

# Building-integrated photovoltaics (BIPV): more than a necessity for our building culture



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The Energy Strategy 2050 represent a major challenge for building culture (Baukultur). Energy renovation of the building stock, solar energy and especially photovoltaics are of central importance. Solar systems are still afflicted with many negative prejudices to be integrated into historical and existing buildings and disfigure our landscapes. Today's innovative building-integrated photovoltaic (BIPV) solutions open up completely new architectural and aesthetic design, which should significant increase their acceptance. Well-conceived solar installations are more than a technical necessity paying a role to rediscover and valorize traditional alpine architecture, expression of a building culture that focuses on people and their needs and form an important basis for sustainability. Three main research experiences show ways to preserve and develop historic buildings in a culturally sensitive way, applying energy efficiency principles and optimizing existing best practices. To this end, tools and strategies can be applied also to historical buildings contributing the energy efficiency, sufficiency, decarbonisation, and climate change adaptation challenges.

## RENOVATION PROCESS

### HERITAGE SIGNIFICANCE

ATLAS project aims at (re-) discovering and valorizing traditional alpine architecture (beyond the level of protection). HiBERAtlas database, presents best-practice examples of how historic buildings can be renovated to achieve high levels of energy efficiency while respecting and protecting its heritage significance.

[www.alpine-space.org/projects/atlas/en/home](http://www.alpine-space.org/projects/atlas/en/home)

#### Highlights Swiss best-practice examples:

ENERGY	LISTED	AGE	BiPV-Solar	COST
Energy performance 26 to 66 kWh/m <sup>2</sup> y Energy performance NZEB – Minergie	Listed? Maximum / Medium / Not listed Conservation area? Yes / No	Age 1400-1850-1950 Renovation period 2014 - 2018	Power supply 24kWp – 136 kWp Self-sufficient rate 17% – 345%	Investment energy renovation 775 – 4'740 CHF/m <sup>2</sup> PV/BiPV Plant cost 785 – 1'960 CHF/m <sup>2</sup>



HiBERAtlas -  
Historic Building  
Energy Retrofit  
Atlas

## RETROFIT SOLUTIONS

### ENVELOPE, WINDOWS, HVAC, SOLAR

Ideas and inspiration on how solar and BiPV work in synergy with other renovation measures to make our buildings more energy efficient. HiBERTool documents solutions for windows, walls, ventilation, heating and solar. A decision tree filters to the documentation and technical information that are interesting for your project.

[www.hiberatlas.com](http://www.hiberatlas.com) / [www.hibertool.com](http://www.hibertool.com)

#### After



#### Before



Best-practice case example:  
Glaserhaus - Affoltern im Emmental (BE-CH)

**Envelope:** Roof and façade returned to their original shape to ensure the load-bearing capacity with new insulation between the wooden rafters to achieve the Minergie-P standard  
**Windows:** Replica windows with the same characteristics and dimensions as the previous ones were made, but which could accommodate a triple glazing.  
**HVAC:** RES implementation - geothermal boreholes and DHW system is integrated in the heating system  
**Solar:** integrated BiPV

## RENEWABLE ENERGY

### BiPV MEETS HISTORY

Photovoltaic technology has made gigantic steps, and today it offers aesthetically pleasing and harmonically integrated solutions in the landscape. The "BiPV meets history" project allows new business opportunities to all players in the supply chain: planners, designers, architects, builders through networking and training.

[www.bipvmeetshistory.eu](http://www.bipvmeetshistory.eu)

#### ENERGY EFFICIENCY

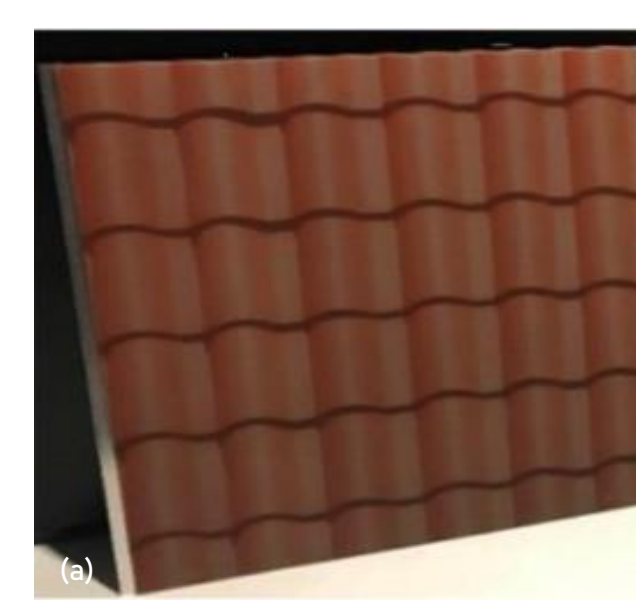
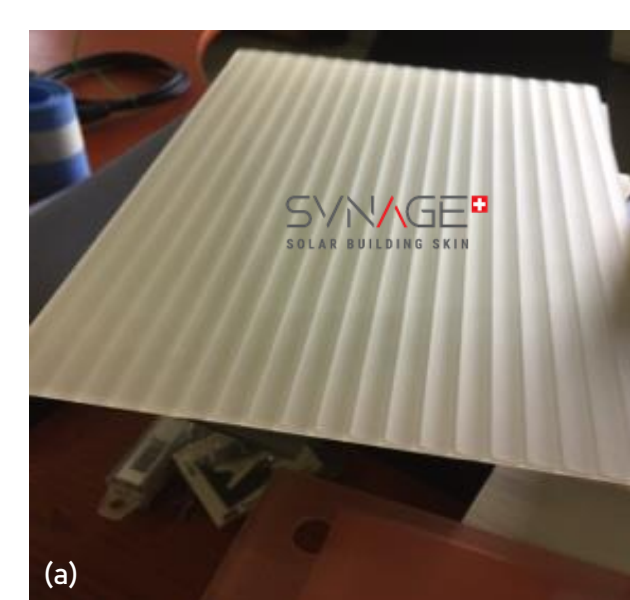
Up to 100% energy savings

