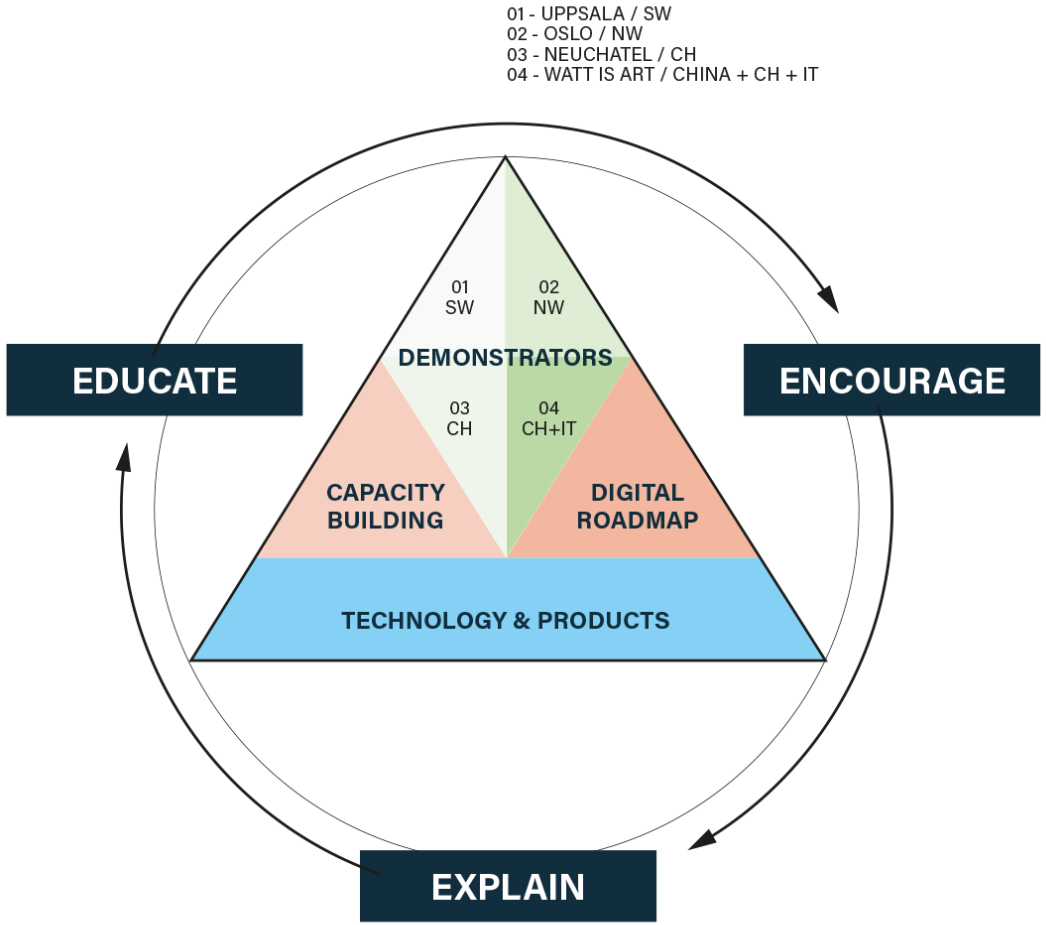
Cost-effective and innovative solar energy integration in stock and new buildings
- how to generate revenue with your building façade and roof

Commercial Solutions for the building sector – how to implement them in a big scale.

Laure-Emmanuelle Perret
Be-Smart project coordinator

20/04/2023

Let’s Be-Smart together



WP4 Demonstrator buildings

WP7 Communication & Dissemination

WP6 Exploitation and capacity building or BIPV implementation in Europe

WP2 Multifunctional EPoGs

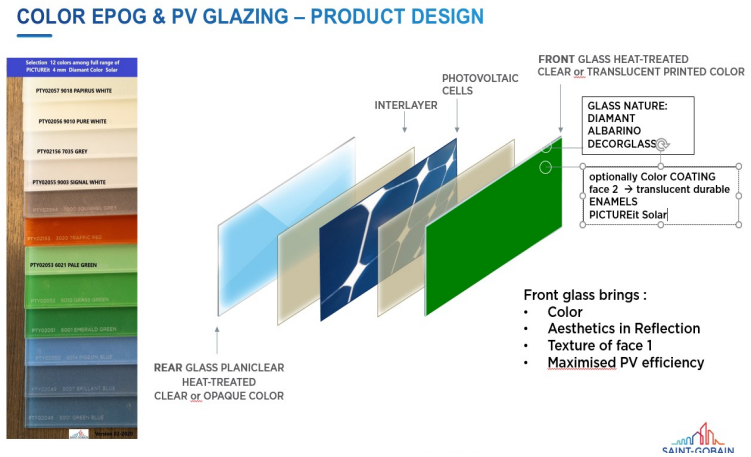
WP3 Multifunctional performance, lifetime, reliability, upscaling and monitoring

