Swiss PV Symposium 2017

70 PNR Virage énergétique
Programme national de recherche

////active interfaces

“Architecture Solaire: du dévelopement technologique au matériau de construction”

Laure-Emmanuelle Perret

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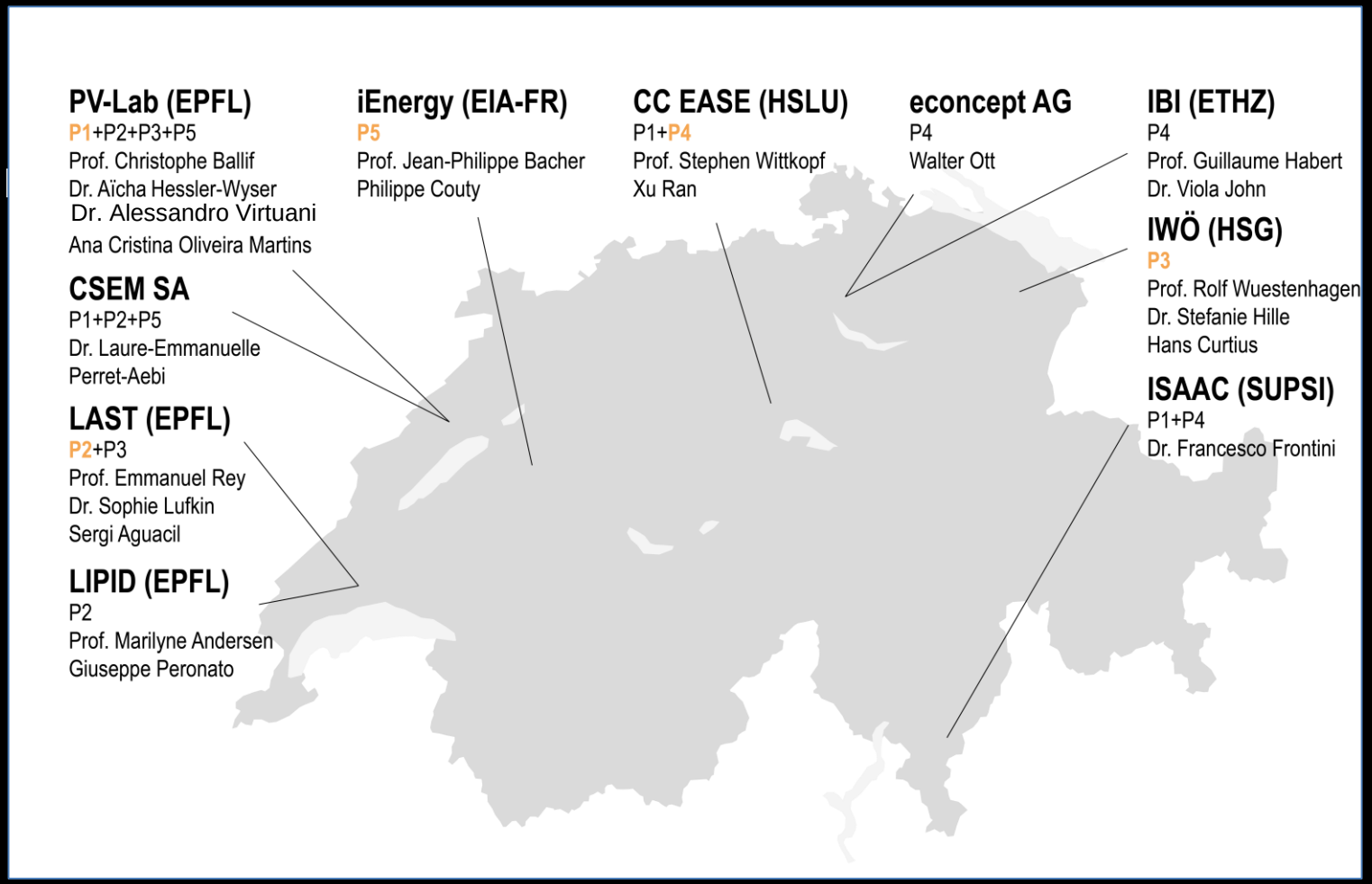
Project organisation

