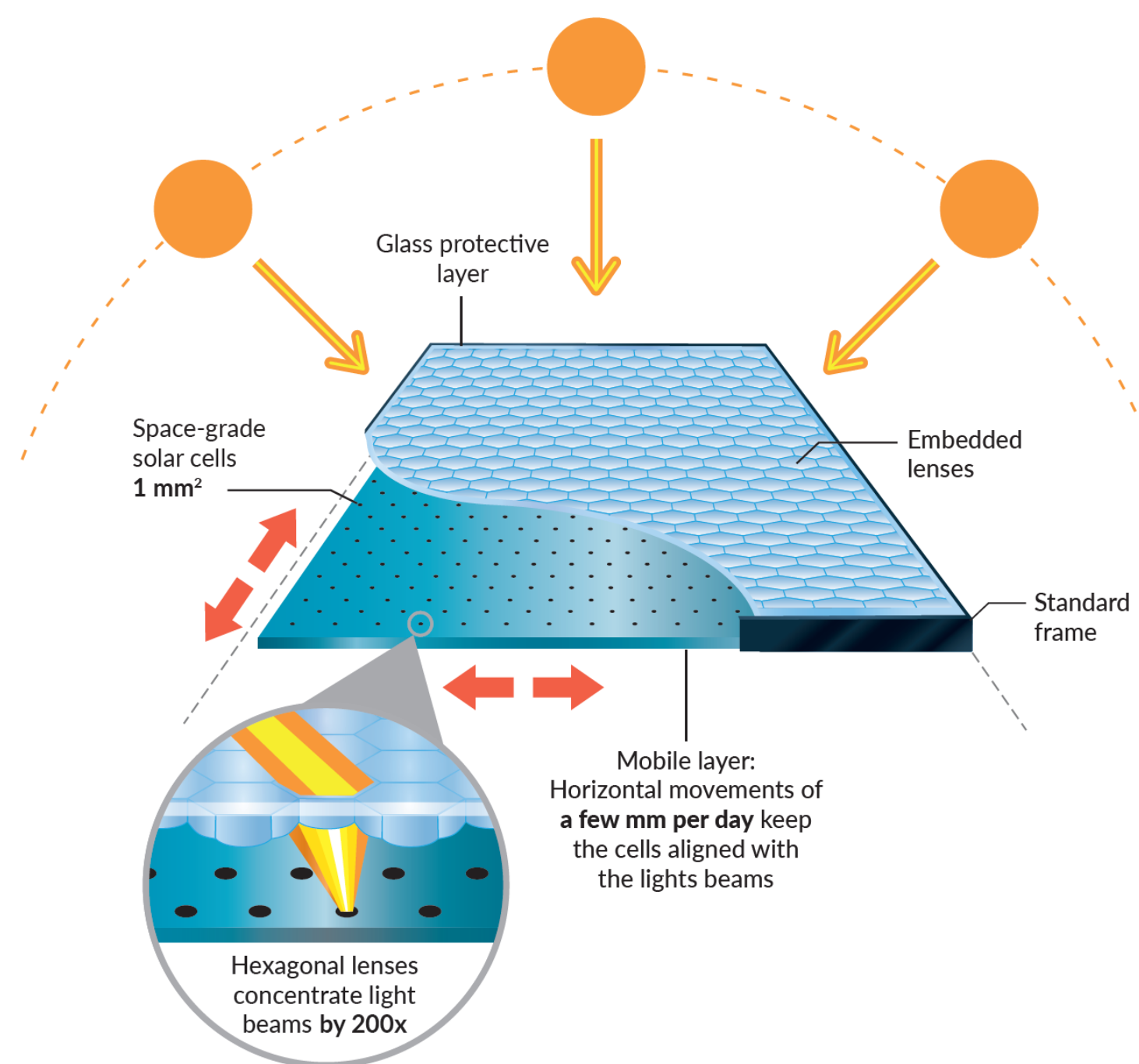
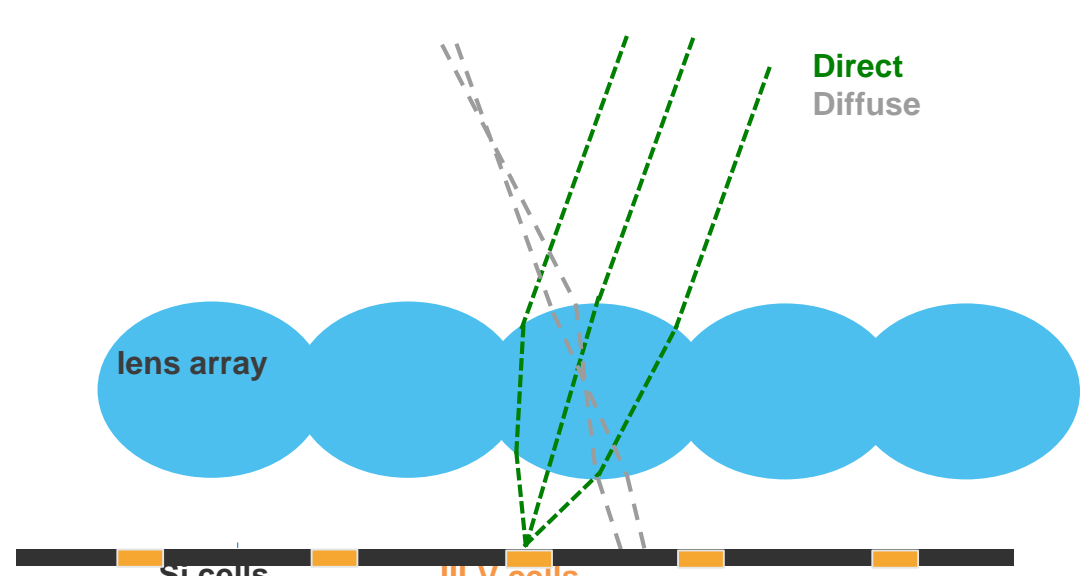
L. Coulot, M. Ackermann et F. Gerlich, Insolight, 1024 Ecublens