WP1 Project management

Technology and Products

Coloured glass for EPoGs by Digital ceramic printing

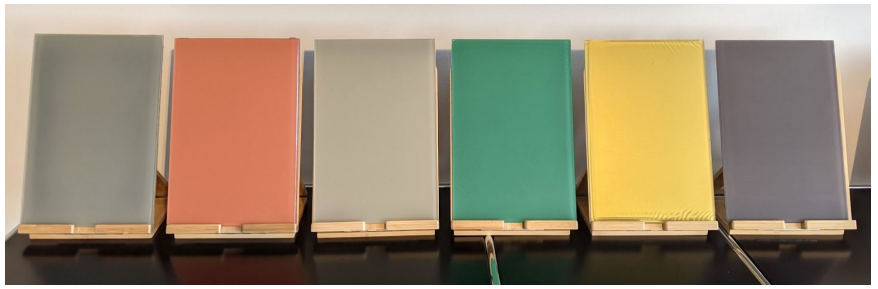
Main contributors: SGDE, WHITE, CEA, CSEM



- PICTUREit Solar series for the use of EPoG, composed of 184 colors including 10 target colours were developed;
- New ink and printing processes were optimized for EPoGs;
- Reliability performances were evaluated in WP3

Coloured encapsulants for EPoGs

Main contributors: CSEM, PADA, SOLAX



Technology and Products

Optimization of clear encapsulant for EPoG

Main contributors: PADA, CSEM

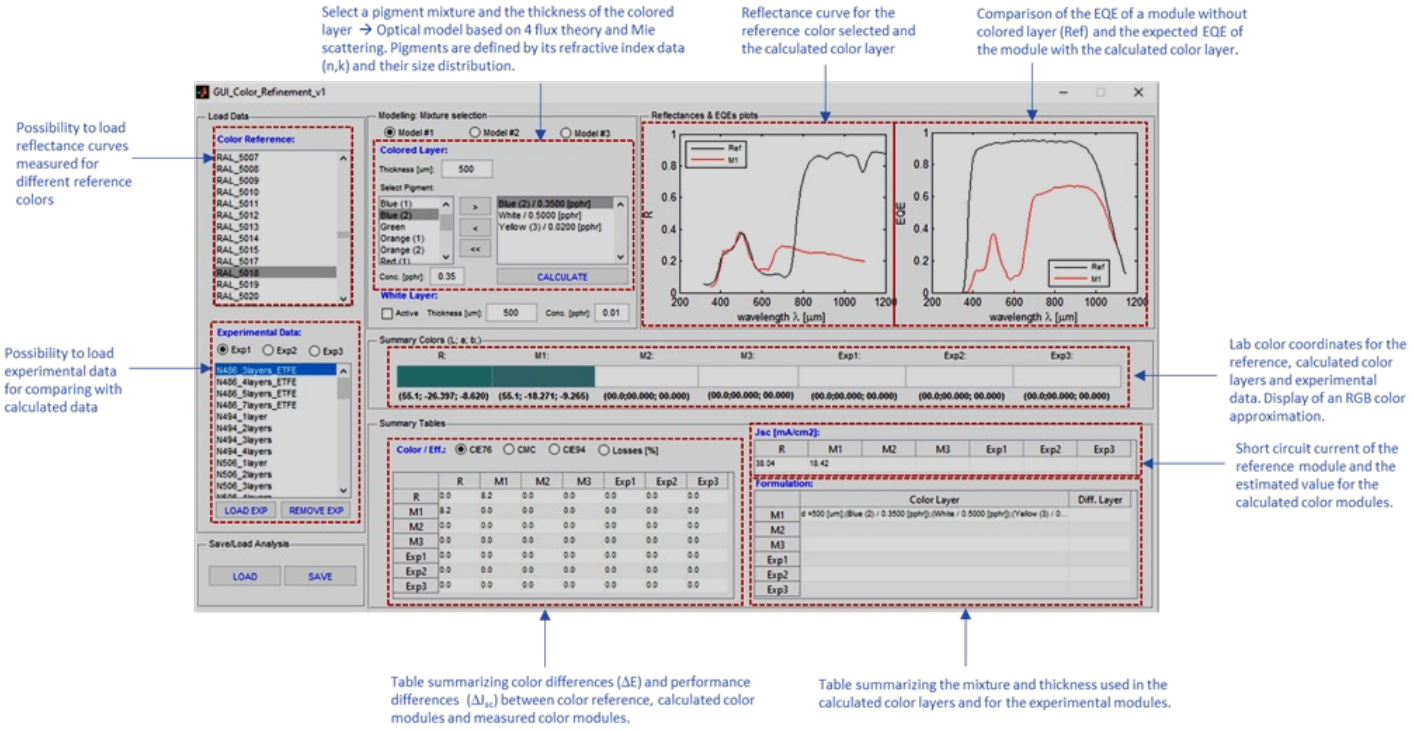
Polidiemme® Solar Film

- no peroxide reaction to be activated
- time and energy saving
- high and stable adhesion on silica substrates
- no acidity evolved along PV module lifetime
- very low content of impurities
- high stability to weathering and low water absorption and transmission
