X10D

Efficient, low-cost, stable tandem organic devices

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New designs, materials and manufacturing technologies for market-competitive organic photovoltaic

FP7-2011-ICT-7-287818

Oct 2011 – Sept 2014

SEVENTH FRAMEWORK PROGRAMME

The research leading to these results has received funding from the European Community's Seventh Framework Programme (FP7/2007-2013) under grant agreement n° 287818 of the X10D project.

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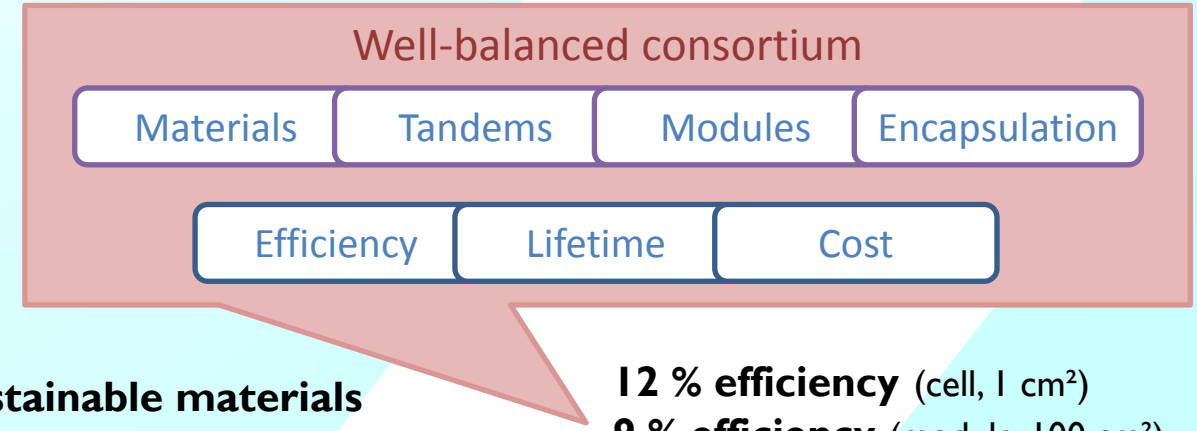
- X10D will develop new designs, materials and manufacturing technologies for **market-competitive organic photovoltaic modules.**
- The objective is to develop efficient, low-cost, stable tandem organic solar cells.



Scalable, sustainable materials
(quantum efficiency >80%; complementary absorption)

12 % efficiency (cell, 1 cm²)
9 % efficiency (module, 100 cm²)

20y lifetime (glass, extrapolated)
10y lifetime (foil, extrapolated)

Technology cost, energy and lifecycle assessments (how to realize cost <0.7 €/Wp)

White paper on status and market potential

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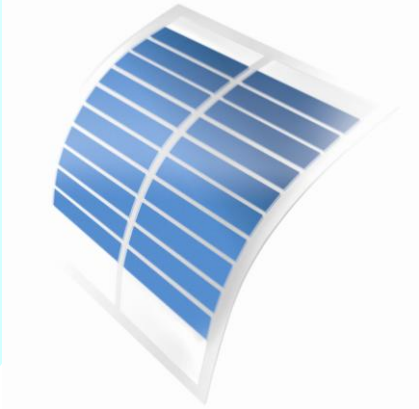
- The project will develop the **enabling technologies** and perform **accurate benchmarking**, having both OPV technologies on board.
  - End-user for each technology