## HYBRID APPROACH

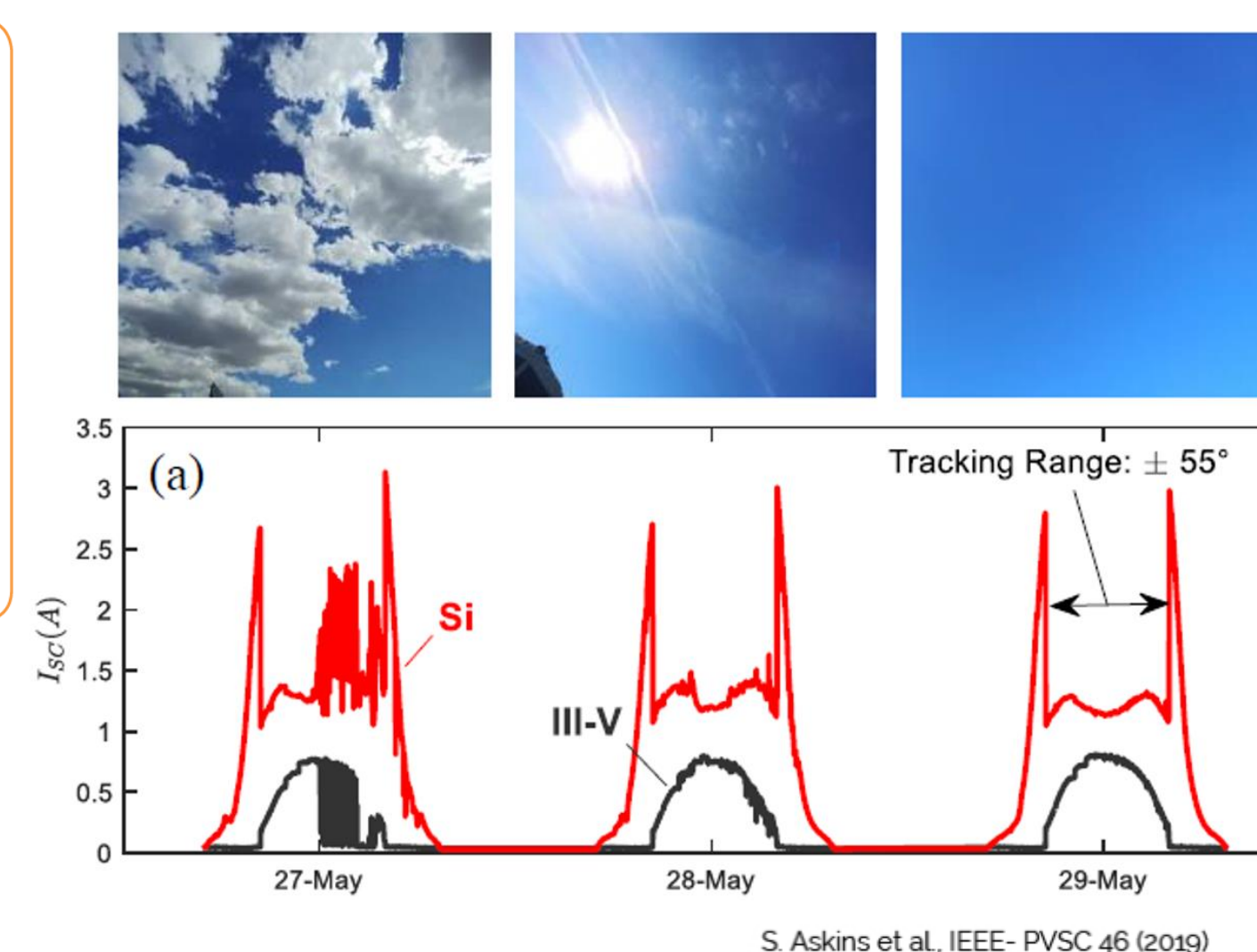
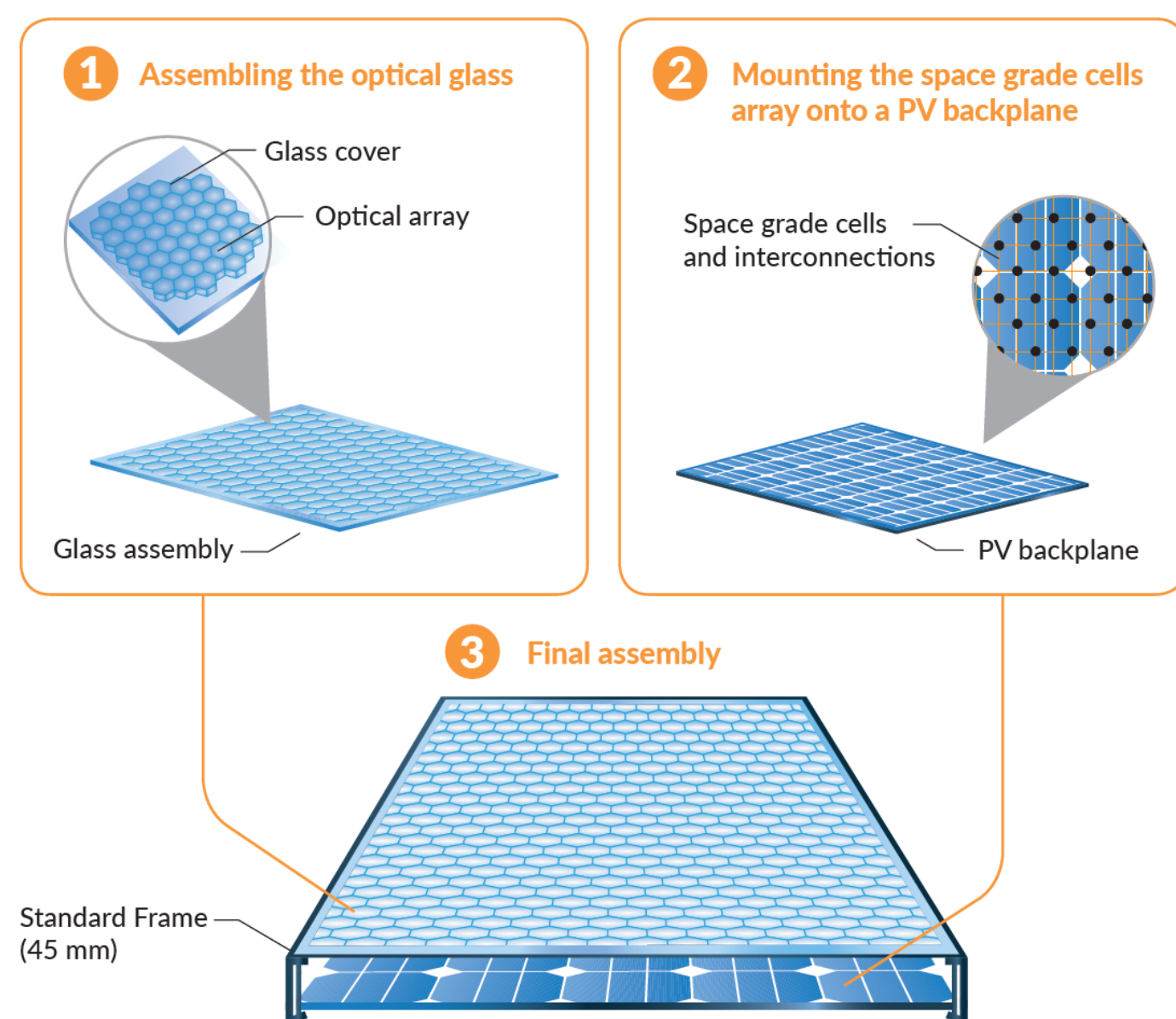