- effective barrier against PID-d
- suitable for temperature sensitive cells

Technology and Products

EPoG color modelling and power prediction

Main contributors: CSEM

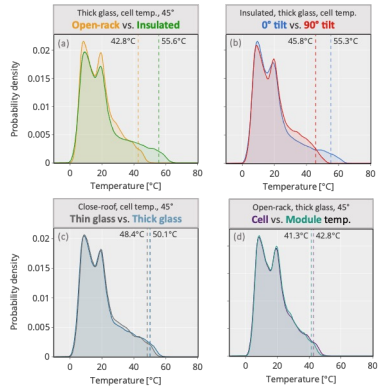


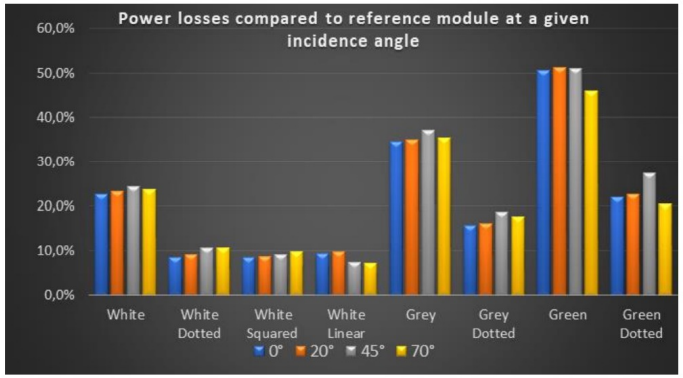
	Model: Type A				Resulting Color			
RAL	Diffuser	R	G	B	L	a	b	Losses [%]
8004	Standard	255	63	75	42.8	22.3	19.2	40.8
3012	Standard	255	105	100	56.6	21.4	19.0	47.4
1013	Standard	255	210	182.5	75.8	0.6	8.8	43.6
1036	Standard	255	170	120	64.6	4.5	22.3	41.1

	Model: Type B			Resulting Color			
RAL	R	G	B	L	a	b	Losses [%]
9017	255	255	255	23.6	0.5	-0.1	0.0
6009	255	243	125	30.3	-5.0	2.3	6.1
7043	255	220	198	40.6	-1.8	-1.5	10.7
5020	30	255	210	36.7	-12.8	-10.5	26.2
3009	255	0	71	35.5	19.2	11.0	41.5
8004	255	63	71	43.9	22.4	19.9	53.4

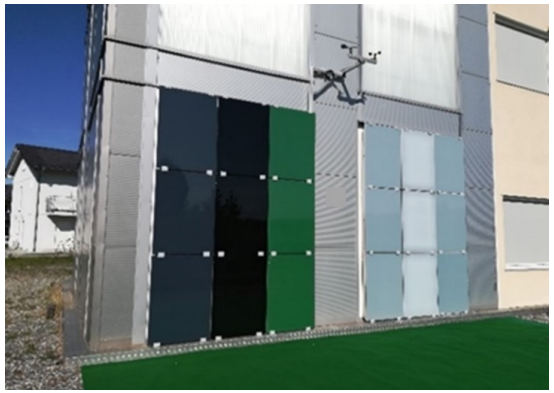
Multifunctional and multi-scale performances