10 research groups

70 PNR Virage énergétique
Programme national de recherche

////active interfaces



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Understanding the barrier

A broad survey

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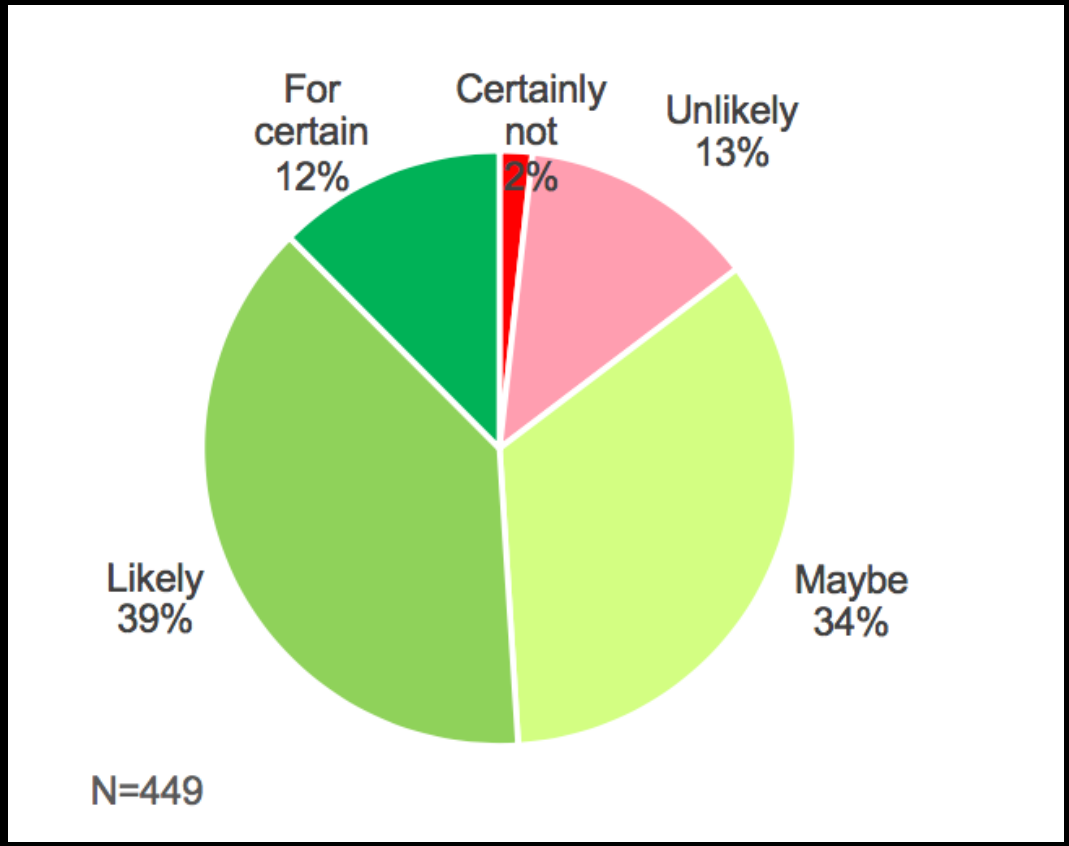
How likely would Swiss owners install PV?

A broad survey



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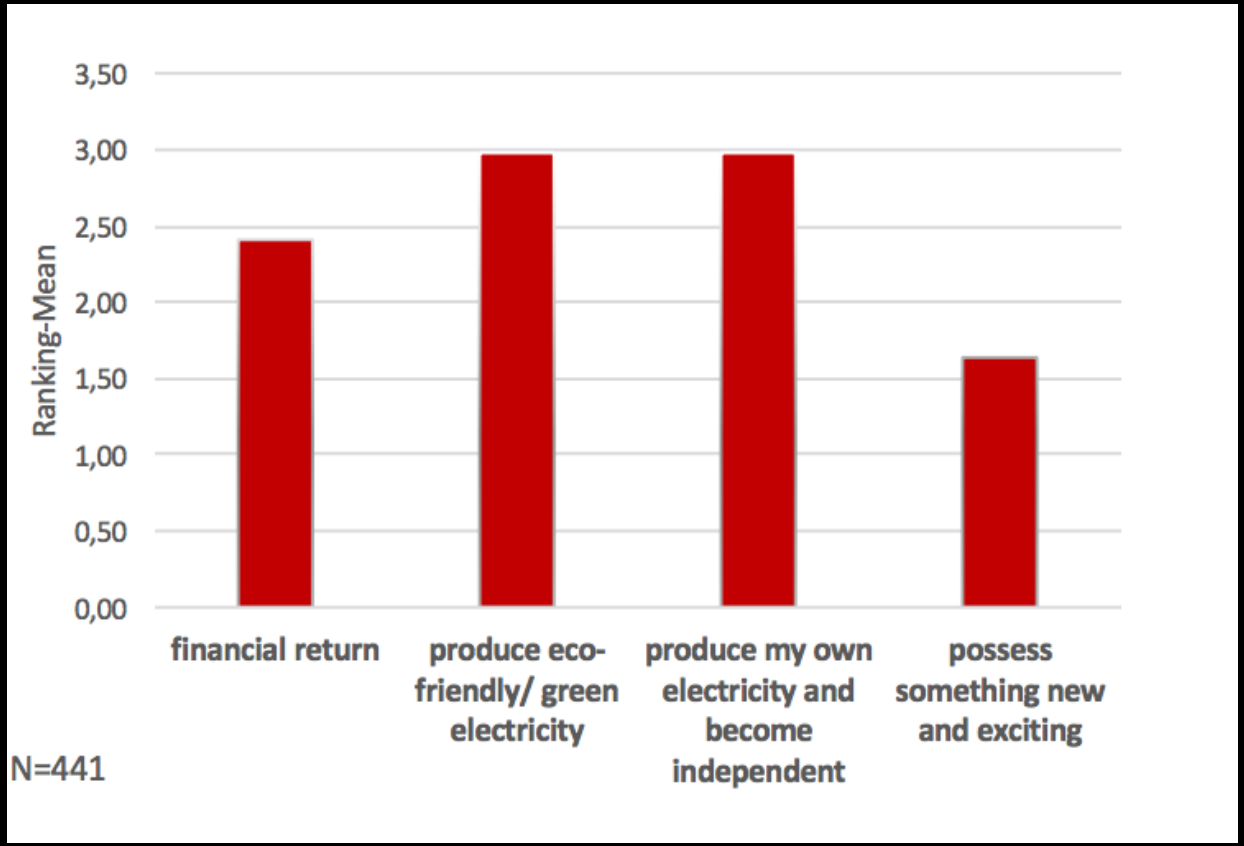
What are their main motivations?