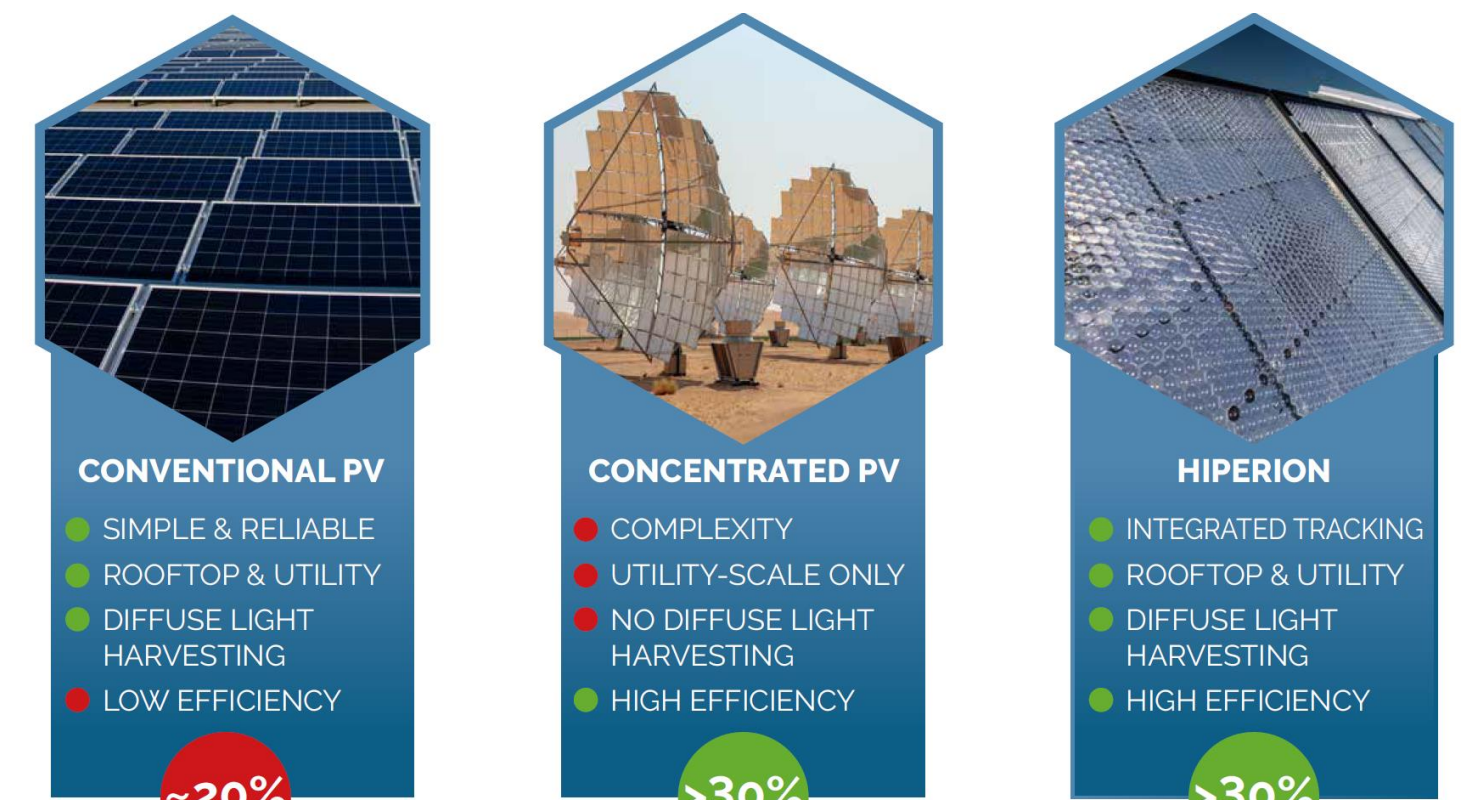
### Planar micro-tracking : principles