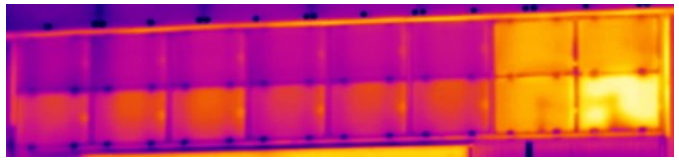
1-cell mini-modules
Main contributors: EPFL, CEA, IFE



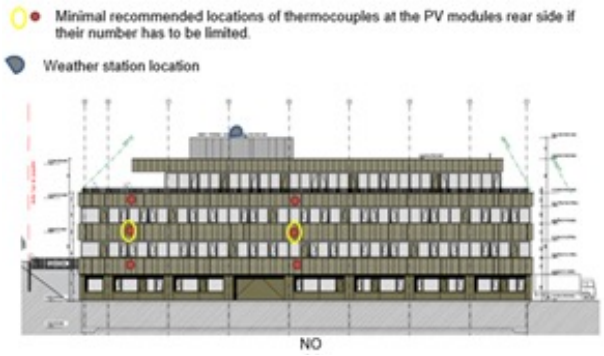


Prototype EPoG modules
Main contributors: IFE, CEA, SGDE





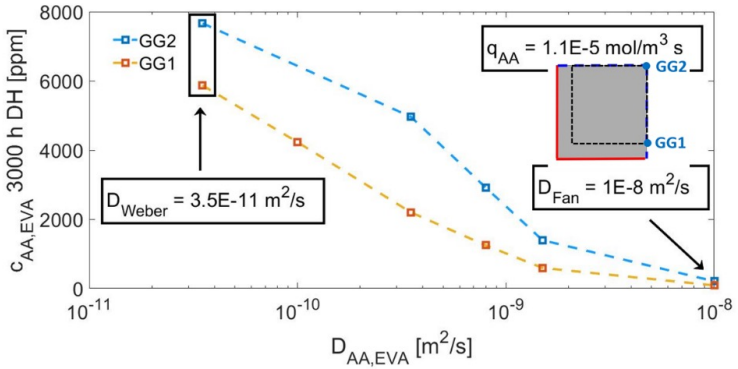
Full EPoG system demonstrator:
Main contributors: CEA, IFE

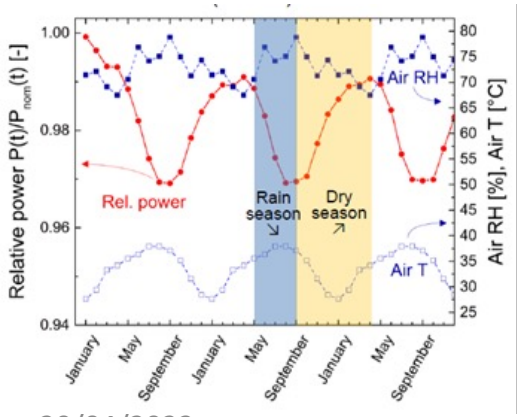


Reliability model

Moisture ingress and PID

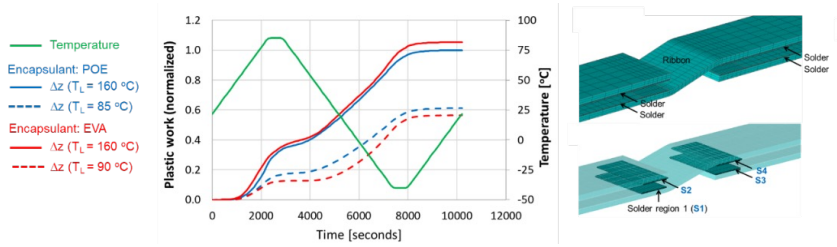
Main contributors: EPFL





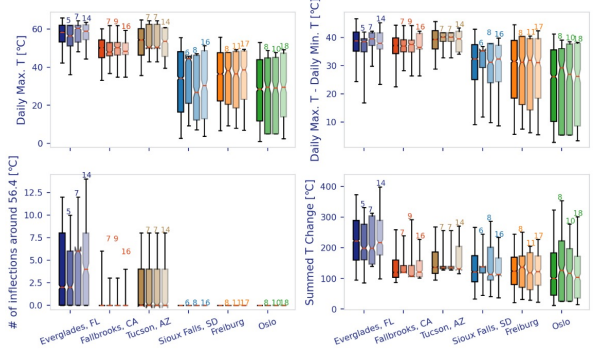
Thermomechanical fatigue and solder joint

