



SOLARCHITECTURE
sun as a building material



Sol'CH



Address

Via dal Solch, 7742 Poschiavo, Switzerland



Location

46°19'48" N | 10°03'23" E



Altitude

1.035 MAMSL

with the support of

SWISSOLAR 



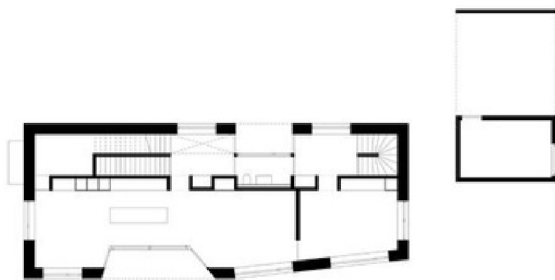
SUPSI

ETH zürich



Winter Plus Energy Building

The project is geared towards the optimal use of solar energy, while at the same time achieving high quality architecture featuring elements that blend optimally with their surroundings. The entire building envelope consists of integrated photovoltaic modules. Flexibility and adaptability are evident both in the load-bearing structure and in the way it is used: the building can be used either as a single-family house or as two separate residential units. The Winter Plus Energy project meets the requirements of the Minergie-P and Minergie-A building standards.



Architectural drawing, ground floor. Source: Nadia Vontobel Architekten GmbH.



Sol'CH blends into the village of Poschiavo and the surrounding landscape.

Energy

		
Active solar surface	187m ²	284m ²
Active solar surface ratio	>100%	>99%
Peak power	34 kWp	30 kWp
Building skin application	Solar tiles	Cold facade
		
Storage	3000 lt hydraulic tank	abt. 50 kWh
	Bi-directional car battery	abt. 25 kWh

Energy production

47770

kWh

Source: monitoring of installation production June 2021 - March 2022

Self-consumption

25%



Self-sufficiency

100%





Building characteristics

Building typology

Residential

Construction type

New

Year of construction

2021

Energy reference surface

375 m²

Minergie energy Index

-86.9 kWh/m²yr

Energy labelling

Minergie-P and Minergie-A



Shape and colour of the PEB change depending on the viewpoint and incidence of light.

BIPV module

Product

SUNAGE BIPV modules

Manufacturer

SUNAGE SA

Cell technology

Mono-crystalline

Cell colour

Black

Front glass type/customization

Facade modules: front float satin glass, 4 mm, uniform Suncol colour / back float glass, 4 mm, clear

Roof modules: solar front glass, 3.2 mm, transparent / back solar glass, 3.2 mm, black

Dimensions

Different module sizes: the most repeated size is 1.00×1.50m (facade), and 1.00×1.05m (roof)

Power

Depends on the size of the PV module, each type of module has a different number of cells and a different power output.

Specific power

Facade modules: 115 Wp/m²
Roof modules: 180 Wp/m²

Specific weight

Facade modules: 23 kg/m²
Roof modules: 18 kg/m²



Building skin

Roof

Application

Solar tiles integrated in a pitched roof

Description

Wooden gable roof insulated with 26 cm of mineral wool

U value

0.15 W/m²K

Fastening system

The support hooks are screwed onto the roof battens. Modules with a laterally integrated water profile are laid similarly to conventional roof tiles.

Other

-

Facade

Application

PV cladding integrated in a cold facade

Description

Concrete walls insulated with 26 cm of mineral wool

U value

0.18 W/m²K

Fastening system

Continuous fixing system (aluminum tracks)

Other

-

Glass surface

Application

Windows and skylights

Description

Triple glazing with wood-metal frame

U value

0.60 W/m²K

g value

0.62

Other

-



The photovoltaic modules are laid on top of the wooden roof battens.



The complete building envelope consists of integrated photovoltaic modules.



Costs

Total cost of the building

n/a

Price per m³

n/a

Parties involved

Owner

Ursula & Felix

Design Architects

Nadia Vontobel
Architekten GmbH

Electrical layout & installation

Vassella Energie Sagl

Mechanical installation

Caotec SA

Photo

Nadia Vontobel
Architekten GmbH

Awards & recognitions

Awards

- Winner of the Austrian “Innovation Award for Integrated Photovoltaics 2022”.
- Final selection Constructive Alps 2022.
- Recognition of the Sol’CH project as a pilot and demonstration installation: maximising the generation of winter electricity and use of all facades and roof surfaces through BIPV (building integrated photovoltaic), Department of Infrastructure, Energy and Mobility of Grisons 2020
- Winner of Norman Foster Solar Award and HTZ-Innovationspreis 2022
- Architecture Award Building-Integrated Solar Technology 2022

Publications

Fotovoltaico: Sol’CH un progetto pilota in Valposchiavo – Il Bernina of 23.12.202



Southern view of the building