A broad survey



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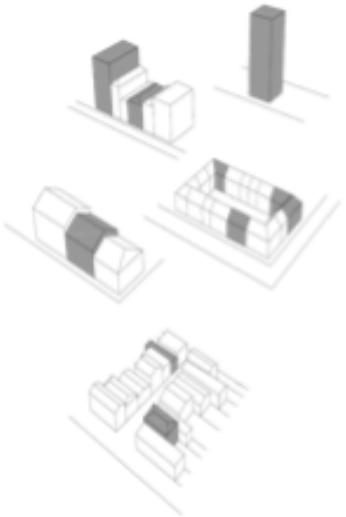
Research methodology

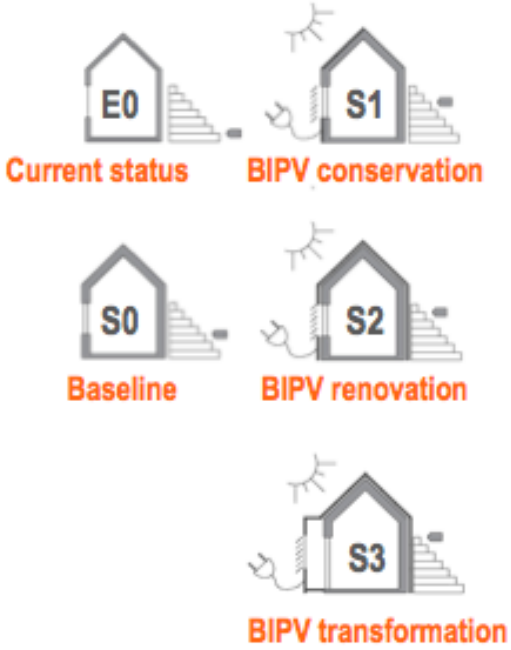
4 phases studied at LAST

Phase 1
Identification of archetypes (residential buildings)



Phase 2
Case study selection

Phase 3
Design strategies with BIPV solutions



Phase 4
Multi-criteria assessment

Poster 11: Sergi Aguacil
Poster 12: Guiseppe Peronato
Poster 10: Angela Clua Longas

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EPFL ÉCOLE POLYTECHNIQUE FÉDÉRALE DE LAUSANNE

PV as a new construction material

multi-functionality

PV modules

- Produce electricity
- Optimized for powerful PV plant

Active Construction Materials

- Holds essential architectural functions, both technical and aesthetic
- Comply with construction and safety norms

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PV as building element

A new paradigm

Active façades should become a construction standard:

- The active element acts as a building material
- It give to the building an architectural and esthetic value
- It does produce energy and therefore generate revenues and become cheaper than a conventional façade

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Cost comparison

some numbers

activefacade@issol.ch

	Glass	PV Techology	Active Glass
Laminated Monolytic Glass	40	90	130
Safety Glass for façade	80	90	170
Safety Glass with different shapes, thickness	120	90	210
Colored Safety Glass	150	120	270
Colored Safety Glass with many diffrent shapes	180	120	300
Printed (Quadri Color) Safety Glass	200	120	320

- Average cost of Active Glass: 280 €/m2
- Cable, Inverters, Mounting: 120 €/m2

Total average cost of an active façade: 400 €/m^2

Annual production per m^2 for a façade: 130 kWh, electricity value: 0,23 €/kWh, revenues per m^2: 30 €/year

- return of investment is less than 10 years.

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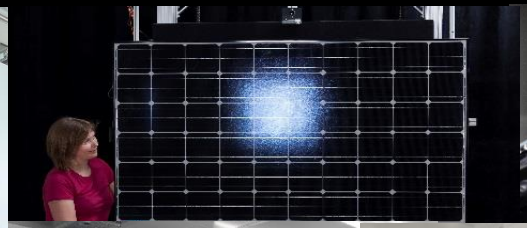
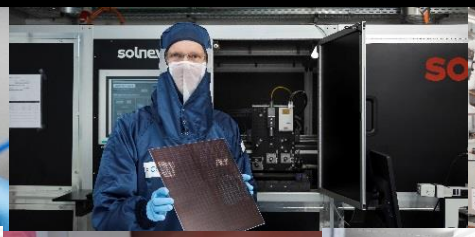
CSEM key infrastructures

From coatings, to cells, to modules, to systems

Technology infra-structure Platforms	Thin film Coating & lasering	Cells Pilot lines	Modules R&D lines	Polymers com-pounding	Testing and reliability with SUPSI	storage R&D center (with BFH)
	Metrology and characterization					

Over 2000 m^2 of lab and facilities in Neuchatel






Module technology at CSEM

Strategic topics

Photovoltaïque intégré au bâtiment (BIPV)

- Architecture et esthétique
- Approche transformative à bas coût

Produits spéciaux

- mobilité, portable, electronique
- Fait « sur mesure »

Matériaux et fiabilité

- Formulation dédiée & extrusion d'encapsulant
- Tests et prédiction de modes de dégradation

