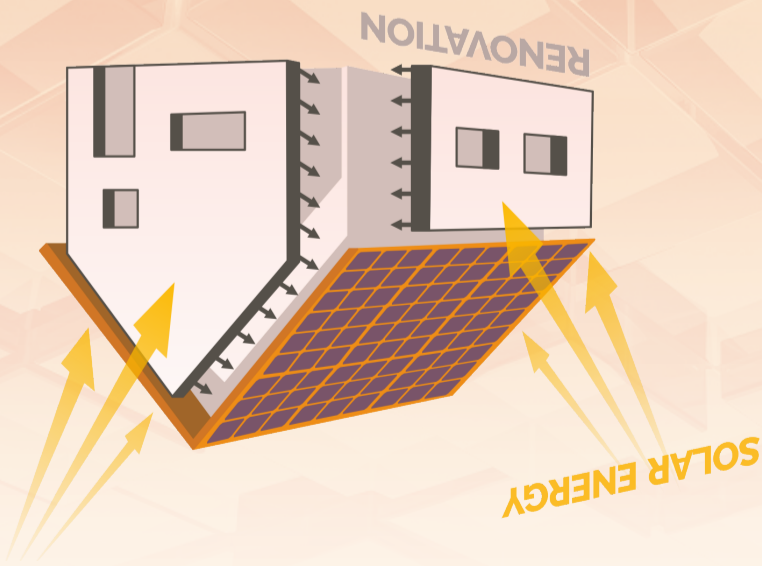


ENVISION at a Glance

ENVISION aims at developing and demonstrating an integrated renovation concept using all the available building surfaces (vertical/horizontal, transparent/opaque) for thermal and electrical energy harvesting. This will allow to exploit the currently unused 60 billion square meters of façades existing in the European Union.

The 'ENVISION' renovation concept will use standard PV solutions for roof and new thermal and electrical energy harvesting solutions for the building façade. The ENVISION façade solutions focus on absorbing the invisible part of the solar radiation, the near-infrared (NIR), roughly 50% of the solar spectrum, allowing visible and aesthetic aspects to be retained.

By demonstrating the possibility to use all buildings surfaces to efficiently harvest energy the HORIZON 2020 'ENVISION' project will create energy positive buildings, thereby contributing to the EU 2030 renewable energy ambition and the greenhouse emission reduction.



Energy harvesting by invisible Solar Integration in building skins

www.energy-envision.eu

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TECHNOLOGIES

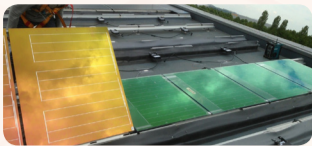
Opaque Surfaces



Solar heat collectors based on the usage of NIR absorbing coloured coatings

The covered and uncovered colored heat harvesting facade elements are designed in such a way that a maximum energy with retaining aesthetics are achieved.

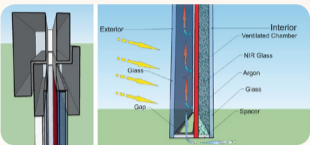
Opaque Surfaces



Covered solar heat collectors using colored NIR transparent glasses

Colored glass is provided with high transmission features to obtain nice aesthetic properties combined with high energy storage

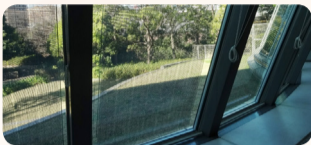
Transparent Surfaces



Smart ventilated heat harvesting window

The ventilated glass solution will harvest heat from the infrared part of the solar radiation. In the summer mode the heat is harvested via an heat-exchanger, to be used to be used whenever needed. In winter mode the air is heated and directly used in the inside.

Transparent Surfaces



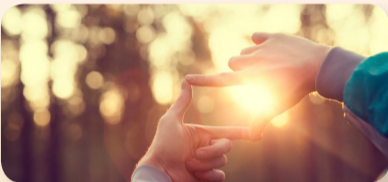
PV harvesting glasses

PV glass with transparent appearance and improved efficiency that harvest electricity from the PV part of the glass

APPROACH

The 'ENVISION' concept consists of a fourfold approach:

- 1. Development and demonstration of efficient solar-radiation absorbing façade elements.** ENVISION will develop aesthetically pleasant technologies for energy harvesting in facades by harvesting the invisible part (NIR) of the solar spectrum (roughly 50% of the total solar radiation). In addition, novel integrated PV solutions for glasses with shading effects will be implemented.
- 2. Development of a flexible harvesting façade concept using modular elements.** The 'ENVISION' façade elements will have a "click-on" mounting system. The transparent harvesting elements will be designed to ensure fast and easy installation.
- 3. Integration and interaction of the energy harvesting technologies with district networks and heat systems.** To efficiently use the ENVISION energy harvesting building skin, an adaptive, model-based energy control system is needed to enable the interaction among the different energy systems at both building and district network level.
- 4. Full demonstration at intermediate steps.** Demonstration and validation of the ENVISION technologies will take place at different stages through the project in order to ensure effective development.



DEMONSTRATION

TRL 1

TRL 2

TRL 3

TRL 4

TRL 5

TRL 6

TRL 7

TRL 8

TRL 9

TRL 5 technologies will be tested in laboratory environment



TRL 6 real case-study of subsystem prototypes (façade element) at the SOLAR-Beat of TNO/SEAC.



At TRL 7, the full façade concept demonstrated in relevant environment at the BESTlabs of EDF.

Finally, in two major renovation sites the technologies will be tested in real environment (TRL8) to study the link to the district network and the grid connection (Savona Campus), and in a real case study of a renovation action (appartments Vosmaerstraat, Delft).