SolarPress
Solar Power For Everyone

heliatek
Organic based Photovoltaics



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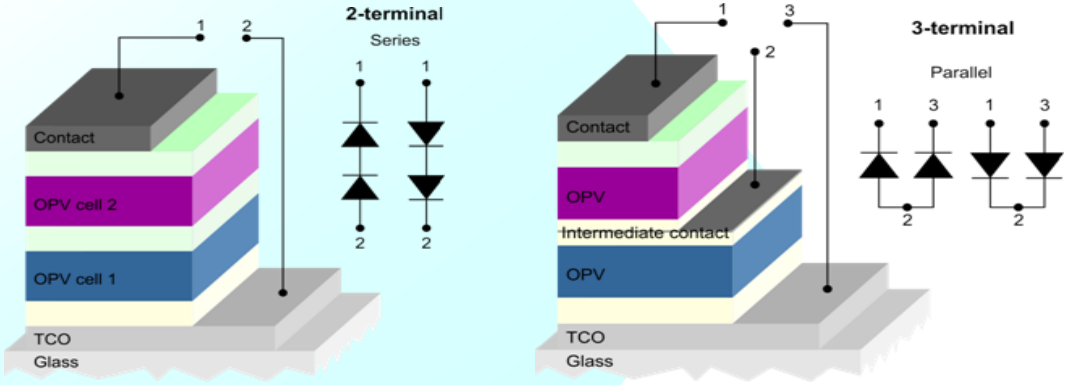
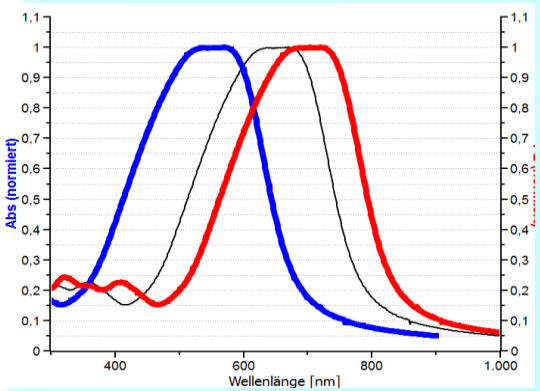
- X10D will realize **structures that allow higher efficiency** than currently available single junction cells by building 2- and 3-terminal **multijunction devices**.





- This requires **new absorber materials to be synthesized** in order to enhance the light harvesting such that a combination of absorbers in tandem devices successfully harvests light over the full visible spectrum.

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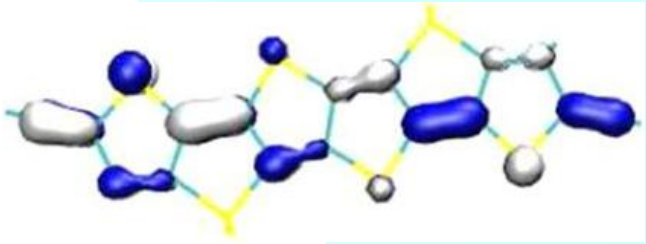
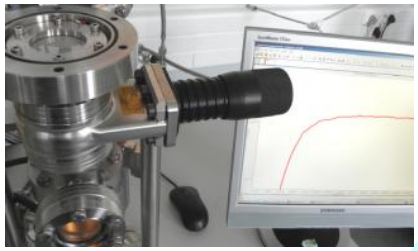
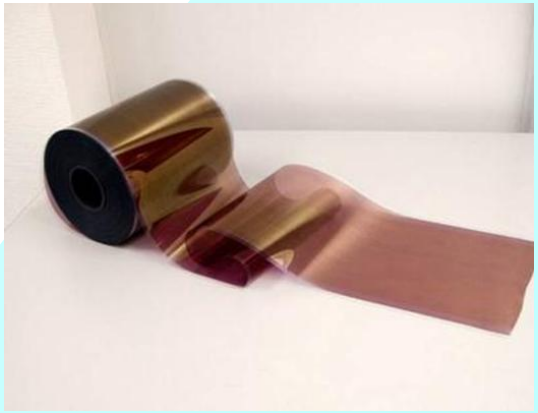
- These materials also need to guarantee **long-term stability** in the device to limit intrinsic degradation.



- Additionally, good control over external influences has to be ensured by **high-quality, low-cost encapsulation**.



- From a cost perspective, **deposition technologies** that can provide uniform, multilayered film deposition at high speed are required.



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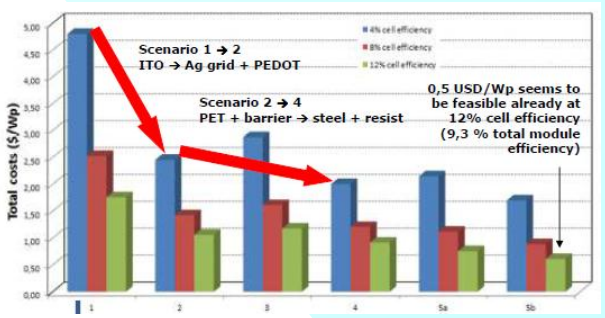
- For the different processing technologies **cost, energy and life cycle assessments** will be done to identify the most sensitive components of the OPV device and process.
- This analysis will be used to **benchmark OPV** to other thin-film PV technologies.
- These outcomes will be described in a **White Paper on status and market potential of OPV.**