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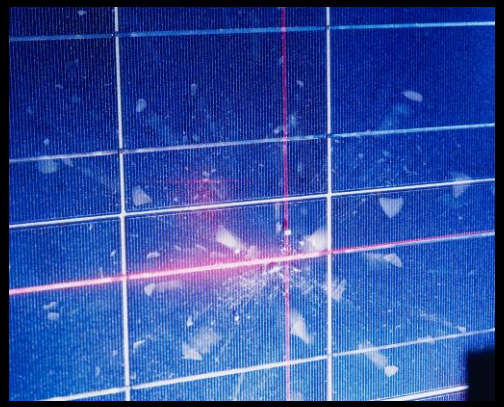
Polymer platform

For dedicated encapsulant



- ✓ 30m^2 lab , packaging foil of 0.1 to 2.5 mm thick and width of 20 cm
- ✓ Compounder / pelletizer (capacity: 4 Kg/h)
- ✓ Flat cast film extrusion / chill roll (capacity: 10kg/h)
- ✓ Rheological analysis, characterization
- ✓ Accelerated aging and testing (DH, TC, UV)
- ✓ Customized encapsulant and polymeric material
- ✓ Lifetime assessment
- ✓ Deep knowledge and understanding of failure mechanisms

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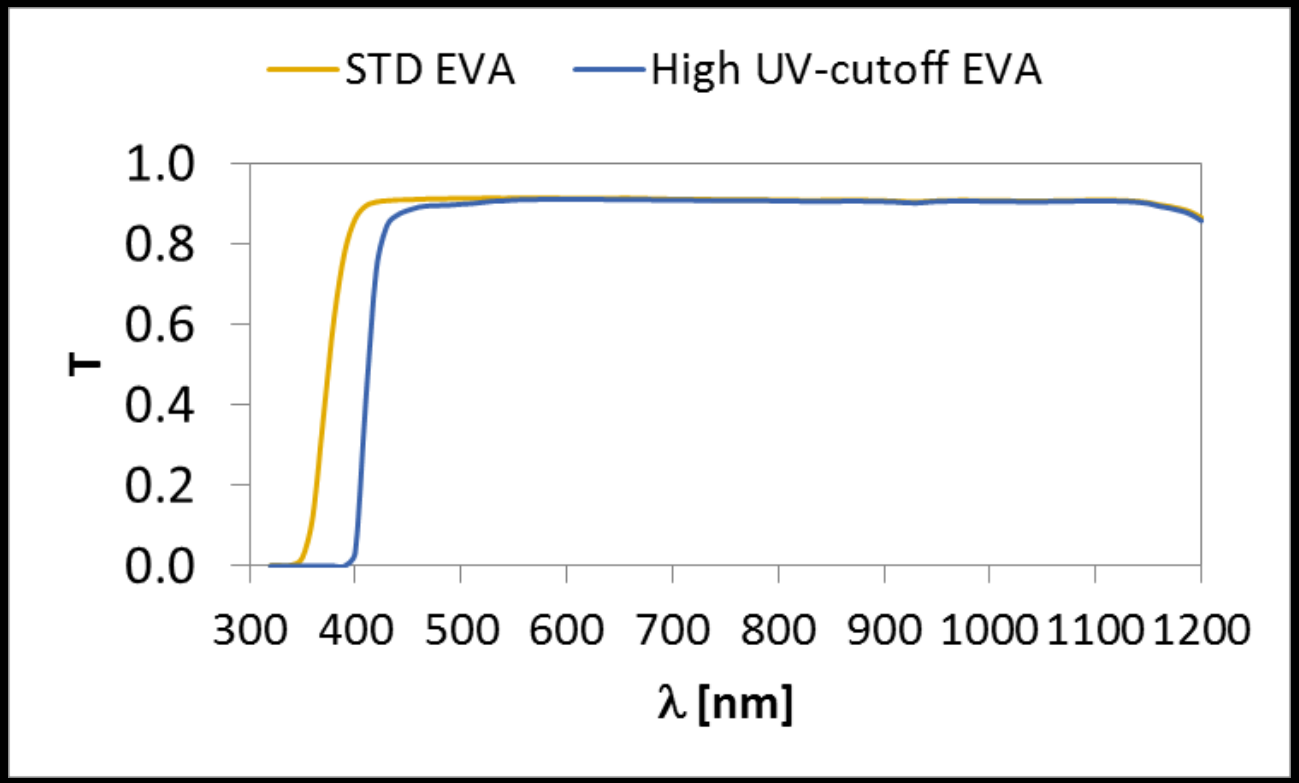
Polymer platform

