

The need for a solar BIPV generation more predictable, manageable, grid-friendly and profitable in terms of building energy savings.

The solution: A combination of flexible and high efficiency grid interface for BIPV systems and new building energy management strategies will be developed.

In PVSITES, the strategies regarding grid integration will target:

- Improvement on short-term solar BIPV forecast
- Increase of BIPV generation excess value
- Reduction of storage system costs
- Reduction of required storage capacity
- Reduction of cost and increase of efficiency, flexibility and robustness of power conversion systems

The need to demonstrate reliability of advanced BIPV solutions by effective incorporation onto real buildings

The solution: high impact demonstrations in real buildings and experimental facilities throughout Europe.

The progressive acceptance of BIPV installations require advanced showrooms with a high visibility towards involved stakeholders and the general public. In PVSITES, the proposed module, grid interface and energy management technologies will be demonstrated in 6 real buildings covering different EU electricity markets and climates, building uses (residential, industrial, commercial), new buildings and retrofitting, public and private property, different architectural implementations provide the largest potential for replication.

## Partners

Tecnalia Research & Innovation 	CTCV 	FormatD2 
Onyx Solar 	Flisom 	Vilogia 
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Nobatek 	Commissariat à l'énergie atomique et aux énergies alternatives-CEA 	CADCAMation 
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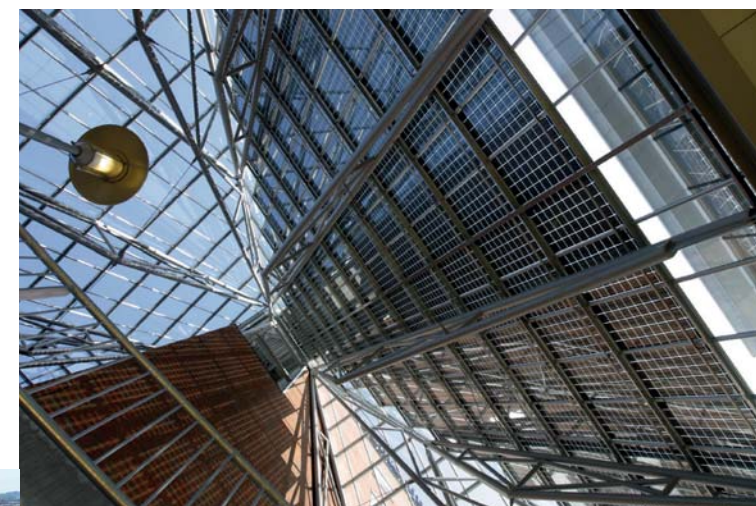
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Towards Sustainable Buildings



Building Integration of Photovoltaic Products



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# Introduction

Building-integrated photovoltaics (BIPV) is currently an expansive market, in which Europe has the leadership in terms of installation followed by USA.

One of the main drivers for BIPV market growth in the European Union is the increasingly demanding legislation related to buildings energy performance.

However a continuous growth of the market requires compliance with strict requirements in terms of design flexibility, aesthetics, durability, cost reduction, grid integration, compliance with standards and operation& maintenance.

Within this framework, the objective of PVSITES project is to drive BIPV technology to a large market deployment by demonstrating an ambitious portfolio of building-integrated solar technologies and systems, giving a forceful, reliable answer to the market requirements identified by the industrial members of the consortium in their day-to-day activity.

High impact demonstration and dissemination actions will be accomplished in terms of cost-effective renewable generation, reduction of energy demands and smart energy management.

## Challenges and Activities

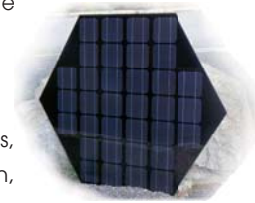
**The challenge of enhanced flexibility of design, outstanding aesthetical value and increased performance.**

**The solution: a wide portfolio of BIPV products based on crystalline silicone and flexible lightweight CIGS thin film photovoltaic technologies complying with market requests.**

The key stakeholders, and in particular architects and final clients are expecting BIPV materials to fulfil the following critical aspects:

- Provide aesthetical products
- Create products which succeed under all stakeholder perspectives in adaptable complex building envelop environments through adding value

- BIPV solutions should integrate into existing building envelop manufacturing processes and supply chains
- To be compatible with a rich variety of shapes and formats including curved configuration
- To comply with local building code and established standards.
- Cost effectiveness
- Competitive payback time
- User-friendliness: planning process, customization, electrical design, ROI calculation & business case, installation



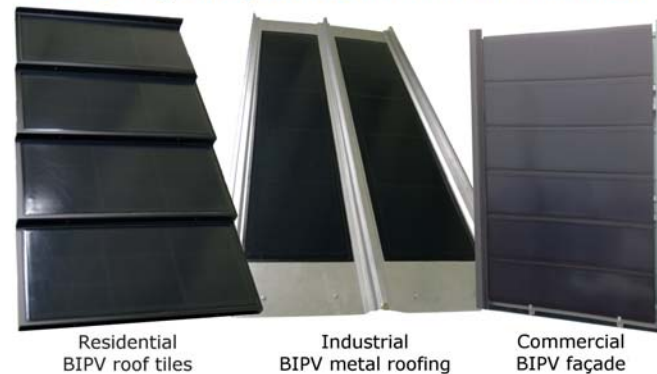
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**Fostering synergies between multifunctional BIPV systems and other functional building elements.**

**The solution: Low concentration and passive solar control BIPV system.**

The architectural integration of BIPV proposed in PVSITES tackles space heating and cooling, by fostering passive synergies with the thermal building envelope. A low concentration photovoltaic solution with associated passive climate control for building integration in façades and skylights will be demonstrated in this project. Semitransparent glass-glass crystalline silicon PV modules in conjunction with integrated optical elements (Fresnel lenses) are proposed towards the interior of the building during the winter.

**Flexible lightweight CIGS thin film solar modules**



Residential BIPV roof tiles

Industrial BIPV metal roofing

Commercial BIPV façade

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**The need for a software tool for the joint simulation of BIPV products and building energy performance.**

**The solution: An accurate, user-friendly, integrated software tool for performance prediction of BIPV (and also building adapted) products and their impact on building energy performance will be developed.**

- Simulation tools currently available do not focus on BIPV, and do not take into account the building related aspects of the PV installation design process.
- Libraries of standardised BIPV products: designers may not be PV experts and need access to a wide range of pre-designed BIPV products with well-established properties. On the other hand, this is a powerful marketing strategy for BIPV manufacturers.
- Compliance of BIPV products with legal requirements: a major concern for designers is the compliance of the project with legal requirements when innovative products are introduced.
- Establishing bridges between architects – engineers – PV manufacturers: BIPV projects often lack proper collaboration between the different parties involved.



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