- Focusing sunlight on high-efficiency cells (concentration factor ~180)
- Fixed-tilt module with integrated 2-axis tracking mechanism



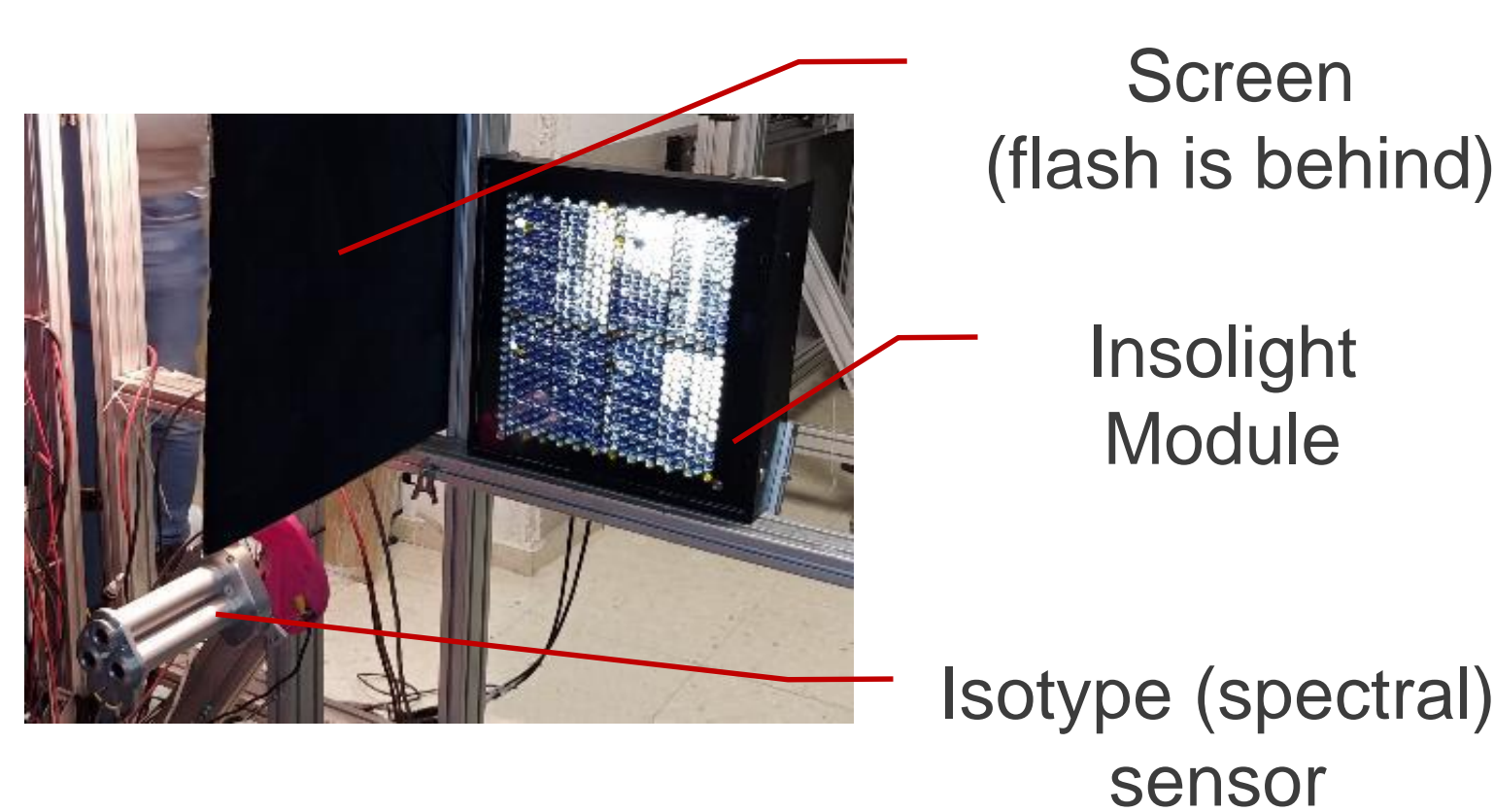
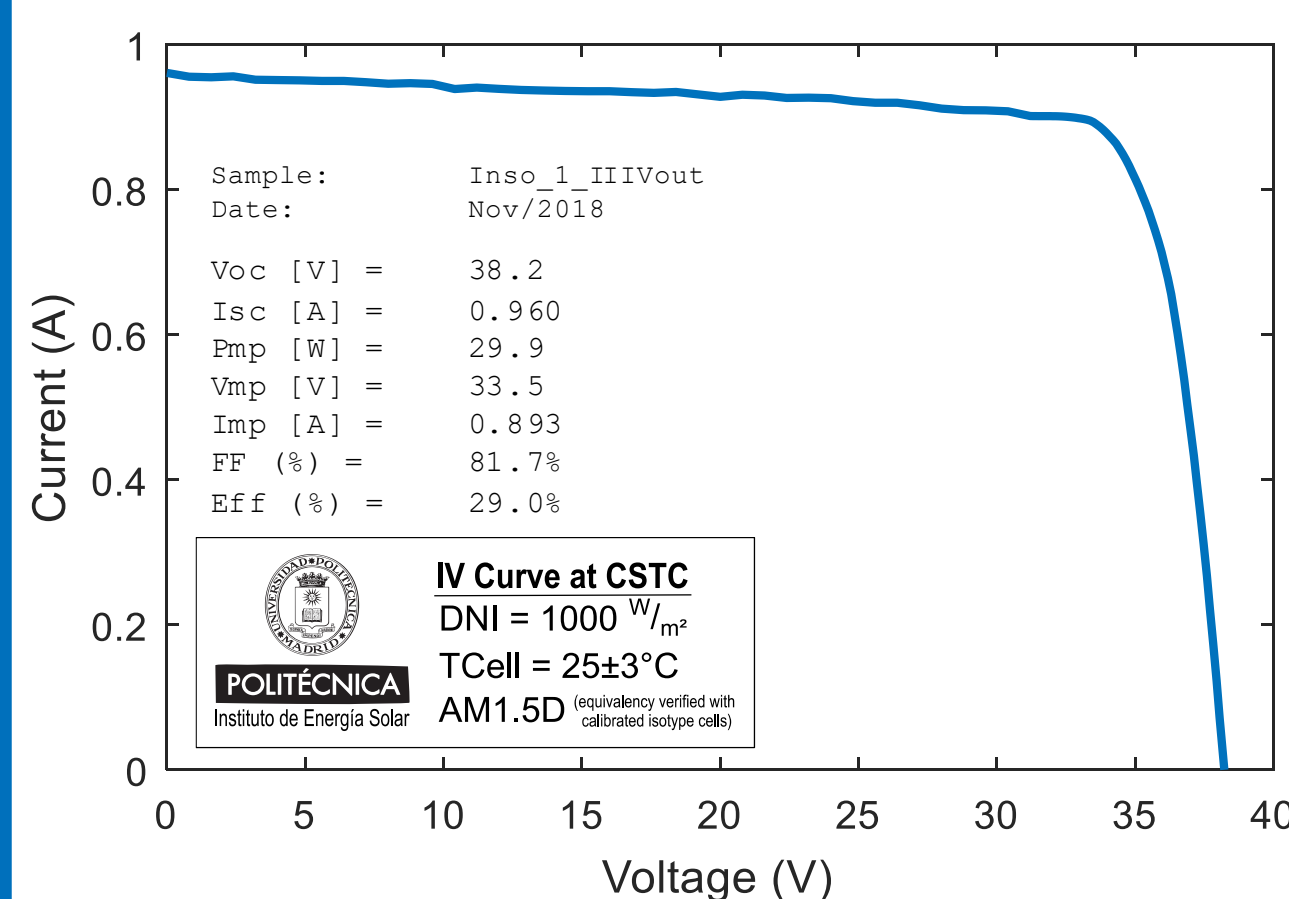
### Hybrid Si/III-V architecture