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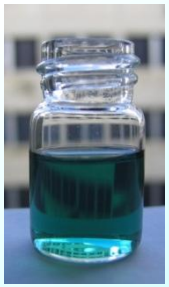
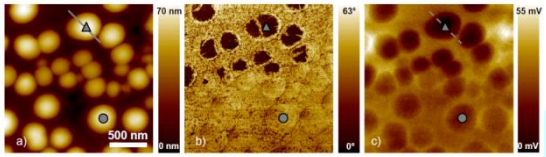
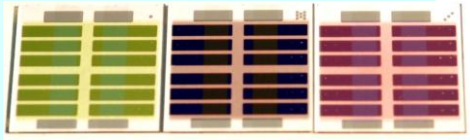
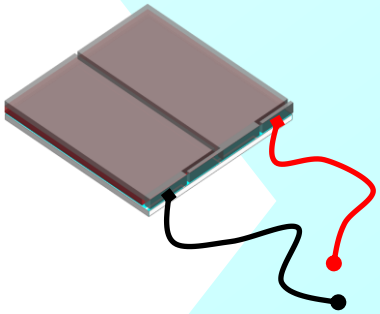
- by pooling the knowledge and expertise of the **leading research institutes and start-up companies** in Europe

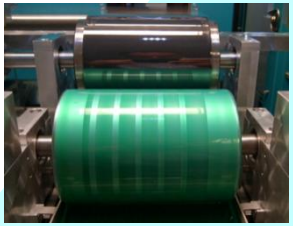








- **First project** of its kind to leverage this knowledge **irrespective of the processing technology**:
  - both **solution processed** as well as **small molecule based** OPV



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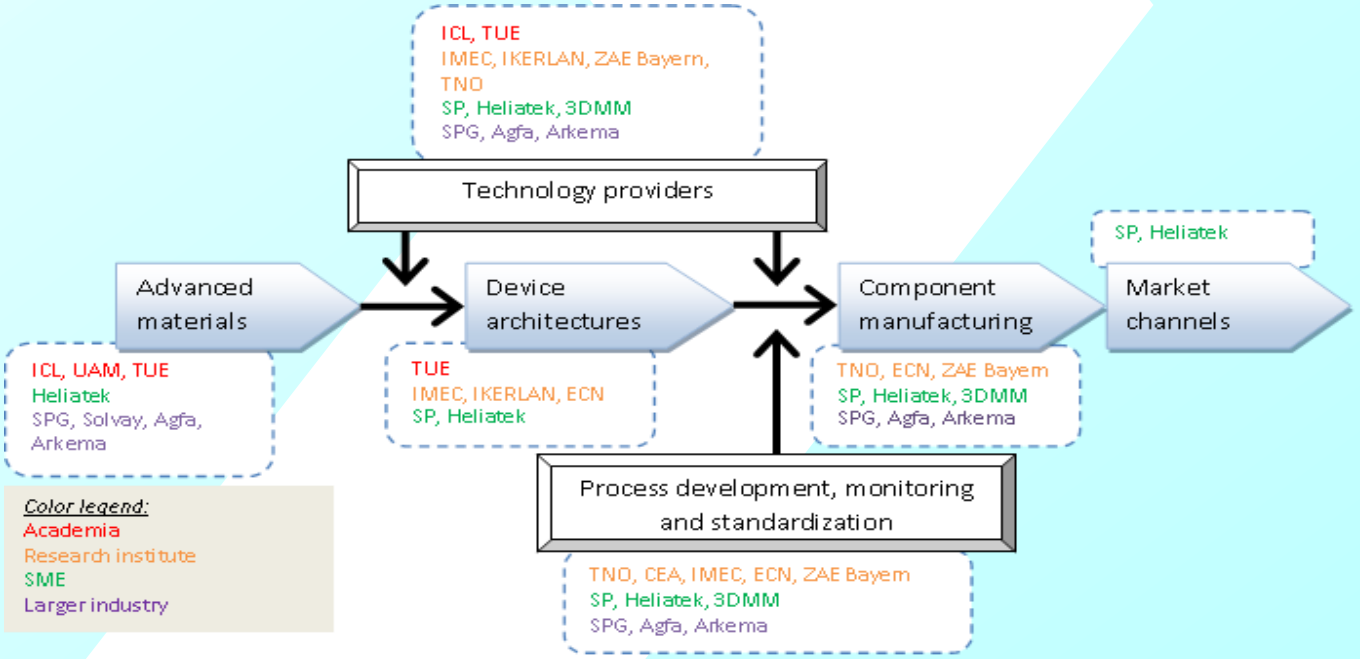
- X10D brings together partners that compose a **complete and unique OPV research and development consortium**, covering each segment of the complete value chain from basic materials and technology developers over to final end-users.
  - Partners will be able to:
    - create new market opportunities over full value chain
    - move further up or down in value chain
    - leverage technology outside value chain where other partners are active



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