Custom made EVA



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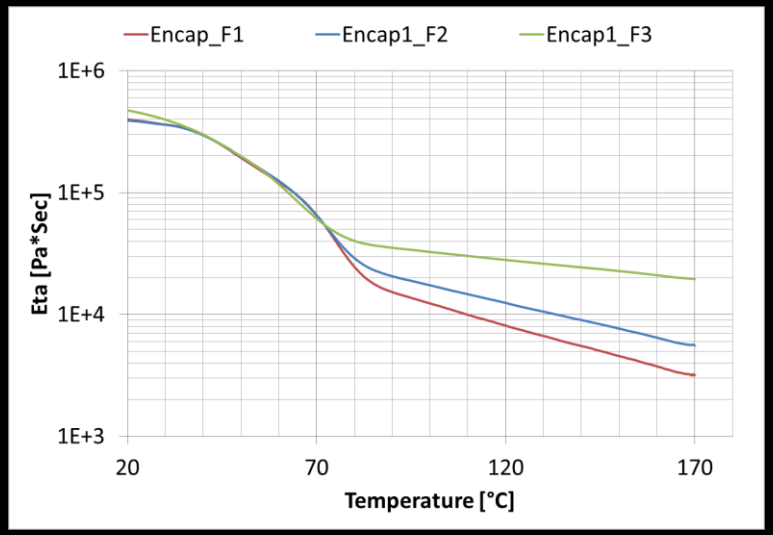
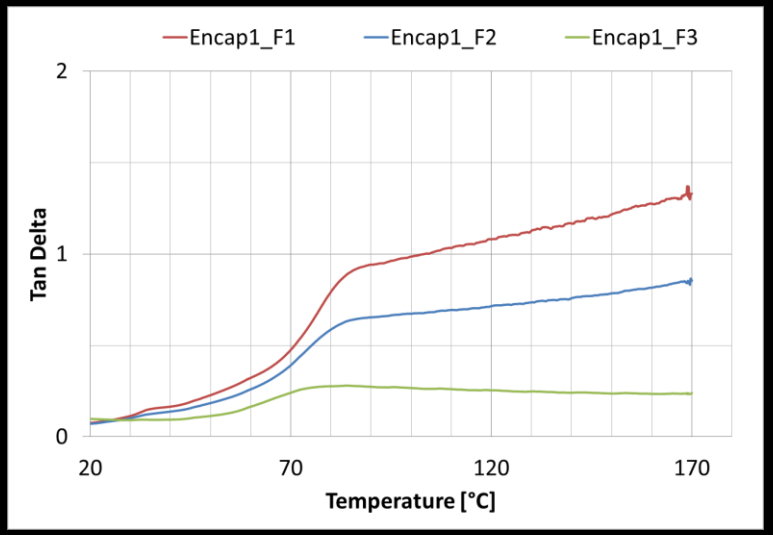
Polymer platform

Custom made PO





- PO-based encapsulant formulation with customized viscosity profile to adapt to the pre-defined lamination cycle of the PV modules
- Enhance the creeping resistance of the encapsulant

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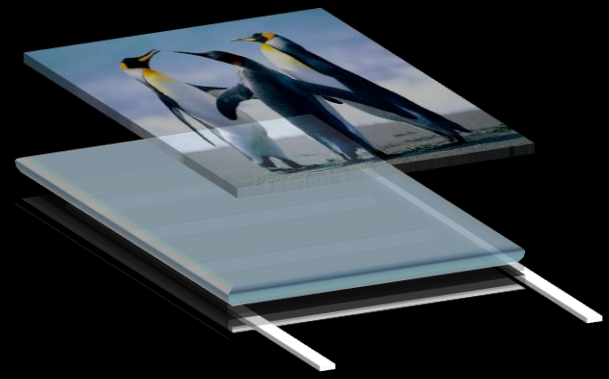
Poster 8: Heng-Yu Li
Poster 29: Gianluca Cattaneo

BIPV elements

Coloured and reliable



- ✓ Encapsulation & lamination process
- ✓ Coloring technics on glass and plastic
- ✓ General system view (energy management)
- ✓ Climatic chamber for IEC testing and more
- ✓ Expertize in design & architecture

- ✓ Architectural integration
- ✓ Customized products
- ✓ Ultra-reliable
- ✓ Easier implementation of PV in buildings
- ✓ Better societal acceptance of PV

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BIPV elements

The white PV modules

SOLAXESS

A reduction of around 10°C at the back of the module is measured when outdoor temperature is at 25°C.