Main contributors: IFE



Predictive models using representative days

Main contributors: IFE



Mechanical load

Main contributors: CSEM

Building
Ground category: urban area
N. floor: 7
Wind pressure: 1.47kN/m²

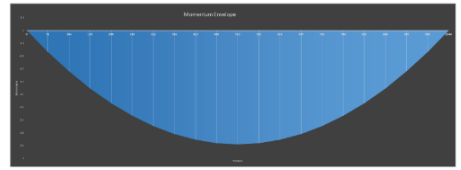
EpoG
Size (a x b): 0.72m x 2.925m
1.040 x 2.925m
Front glass: 4mm
Back glass: 4mm
Encapsulant: POE 2x0.450mm
Module temperature: 90°C

Fixation system
Fixed at both long sides (Schüco AOC 60 TI)

Design value
W_d= 20mm $f_{g;d}$ = 87 N/mm²

Q_{SLS}= 1.5 kN/m² Q_{ULS}= 2.25 kN/m²

G* = 0.3 Mpa Γ= 0.36 $h_{ef;w}$=6.37mm $h_{ef;o}$=6.96mm

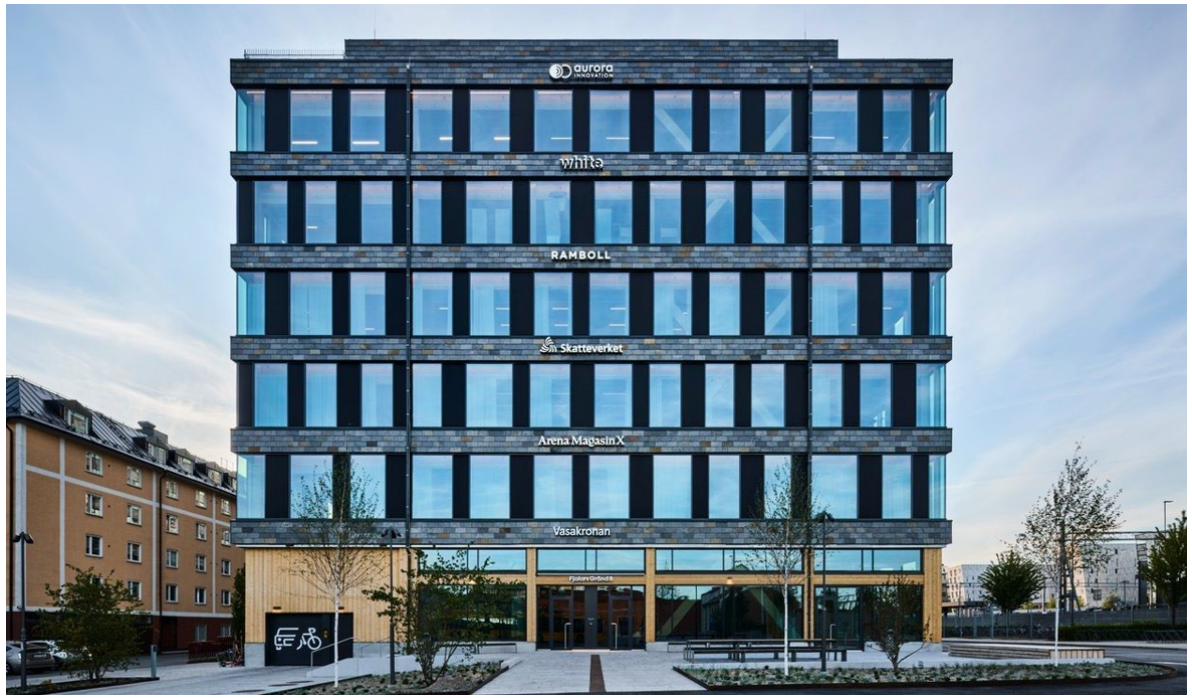


	EPoG1	EPoG2
W_{max}	4.6mm	15.2mm
σ_{max}	21N/mm²	38N/mm²

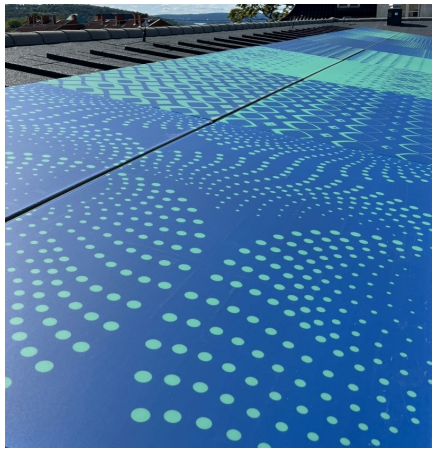
How to implement?

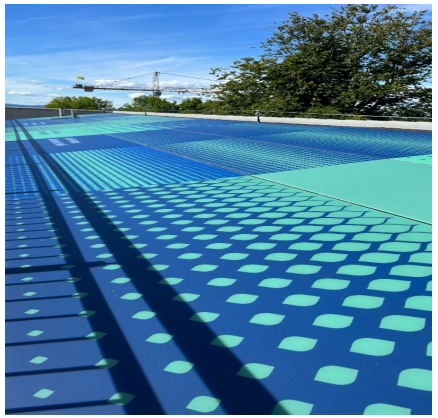
The contribution of Be-Smart.