- High efficiency III-V cells capture direct sunlight (concentrated)
- Low-cost Si cells capture diffuse sunlight (transmitted)
- Two architectures evaluated:
  - Si cells with holes
  - III-V cells on a glass substrate



### Module performance (2018)

- Measured on a 0.1m² module (574 GaInP/GaInAs/Ge 1mm² cells)
- 29.0 % efficiency vs direct sunlight (indoor measurement @ C-STC)



## HIPERION OBJECTIVES

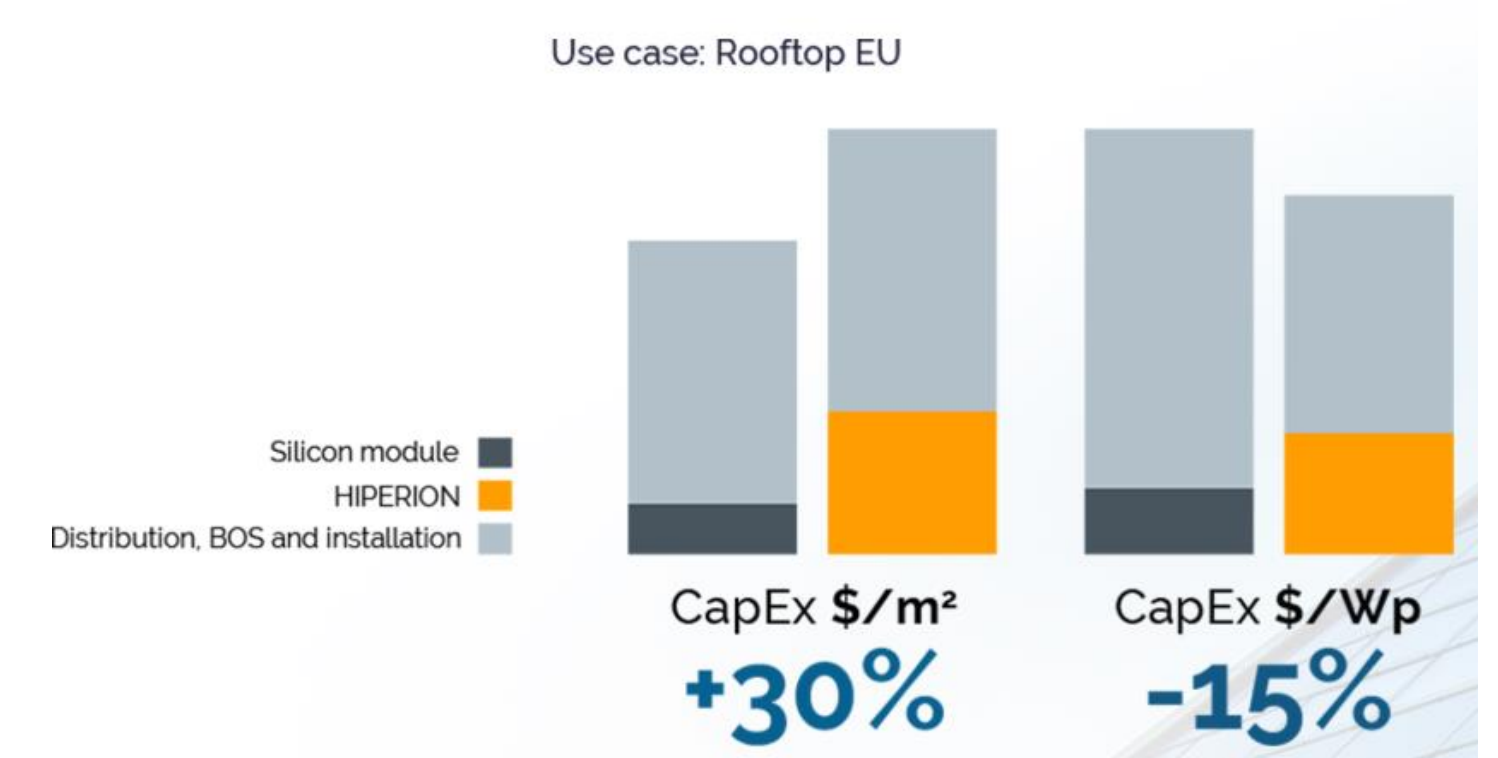
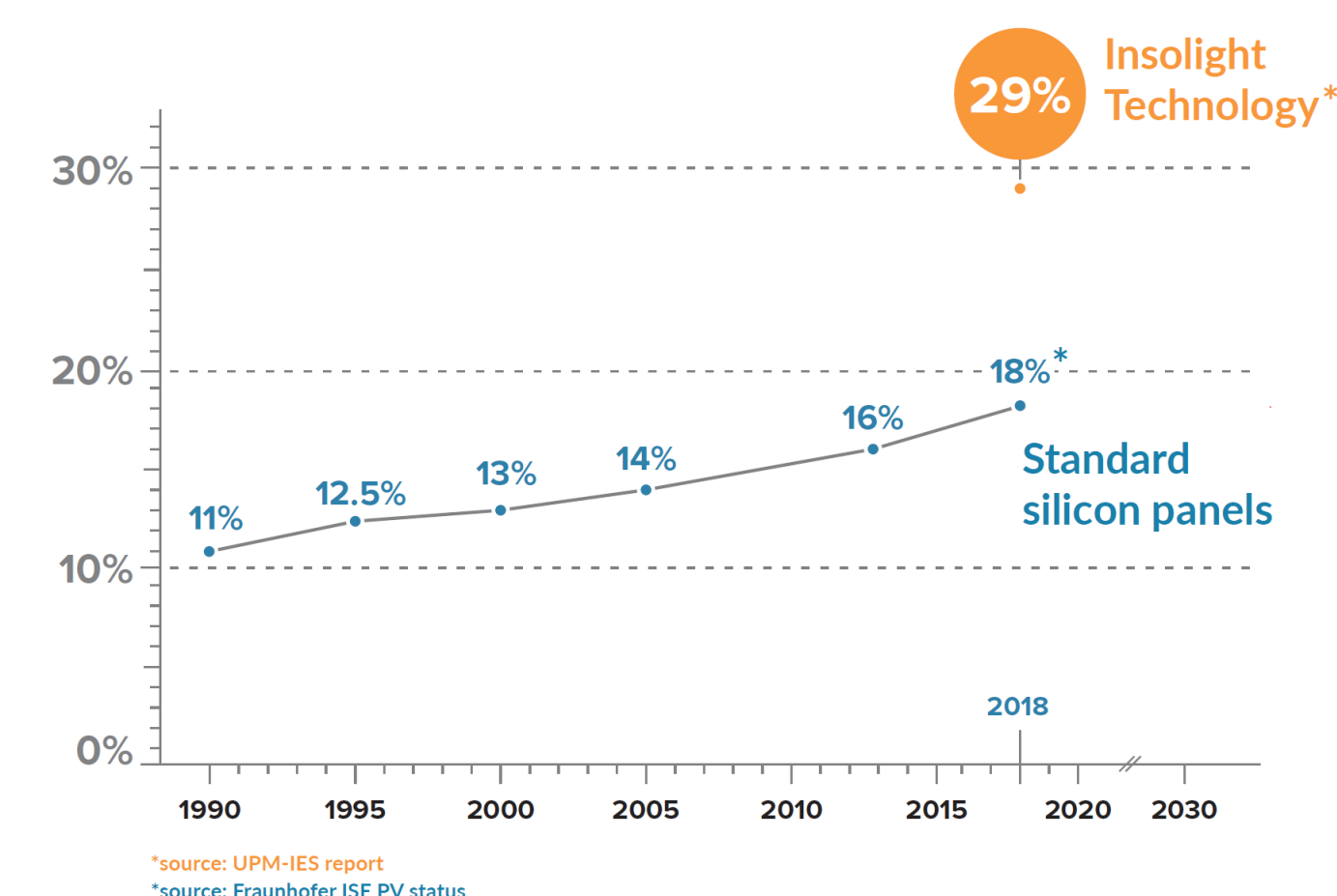
**1. Develop an industrial process to manufacture highly efficient hybrid solar modules** which combine photovoltaic and concentrated photovoltaic technologies. This goal will be achieved by building a pilot production line in Neuchâtel (CSEM) and by developing tailored assembly techniques



