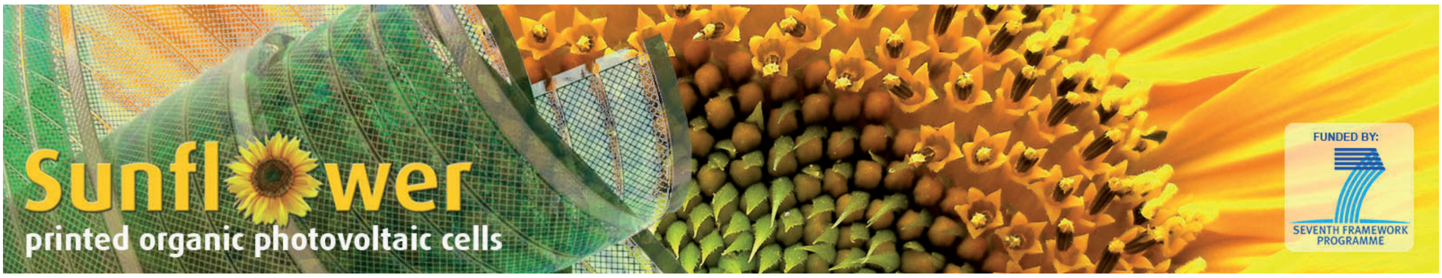
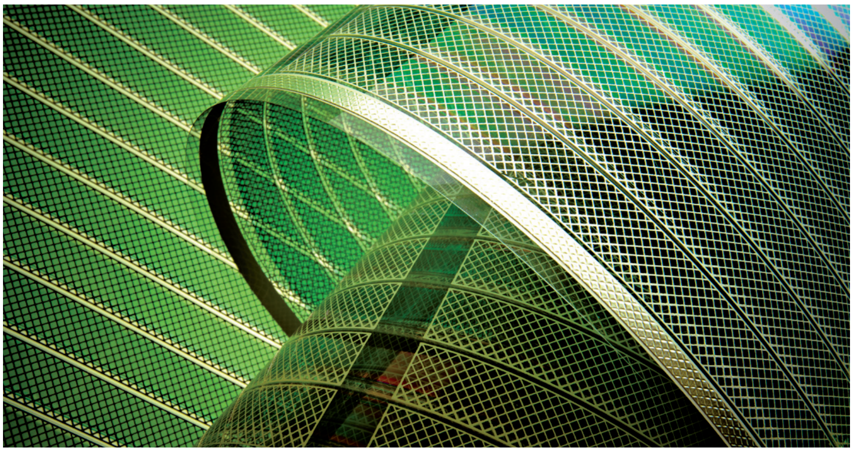


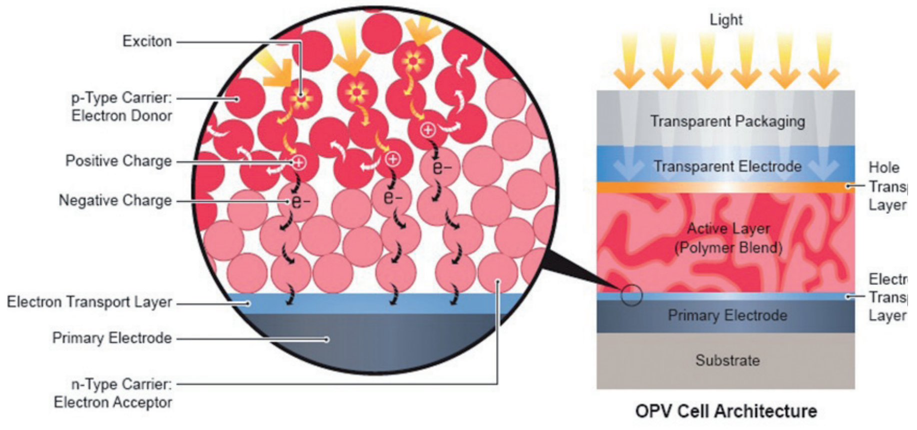
TECHNOLOGY

ORGANIC PHOTOVOLTAICS

Organic Photovoltaics (OPV) represent the latest generation of technologies in solar power.
In economic terms, the opportunities are new application areas e.g. the integration in facades and windows, the expansion of the innovation base in alternative energies and the development of manufacturing technologies requiring a high level of automation, highly trained personnel, low energy consumption and close proximity to suppliers and markets.



	BENEFITS AND CHALLENGES
Benefits	Long term perspective OPV offer the benefits of free shape, flexibility, low weight, thin form factor, color tuning, limited environmental impact and fast energy pay-back times. Further, OPV can be produced with automated, high volume coating and printing technologies which require low capital investment for significant production throughput. OPVs can be easily integrated in consumer electronics and goods and in the long run OPV will be integrated in buildings as well.
Challenges	Efficiency, lifetime, costs The current challenges reside in the combination to increase efficiencies to 8-10% (module level), increase expected lifetime up to 20 years and decrease production costs to 0.7 Eur/Wp on the way to further reduction, under consideration of society's concerns on risks and uncertainties of environmental impacts especially climate change.



SOLAR ENERGY IN EVERY DAY LIFE

SUNFLOWER is a collaborative research project of 17 partner institutions from science and industry. Its goal is the development of highly efficient, long-lasting, cheap and environmentally friendly printed organic photovoltaics.

The SUNFLOWER partners focus on high-tech research with the goal to produce printed organic photovoltaic modules with high efficient (tandem) architecture and dedicated light management structures. The partners will deliver solutions for new photo-active polymer materials, cost effective flexible substrates including diffusion barriers and printed conductors. In the near future a deeper understanding of the device physics, an elucidation of degradation mechanisms and an estimate of the environmental impact of the main materials and processes will be available thanks to the SUNFLOWER partners.