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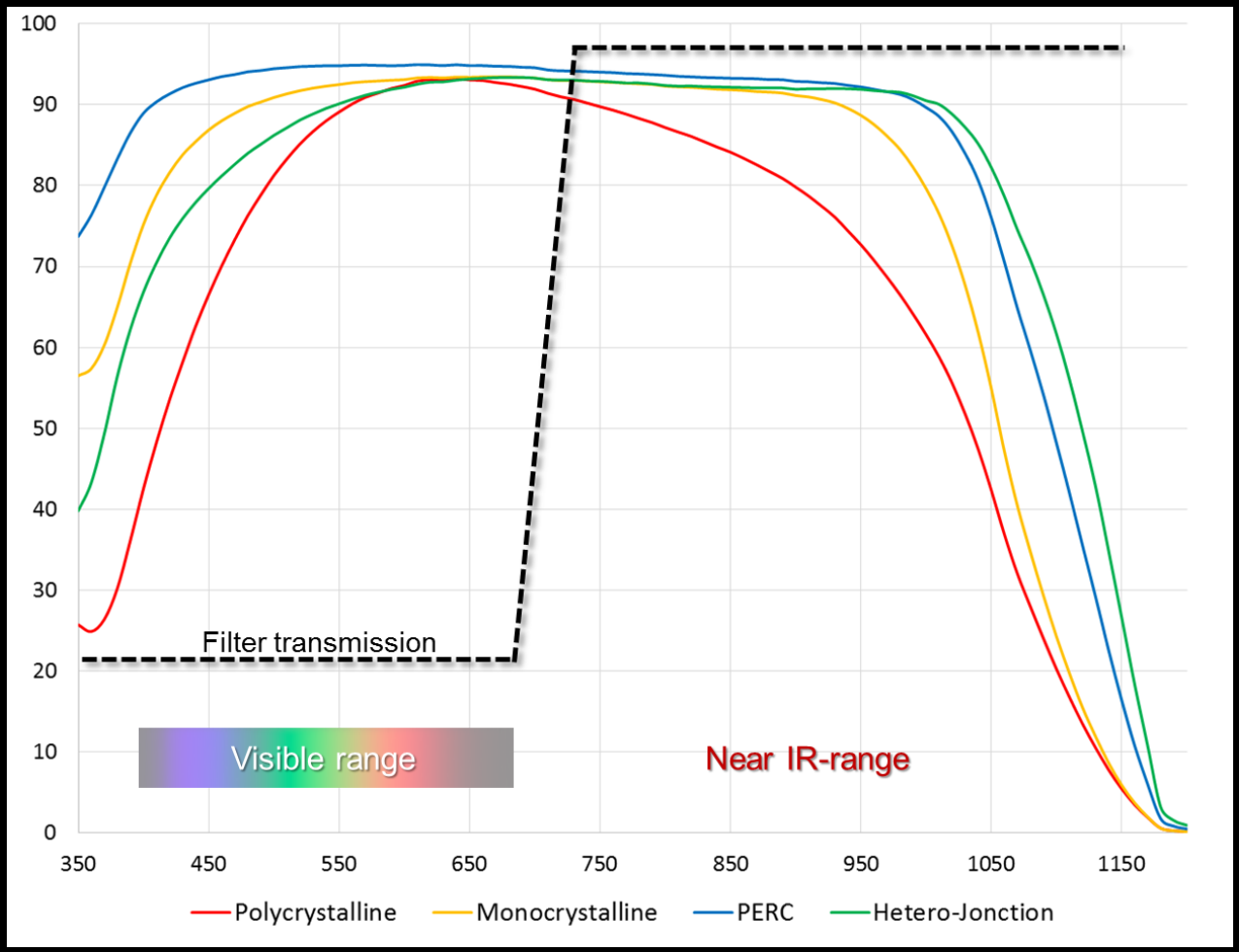
Poster 18: Karin Söderström

White and coloured

Efficient spectral selectivity



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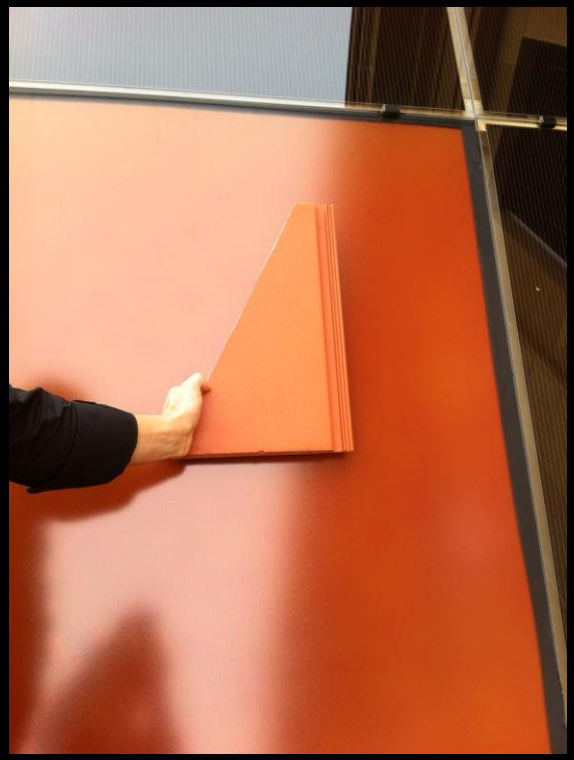
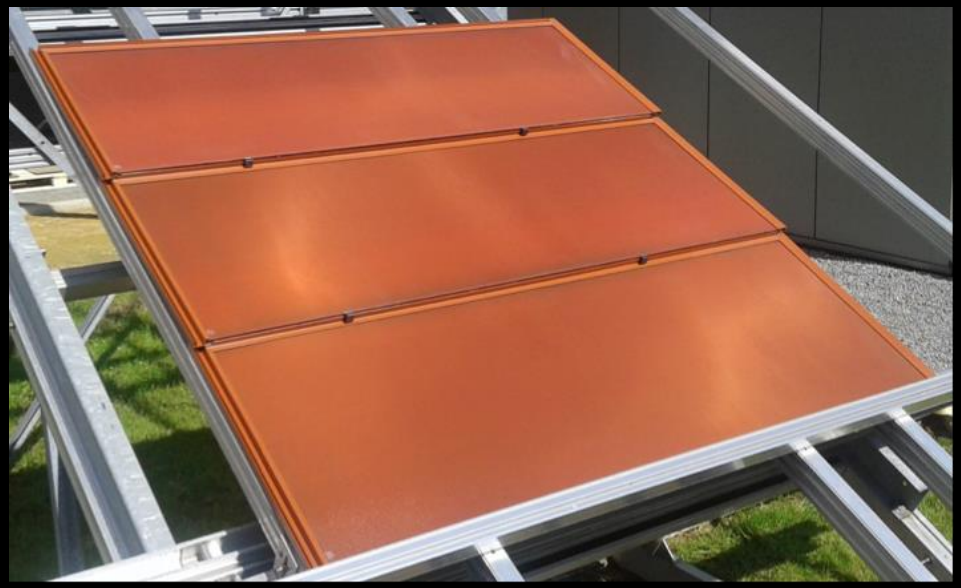
PV instead of tiles