Magasin X, Uppsala, Sweden



Queen Ingrid's Garden Oslo, Norway





Marin Centre – Migros, Neuchâtel, Switzerland

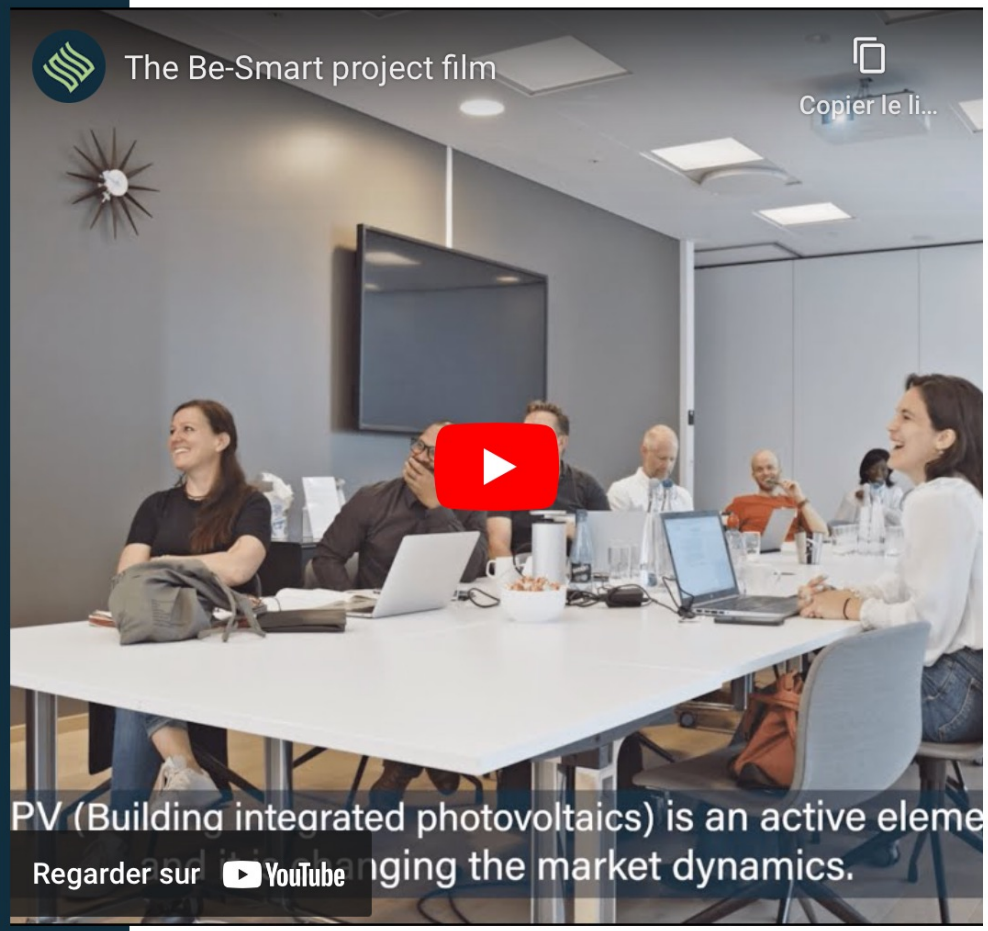
Figli del Sole, Oliveri, Sicily