Pilot installation at EPFL, Lausanne

**2. Deliver unique and highly efficient solar modules** capable of providing real-time record of energy generation. HIPERION modules will be easy to install, with an estimated lifetime of 25 years, featuring 30% efficiency under direct and 15% under diffuse sunlight

**3. Perform a technical and economical assessment of the blueprint solution**, including qualification testing, performance and reliability validation at several commercial pilot sites across Europe.



HIPERION solution yields a competitive total installation cost in target markets

## HIPERION IMPACTS

### INNOVATIVE PRODUCTION PROCESS

Trigger new investments in the European PV industry by establishing a pilot line, capable of assembling the HIPERION module architecture through an industrial manufacturing process and strengthen its intellectual property on the process level in Europe and internationally.

### EQUIPMENT DEVELOPMENT FOR PV TECHNOLOGIES

Trigger new investments in the European PV industry via tailored equipment development for mainstream power PV and integrate the latest photovoltaic silicon modules on the market and the III-V cells technology.

### PERFORMANCE & COST COMPETITIVENESS

Thanks to high efficiency modules, offer a final product with performance and cost competitiveness and yield a competitive total installation cost in target markets, lower solar electricity cost on rooftops, higher margins for manufacturers and increase the return on investment of the full PV installation value chain.

### REGAIN MARKET SHARES

Enable more PV applications (e. g. standalone PV applications, zero-energy buildings, electric vehicle stations and parking lots), provide added value for the rooftop market, decrease the LCOE, improve the internal rate of return for homeowners and increase the manufacturing gross margin. On the long term, HIPERION will reduce cost of electricity in the utility market.