from lab to fab



Silicon thin-film solar tiles
(Archinsolar project)
60W /m^2



Silicon m- crystaline
130W/m^2

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Photovoltaic in buildings

S F O E P & D p r o j e c t

Ecuvillens, Mai 2017

Poster 7: Patrick Heinstein

Poster 13: Francesco Frontini

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A future solar city in Neuchâtel?

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A future solar city in Neuchâtel?

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A future solar city in Neuchâtel?

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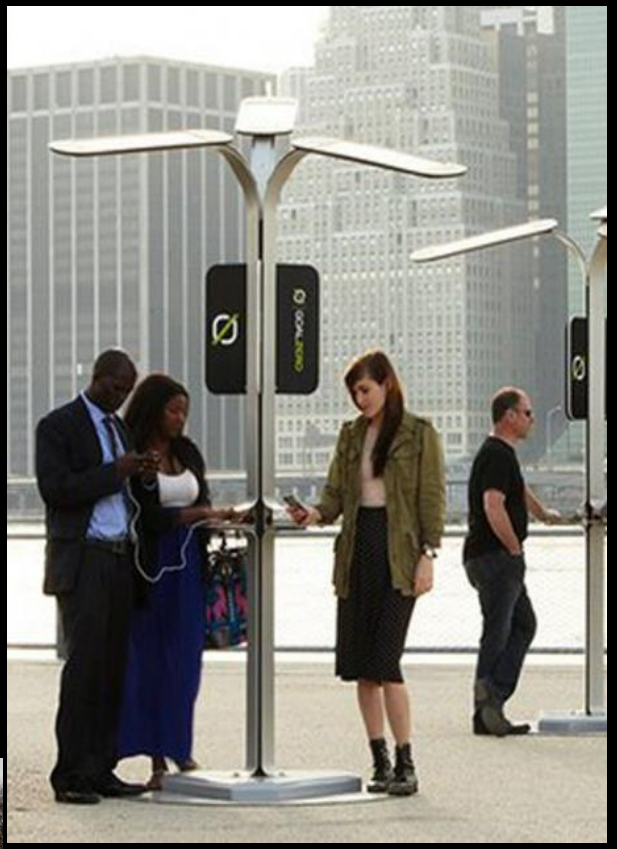
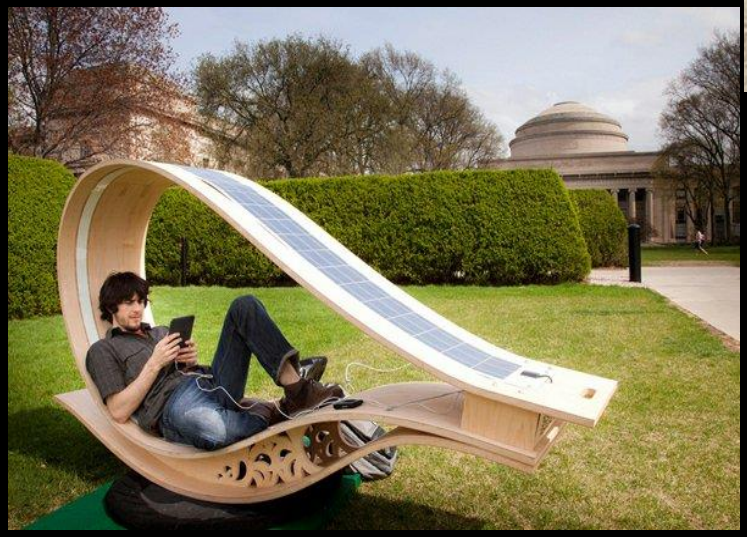
Architectural city