Film of the project

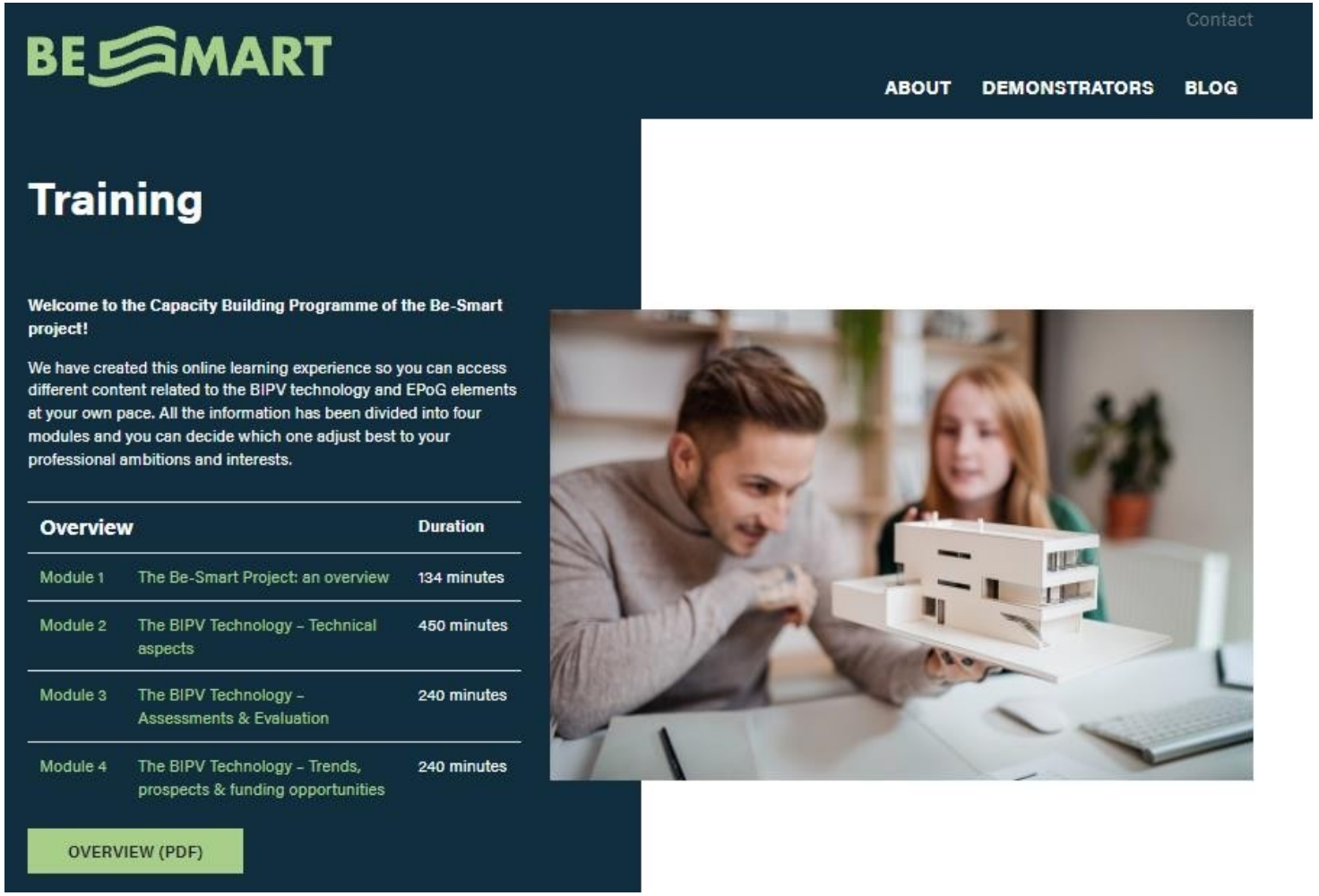
What have been the different demonstrators linked to the Be-Smart project, and the project itself?