### SECURE & SUSTAINABLE SUPPLY CHAIN

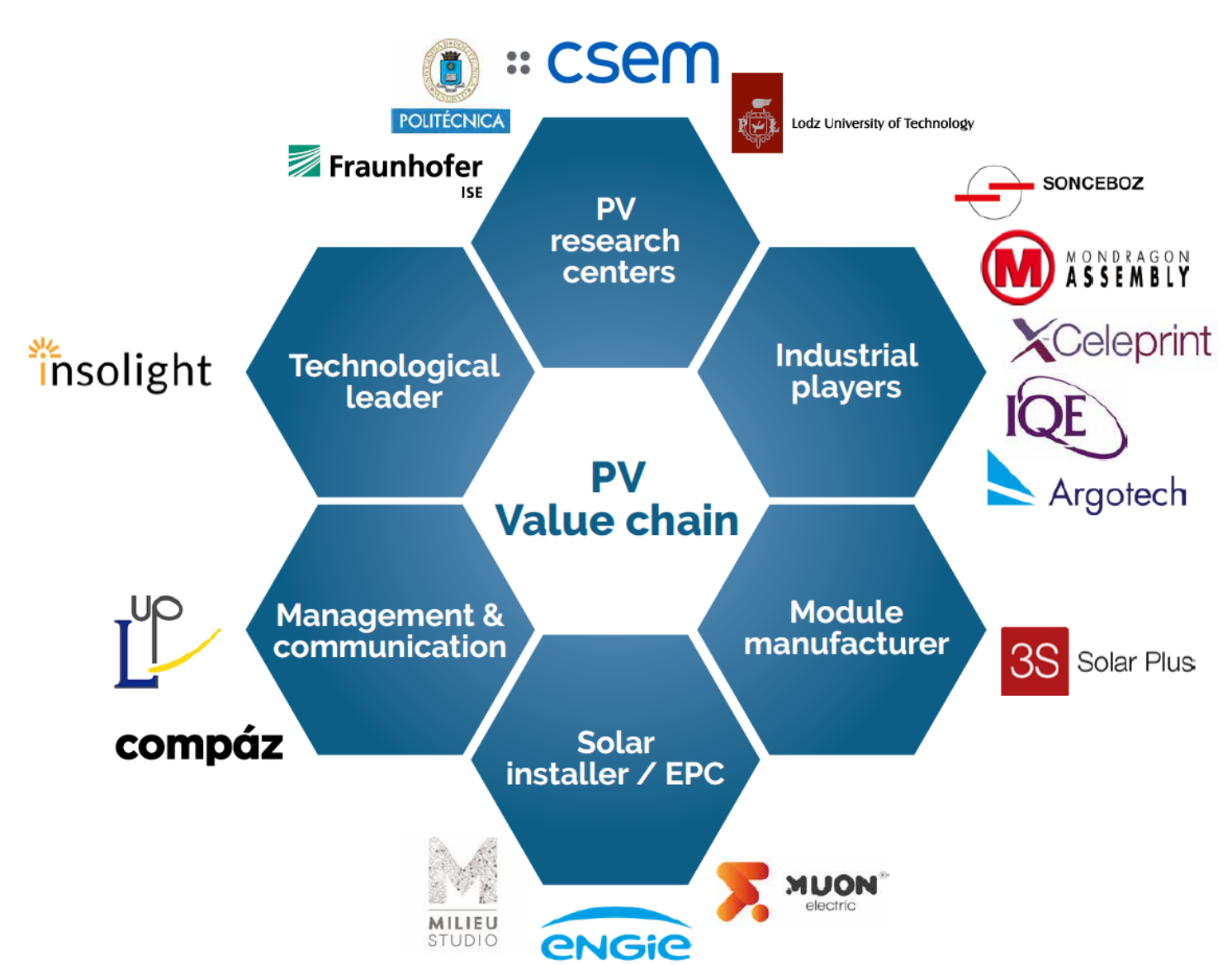
Create a more secure and sustainable supply chain for the European PV market and preserve the European strategic position in this new field and strengthen the European expertise and know-how in several fields such as advanced optics, micro-mechanical components and multi-junction III-V solar cells and metrology.

## THE HIPERION CONSORTIUM

The HIPERION consortium, led by CSEM, comprises 16 partners covering the complete photovoltaic value chain.

### HIPERION project in numbers

16 Partners	10 Countries	48 Months
10 590 511 € EU Funding	13 534 524 € Total Budget	1 236 Person-Months



www.hiperion-project.eu

Project name: HYBRID PHOTOVOLTAICS FOR EFFICIENCY RECORD USING INTEGRATED OPTICAL TECHNOLOGY  
Funding scheme: Innovation Action (IA)  
Project coordinator: CSEM SA - Jacques Levrat  
Management and dissemination: L-Up - Anamul Hoque, Sofia Santi  
Contact: contact@hiperion-project.eu  
Project start date: 01/09/2019  
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