#### CUSTOMIZATION

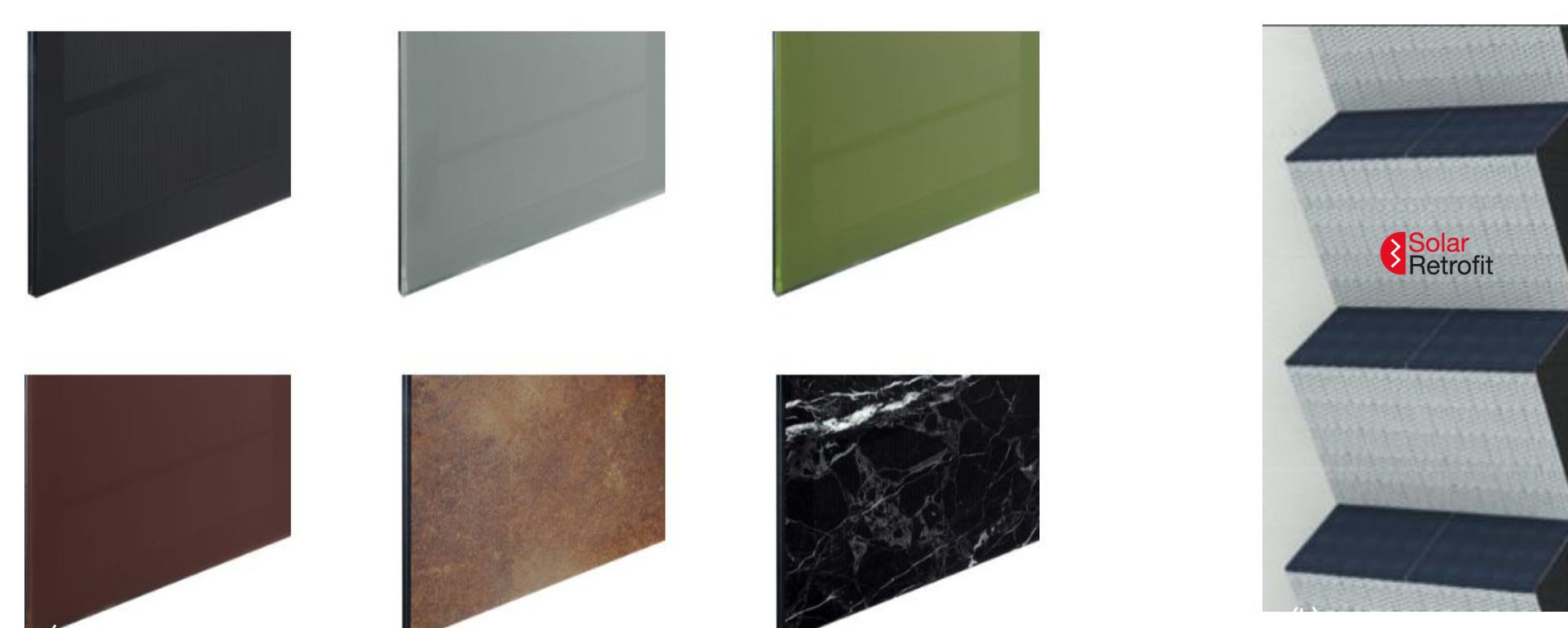
100% customisable building skin

#### COST BENEFIT

Payback time of approximately 10 years



Innovative solar BiPV products developed by Swiss PV manufacturers: (a) [2021. Sunage SA]; (b) [2021. Solar Retrofit Sga]



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HISTORIC BUILDING  
ENERGY RETROFIT ATLAS



A best-practice database of  
exemplary energy efficient  
interventions in historic buildings



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