Urban furnitures





Solar energy can be integrated everywhere

Air, water, space

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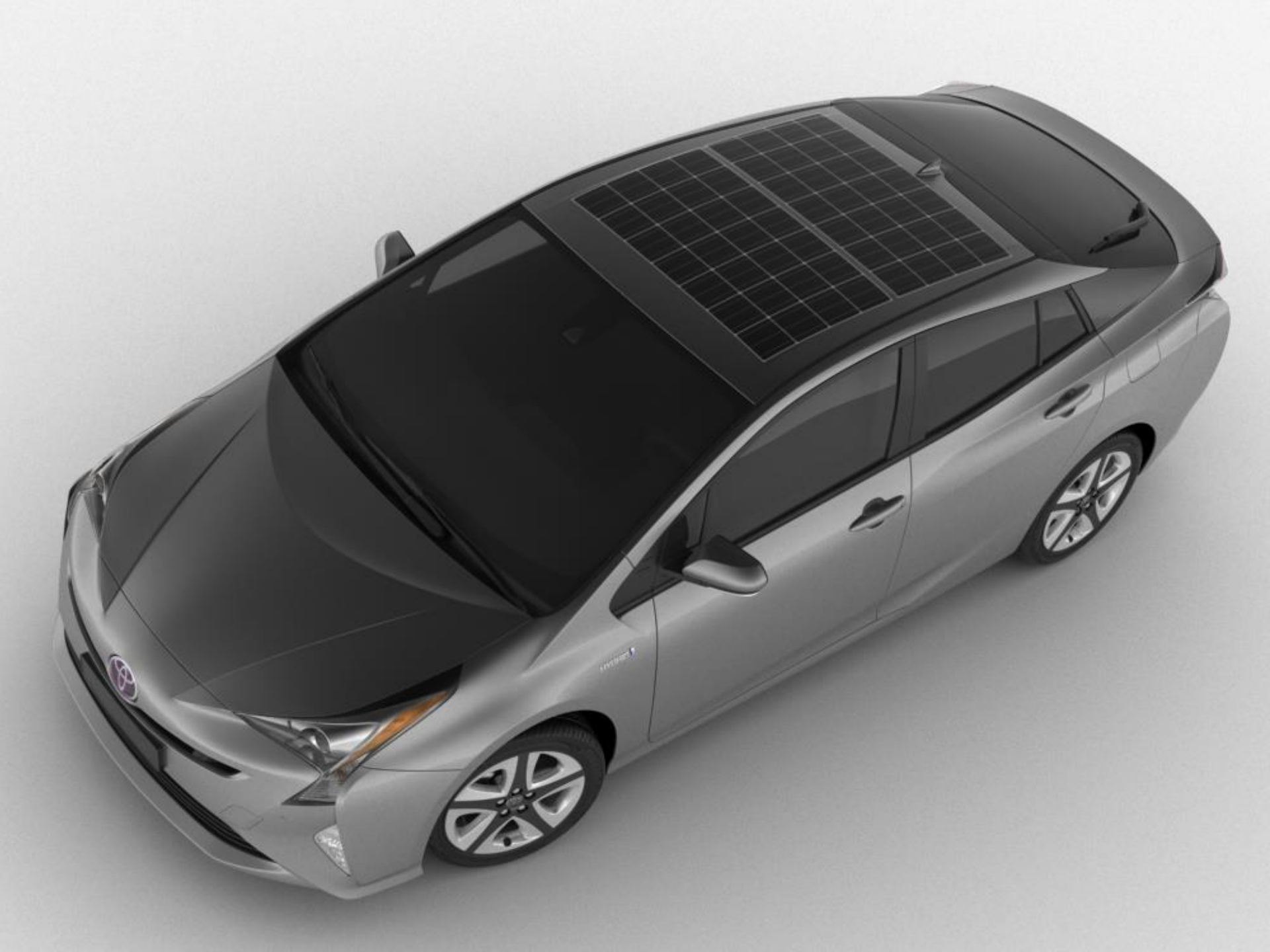
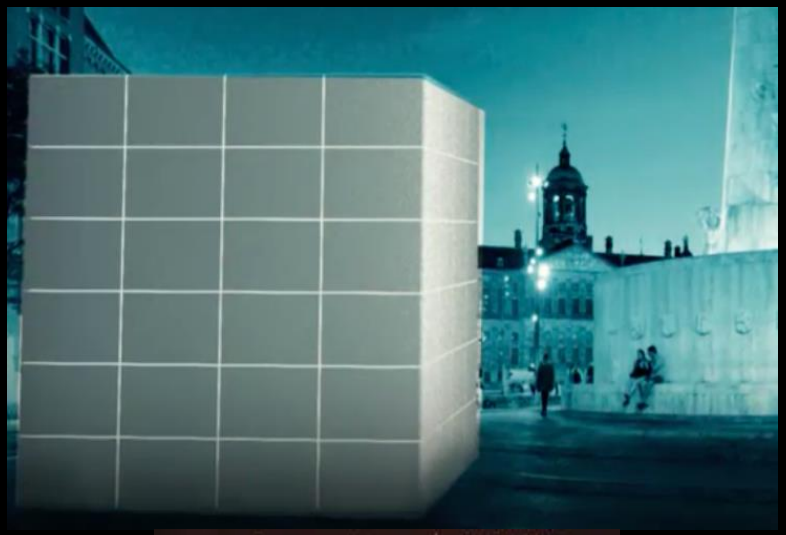
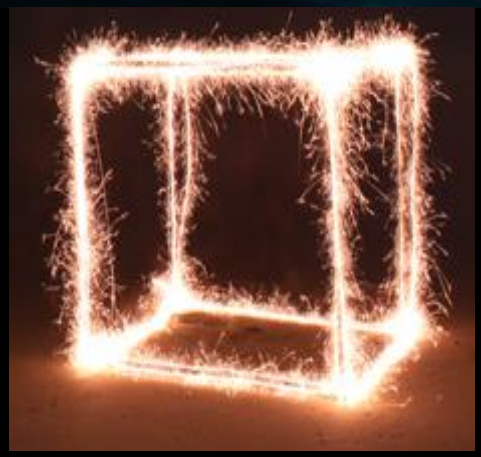


Technology and Art

An emotional experience





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SolarSwissConnect

Network platform

solar swiss connect

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Dès le 21 juin à Neuchâtel dans les jardins de la BCN!

Thank you for your attention!

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