We have been following the consortium activities and working on a film condensing the four years of activity of this magnificent human and technological adventure that Be-Smart is.

See more videos related to the project on our YouTube channel



Educational programme online



Our roadmap

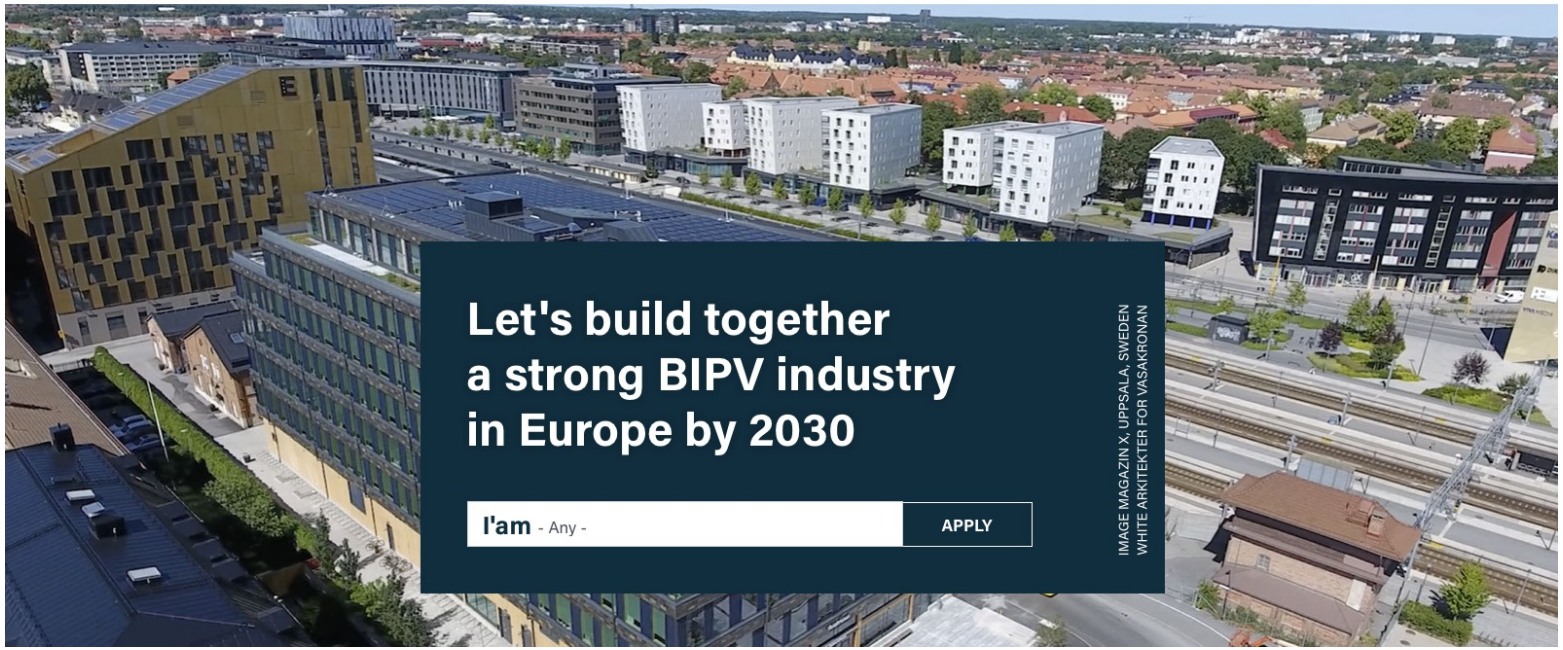
The Be-Smart consortium is a group of engage, committed and passionate experts who have joined forces to develop a roadmap that will contribute to enable the massive implementation and use of BIPV elements in the building industry.

This solution-oriented roadmap aims at inspiring and connecting anyone active in the field to promote their specific actions and field of expertise and engage them to contribute actively to the European green deal goals.

We believe that BIPV elements are key to more sustainable buildings and that by working together, we can make a real difference.

Join us on this journey!

https://www.besmartproject.eu/roadmap



Thank you

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www.lmntconsultancy.ch

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Be-Smart project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 818009