	PROJECT DESCRIPTION
Goal	A significant contribution to the improvement of solar cells The 17 partner institutions from science and industry team up for the development of highly efficient, long lasting, cheap and environmentally friendly printed organic photovoltaics.
Solar energy	An alternative and more environmentally friendly energy source Solar energy is already in use to charge electronic devices and also increasingly in the form of power plants for the production of electricity. The challenge related to the production of solar electricity is currently to make solar cells more efficient, more durable and for a competitive price.
4 ambitious objectives	1. Printed OPV with high efficiency architectures such as tandem cells and dedicated light management structures. 2. High performance photo-active polymers and diffusion barrier substrate materials. 3. Solutions for cost effective flexible substrates, diffusion barriers and conductors. 4. Deep understanding of the device physics, elucidation of degradation mechanisms and quantifications of the environmental benefits and costs of the main materials and processes.

PROJECT TARGETS AND INNOVATION IMPACT

	PROJECT TARGETS
Increase efficiencies	• Photo active polymers, nanoparticles, interlayer materials • Morphology control • Tandem cells architecture • Advanced device physics and analytics • Light management structures • Printed transparent electrodes
Increase expected lifetime	• Diffusion barriers • UV-stable films • Degradation mechanisms • Mechanical stability of flexible cells • Getter materials, novel additives • Sustainability requirements • Low environmental impact over the whole life-cycle • Experimental eco-toxicity
Decrease costs	• Industrially up-scalable materials and processes • Atmospheric coating and printing processes • Cost effective diffusion barrier • ITO-free devices • Eco-efficient production techniques (roll-to-roll compatible) • New production and workplaces in Europe • Access to cheap and environmental friendly energy

REQUIREMENTS FOR THE PROTOTYPE

• High efficiency, printable PV modules

• Multilayer structure ("tandem") to achieve high efficiency

• Cost effective barriers and getters to achieve long lifetime

• Roll-to-roll atmospheric printing processes to lower costs [where costs include fabrication (Eur) and environmental impact (e.g. kg_CO_2 / kW peak OPV]

• Replacement of rare inorganic components such as In, Te, and Cd to enable sustainability

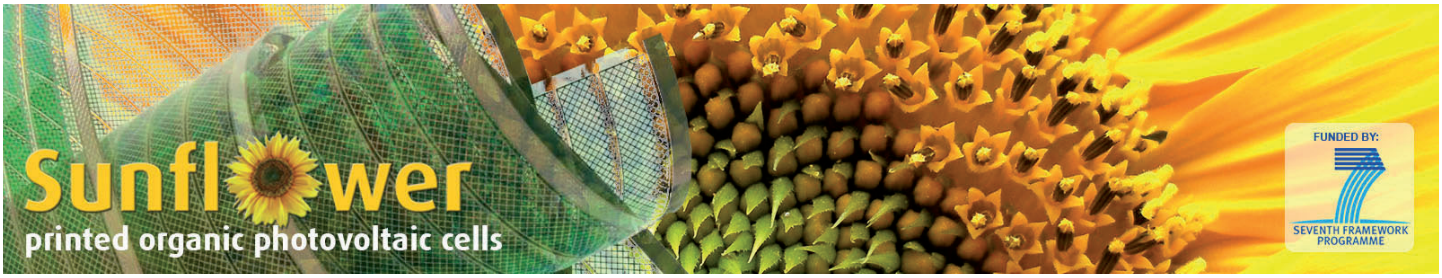
• Development of fundamental science and technology of printable photoactive materials to enable efficient and stable modules

PROJECT OUTCOME AND EXPLOITATION PLAN

With regard to the OPV module production, the large presence of industrial partners in the consortium (50%) ensures an enhanced level of competitiveness of the entire supply chain represented in the Sunflower project.

A large part of the OPV value chain resides in materials suppliers, largely represented in the consortium. Among the materials that are being developed and investigated: photo active polymers, nano-inks, UV stable substrates and barrier materials, active getter materials (water and oxygen).

Standards and testing methodology, environmental and sustainability analysis, simulation software and metrology equipment will result from the SUNFLOWER project as enabling tools for the partners as well as for the industry.



PROJECT FACTS

	PROJECT DETAILS
Project Acronym	SUNFLOWER SUstainable Novel FLexible Organic Watts Efficiently Reliable
Duration	4 YEARS (2011/10/01 TO 2015/09/31)
Project Cost	€ 14.2 M of which € 10.1 M are funded as Collaborative Project within the Seventh Framework Programm
7th Framework Programm	The SUNFLOWER project (Grant number 287594) is supported by the European Commission through the 7th Framework Programm on Research and Technological Development under the Information and Communication Technologies (ICT) thematic call: FP7-ICT-2011-7

PROJECT MEMBERS

The project consortium combines industrial, institutional and academic support to make a significant impact at European and International level, especially on materials and processes while demonstrating their market relevant implementations. The industrial project partners are well assembled along the supply chain of future OPV-based products: an important prerequisite for the creation of a significant socio-economic impact.

PROJECT COORDINATION

Project coordinator:
Dr. Giovanni Nisato
CSEM SA
giovanni.nisato@csem.ch
www.csem.ch

"We have the chance to develop a technology that is ideally suited to manufacturing in the EU due to its high level of automation, need for highly trained personnel, low energy consumption, and close proximity to suppliers and markets."

Dr. Giovanni Nisato

Follow us on our Linked-In Group : Sunflower OPV